# IBM Parallel System Support Programs for AIX System Planning

Document Number GC23-3902-02

November 5, 1996

**Note!**

Before using this information and the product it supports, be sure to read the general information under “Notices” on page vii.

**Second Edition (November 1996)**

This is a major revision of GC23-3902-02.

This edition applies to Version 2 Release 2 of IBM Parallel System Support Programs for AIX (5765-529), which runs on IBM RS/6000 Scalable POWERparallel Systems, and to all subsequent releases and modifications until otherwise indicated in new editions. Significant changes or additions to the text and illustrations are indicated by a vertical line (|) to the left of the change.

Order publications through your IBM representative or the IBM branch office serving your locality. Publications are not stocked at the address below.

IBM welcomes your comments. A form for readers' comments may be provided at the back of this publication, or you may address your comments to the following address:

International Business Machines Corporation
Department 55JA Mail Station P384
522 South Road
Poughkeepsie, NY 12601-5400
United States of America

FAX: (United States and Canada) 1+914+432-9405
FAX: (Other Countries) Your international Access Code +1+914+432+9405

IBMLink (United States customers only): KGNVMC(MHVRCFS)
IBM Mail Exchange: USIB6TC9 at IBMMAIL
Internet e-mail: mhvrcfs@vnet.ibm.com
World Wide Web: http://www.rs6000.ibm.com

If you would like a reply, be sure to include your name, address, telephone number, or FAX number.

Make sure to include the following in your comment or note:

- Title and order number of this book
- Page number or topic related to your comment

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

Copyright International Business Machines Corporation 1996. All rights reserved. Note to U.S. Government Users — Documentation related to restricted rights — Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp..

# Contents


**Notices** . . . vii
Trademarks . . . vii
Publicly Available Software . . . viii

**About This Book** . . . ix
Who Should Use This Book . . . ix
How This Book is Organized . . . ix
Typographic Conventions . . . xi
Obtaining Documentation . . . xi
Related Publications . . . xii
- SP Hardware Publications . . . xii
- SP Software Publications . . . xii
- IBM Virtual Shared Disk Publications . . . xii
- Performance Monitor Publication . . . xii
- LoadLeveler Publications . . . xiii
- Parallel Environment for AIX Publications . . . xiii
- PVMe for AIX Publications . . . xiii
- Client Input Output/Sockets (CLIO/S) Publications . . . xiii
- Parallel I/O File System Publications . . . xiii
- Network Tape Access and Control System for AIX (NetTAPE) Publications xiii

Other IBM Publications . . . xiv
- International Technical Support Organization Publications (Red Books) . . . xiv
- AIX and RISC System/6000 Publications . . . xiv
- Service . . . xv
- Network Queueing System/MVS (NQS/MVS) . . . xv
- Network Connectivity . . . xv
- Adapters . . . xv

Non-IBM Publications . . . xvi
- Parallel Computing . . . xvi
- Tcl . . . xvi

Manual Pages for Public Code . . . xvii

**Planning Your System** . . . 1

**Chapter 1. Introduction to System Planning** . . . 3
Planning Services . . . 3
Getting Acquainted with Your SP . . . 4
Paths Through SP Planning . . . 7
Using SP Books for Planning . . . 8

**Chapter 2. Defining the System that Fits Your Needs** . . . 9
Question 1. Do You Want a Preloaded SP or the Default Version? . . . 10
Question 2. Why Do You Need an SP? . . . 14
Question 3. What Related IBM Program Products Do You Need? . . . 17
Question 4. What Levels of AIX Do You Need? . . . 21
Question 5. What Type of Network Connectivity Do You Need? . . . 25
Question 6. What are Your Disk Storage Requirements? . . . 27
Question 7. What are Your Reliability and Availability Requirements? . . . 30
Question 8. How Many Nodes Do You Need? . . . 32


© Copyright IBM Corp. 1996

System-Wide Worksheets . . . 35
Completing the SP Node Layout Worksheets . . . 36
Networking Information . . . 39
Question 9: Defining Your System Images . . . 45
Question 10. What Do You Need for Your Control Workstation? . . . 48

**Chapter 3. Defining the Configuration that Fits Your Needs** . . . 59
Software Planning's Impact on Site and Hardware Planning . . . 59
Planning Your Site Environment . . . 59
Planning Your Network . . . 69
System Topology Considerations . . . 69
Determining Space Requirements . . . 76
Planning Your Network . . . 79
Understanding Node Numbering and Switch Node Numbering . . . 82

**Chapter 4. Planning for a High Availability Control Workstation** . . . 89
Overall System View of a High Availability Control Workstation . . . 89
Benefits of a High Availability Control Workstation . . . 90
Difference Between Fault Tolerance and High Availability . . . 91
IBM's Approach to High Availability for Control Workstations . . . 91
Related Reliability Options for Control Workstations . . . 94
Software Requirements for HACWS Control Workstation Configurations . . . 95
Sample Scenario: Setting Up a High Availability Control Workstation . . . 97

**Chapter 5. Planning SP System Partitions** . . . 101
What is System Partitioning . . . 101
How Do You Partition the System? . . . 101
Example 1 -The basic 16-node system . . . 103
Using a Switch in a Partition . . . 104
Example 2 - A Switchless System . . . 107
The System Partitioning Aid . . . 107
Accessing Data Across System Partitions . . . 108
The Relationship of SP Resources to System Partitions . . . 108
Example 3 - An SP with 3 frames, 2 switches, and various node sizes . . . 114
System Partitioning Configuration Directory Structure . . . 116

**Chapter 6. Planning for Security** . . . 119
Authentication in the SP System . . . 119
Authentication Worksheets . . . 129

**Chapter 7. Planning to Record and Diagnose System Problems** . . . 131
Configuring the AIX Error Log . . . 131
Configuring the BSD Syslog . . . 131
System Error Logging Tools and Logs . . . 132
Finding and Using Error Messages . . . 133
Getting Help from IBM . . . 134
IBM Tools for Problem Resolution . . . 135

**Chapter 8. Planning for PSSP-Related LPPs** . . . 137
Planning for IBM Virtual Shared Disk and IBM Recoverable Virtual Shared Disk . . . 137
Planning for IBM Virtual Shared Disk Communications . . . 137
Planning for Parallel ESSL . . . 140
Planning for Parallel Environment . . . 141

Planning for Performance Monitor (PTPE) . . . 141
Planning for LoadLeveler . . . 142
Planning for PVMe . . . 144
Planning for Parallel I/O File System . . . 144
Planning for NetTape . . . 144
Planning for IBM Client Input Output/Sockets (CLIO/S) . . . 145

**Customizing Your System** . . . 147

**Chapter 9. Planning for Expanding or Modifying Your System** . . . 149
Questions to Answer Before Expanding/Modifying/Ordering Your System . . . 149
Scenario 1: Expanding the Sample System by Adding a Node . . . 153
Scenario 2: Expanding the Sample System by Adding a Frame . . . 153
Scenario 3: Expanding the Sample System by Adding a Switch . . . 157

**Chapter 10. Planning for Migration** . . . 159
Migrating to PSSP 2.2 . . . 159
Migrating the Control Workstation . . . 160
Migrating SP Nodes . . . 162
Coexistence with PSSP 2.2 and Earlier Releases . . . 164

**Appendices** . . . 165

**Appendix A. The System Partitioning Aid – A Brief Tutorial** . . . 167
The GUI – "spsyspar" . . . 168
The CLI – "sysparaid" . . . 177
Example 3 of Chapter 5 . . . 180

**Appendix B. System Partitioning** . . . 191
8 Switch Port System . . . 191
16 Switch Port System . . . 191
32 Switch Port System . . . 194
48 Switch Port System . . . 198
64 Switch Port System . . . 199
80 Switch Port System With 0 Intermediate Switch Boards . . . 200
80 Switch Port System With Intermediate Switch Boards . . . 203
96 Switch Port System . . . 205
112 Switch Port System . . . 207
128 Switch Port System . . . 210

**Appendix C. SP System Planning Worksheets** . . . 215

**Glossary of Terms and Abbreviations** . . . 313

**Index** . . . 321

# Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, are the user's responsibility.

IBM may have patents or pending patent applications covering subject matter 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
500 Columbus Avenue
Thornwood, NY 10594
USA

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independent created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Mail Station P300
522 South Road
Poughkeepsie, NY 12601-5400
USA
Attention: Information Request

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

## Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

**AIX**
**ESCON**
**IBM**
**LoadLeveler**
**Micro Channel**
**RS/6000**
**RS/6000 Scalable POWERparallel Systems**

Microsoft, Windows, and the Windows 95 logo are trademarks or registered trademarks of Microsoft Corporation.

© Copyright IBM Corp. 1996

UNIX is a registered trademark in the United States and other countries licensed exclusively through X/Open Company Limited.

Other company, product, and service names, which may be denoted by a double asterisk (**), may be trademarks or service marks of others.

## Publicly Available Software

This product includes software that is publicly available:

**Amd** Berkeley Software Distribution automount daemon

**expect** Programmed dialogue with interactive programs

**Kerberos** Provides authentication of the execution of remote commands

**NTP** Network Time Protocol

**Perl** Practical Extraction and Report Language

**SUP** Software Update Protocol

**Tcl** Tool Command Language

**TclX** Tool Command Language Extended

**Tk** Tcl-based Tool Kit for X-windows

This book discusses the use of these products only as they apply specifically to the SP system. The distribution for these products includes the source code and associated documentation. (Kerberos does not ship source code.) **/usr/lpp/ssp/public** contains the compressed **tar** files of the publicly available software. (IBM has made minor modifications to the versions of Tcl and Tk used in the SP system to improve their security characteristics. Therefore, the IBM-supplied versions do not match exactly the versions you may build from the compressed **tar** files.) All copyright notices in the documentation must be respected. You can find version and distribution information for each of these products that are part of your selected install options in the **/usr/lpp/ssp/README/ssp.public.README** file.

# About This Book

This book helps you plan an IBM RISC System/6000 Scalable POWERparallel Systems installation that meets your programming requirements. Read this book and fill in the worksheets in Appendix C, "SP System Planning Worksheets" on page 215 as you plan your software.

This book applies to PSSP Version 2 Release 2. To find out what version of PSSP is running on your system, enter the following:

```
SDRGetObjects Syspar syspar_name code_version
```

In response, the system displays something similar to:

```
syspar_name  code_version
Part_1       PSSP-2.2
```

If the response indicates **PSSP-2.2**, this book applies to the version of PSSP that is running on your system.

If you are running mixed levels of PSSP in a system partition, be sure to maintain and refer to the appropriate documentation for whatever versions of PSSP you are running. this book applies to the version of PSSP that is running on your system.

## Who Should Use This Book

This book is intended for those responsible for planning the network and system installation of an IBM RISC System/6000 Scalable POWERparallel Systems machine.

This book assumes that you have a working knowledge of AIX* or Unix* and experience with network systems. In addition, you should already know what the basic SP and AIX features are, and have a basic understanding of computer systems, networks, and applications.

## How This Book is Organized

This book is organized into several sections:

**Planning Your System**
This section discusses a variety of topics including defining your system and configuration, planning for control workstations and system partitions, as well as security and problem diagnosis.

**Customizing Your System**
This section discusses the planning considerations necessary when modifying your system by expanding it or migrating it to a different level of AIX and PSSP.

**Appendices**
This section contains appendices. The first appendix contains a tutorial for using the System Partitioning Aid. The second appendix is a description of the system partitioning layouts and

© Copyright IBM Corp. 1996

| the third appendix contains system planning worksheets that
| you should copy, and complete according to directions
| throughout the book, and save for reference.

## Typographic Conventions

This book uses the following typographic conventions:

| Typographic | Usage |
|---|---|
| **Bold** | • **Bold** words or characters represent system elements that you must use literally, such as commands, flags, and path names.<br>• **Bold** words also indicate the first use of a term included in the glossary. |
| *Italic* | • *Italic* words or characters represent variable values that you must supply.<br>• *Italics* are also used for book titles and for general emphasis in text. |
| `Constant width` | Examples and information that the system displays appear in `constant width` typeface.<br>All references to the hypothetical customer, `Corporation ABC`, and any choices made by `Corporation ABC` are in this font. |
| [ ] | Brackets enclose optional items in format and syntax descriptions. |
| { } | Braces enclose a list from which you must choose an item in format and syntax descriptions. |
| \| | A vertical bar separates items in a list of choices. (In other words, it means “or.”) |
| < > | Angle brackets (less-than and greater-than) enclose the name of a key on the keyboard. For example, <**Enter**> refers to the key on your terminal or workstation that is labeled with the word Enter. |
| ... | An ellipsis indicates that you can repeat the preceding item one or more times. |
| <**Ctrl-***x*> | The notation <**Ctrl-***x*> indicates a control character sequence. For example, <**Ctrl-c**> means that you hold down the control key while pressing <**c**>. |

## Obtaining Documentation

This book is available in PostScript format. You can obtain PostScript files for the product documentation by:

- Downloading them from the **lscftp.pok.ibm.com** anonymous FTP server. The files for PSSP can be found in the directory called /**pub**/**pps**/**pssp**.
- Printing the PostScript documentation files that are shipped on the product media.

You can also view or download this book from the IBM RS/6000 web site at **http://www.rs6000.ibm.com**.

# Related Publications

## SP Hardware Publications

- *IBM RS/6000 Scalable POWERparallel Systems: Site Planning*, GC23-3905
- *IBM RS/6000 Scalable POWERparallel Systems: Maintenance Information, Volume 1, Installation and CE Operations*, GC23-3903
- *IBM RS/6000 Scalable POWERparallel Systems: Maintenance Information, Volume 2, Maintenance Analysis Procedures and Parts Catalog*, GC23-3904
- *IBM RS/6000 Scalable POWERparallel Systems: Library Guide*, GC23-3868
- *IBM RS/6000 Scalable POWERparallel Systems: Installation Aid Licensed Program Specification*, GC23-3838

## SP Software Publications

- *IBM Parallel System Support Programs for AIX: Administration Guide*, GC23-3897
- *IBM Parallel System Support Programs for AIX: Installation and Migration Guide*, GC23-3898
- *IBM Parallel System Support Programs for AIX: Diagnosis and Messages Guide*, GC23-3899
- *IBM Parallel System Support Programs for AIX: Command and Technical Reference*, GC23-3900
- *IBM Parallel System Support Programs for AIX: Event Management Programming Guide and Reference*, SC23-3996
- *IBM Parallel System Support Programs for AIX: Group Services Programming Guide and Reference*, SC28-1675
- *IBM Parallel System Support Programs for AIX: Licensed Program Specification*, GC23-3901

As an alternative to ordering the individual books, you can use SBOF-8587 to order the entire SP software library.

## IBM Virtual Shared Disk Publications

- *IBM Parallel System Support Programs for AIX: Managing Shared Disks: IBM Virtual Shared Disks, Data Striping Devices, and the IBM Recoverable Virtual Shared Disk Licensed Program*, SC23-3849
- *IBM Recoverable Virtual Shared Disk: Licensed Program Specification*, GC23-3848

## Performance Monitor Publication

- *IBM Performance Toolbox Parallel Extensions for AIX: Guide and Reference*, SC23-3997

## LoadLeveler Publications

- *Using and Administering LoadLeveler*, SC23-3989
- *IBM LoadLeveler: Licensed Program Specification*, GH23-0040

## Parallel Environment for AIX Publications

- *IBM Parallel Environment for AIX: Hitchhiker's Guide*, GC23-3895
- *IBM Parallel Environment for AIX: Operation and Use, Volume 1*, SC28-1979
- *IBM Parallel Environment for AIX: Operation and Use, Volume 2*, SC28-1980
- *IBM Parallel Environment for AIX: Installation Guide*, GC28-1981
- *IBM Parallel Environment for AIX: Messages*, GC28-1982
- *IBM Parallel Environment for AIX: MPL Programming and Subroutine Reference*, GC23-3893
- *IBM Parallel Environment for AIX: MPI Programming and Subroutine Reference*, GC23-3894
- *IBM Parallel Environment for AIX: Licensed Program Specification*, GC23-3896

As an alternative to ordering the individual books, you can use SBOF-8588 to order the entire Parallel Environment for AIX library.

## PVMe for AIX Publications

- *IBM PVMe for AIX: Fact Sheet*, GC23-3907
- *IBM PVMe for AIX: User's Guide and Reference*, GC23-3884
- *IBM PVMe for AIX: Licensed Program Specification*, GC23-3885

## Client Input Output/Sockets (CLIO/S) Publications

- *IBM CLIO/S General Information*, GC23-3879
- *IBM CLIO/S Licensed Program Specification*, GC23-3789
- *IBM CLIO/S User's Guide and Reference*, GC28-1676

## Parallel I/O File System Publications

- *IBM AIX Parallel I/O File System: Fact Sheet*, G325-0649
- *IBM AIX Parallel I/O File System: Installation, Administration, and Use*, SH34-6065
- *IBM AIX Parallel I/O File System: Licensed Program Specification*, GH34-6066

## Network Tape Access and Control System for AIX (NetTAPE) Publications

- *IBM NetTAPE General Information*, GC23-3990
- *IBM NetTAPE User's Guide and Reference*, available from your IBM representative

## Other IBM Publications

### International Technical Support Organization Publications (Red Books)

- *IBM International Technical Support Centers Implementing High Availability on RS/6000 SP*, SG24-4742
- *IBM International Technical Support Centers RS/6000 SP High Availability Infrastructure*, SG24-4838
- *IBM International Technical Support Centers RS/6000 SP PSSP 2.2 Technical Presentation*, SG24-4868

### AIX and RISC System/6000 Publications

- *IBM AIX Version 4 Getting Started*, SC23-2527
- *IBM General Concepts and Procedures for RS/6000*, GC23-2202
- *IBM AIX Version 4 Files Reference*, SC23-2512
- *IBM AIX Version 4 System Management Guide: Communications and Networks*, SC23-2526
- *IBM AIX Version 4.1 Installation Guide*, SC23-2550
- *IBM AIX Version 4.2 Installation Guide*, SC23-1924
- *IBM AIX Version 4 Commands Reference*, SBOF-1851
- *IBM AIX Versions 3.2 and 4 Performance Tuning Guide*, SC23-2365
- *IBM AIX Version 4 Problem Solving Guide and Reference*, SC23-2606
- *IBM AIX Version 4 Messages Guide and Reference*, SC23-2641
- *IBM AIX Version 4.1 Network Installation Management Guide and Reference*, SC23-2627
- *IBM AIX Version 4.2 Network Installation Management Guide and Reference*, SC23-1926
- *IBM AIX Version 4 System Management Guide: Operating System and Devices*, SC23-2525
- *IBM AIX Version 4 General Programming Concepts: Writing and Debugging Programs*, SC23-2533
- *IBM AIX Version 4 Communications Programming Concepts* SC23-2610
- *Diskless Workstation Management Guide*, SC23-2433
- *C++ for AIX/6000: Language Reference*, SC09-1606
- *C++ for AIX/6000: Standard Class Library Reference*, SC09-1604
- *C++ for AIX/6000: User's Guide*, SC09-1605
- *IBM Performance Toolbox 1.2 and 2 for AIX: Guide and Reference*, SC23-2625

## Service

- *RS/6000 Problem Solving Guide*, SC23-2204
- *Common Diagnostics Micro Channel*, SA23-2765
- *7012 300 Series Operator Guide*, SA23-2623
- *7012 300 Series Installation and Service Guide*, SA23-2624
- *7013 500 Series Operator Guide*, SA23-2621
- *7013 500 Series Installation and Service Guide*, SA23-2622
- *Electrical Safety for IBM Service Representatives*, S229-8124
- *Service Information Binder*, SX33-6060
- *7015 Model R30 CPU Operator Guide*, SA23-2742
- *7015 Model R30 CPU Service Guide*, SA23-2743
- *Supplemental Information for 7012 G Series Models, 7013 J Series Models, 7015 Models R30 and R40* (No order number — this book comes as part of the ship group with the SP hardware)

## Network Queueing System/MVS (NQS/MVS)

- *IBM NQS/MVS Installing and Administering*, SC23-0232
- *IBM NQS/MVS Client User's Guide*, SC23-0231
- *IBM NQS/MVS General Information*, GC23-3684
- *IBM NQS/MVS Licensed Program Specifications*, GC23-0233

## Network Connectivity

- *IBM LAN Cabling System Planning and Installation Guide*, GA27-3361
- *IBM Cabling System Optical Fiber Planning and Installation Guide* GA27-3943
- *IBM 8250/8260/8285 Planning and Site Preparation Guide*, GA33-0285
- *IBM 6611 Network Processor: Introduction and Planning Guide* GK2T-0334

## Adapters

- *FDDI Introduction and Planning Guide*, GA27-3892
- *FDDI User's Guide and Programming Reference*, SC28-2823
- *Block Multiplexer Channel Adapter User's Guide and Service Information*, SC23-2427
- *Planning for Fiber Optic Channel Links*, GA23-0367
- *Token-Ring Network Introduction and Planning Guide*, GA27-3677
- *RS/6000 Token Ring Adapter Card*, G511-1681
- *HiPPI User's Guide and Programmer's Reference*, SA23-0369 and SA23-2488
- *AIX Parallel and ESCON Channel Tape Attachment/6000 Installation and User's Guide*, GA32-0311
- *9334 SCSI Expansion Units Operator Guide*, GA33-3232

- *9334 SCSI Model 010 Expansion Unit: Installation and Service Guide*, SY33-0165
- *9334 SCSI Model 500 Expansion Unit: Installation and Service Guide*, SY33-0167
- *SCSI-2 Fast/Wide Adapter*, SC23-2646
- *IBM SCSI-2 Fast/Wide Adapter/A Technical Reference*, S83G-7545
- *Turboways 100 User's Guide ATM*, GA27-4057
- *9333 Model 010 and 011 High-Performance Disk-Drive Subsystem Operator Guide*, GA33-3208
- *9333 Model 010 and 011 High-Performance Disk-Drive Subsystem Installation and Service Guide*, SY33-0161
- *9333 Model 010 and 011 High-Performance Disk-Drive Subsystem Hardware Technical Information*, SA33-3209
- *9333 Model 500 and 501 High-Performance Disk-Drive Subsystem Operator Guide*, GA33-3234
- *9333 Model 500 and 501 High-Performance Disk-Drive Subsystem Installation and Service Guide*, SY33-0168
- *9333 Model 500 and 501 High-Performance Disk-Drive Subsystem Hardware Technical Information*, SA33-3235
- *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers Installation and User's Guide*, GC35-0154

## Non-IBM Publications

### Parallel Computing


- Almasi, G., Gottlieb, A., *Highly Parallel Computing*, Benjamin-Cummings Publishing Company, Inc., 1989.
- Gropp, W., Lusk, E., Skjellum, A., *Using MPI*, The MIT Press, 1994.
- Message Passing Interface Forum, MPI: *A Message-Passing Interface Standard*. Version 1.1, University of Tennessee, Knoxville, Tennessee, June 6, 1995.
- Foster, I., *Designing and Building Parallel Programs*. Adison Wesley, 1995.
- Bergmark, D., Pottle, M. *Optimization and Parallelization of a Commodity Trade Model for the SP1*. Cornell Theory Center, Cornell University, June, 1994.
- Phister, Gregory, F., *In Search of Clusters*. Prentice Hall, 1995.


### Tcl


- Ousterhout, John K., *Tcl and the Tk Toolkit*, Addison-Wesley, Reading, MA, 1994, ISBN 0-201-63337-X.

## Manual Pages for Public Code

The following manual pages for public code are available in this product:

| | |
|---|---|
| **SUP** | /usr/lpp/ssp/man/man1/sup.1 |
| **Amd** | /usr/lpp/ssp/man/man8/amd.8 |
| | /usr/lpp/ssp/man/man8/amq.8 |
| **NTP** | /usr/lpp/ssp/man/man8/xntpd.8 |
| | /usr/lpp/ssp/man/man8/xntpdc.8 |
| **Perl (Version 4.036)** | /usr/lpp/ssp/perl/man/perl.man |
| | /usr/lpp/ssp/perl/man/h2ph.man |
| | /usr/lpp/ssp/perl/man/s2p.man |
| | /usr/lpp/ssp/perl/man/a2p.man |
| **Perl (Version 5.002)** | Man pages are in the /usr/lpp/ssp/perl5/man/man1 directory |

Manual pages and other documentation for Tcl, TclX, Tk, and expect can be found in the compressed **tar** files located in **/usr/lpp/ssp/public**.

# Planning Your System


**Chapter 1. Introduction to System Planning** . . . . . 3

**Chapter 2. Defining the System that Fits Your Needs** . . . . . 9

**Chapter 3. Defining the Configuration that Fits Your Needs** . . . . . 59

**Chapter 4. Planning for a High Availability Control Workstation** . . . . . 89

**Chapter 5. Planning SP System Partitions** . . . . . 101

**Chapter 6. Planning for Security** . . . . . 119

**Chapter 7. Planning to Record and Diagnose System Problems** . . . . . 131

**Chapter 8. Planning for PSSP-Related LPPs** . . . . . 137


© Copyright IBM Corp. 1996

# Chapter 1. Introduction to System Planning

Even though your system configuration will probably change after you install your RS/6000 SP, detailed planning is necessary because it will help you to consider many components of your system, from the network design, to the definition of user accounts, backup procedures and so on. A further benefit of a detailed plan is that it forms the basis of an ongoing process of system management for the RS/6000 SP and provides a very useful mechanism to familiarize all members of a project team with how the SP system will fit together and integrate into an operational environment. These project team members can include system programmers, network administrators, operators and application developers.

This chapter gets you started on the system planning task. The basic areas you have to plan for are:

- The physical system and its software
- The environment
- The control workstation
- System partitions
- Security and authentication

If you already have an SP system and want to move to a different level of AIX and PSSP software, you may also need to plan for migration.

You can plan for and do these tasks, or you can contract with IBM to plan and install the SP for you. Talk with your IBM representative if you want help with these tasks.

**Save Your Old Manuals**

This book is primarily for users planning to install AIX 4.1. If you plan to have both AIX 4.1 nodes **and** AIX 3.2.5 nodes, you should save and use your existing SP documentation for the 3.2.5 nodes.

## Planning Services

This optional IBM service offering provides a specialist on site to assist you with planning your implementation. Activities included as part of this offering include:

- Planning for integrating PSSP into your network
- Defining nameservice requirements
- Defining volume group and file system
- Planning for migration applications
- Defining accounting practices and policies
- Defining security policies.

For further details, call 1-800-CALL-AIX.

IBM representatives and IBM Business Partners can also obtain information on selecting the right type of node for a customer's system by referring to the document *Node Selection for the IBM SP System - Factors to Consider*.

© Copyright IBM Corp. 1996

Author: Clive Harris
EMEA AIX Consultant
EMEA High-End Centre of Competence
IBM Basington, UK
Telephone (44) 343184
PROFS: NHBVM7(HARRIC2)
email: clive_harris@uk.ibm.com

# Getting Acquainted with Your SP

This section briefly discusses the components of your system. For a more detailed discussion, refer to the IBM RISC System/6000 Scalable POWERparallel Systems: Administration Guide.

## Hardware Overview

The basic hardware components of an SP system are:

- Processor nodes
- Frames
- Optional switch
- A control workstation
- Network connectivity adapters

These components connect to your existing computer network through a Local Area Network (LAN), making the SP system accessible from any network-attached workstation.

### Processor Nodes

The SP system is scalable from two to 128 processor nodes that can be contained in multiple SP frames. A single frame can contain from two to 16 processor nodes.

The SP nodes are available in three types: thin nodes, wide nodes, and the 604 high nodes. Thin nodes are typically configured as compute nodes, while wide nodes are more often used as servers to provide high-bandwidth data access. However, no rigid rule governs the logical configuration of a node. You can configure a physical node type for the logical functions that best serve your computing requirements.

Each processor node includes a minimum of 64 megabytes of memory, one gigabyte of direct access storage devices (DASD), and an Ethernet adapter. The 604 high node has a minimum of 2.2 gigabytes of DASD.

### Thin Nodes

The SP thin node is functionally equivalent to a RISC System/6000 desktop system. Half the width of the wide node, it can be packaged 16 to a 79 inch frame and can contain either a RISC System/6000 POWER or POWER2 processor. The POWER processor operates at 75 megahertz, and the POWER2 processor operates at 66.7 megahertz with 64 kilobytes of data cache, and 32 kilobytes of instruction cache. The thin processor node has four Micro Channel adapter (MCA) slots. It can have up to two SCSI disks packaged internally, and can have access to external storage devices attached through SCSI-2 adapter features. The Ethernet adapter for the SP Ethernet is integrated and does not use an MCA slot.

## Wide Nodes

The SP wide node is functionally equivalent to a RISC System/6000 deskside system. It is a RISC System/6000 POWER2 processor that operates at 75 megahertz with 256 kilobytes of data cache, and 32 kilobytes of instruction cache. The wide node occupies twice the space of the thin node and can be packaged up to eight per frame. In addition to a maximum of four SCSI disks packaged internally, the wide node can have external storage devices attached through SCSI-2 adapters. It has seven MCA slots and also supports the High Performance Parallel Interface adapter. The Ethernet adapter for the SP Ethernet uses one MCA slot.

## 604 High Node

The 604 high node is classified as a Symmetric Multi-Processing (SMP) system that can have 2, 4, 6, or 8 POWERPC 604 processors running at 112 MHz.

The 604 high node occupies two full drawers of a frame. This means that a maximum of four 604 high nodes can fit in a 79 inch frame. The 604 high node is supported in the 79 inch frame with or without the 16-port switch. It is not supported in the 49 inch frame and cannot be connected to the High Performance Switch-LC8 or the SP Switch-8. Power and Power2 nodes can exist in the same frame and in the same partition as the 604 high nodes. However, the different physical sizes results in changes to the set of configurations which are supported.

## Frames

A 79 inch frame can house up to 16 thin nodes, eight wide nodes, or four 604 high nodes. All three types of nodes can be mixed together in a single frame.

The SP frame contains redundant power supplies; if one power supply fails, another takes over. The frame is also designed for concurrent maintenance; each processor node can be removed and repaired without interrupting operations on the other nodes.

An SP Switch-8 or High Performance Switch-LC8 configuration can consist of either two short 49" frames with single phase power that supports two to eight nodes in up to two frames, or one 79" frame that supports up to eight nodes.

An *expansion frame* is an additional frame that you can add to a system that has a switch to take advantage of unused switch ports in certain configurations. For example, a switch has ports to attach up to 16 nodes and if you have a frame with eight wide nodes, only eight of those switch ports will be used. You can add an expansion frame next to the existing frame to take advantage of the eight unused switch ports.

Similarly, if your frame contains four 604 high nodes, only four of the switch ports will be used. You can add up to three expansion frames containing all 604 high nodes to take advantage of the 12 unused switch ports.

## High Performance Switch

The High Performance Switch provides low latency, high-bandwidth communication between nodes, supplying a minimum of four paths between any pair of nodes. The High Performance Switch dramatically speeds up TCP/IP, file transfers, remote procedure calls, and relational database functions. It consists of a switch assembly and the internal cables to support connection to 16 processor nodes in a system (one switch per frame).

The High Performance Switch Adapter connects each SP node to the subsystem.

### Scalable POWERparallel Switch

In addition to all the capabilities provided by the High Performance Switch described previously, the SP Switch provides:

- Higher availability
- Fault isolation
- Concurrent maintenance for nodes
- Improved switch chip bandwidth

The SP Switch Adapter connects each SP node to the SP Switch subsystem.

## Control Workstation

The SP system requires a customer-supplied RISC System/6000 workstation with a color monitor. The control workstation serves as a point-of-control for managing and maintaining the SP processor nodes. The workstation connects to each frame via an RS-232 line to provide hardware control functions. A system administrator can log in to the control workstation from any other workstation on the network to perform system management, monitoring, and control tasks.

The control workstation also acts as a boot/install server for other servers in the SP system. In addition, the control workstation can be set up as an authentication server using Kerberos. It can be the Kerberos primary server, with the master database and administration service as well as the ticket-granting service. Or it can be set up as a Kerberos secondary server, with a backup database and just the ticket-granting service.

### Network Connectivity Adapters

Network connectivity is supplied by various adapters, some optional, that can provide connection to I/O devices, networks of workstations, and mainframe networks. Ethernet, FDDI, token-ring, HiPPI, SCSI, FCS, and ATM are examples of adapters that can be used as part of an SP system.

On boot/install server nodes, these adapters are need to support systems that contain nodes running on different PSSP release levels.

## Software Overview

The SP system software infrastructure includes:

- AIX, the base operating system
- The Parallel System Support Programs
- Other IBM system and application software products
- Independent software vendor products

### AIX

AIX provides operating system functions such as the AIXwindows user interface, extended real-time support, network installation management, advanced file system support, physical disk space management, and a platform for application development and execution. AIX provides UNIX functionality and conformance to industry standards for open systems.

### IBM Parallel System Support Programs for AIX (PSSP)

The PSSP software provides a single point of control for administrative tasks and helps increase productivity by letting administrators view, monitor, and control system operation. The IBM Virtual Shared Disk device driver, which makes disks globally accessible; Distributed Tape Management System (DTMS) enablement; and High Availability Control Workstation Connectivity (HACWS) function are also available with the PSSP software.

## Paths Through SP Planning

If you are new to IBM RISC System/6000 Scalable POWERparallel Systems, usually called SP, you should read all of this book. The planning steps you take depend on where you are now and the system you want to end up with. Chapter 2, "Defining the System that Fits Your Needs" on page 9 helps you define an SP that meets your needs. Table 1 lists four major system goals and the macro steps you take to get to those goals.

*Table 1. SP Planning Paths*

| Starting Point | System Goal | Major Steps... |
|---|---|---|
| New installation | Control workstation and all nodes at AIX 4.1 | Install AIX 4.1 at control workstation and all nodes. |
| New installation | Control workstation and some nodes at AIX 4.1 and PSSP 2.2 and some at AIX 3.2.5 | Install 3.2.5 and PSSP 1.2 at control workstation |
| | | Install AIX 3.2.5 at nodes in AIX 3.2.5 system partition. Either do the next step, or follow the migration path. |
| | | Install AIX 4.1 at control workstation |
| | | Define system partitions |
| | | Install AIX 4.1 at nodes in AIX 4.1 system partitions |
| Migrating installation | Control workstation and all nodes at AIX 4.1 and PSSP 2.2. | Read Chapter 10, "Planning for Migration" on page 159. |
| | | Back up data. |
| | | Install AIX 4.1 at control workstation and all nodes. |
| Migrating installation | Control workstation and some nodes at AIX 4.1 and PSSP 2.2, and some at AIX 3.2.5 | Read Chapter 10, "Planning for Migration" on page 159. |
| | | Install AIX 4.1 at control workstation |
| | | Define system partitions |
| | | Keep AIX 3.2.5 at nodes in AIX 3.2.5 system partitions |
| | | Install AIX 4.1 at nodes in AIX 4.1 system partitions |

If you plan to install or keep some nodes at AIX 3.2.5, keep and use the documentation that came with that release. Use the AIX 4.1 documentation with your AIX 4.1 nodes.

## Using SP Books for Planning

1. Use this book to plan your software. Make your decisions about what components to install, which nodes to use for what purposes, and planning system partitions.
2. Use the *Site Planning Guide* to make sure you have the correct physical environment for your SP system.
3. Use the *Administration Guide* for the day-to-day running and management of your system.
4. Use the *Command and Technical Reference* as a command and technical reference.
5. Use the *Diagnosis and Messages Guide* to help diagnosis problems and to get more information about messages.
6. Use the *Library Guide* to find out where information is for this product and for related products.

# Chapter 2. Defining the System that Fits Your Needs

This chapter helps you define a new RS/6000 SP system that meets your hardware and software computing needs. You will be asked to answer many questions about the type of system you want and you will be prompted to complete a set of worksheets as you progress through the questions.

Decision making is an iterative and recursive process. Therefore, you may find yourself modifying answers to questions you previously answered. Reviewing, and sometimes modifying, your plans is a necessary part of a thorough planning process. The output of this exercise should be a completed layout of your system hardware and software that will help you to prepare for your installation.

**Contact Your Network Administrator**

Connecting your SP to a network has important benefits because networking information is critical to the success of the RS/6000 SP installation. Network planning may seem at times to be complex but it is a necessary part of a thorough planning process. It is important to consider networking information early on in the process so do not delay contacting your network administrator.

As you plan your SP you'll make many decisions. The remainder of this chapter poses several questions for you to answer. Review these questions and become familiar with the types of information you will need to gather throughout the planning process:

This chapter contains sample worksheets for a hypothetical corporation called the `ABC Corporation`. Review these sample worksheets to see the decisions that the `ABC Corporation` made. Whenever decisions made by the `ABC Corporation` are shown, they will be in `constant width` format to help distinguish them from the regular text.

Your decisions will most likely be different from the `ABC Corporation`'s. This is natural since every company is different and the decisions you make should meet your corporation's needs.

As you go through these questions, fill in the worksheets in Appendix C, “SP System Planning Worksheets” on page 215 with the information about your system. Make several copies of all the worksheets first. You can change your mind as you go through the worksheets. You'll need these worksheets later when you want to add to your system.

© Copyright IBM Corp. 1996

## Question 1. Do You Want a Preloaded SP or the Default Version?

You have the option of purchasing your SP with the default software installed or you can purchase one that IBM has preloaded with software to meet your organization's specific needs. There are two manufacturing based services available from which you can choose if you decide to purchase a preloaded version:

1. Standard Preload Service

   By default, every SP system is delivered with the most current software level, including Program Temporary Fix (PTF), of AIX and PSSP installed on the nodes. A MKSYSB backup tape for the nodes that can be restored on each of the nodes and a tape that can be restored on the control workstation is delivered with the system. The tape for the control workstation contains installed versions of AIX and PSSP and a LoadLeveler install image.

   The version of AIX and PSSP installed is determined by one of the following feature codes:

   - FC #9325: AIX 3.2.5 and PSSP 1.2 (unavailable by year-end 1997)
   - FC #9410: AIX 4.1 and PSSP 2.2

   If you do not specify a feature code, IBM will install AIX 4.1.4 and PSSP 2.2.

   There is no action required by the field or at the time of order for this service. For feature code #9325 (AIX 3.2.5 and PSSP 1.2), a reinstallation of the MKSYSB image for the nodes may not be necessary because AIX 3.2.5 and PSSP 1.2 will have already been installed on the nodes in manufacturing for testing purposes. Additional customization work including network configuration, image installation on the control workstation, and any required LPPs will need to be done in the field.

   For feature code #9410 (AIX 4.1 and PSSP 2.2), a complete installation of all MKSYSB images from tape (both the nodes and the control workstation) will be required, as well as network configuration and any additional LPPs that are desired.

2. Customized Preload Service

   This service installs AIX and PSSP components, as well as other IBM LPPs that you specify on the SP nodes and on the control workstation image. This service also performs network customization on the SP prior to its arrival at your site. You can obtain a list of supported LPPs using the following VM command (if you do not have access to VM, you can request that your IBM representative issue this command for you):

   ```
   TOOLS SENDTO USDIST MKTTOOLS MKTTOOLS GET SPCHRTPP TERS3820
   ```

   **Note:** This service preloads any LPPs that are on the SPCHRTPP package with the exception of Netview for AIX V3 (5696-731) and AIX HACMP/6000 V3.1 (5696-923).

   If you order this service, you must also order the following:

   - The installation service contract offered by the AIX Family of Services or by a certified IBM business partner
   - A feature code 1250 on the SP (no charge).

IBM will deliver a MKSYSB backup tape for the nodes that can be restored on each of the nodes and a tape that can be restored to the control workstation.

When you order this feature code, the AIX Family of Services representative will work with you to provide the required customization information to Manufacturing. To ensure complete customization, you must complete and return the worksheets found in this book at least 10 business days prior to the scheduled ship date. If this is not possible, network customization/configuration may still be an option because this requires the worksheets to be returned within 5 business days of the ship date. If no information is received within 5 business days of the ship date, the order will be altered to remove the feature code (1250) and provide default service instead.

Once IBM receives the information, IBM manufacturing will customize network information (including hostnames and IP addresses), install customer selected AIX and PSSP components and selected IBM licensed Program Products (LPP) on the control workstation image and on the SP nodes.

3. Additional SP Customization Services (based on cost-recovery charges)

   Additional customization services are available both in-house and on-site according to customer requirements. The Customized Solutions Group has a team comprised of skilled resources from both Austin and the POWER Parallel Development Lab in Poughkeepsie, New York to deliver the following services:

   - Pre-install Planning which includes a review of the control workstation, frame, network, and node configurations, the control workstation support matrix, planning for SP frame upgrades, and so on.
   - Design reviews focused on how to implement application suites on specific SP hardware configuration.
   - Highly Available Control Workstation (HACWS) customization.
   - HACMP/6000 design and implementation. This includes a complete integration from pre-sales consulting and design sessions through on-site integration.
   - Oracle Parallel Query installation, customization, and integration.
   - Lotus Notes server integration and Lotus Notes implementation with HACMP/6000.
   - DB/2 Parallel Edition implementation.

   For more information on these services, call 1-800-426-4955.

## Steps to Receive Customized Preload Service

1. Order the installation services contract by contacting the AIX Support Family Project Office at 1-800-CALLAIX (1-800-225-5429) or a certified IBM business partner.
2. Select feature code 1250 from the configurator.
3. After placing the order for a 9076 on the configurator and after ordering the feature code 1250, IBM sends a note and two required files to the person who configured the order. The person is requested to pass these on to the AIX Family of Services representative assigned to the order. The two files that are sent are:

   - **orderno** WKBKSOFT

- **orderno** WKBKNET

where **orderno** corresponds to the six digit manufacturing order number.

If these files were not received, generically named versions are available using a request command from a VM userid:

```
REQUEST SP2INST FROM SP2INST AT KGNVMC
```

After receiving the files, you should rename them to have a filename that corresponds to the six digit manufacturing order number as follows:

```
RENAME SP2INST WKBKSOFT A orderno WKBKSOFT A
RENAME SP2INST WKBKNET A orderno WKBKNET A
```

4. The account team and intallation service representative will work with you to fill in the required information in the two files. These files are online versions of the worksheets contained in this book.
5. Edit these files and fill in the information that is required. Ensure the files have a filename that corresponds to the six digit purchase order number for the order.
6. Return the files to SP2INST at KGNVMC at least 10 business days prior to the scheduled ship date from manufacturing.

In some cases, IBM may only be able to perform the network customization because the software customization has the longest lead time in manufacturing. However, in some cases, it may not be possible to perform any of the customization requested. In this case, the order will be altered to remove the feature code and IBM manufacturing will provide the default service instead. The IBM installation service representative can perform any further customization required by the customer.

If you have questions about either the Default Preload Service or the Customized Preload Service, please contact the Poughkeepsie Customized Solution Organization at:

- 1-800-426-4955
- VM USERID: JUSTASK at PKEDVM9
- Internet: JUSTASK @ vnet.ibm.com.

Include in the message your name, phone number, user ID, and order number. A member of the Customized Solution Department will then work with you to help make the installation a success.

## Feature Codes 9325 and 9410

These preload features ship tapes and instructions with SP systems that simplify installation. Feature 9325 ships tapes for AIX 3.2.5 with PSSP 1.2 and service already installed. Feature 9410 ships tapes for AIX 4.1.4 with PSSP 2.2 and service installed. Both features may be ordered although Feature 9325 will be withdrawn by year-end 1997. Instructions and tapes are in a clear plastic bag inside a wooden frame shipping container.

The preload features provide two tapes each. The first tape is booted on the control workstation to load AIX and PSSP. The second tape contains an image that is copied to the control workstation and loaded on an SP node during a network boot/install.

With these features, SP nodes are shipped with the AIX 3.2.5 preload installed. Default network addresses used in manufacturing must be changed to customer network addresses during installation. AIX 3.2.5 nodes can be customized without reloading. For AIX 4.1.4, nodes are overwritten and customized during the first install.

## Question 2. Why Do You Need an SP?

Why do you need an SP? For LAN consolidation? For data mining? For engineering or scientific computing? See Figure 1 for some typical SP uses.

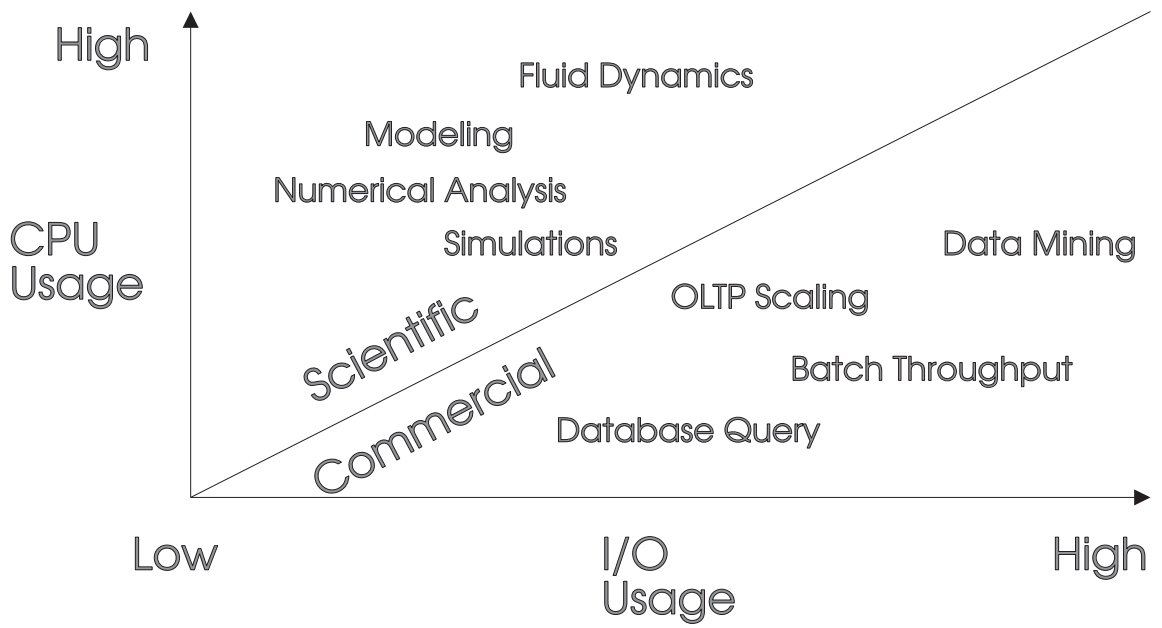



*Figure 1. Typical SP Uses (not to scale)*

What applications do you want to run on this system? Each SP node is a POWER2 node or a 604 high node Power-PC processor running the AIX Operating System and some special SP support programs. Thousands of RISC System/6000 applications can run unchanged on the RS/6000 SP with a single point of control for system management.

## Parallel Computing

Along with this question, you need to decide whether you want to reap the benefits that parallel computing offers by running parallel applications. Parallel computing involves breaking a serial application into its logical parts and running those parts simultaneously. As a result, you can solve large, complex problems quickly.

Parallel applications can be broadly classified into two classes by considering whether the parallelism can be achieved through the use of a "middleware" software layer or whether the application developer needs to explicitly parallelize the problem by working with the source code and adding directives and code to achieve speedup.

Examples of a parallelized software layer are a parallel relational database such as DB2 Parallel Edition, or the Parallel Engineering and Scientific Subroutine Library (PESSL), which lets you execute an SQL statement, or call a matrix multiplication routine, and achieve problem speedup without having to specify how to achieve the parallelism.

An example of explicit parallelism is taking an existing serial FORTRAN program and adding calls to a message passing library to distribute the computations among

the nodes of the RS/6000 SP system. In this case, various parallel tools such as compilers, libraries and debuggers are required.

## Choosing a Switch

Now that you have considered the types of applications you will run on the system, you are ready to decide whether you can benefit from an SP Switch or a High Performance Switch.

| Switch Feature | Description |
|---|---|
| High Performance Switch | This switch (feature code 4010) connects all the processor nodes, providing scalable high-performance communication between processor nodes for parallel job execution. This switch contains the High Performance Switch Adapter-2 (feature code 4018). Some older models may contain the High Performance Switch Adapter-1 (feature code 4017). |
| High Performance Switch-LC8 | This switch (feature code 4007) provides high-performance switch functions for small systems (up to 8 total nodes). It does not support scaling to larger systems. |
| Scalable POWERparallel Switch (SP Switch) | This switch (feature code 4011) represents the newest level of switch function. Like the high performance switch, it connects all the processor nodes, providing enhanced scalable high-performance communication between processor nodes for parallel job execution. |
| Scalable POWERparallel Switch-8 (SP Switch-8) | This switch (feature code 4008) provides enhanced high-performance switch functions for small systems (up to 8 total nodes). It does not support scaling to larger systems. |

### High Performance Switch

The optional High Performance Switch provides low latency, high-bandwidth communication between nodes, supplying a minimum of four paths between any pair of nodes. The High Performance Switch dramatically speeds up TCP/IP, file transfers, remote procedure calls, and relational database functions. It consists of a switch assembly and the internal cables to support connection to 16 processor nodes in a system (one switch per frame). High Performance Switch capabilities include:

- Interframe connectivity and communication
- Scalability up to 128 node connections, including intermediate switch frames
- Constant bandwidth and latency between node pairs
- Support for Internet Protocol (IP) communication between nodes
- IP Address Resolution Protocol (ARP) support

- Support for dedicated user space access (via message passing libraries) and multiuser environments (via IP)
- Error detection and retry

The High Performance Switch Adapter-2 connects each SP node to the High Performance Switch subsystem.

### Scalable POWERparallel Switch

In addition to all the capabilities provided by the High Performance Switch described previously, the SP Switch provides:

- Higher availability
- Fault isolation
- Concurrent maintenance for nodes
- Improved switch chip bandwidth

The SP Switch Adapter connects each SP node to the SP Switch subsystem.

**Note:** If you currently have a High Performance Switch configuration and are adding another system, you must select a High Performance Switch. However, you can replace the High Performance Switches in your current frames with the new SP Switch. Although PSSP 2.1 and above supports both switches, the two switch networks are not compatible and cannot be mixed within an SP system.

## Listing Your Applications

List on Worksheet 1, “Preliminary List of Applications” on page 216 the applications you are considering. Check **parallel** √ and **Need Switch** √ if you know you need these functions. Put “?” if you are not sure yet. If you think of additional applications, you can add them to this list at any time.

Our hypothetical customer, `Corporation ABC` looked at their application requirements and filled in Table 2.

*Table 2. Preliminary List of Applications For ABC Corporation*

**Worksheet 1**

**SP Preliminary List of Applications**

| Application | Parallel | Need Switch |
|---|---|---|
| `DB2 Parallel Edition` | √ | √ |
| `AIX Performance Toolkit` | | |
| `Customer Written Application` | √ | √ |
| | | |
| | | |
| | | |
| | | |
| | | |

Save your list. You'll use it later in the planning process.

## Question 3. What Related IBM Program Products Do You Need?

There are two sets of IBM Program Products that you must decide on. The first set of programs are part of your SP environment and the second set are programs that are for the AIX operating system that runs on each node.

IBM C for AIX, V3 (Program 5765-423), is a pre-requisite of the PSSP. This is necessary for service of the PSSP. Without the compiler's pre-processor, dump diagnosis tools such as **crash**, will not function fully. You need at least a one-user license, but if you intend to do C development work, you will have to decide how many users you want to support at a given time.

There are many other program products for AIX that can add to your enterprise's productivity. For more information on these products, consult with your IBM representative.

The IBM AIX Parallel System Support Programs (PSSP) software is an integral part of your RS/6000 SP. It is the software that makes a collection of RS/6000 nodes into an SP. PSSP helps a system administrator manage the RS/6000 SP. It provides a single point of control for administrative tasks and helps increase productivity by letting administrators view, monitor, and control system operation.

The SP software suite also includes a number of optional program products. A brief description of each product follows. If you think one of them may provide a service you want on your SP, ask your IBM representative. At the end of this section, you will find a worksheet where you can check off those program products you want.

### IBM LoadLeveler

(Program Number 5765-145). LoadLeveler is an IBM software product that lets you build, submit, and process both serial and parallel jobs on your RS/6000 SP system, RS/6000 workstations, Silicon Graphics systems, Sun SPARCstation systems, and Hewlett-Packard systems. LoadLeveler is recommended, but not required, for batch processing on the SP system, and is included with the SP.

### IBM Client Input Output/Sockets (CLIO/S)

(Program Number 5648-129). Client Input Output/Sockets provides high-speed transparent data transfer and tape access between MVS/ESA systems and AIX systems or between AIX systems. It provides a set of user commands and application programming interfaces that run on either MVS or AIX.

### IBM's Network Tape Products for AIX

IBM provides two network tape products for AIX:

- IBM Network Tape Access and Control System for AIX (NetTape) (program number 5765-637)
- IBM Tape Library Connection (Tape Library Connection) (program number 5765-643)

NetTape is a program that provides consolidated tape operations and transparent access to a wide variety of remote tape devices on a network of AIX workstations and supports both RISC System/6000 workstations and RISC System/6000 Scalable POWERparallel Systems (SPs).

The Tape Library Connection builds on NetTape, adding support for robotic tape library devices. These devices include the IBM 3494 and IBM 3495 Tape Library Dataservers and StorageTek** tape library devices. NetTape is a prerequisite product for the Tape Library Connection.

## IBM Parallel Environment for AIX

(Program Number 5765-543). The IBM Parallel Environment for AIX program product provides support for parallel application development and execution for the RS/6000 SP or on a single RS/6000 processor or a TCP/IP-networked cluster of RISC System/6000 processors. The Parallel Environment product contains tools to support the development and analysis of parallel applications written in FORTRAN, C or C++, and also provides a user-friendly runtime environment for their execution. Parallel Environment has support for both the Message Passing Library (MPL) subroutines and the Message Passing Interface (MPI) standard.

Note that user space jobs are not supported on 604 high nodes.

## Parallel Libraries

Multiple parallel libraries are available to make it easier for developers, especially those not proficient in advanced parallel processing techniques, to create or convert applications to take advantage of the parallel processors of the SP. Two IBM libraries are available for use on the RS/6000 SP: Parallel Optimization Subroutine Library (OSLp) and Parallel Engineering and Scientific Subroutine Library (PESSL).

### IBM Parallel Optimization Subroutine Library

(Program Number 5765-392). The Parallel Optimization Library (OSLp) is a collection of high-performance subroutines for use by mathematical application programs that solve optimization problems. Parallel OSL helps you find the optimal solutions to several types of problems using linear programming, mixed-integer programming, and quadratic programming. OSLp subroutines can be called from FORTRAN, PL/1, APL2, and C programs at different levels.

### IBM Parallel Engineering and Scientific Subroutine Library (PESSL)

(Program Number 5765-422). Parallel ESSL accelerates applications by substituting comparable math subroutines and in-line code with high performance, highly-tuned subroutines. The design of Parallel ESSL centers on exploiting scientific operational characteristics and the architecture of the SP. Both new and current numerically intensive applications can call Parallel ESSL subroutines. Thirty-one parallel routines are included with over 400 additionally available for serial operations.

## IBM Parallel I/O File System for AIX (PIOFS)

(Program Number 5765-297). The Parallel I/O File System is a high performance file system for the SP. The PIOFS supports AIX 4.1 or 3.2.5 and exploits the architecture of the SP. It scales in file input/output performance just as the RS/6000 SP scales in computing performance. It also processes large files (up to 64GB per server node) on an SP with a switch installed.

## IBM PVMe for AIX - Version 2.1

(Program Number 5765-544). The IBM PVMe for AIX program product is an implementation of the application program interface (API) defined by the public domain package PVM (Parallel Virtual Machine). The IBM PVMe for AIX program product now provides source and object compatibility with PVM 3.3.7, which is developed at Oak Ridge National Laboratory. If you currently run PVM applications, you will realize faster performance using PVMe on your RS/6000 SP.

## IBM Recoverable Virtual Shared Disk

(Program Number 5765-444). The IBM Recoverable Virtual Shared Disk program product lets you configure nodes as primary and secondary IBM Virtual Shared Disk server nodes. It provides transparent switchover to a secondary server node if the primary server node for a set of virtual shared disks fails. The base IBM Virtual Shared Disk support is included with the PSSP.

## x3270

(Program Number 5765-011). x3270 is an enhanced 3270 emulator for workstations that communicate with MVS or VM mainframes through TCP/IP. The enhanced features include support for GDDM graphics, the APL2 character set, a graphical interactive keyboard remapper, and support for the High Level Language Application Programming Interface (HLLAPI).

## Selecting IBM Program Products

Our sample customer, `Corporation ABC` selected the products checked off in Table 3 on page 20. You can check off the products that you want in Worksheet 2, “IBM Program Products To Order” on page 217.

*Table 3. IBM Program Products Ordered by ABC Corporation*

## Worksheet 2

## IBM Program Products

| Order | Program Product | Program Number | Level |
|---|---|---|---|
| √ | IBM C for AIX | 5675-423 | 3.0 |
| √ | IBM Parallel System Support Programs for AIX (PSSP) | 5765-296 | 1.2 |
| √ | IBM Parallel System Support Programs for AIX (PSSP) | 5765-529 | 2.2 |
| √ | IBM LoadLeveler | 5765-145 | 1.2.1 |
| | IBM LoadLeveler | 5765-145 | 1.3 |
| √ | IBM Client Input Output/Sockets (CLIO/S) | 5648-129 | 2.2 |
| √ | IBM Parallel Environment for AIX | 5765-543 | 2.2 |
| | IBM Parallel Optimization Subroutine Library | 5765-392 | 1.3.0 |
| | IBM Parallel Engineering and Scientific Subroutine Library | 5765-422 | 1.1 |
| | IBM Parallel I/O File System for AIX | 5765-297 | 1.2 |
| | IBM PVMe for AIX | 5765-544 | 2.2 |
| √ | IBM Recoverable Virtual Shared Disk | 5765-444 | 1.1.1 |
| | x3270 | 5765-011 | 1.2.2 |
| | NetTape | 5765-637 | 1.1 |
| | Tape Library Connection | 5765-643 | 1.1 |
| | | | |
| | | | |

**Note:** Add other AIX program products that you expect to use such as the C Set ++ for AIX or other compilers.

## Question 4. What Levels of AIX Do You Need?

New RS/6000 SPs come with AIX 4.1.4 and PSSP 2.2 installation tapes. For a limited time, you can also order, at no additional cost, AIX 3.2.5 and PSSP 1.2. You may need AIX 3.2.5 to support specific hardware. If you need AIX 3.2.5 for any applications or specific hardware, you cannot install the new SP Switch option.

SP Micro Channel adapters that were supported in AIX 3.2.5, but were not in the initial release of AIX 4.1 are listed in the following table. If you have requirements for MCS adapters, check the latest AIX information to see whether support for them has been updated.

*Table 4. AIX Devices Not Supported by Release 4.1.4*

| Devices | Feature Number |
|---|---|
| Fibre Channel Adapter/2 | 1906 |
| S/390 ESCON Channel Emulator | 2754 |

Your decision about software levels is also based on the new features available in new releases. The following sections briefly describe the new and changed functions in AIX 4.1 and PSSP 2.1. You should plan to order the system level that supports the functions you need.

## What's New in AIX 4.1?

AIX 4.1 has new device support and new features that can add to your system's usefulness. The following is a partial summary. For more detail, see your IBM representative.

- Greater than 2GB file system size so users need not constrain application development and execution.
- Addition of an integrated desktop based on the Common Desktop Environment (CDE) standard for windowing and presentation services to increase user productivity through ease-of-use features.
- Automatic loading of X-Windows which reduces installation time and complexity.
- Use of a Network Installation Manager (NIM) which simplifies the distribution and installation of software and updates on SP nodes and to workstations external to the SP thus requiring less expertise at the remote user locations.
- You can define multiple boot images and root volume groups. This provides you with a quick fall back mechanism for an SP system or a partition in case a problem is found in the system software, hardware, or application software. This requires two disks, each holding a complete copy of the operating system. If you want alternate boot system images, make sure you plan for enough disk space.

# What's New in PSSP 2.2?

The new function in PSSP 2.2 requires AIX level 4.1.4 or greater.

## 604 High Node Support

The 604 high node introduces Symmetric Multi-Processor and PowerPC technology to the RS/6000 Scalable POWERparallel Systems computer. Support for the new node is provided by the System Partitioning Aid, the IBM Virtual Shared Disk, and the SP Switch. In addition, system management support is provided that allows the 604 high node to be managed in a way that is consistent with the management of the thin and wide nodes.

## The System Partitioning Aid

The System Partitioning Aid provides a set of predefined system partition layouts. If one of these predefined layouts does not meet your needs, you can use the System Partitioning Aid to create and save a new one. When the system administrator accepts a system partition layout generated by the System Partitioning Aid, the tool generates the topology files, node lists, and layout descriptions and installs the configuration in the system partitioning directory structure.

The System Partitioning Aid can be invoked from a command line interface or from the new graphical user interface called Perspectives.

## Perspectives

Scalable POWERparallel Perspectives for AIX is a graphical user interface that enables you to perform system management tasks for your RS/6000 Scalable POWERparallel Systems computer through direct manipulation of system objects represented by icons. You can use this GUI to perform system management tasks such as monitoring and controlling hardware, creating system events, defining and managing IBM Virtual Shared Disks, and creating customized layouts for system partitions.

## Installation Support

PSSP 2.2 provides the ability to support multiple versions of AIX and PSSP from a single node or the control workstation; the clients must be at AIX 4.1 and PSSP 2.1 or later. It provides a set of new installation commands which speed setup for installation and provide a greater flexibility in installation error recovery. An AIX 4.1 boot install node has Network Installation Manager (NIM) support to allow an AIX migration install from AIX 3.2.5 to AIX 4.1 or AIX 4.2 and AIX 4.1.3 to AIX 4.1.4, or AIX 4.2.

## Node Grouping

Function is provided to persistently name a set of nodes which can then be acted on as a single entity or object. Node groups can be created, modified, and deleted through a command line interface or through Perspectives. They can also be used by other PSSP commands or imbedded in shell scripts.

## Problem Management

Problem Management enables the easy exploitation of Event Management services. By entering simple commands, an administrator may subscribe events such as nodes down, reaching a filesystem threshold, high paging rates, and so on, and may associate these commands or scripts to be triggered by events, such as recovery steps or mailing messages. This infrastructure may be used to make an application highly available by providing automatic recovery from subscribed events. Problem Management also enables the user to create resource monitors, special user programs which monitor specialized resources. Problem management will check the output of these monitors, and generate events on special (user-defined) conditions. This function is especially valuable in making an application highly available, since a resource monitor may be created to monitor the health of the application and to run recovery commands on special conditions.

## Performance Toolbox Parallel Extensions for AIX

IBM Performance Toolbox Parallel Extensions for AIX (PTPE) collects and provides performance data for SP hardware and software. It is designed as an enhancement to Performance Toolbox for AIX, the preferred performance monitor for AIX systems. PTPE gives Performance Toolbox access to SP hardware and software statistics, and makes Performance Toolbox easier to use when monitoring a large number of systems. All this is done while retaining the same familiar interfaces to the performance data that you have come to expect from Performance Toolbox for AIX.

For information on PTPE, refer to *Performance Toolbox Parallel Extensions for AIX Guide and Reference*, SC23-3997.

## Event Management and Group Services

Event Management provides comprehensive event detection by monitoring various hardware and software resources. Through Event Management, a client subsystem can be informed of events affecting its own resources, or of general system conditions that require attention by the subsystem. For information on Event Management, refer to *PSSP Event Management Programming Guide and Reference*.

Group services provides a general purpose facility for coordinating and monitoring changes to the state of a subsystem on a set of nodes. Group Services help both in the design and implementation of fault-tolerant subsystems, and in the consistent recovery of multiple subsystems.

## IBM Virtual Shared Disk Usability Enhancements

A number of usability enhancements have been made to the IBM Virtual Shared Disk function of PSSP. Some of these include one command line to define and one command line to undefine VSDs, a graphical depiction of VSDs via Perspectives, and the ability to configure a subset of VSDs within a system partition.

## IBM Recoverable Virtual Shared Disk

The IBM Recoverable Virtual Shared Disk is a separate IBM Licensed Program Product (LPP). IBM Recoverable Virtual Shared Disk provides recovery for the VSDs with the help of user-level daemons that provide node UP/DOWN information and drive scripts tailored to enable VSDs to recover. The underlying physical disks must be physically twin-tail attached to both the primary and secondary nodes.

RVSD also provides recovery services via daemons and an application programming interface. By utilizing these services, an application, such as a data base system, can now provide transparent recovery from a node failure. For more information on these and other enhancements made to the VSD and RVSD, refer to *RS/6000 Scalable POWERparallel Systems Managing Shared Disks: IBM Virtual Shared Disks, Data Striping Devices, and the IBM Recoverable Virtual Shared Disk Licensed Program* , SC23-3849.

### Coexistence

For more information, refer to:

`http://www.rs6000.ibm.com/tech/`

## Recording Your Decision for Question 4

Now you should know which level of AIX you need. If you need more than one level, you will require system partitions which are discussed in more detail in Chapter 5, “Planning SP System Partitions” on page 101. Note that AIX 3.2.5 can no longer be ordered after January 31, 1997. See your IBM representative for more information.

`ABC`'s worksheet appears in Table 5.

*Table 5. Operating System Level Selected By ABC Corporation*

| Check One Or Both | AIX | PSSP |
|---|---|---|
| | AIX 3.2.5 | PSSP 1.2 |
| √ | AIX 4.1.4 or higher | PSSP 2.2 |

**Note:** If you checked more than one level, you must also check the system partition option in question 6.

## Question 5. What Type of Network Connectivity Do You Need?

In order to answer this question, you need to consult with your network administrator to decide how this system will connect into your existing computing network. As listed in Table 4 on page 21, some adapters may not be supported in AIX 4.1 when it is first available. Check with your IBM representative to find out when support is available for the adapters you want. Remember, you can still use these adapters by creating a system partition with AIX 3.2.5 installed on it and then migrate that partition to AIX 4.1 when the adapter support has been added. All the adapters work on wide, thin, and 604 high nodes *except* the High Performance Parallel Interface adapter which is supported only on the wide and 604 high node. You will be reminded of this when we discuss node types in question 7.

Review the following questions to determine the type of network connectivity your organization needs:

- Do you currently have a TCP/IP network?
- Do you intend to connect this network to the network of the SP and its control workstation?
- Do you have a TCP/IP address range? What is the address range and how is it subnetted? What subnet masks are employed? Will the address range be sufficient to cover the addresses of the SP and RS/6000 control workstations? Remember here to think about the future—if you are starting with a 10-node system but plan to grow to 100 nodes in the future—be sure to define an address range that is big enough to accommodate your future needs.
- Do you have a domain name? If so, what is it? How are IP addresses resolved to names and vice versa? Do you have DNS, NIS, or /**etc/hosts**? How are your domain name servers configured?
- What is the topology of your TCP/IP network? Where do you intend to connect the RS/6000 workstations and the SP into the network?

For the SP and the control workstations, also consider the following:

- The RS/6000 SP with a switch has a minimum of two networks; the SP Ethernet that connects each node to the control workstation and the switch network. The two networks must each be assigned unique TCP/IP network addresses. If you have a switch, you must also plan for the switch network.
- In addition to the SP Ethernet and switch network, often additional communications adapters such as ATM or FDDI adapters are installed in the SP nodes. If this is the case, then separate TCP/IP network addresses need to be assigned. Have these networks been considered?
- What domain name will be assigned to the SP?
- What IP networks, addresses, subnet masks and default gateways will be assigned to the SP networks?
- Will machines be configured as primary and secondary name servers?
- What MVS considerations are there? If you currently have an MVS system, and if you plan to move large amounts of data (many gigabytes) between the MVS system and the SP, you may need CLIO/S. CLIO/S provides high-speech, low-overhead transfers over fast channel-to-channel connections. Planning for CLIO/S requires participation by both MVS and SP system

planners. For more information on CLIO, refer to “Planning for IBM Client Input Output/Sockets (CLIO/S)” on page 145.

You may not have laid out your system requirements quite far enough yet to be able to answer all these questions fully. But do start to think about them and know that you will have to come back to them and fill in all the network information when the layout plan is complete. Also, read “Planning Your Network” on page 79 which will help you understand the SP network capabilities.

The worksheets for this question are with the worksheet for Question 7.

## Question 6. What are Your Disk Storage Requirements?

Consult with your system administrator to answer this question. You need to understand your existing environment to be able to project your future disk requirements. In planning how much disk space you need, you should be aware of the following considerations that relate to internal and external disk storage.

Study these considerations and record your answers. Later you'll fill them in on the worksheet, “Hardware Configuration By Node” on page 223.

Make sure you have two disks if you want alternate boot system images. See “multiple boot images” on page 21.

## Disk Space for Users' Home Directories

You need to decide where you will serve your users' home directories from; an existing server, or a new server.

## Disk Space for System Programs

Installing AIX and some subset of PSSP and related products consumes disk storage on each node. Use the tables in “Determining Space Requirements” on page 76 to calculate the disk storage needed for AIX and PSSP and the related products.

Think about the program products and applications you plan to install. How much space do you need for /**usr**, /, and other file systems? For the /**spdata** file system, note that you will need extra space on the control workstation and boot/install servers if more than one level of AIX or PSSP is maintained on the system.

Will your applications be installed in rootvg with the base AIX programs or will they be installed elsewhere? Decisions like these may help you decide whether to add additional internal disks. Adding additional disks gives you the flexibility to preserve the application installation in the event that a node requires a reinstallation or a service upgrade.

## Disk Space for Databases

Will you install any databases on your system? How many? How large? Are they production or development databases? What is the high availability strategy and do you require twin-tailed disks? What is the data protection strategy? Do you require disk mirroring or RAID 1 or RAID 5?

For each database you need to consider:

- How much temporary space is needed?
- How much space is needed for logging?
- How much space is needed for the database definition and data dictionary?
- How much space is required for rollback?

**Note:** If you plan to use twin-tailed disks or disk mirroring, you must also take into account what types and how many adapters you will need. This may later determine the node models you need because thin nodes have fewer adapter slots.

## Disk Requirements for the IBM Virtual Shared Disk

If an application exploits the use of the IBM Virtual Shared Disk, you should **not** place anything except IBM Virtual Shared Disks on disks allocated to IBM Virtual Shared Disks. In the implementation of the IBM Recoverable Virtual Shared Disk, the only support is for the recovery of IBM Virtual Shared Disks. Other filesystems should not reside on a IBM Virtual Shared Disk disk. All IBM Virtual Shared Disks must be defined on external disk storage drives. Data that resides on an internal disk will become unavailable if that node fails, whether or not the IBM Recoverable Virtual Shared Disk is in use.

## File System Requirements

You should plan ahead of time for expected growth of all your file systems. And, you should monitor your file system growth periodically and readjust your plans when necessary.

## Boot/Install Server Requirements

The number of boot/install servers and the network layout of their Ethernet connections can affect the efficiency of your system. See “System Topology Considerations” on page 69 for recommended boot/install configurations for various system sizes.

## External Disk Storage

If external disk storage is part of your system solution, you need to decide which type of the external disks offered for the SP best satisfies your needs.

One of the major decisions here is whether you want RAID (Redundant Arrays of Independent Disks) technology or not. RAID subsystems offer improved reliability over JBOD (Just a Bunch of Disks) subsystems. However, JBOD subsystems provide low cost disk storage media. Refer to the following table for more information on disk storage choices.

| Disk Storage | Description |
|---|---|
| 7134 | The 7134 subsystem, designed for a mix of I/O and throughput, provides low cost disk storage media and is employed where performance is not the critical characteristic of the parallel environment. The 7134 with up to 16 disks can support from 4.5GB to 72GB of data. |
| 7133 | If you require better performance, the 7133 Serial Storage Architecture (SSA) Disk may be the subsystem of choice for you. It provides more megabytes per second throughput at a higher cost than the 7134, but does not provide for high reliability. This is a good storage subsystem for transaction processing with small, random reads and writes, and for scientific environments. The 7133 can support from 4.5GB to 72GB of data per each SSA adapter. You can also connect up to 16 SSA adapters to a ring of disk drives. |
| 7137 Disk Storage | The 7137 subsystem supports both RAID 0 and RAID 5 modes. It can hold from 4 to 33 gigabytes of data (29GB maximum in RAID 5 mode). The 7137 is the low end model of RAID support. If performance is not critical but reliability and low cost are important, this is a good choice. |
| 7135 | If performance and high reliability are key requirements, the 7135 is the subsystem of choice. It supports RAID modes R0, R1, R3, and R5. It has a 20MB/second SCSI-DE interface.<br>**R0** 4.5 to 135GB of data<br>**R1** 4.5 to 67.5GB of data<br>**R3, R5** 4.5 to 108GB of data<br>The 7135's high availability features include:<br>• No single point of failure<br>• Redundant power supplies and fans<br>• A dynamically switched “spare” controller<br>• Hot-pluggable disk drives and controllers |

## External Disk Storage Worksheet

The following table shows how the `ABC Corporation` specified their external disk storage needs. Record your external disk storage needs on Worksheet 3, Table 38 on page 218. You'll fold that information into Worksheet 4, the “SP Planning Worksheet” on page 219.

*Table 6. ABC Corporations's External Disk Storage Needs*

**Worksheet 3**

**Check the external disk subsystems you require**

| Quantity | External Disk Subsystem | Disk Space (MB) |
|---|---|---|
| | 7133 (4.5 to 72GB) | |
| | 7134 (4.5 to 72GB) | |
| 1 | 7135 (4.5 to 135GB) | 90 MB |
| | 7137 (4 to 33GB) | |

## Question 7. What are Your Reliability and Availability Requirements?

What are your reliability and availability requirements? Who is going to use the SP? For some users reliability is not worth the cost. For others it is worth any cost and extremely important to keep their production system up and running. Two of the functions in PSSP that assist in reliability and availability are the High Availability Control Workstation and system partitions.

SP Switch systems provide enhanced availability.

## High Availability Control Workstation

One function providing enhanced reliability is the High Availability Control Workstation (HACWS) which basically provides a second control workstation that, in effect, eliminates the control workstation as a single point of failure. When the primary control workstation becomes unavailable, either through a planned event or a hardware or software failure, the SP high availability component detects the loss and shifts that component's workload to a backup control workstation.

To provide this extra reliability and eliminate the control workstation as a single point of failure, you need both extra hardware and software as summarized in Table 7.

*Table 7. Requirements for the High Availability Control Workstation*

| | |
|---|---|
| Software | An additional AIX 4.1 license |
| | 2 licenses for HACMP/6000 4.2; 5050 High Availability feature (1) |
| | 1 HACWS software feature 3936 |
| Hardware | A second control workstation |
| | HACWS Connectivity Feature |
| **Note:** (1) You do not need feature 5051. | |

Planning and using the HACWS will be simpler if you configure your backup control workstation identical to the primary control workstation. Some components must be identical, others can be similar. Wait until the last question about control workstation hardware and software to specify the components. For now, you need only decide if you need HACWS support. For more information, refer to Chapter 4, “Planning for a High Availability Control Workstation” on page 89.

## System Partitions

System partitions are another function that can aid in system availability. This function lets you logically divide the SP into non-overlapping groups of nodes called system partitions. You can then use a system partition to test new levels of AIX, PSSP, LPPs, application programs, or other software on a system currently running a production workload without disrupting that workload. Such a system partitions solution assumes that there are nodes available for the test system partition. A minimum system partition must consist of at least four slots.

Another good use for system partitions is to create multiple production environments with the same non-interfering characteristics that benefit a testing partition. With system partitions these environments are sufficiently isolated so that

the workload in one environment is not adversely affected by the workload in the other, especially for services whose usage is not monitored and not charged for, but which have critical implications for jobs performance, for example, the switch. System partitions let you isolate switch traffic in one system partition from the switch traffic in other system partitions.

Initially, the system is a single partition. The number of system partitions you can define is dependent upon the size of your SP. See Chapter 5, “Planning SP System Partitions” on page 101 for complete information about system partitions. If you decide you want system partitions, study that chapter in more detail before completing your system plan. For now, you need to decide only if it is something you want or need and how many system partitions you think you'll need (you can come back and modify these answers if you learn new information that affects your answer).

*Table 8. New Function Checklist*

| √ | **Function** |
|---|---|
| | High Availability Control Workstation |
| | System Partitions (1) |

**Note:** (1)If you specified that you needed **both** AIX 3.2.5 with PSSP 1.2 **and** AIX 4.1 with PSSP 2.1 in Table 37 on page 217, you must check this requirement.

## Question 8. How Many Nodes Do You Need?

Your answer to this question may be based on financial limits or it may be based on performance requirements. Keep in mind that the SP is “scalable” which means that you can add more nodes later. Your answers to the prior questions should have helped you determine the type of work for which you will be using the SP. For example, if you previously determined that you want to divide your system into partitions, this can affect the number of nodes you require. As mentioned previously, the RS/6000 SP is scalable so you can select fewer nodes now and add more later or select more now and scale down later.

Some helpful hardware reference information is included here to help you select nodes. Much more detail about the hardware is available in *IBM RISC System/6000 Scalable POWERparallel Systems: Site Planning*.

Along with deciding how many nodes you want, you must also decide what physical types of nodes you need. There are three physical types of nodes; wide, thin, and the 604 high node.

- Thin Node

  There are two types of thin nodes, Thin and Thin Node 2. The Thin nodes have 64 kilobytes of data cache and a 64 bit memory bus. This node is designed for users who require the highest number of processors per frame at the higher levels of computational performance. The Thin Node 2 nodes have 128KB data cache and the bandwidth has been doubled with the addition of a second path for memory and the integer and floating point units (128 bit memory bus). The Thin Node 2 performs at increased levels for most commercial applications and has better floating point performance due to the larger bus bandwidths and cache.

  Both thin node types support four MCA slots and up to two SCSI disks packaged internally.

- Wide Node

  Wide nodes occupy two slots in a frame and have more Micro Channel slots to allow greater attachment options. (This decision is basically the same one as choosing between a desktop or a deskside model in the RS/6000 line).

  The wide nodes have 256 kilobytes of data cache, eight MCA slots and up to four SCSI disks packaged internally. The wide nodes greatly expand the I/O and network server functions of the SP.

- 604 high Node

  The 604 high node is classified as a Symmetric Multi-Processing (SMP) system that can have 2, 4, 6, or 8 POWERPC 604 processors running at 112 MHz. The node includes 2 microchannel buses for I/O attachment including attachment to High Performance Switch and the SP Switch using the HPS-2 and SP Switch adapters, respectively. The 604 high node also includes a node supervisor through which hardware control and node conditioning are provided.

  The 604 high occupies two full drawers of a frame. This means that a maximum of four 604 high nodes can fit in a 79 inch frame. The 604 high node is supported in the 79 inch frame with or without the 16-port switch. It is not supported in the 49 inch frame and cannot be connected to the High Performance Switch-LC8 or the SP Switch-8. Power and Power2 nodes can exist in the same frame and in the same partition as the 604 high nodes.

However, the different physical sizes results in changes to the set of configurations which are supported.

There are several basic model classes in the RS/6000 SP system, from a single-frame entry system to a highly-parallel, large-scalable system. The basic model classes are listed in Table 9.

*Table 9. The Basic SP Model Switch Topology Classes*

| Model class | Description |
|---|---|
| Model 2Ax Class | Non-switched, 2-to-8 processor nodes, 49-inch frame (8 node total) |
| Model 20x Class | Non-switched, 2-to-64 processor nodes, 79-inch frame (8 node total) |
| Model 3Ax Class | High Performance Switch - 8-port switch, 2-8 processor nodes, 49-inch 1-frame system |
| | SP Switch - 8-port switch, 2-8 processor nodes, 49-inch 1-frame system |
| Model 3Bx Class | High Performance Switch - 8-port switch, 2-8 processor nodes, 79-inch 1-frame system |
| | SP Switch - 8-port switch, 2-8 processor nodes, 79-inch 1-frame system |
| Model 30x Class | High Performance Switch - single-staged switching, 2-to-80 processor nodes |
| | SP Switch - single-staged switching, 2-to-80 processor nodes |
| Model 40x Class | High Performance Switch - two-staged switching, 64-to-128 processor nodes (5 frames minimum for second staged switch) |
| | SP Switch - two-staged switching, 64-to-128 processor nodes (5 frames minimum for second staged switch) |

*Table 10 (Page 1 of 2). SP Model Node Summary Matrix*

| Model | Speed in MHz | Node Type (# of slots node occupies) | Minimum-Maximum Memory Per Node | Minimum-Maximum Disk Space Per Node |
|---|---|---|---|---|
| 202 | 66 | Thin (2) | 64MB to 512MB | 2GB to 9GB |
| 203 | 66 | Wide (1) | 64MB to 2GB | 2GB to 18GB |
| 204 | 66 | Thin 2 (2) | 64MB to 512MB | 2GB to 9GB |
| 205 | 77 | Wide (1) | 64MB to 2GB | 2GB to 18GB |
| 2A2 | 66 | Thin (2) | 64MB to 512MB | 2GB to 9GB |
| 2A3 | 66 | Wide (1) | 64MB to 2GB | 2GB to 18GB |
| 2A4 | 66 | Thin 2 (2) | 64MB to 512MB | 2GB to 9GB |
| 2A5 | 77 | Wide (1) | 64MB to 2GB | 2GB to 18GB |
| 302 | 66 | Thin (2) | 64MB to 512MB | 2GB to 9GB |
| 303 | 66 | Wide (1) | 64MB to 2GB | 2GB to 18GB |
| 304 | 66 | Thin 2 (2) | 64MB to 512MB | 2GB to 9GB |
| 305 | 77 | Wide 2 (1) | 64MB to 2GB | 2GB to 18GB |
| 3A2 | 66 | Thin (2) | 64MB to 512MB | 2GB to 9GB |

*Table 10 (Page 2 of 2). SP Model Node Summary Matrix*

| Model | Speed in MHz | Node Type (# of slots node occupies) | Minimum-Maximum Memory Per Node | Minimum-Maximum Disk Space Per Node |
|---|---|---|---|---|
| 3A3 | 66 | Wide (1) | 64MB to 512MB | 2GB to 18GB |
| 3A4 | 66 | Thin 2 (2) | 64MB to 512MB | 2GB to 9GB |
| 3A5 | 77 | Wide 2 (1) | 64MB to 2GB | 2GB to 18GB |
| 3B2 | 66 | Thin (2) | 64MB to 512MB | 2GB to 9GB |
| 3B3 | 66 | Wide (1) | 64MB to 512MB | 2GB to 18GB |
| 3B4 | 66 | Thin 2 (2) | 64MB to 512MB | 2GB to 9GB |
| 3B5 | 77 | Wide 2 (1) | 64MB to 2GB | 2GB to 18GB |
| 402 | 66 | Thin (2) | 64MB to 512MB | 2GB to 9GB |
| 403 | 66 | Wide (1) | 64MB to 2GB | 2GB to 18GB |
| 404 | 66 | Thin 2 (2) | 64MB to 512MB | 2GB to 9GB |
| 405 | 77 | Wide 2 (1) | 64MB to 2GB | 2GB to 18GB |
| 406 | 112 | 604 high node (4) | 64MB to 2GB | 2GB to 18GB |
| 206 | 112 | 604 high node (4) | 64MB to 2GB | 2GB to 18GB |
| 306 | 112 | 604 high node (4) | 64MB to 2GB | 2GB to 18GB |

## System-Wide Worksheets

Now it's time to take all the information you have thought about and start to lay out your system requirements on detailed worksheets. These worksheets are an invaluable tool for helping you plan your configuration and installation in detail. If you have not done so already, make copies of the worksheets in Appendix C, "SP System Planning Worksheets" on page 215. The worksheets in this chapter have been filled out for our hypothetical customer, the ABC Corporation. ABC's system-wide selections are in the "SP Planning Worksheet" on page 35.

You cannot have a combination of High Performance Switch and SP Switch adapters.

*Table 11. Overall System Information*

### SP Planning - Worksheet 4

**Customer Name** ABC Corporation **Date** August 20, 1996

**Customer Number** 999999

**Customer Contact** Jim Smith **Phone** 1-800-555-5678

**IBM Contact** Susann Burns **Phone** 1-800-555-6789

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **SP Model** | ___ 202 | ___ 302 | ___ 402 | ___ 2A2 | ___ 3A2 | ___ 3B2 | ___ 206 |
| | ___ 203 | _√_ 303 | ___ 403 | ___ 2A3 | ___ 3A3 | ___ 3B3 | ___ 306 |
| | ___ 204 | ___ 304 | ___ 404 | ___ 2A4 | ___ 3A4 | ___ 3B4 | ___ 406 |
| | ___ 205 | ___ 305 | ___ 405 | ___ 2A5 | ___ 3A5 | ___ 3B5 | |

| **Number of** Frames | **Number of** Switches | **Number of Thin Nodes** (F/C 2002) | **Number of Wide Nodes** (F/C 2003) | **Number of Thin Node 2s** (F/C 2004) | **Number of Wide Nodes** (F/C 2005) | **Number of 604 High Nodes** |
|---|---|---|---|---|---|---|
| 1 | 1 | 0 | 2 | 4 | 0 | 0 |

| **External Disk Storage** | **7133** | **7134** | **7135** | **7137** |
|---|---|---|---|---|
| | _____ | _____ | 1 90MB_ | _____ |

**Fill in the remainder of this chart after you place your order.**

**RS/6000 SP System Number** _____

**RS/6000 SP Purchase Order Number** _____

**Control Workstation System Number** _____

**Control Workstation Purchase Order Number** _____

**Peripheral Order Numbers** _____

Fill in Worksheet 4, "SP Planning" on page 219 with the heading information, the SP model, the number of frames and switches, and the number of each node type you need. If you selected an external disk in "Question 6. What are Your Disk Storage Requirements?" on page 27, copy the information from that table to Worksheet 4 on page 219. Once you place your order you can fill in the order numbers for handy reference.

## Completing the SP Node Layout Worksheets

To complete the Node Layout Worksheets, first you draw a diagram of your SP system. Then you add network information to that diagram. After that, you write your network information into the worksheets.

Our `ABC Corporation` drew a network in Figure 2 and Figure 3 on page 37. You'll fill in as many copies of Worksheets 5 and 6, Figure 54 on page 220 and Figure 56 on page 222 as you need.

Complete the SP Node Layout Worksheets as follows:

1. For each frame, fill in the frame number and the switch number on the line marked **Frame Number** or **Switch Number** at the bottom of the diagram.
2. Indicate whether each node is a wide, thin, or 604 high node using a unique identifier for each. For example, you could represent wide nodes with a *w*, thin nodes with a *t*, and 604 high nodes with an *h*. Slot numbers have been indicated on each frame diagram. Wide nodes occupy two slots and use the odd-numbered slot number. Cross out the even slot numbers in all wide nodes. 604 high nodes occupy four slots. Figure 2 shows a single frame with numbered slots for our customer, the `ABC Corporation`.

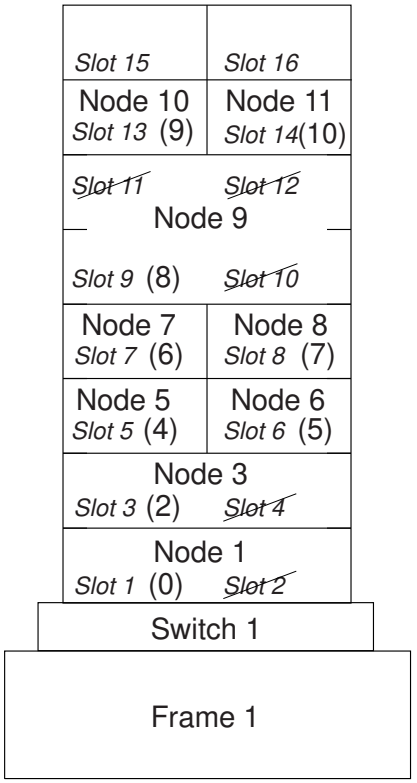
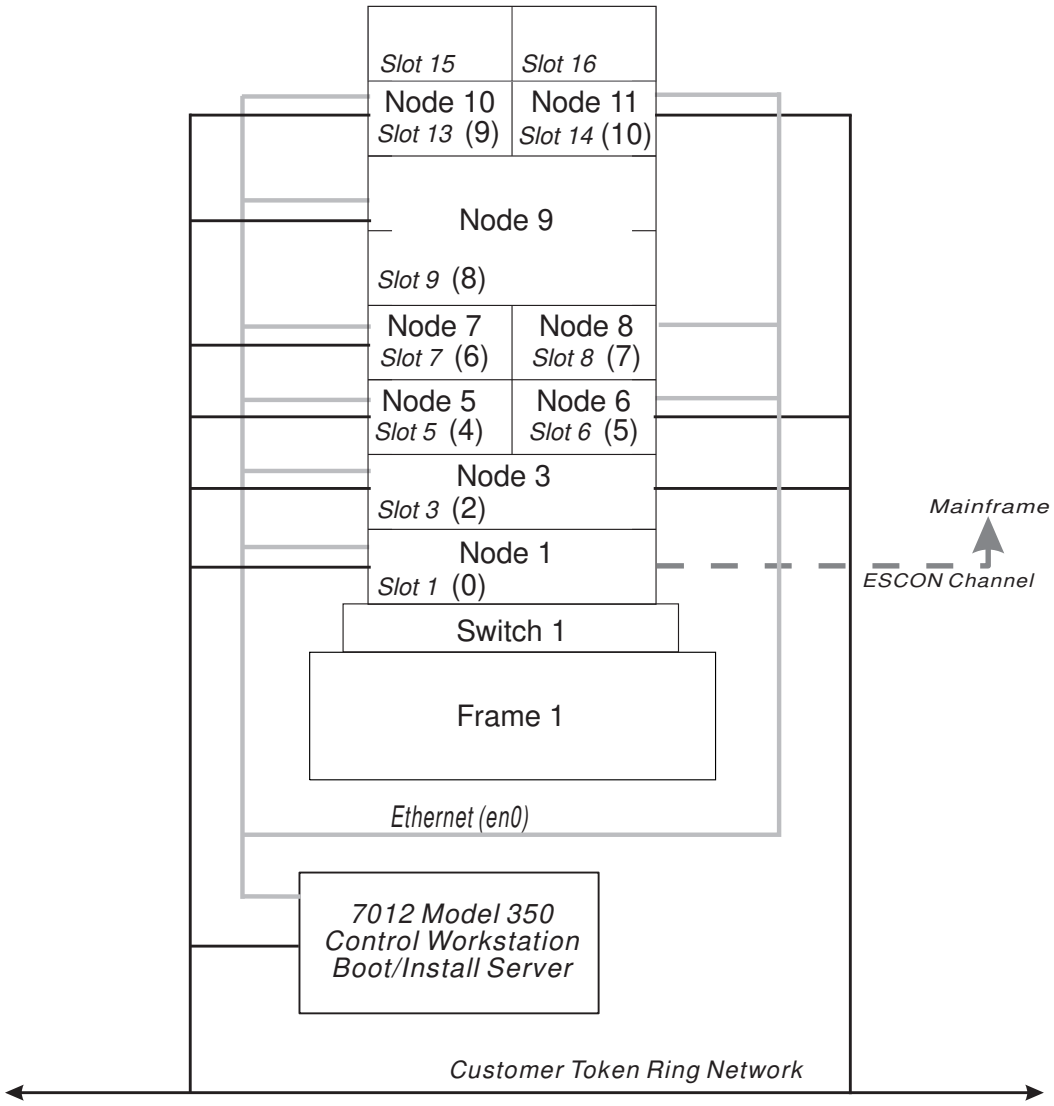



*Figure 2. Node Layout Example For The ABC Corporation*

3. Refer to "Understanding Node Numbering and Switch Node Numbering" on page 82 to learn how to determine the node number and the slot number and fill this information in the diagram.

   At this point, your layout should look something like Figure 3 on page 37.




| *Figure 3. The ABC Corporation Node Layout Example With Communications Information*

4. Sketch your SP Ethernet connections to each node and to the Control Workstation. Indicate specific adapter connections (for example, en0 and en1 connections). Refer to "System Topology Considerations" on page 69 for Ethernet tuning considerations.
5. Sketch your additional network connections.
6. Sketch connections to any routers, gateways, or networks.
7. Indicate network addresses, netmasks and hostnames for each subnet and node address on each node interface.

## Completing the High Performance Switch-LC8 and SP Switch-8 Frame Layout Worksheets

Use the following formula if you have a frame that has a High Performance Switch-LC8, an SP Switch-8, or is a 49" frame without a switch:

1. Assign the node in slot 1 to `switch_node_number` = 0.
2. Start a loop here. Check the next slot. If there is a node in the slot, assign it the last `switch_node_number` + 1. Repeat this loop until you reach the last slot in the frame (a system with this kind of switch can contain at most switch node numbers 0 through 7).

## Processor Memory

At the same time you decide what types of nodes and how many you want, you also need to decide how much processor memory each node will have and how much internal disk storage. For Thin Node 2, you also have the option of L2 cache. Each of these values will affect the performance of your system, so choose carefully. `ABC Corporation` made the choices in Table 12.

Once you decide on this information, fill in Worksheet 7, “Hardware Configuration by Node” on page 223. You may need multiple copies of this worksheet depending on the number of nodes you plan to install.

*Table 12. ABC Corporations's Choices For Hardware Configuration By Node*

**SP Hardware Configuration by Node - Worksheet 7**

**Frame Number** __1___ **Switch Number** __1___

| Slot Number | Node Number | Node Type | Processor Memory | Internal Disk | L2 Cache | Adapters |
|---|---|---|---|---|---|---|
| Slot 1 | 1 | wide | 256MB | 18GB | | token ring |
| Slot 2 | -- | | | | | |
| Slot 3 | 3 | wide | 256MB | 18GB | | token ring |
| Slot 4 | -- | | | | | |
| Slot 5 | 5 | thin 2 | 256MB | 9GB | 1MB | token ring |
| Slot 6 | 6 | thin 2 | 256MB | 9GB | 1MB | token ring |
| Slot 7 | 7 | thin 2 | 256MB | 9GB | 1MB | token ring |
| Slot 8 | 8 | thin 2 | 256MB | 9GB | 1MB | token ring |
| Slot 9 | 9 | 604 high node | 74-2GB | 2.2-66GB | | token ring<br>FDDI |
| Slot 13 | 10 | thin 2 | 256MB | 9GB | 1MB | token ring |
| Slot 14 | 11 | thin 2 | 256MB | 9GB | 1MB | token ring |
| Slot 15 | 12 | thin 2 | 256MB | 9GB | 1MB | token ring |
| Slot 16 | 13 | thin 2 | 256MB | 9GB | 1MB | token ring |

## Networking Information

Each adapter in each node, workstation, and router has an IP address. Each of these addresses should have a separate name associated with it. I1.host name

## Host Names

Independent of any of the network adapters, each processor has a *host name*. Usually the host name of a processor is the name given to one of the network adapters in the processor.

While completing these tables, keep in mind that the host name in the table is referring to the name given to that adapter. You need to select which of these adapter host names should be the one given to the processor. An application may require that the processor host name be the name associated with the adapter over which its traffic will flow. Put a check (√) in the column of the adapter that will be the host name.

Also keep in mind that, during installation and configuration, all addresses, including router address, must be resolvable into names, and vice versa. If your network administrator or support group provides name-to-address resolution through DNS, NIS, or some other means, then they need to plan for the addition of all these names to their servers before the system arrives.

`ABC Corporation` completed “Node Network Configuration Worksheet” on page 40. Review your network topology and fill in Worksheet 8, “Node Network Configuration Chart”, on page 223. Be sure to make extra copies of the chart before you completing it. You need a chart for every frame you configured. If you have additional network adapters planned for some or all of your nodes, you need to plan their network information on this worksheet also.

*Table 13. ABC Corporation*

# SP Node Network Configuration - Worksheet 8

**Company Name** __ ABC Corporation_____ **Date** __June 25, 1995 **Frame Number** _1__ **Token Ring Speed** __16

| | **SP Ethernet** *(en0 adapters)* **Netmask** __255.255.255.192__ | | **Default Route** | **Additional Adapter** **Netmask** __255.255.255.192__ | | |
|---|---|---|---|---|---|---|
| | **Hostname** [2] | **IP Address** | | **Adapter Name** | **Hostname** | **IP Address** |
| slot 1 | spnode01 | 129.40.60.2 | 129.40.60.1 | tr0 | sptok01 | 129.40.61.2 |
| slot 2 | -- | | | | | |
| slot 3 | spnode03 | 129.40.60.3 | 129.40.60.1 | tr0 | sptok03 | 129.40.61.3 |
| slot 4 | -- | | | | | |
| slot 5 | spnode05 | 129.40.60.4 | 129.40.60.1 | tr0 | sptok05 | 129.40.61.4 |
| slot 6 | spnode06 | 129.40.60.5 | 129.40.60.1 | tr0 | sptok06 | 129.40.61.5 |
| slot 7 | spnode07 | 129.40.60.6 | 129.40.60.1 | tr0 | sptok07 | 129.40.61.6 |
| slot 8 | spnode08 | 129.40.60.7 | 129.40.60.1 | tr0 | sptok08 | 129.40.61.7 |
| slot 9 | spnode09 | 129.40.60.8 | 129.40.60.1 | tr0 | sptok09 | 129.40.61.8 |
| slot 10 | | | | | | |
| slot 11 | | | | | | |
| slot 12 | | | | | | |
| slot 13 | spnode10 | 129.40.60.9 | 129.40.60.1 | tr0 | sptok10 | 129.40.61.9 |
| slot 14 | spnode11 | 129.40.60.10 | 129.40.60.1 | tr0 | sptok11 | 129.40.61.10 |
| slot 15 | spnode12 | 129.40.60.11 | 129.40.60.1 | tr0 | sptok12 | 129.40.61.11 |
| slot 16 | spnode12 | 129.40.60.11 | 129.40.60.1 | tr0 | sptok12 | 129.40.61.11 |

**1.** Wide nodes occupy two frame slots and use the *odd-numbered* slot number.
**2.** AIX is case sensitive. Use lower case for the hostname and addresses.

## Switch Worksheet

If you are planning to install an SP with a switch, remember that the advantage of the switch is that it, too, has its own subnet. You need to plan for this network now, too.

Do you plan to enable ARP over the switch? If not, you need to derive the switch IP addresses from the address of the first node plus the switch node number.

Make copies of Worksheet 9, “Switch Configuration ” on page 225 before you start. Our hypothetical `ABC Corporation` filled out the following chart.

If you do not plan to have a switch, you can skip this worksheet.

*Table 14. ABC Corporation's Choices For The Switch Configuration Worksheet*

**Switch Configuration - Worksheet 9**

**Frame Number** 1 **Switch Number** 1 **Netmask** 255.255.255.192

| Slot Number | Switch Node Number | Hostname | IP Address |
|---|---|---|---|
| Slot 1 | 0 | sphps01 | 129.40.62.2 |
| Slot 2 | -- | | |
| Slot 3 | 2 | sphps03 | 129.40.62.3 |
| Slot 4 | -- | | |
| Slot 5 | 4 | sphps05 | 129.40.62.4 |
| Slot 6 | 5 | sphps06 | 129.40.62.5 |
| Slot 7 | 6 | sphps07 | 129.40.62.6 |
| Slot 8 | 7 | sphps08 | 129.40.62.7 |
| Slot 9 | -- | | |
| Slot 10 | | | |
| Slot 11 | | | |
| Slot 12 | | | |
| Slot 13 | | | |
| Slot 14 | | | |
| Slot 15 | | | |
| Slot 16 | | | |

**Note:** Refer to Table 13 on page 40 to see how this table could be completed.

## Specifying Adapters

If you want to order other adapters for your nodes when you place your SP order, you can use Worksheets 10 and 10-A. The choices selected by `ABC Corporation` are noted on the following chart.

*Table 15 (Page 1 of 2). Adapters Supported*

**Adapters Supported - Worksheet 10**

| √ | Adapter | Feature code | Wide node[1] | Thin node[2] | Number of slots Required | AIX support level |
|---|---|---|---|---|---|---|
| | Internal Ethernet | Standard | | x | 0 | 4.1.4 |
| | FCS Dwtr | 1902 [6][7] | x | x | 1 | 4.1.4 |
| | FCS 1GB | 1904 [7] | x | x | 1 | 4.1.4 |
| | FCS 266MB | 1906 | x | x | 1 | 3.2.5 |
| | SCSI-2 Ext I/O | 2410 | x | x | 1 | 4.1 |
| | SCSI Turbo | 2412 | x | x | 1 | 4.1 |
| | SCSI F/W DIF | 2415 | x | x | 1 | 4.1 |
| | SCSI F/W DIF | 2416 | x | x | 1 | 4.1 |
| | SCSI EXT I/O | 2420 | x | x | 1 | 4.1 |
| | FDDI D/R | 2723 [3] | x | x | 1 | 4.1 |
| | FDDI S/R | 2724 | x | x | 1 | 4.1 |
| | HIPPI | 2735 | x | | 5[4] | 4.1 |
| | ESCON Chan Em. | 2754 | x | x | 2 | 3.2.5 |
| | BMCA | 2755 | x | x | 1 | 4.1 |
| | ESCON CNTRL | 2756 | x | x | 2 | 4.1 |
| | Token Ring | 2970 | x | x | 1 | 4.1 |
| | Token Ring | 2972 | x | x | 1 | 4.1 |
| | Ethernet | 2980 | x | x | 1 | 4.1 |
| | Ether BNC | 2994 | x | x | 1 | 4.1 |
| | ATM 100 | 2984 | x | x | 1 | 4.1 |
| | ATM 155 | 2989 [7] | x | x | 1 | 4.1 |
| | HI-P Subsys | 6212 | x | x | 1 | 4.1 |
| | HPS-2 (TB2) | 4018 | x | x | 1 | 4.1 |
| | SPSw (TB3) | 4020 | x | x | 1 | 4.1 |
| | SSA | 6214 | x | x | 1 | 4.1 |
| | SSA | S6216 [7] | x | x | 1 | 4.1 |
| | SSA 4RD | 6217 | x | x | 1 | 4.1 |

*Table 15 (Page 2 of 2). Adapters Supported*

| | | | | | | |
|---|---|---|---|---|---|---|
| | 8-port async | 2930 [8] | x | x | 1 | 4.1 |

**Note:**

[1]: There are a total of 7 MCA slots available per wide node.
[2]: There are a total of 4 MCS slots available per thin node.
[3]: FDDI D/R adapters (F/C 2723) have a mandatory prerequisite of FDDI S/R adapters (F/C 2724)
[4]: The HIPPI feature uses 3 physical MCA slots and requires a total of 5 MCA slots to satisfy power and thermal requirements.
[6]: FCS Daughter card F/C 1902 does not require a micro channel slot.
[7]: These adapters are not supported on any 62MHz node, 201, 301, 2001, 1001.
[8]: This adapter has a co-requisite of 2995 feature cable.

*Table 16. 604 High Node Adapters Supported*

## High Node Adapters Supported - Worksheet 10-A

| √ | Adapter | Feature code | Quantity Per High Node |
|---|---|---|---|
| | Ethernet | F/C 2980 | 1-12 |
| | SCSI F/W Dif | F/C 2416 | 0-14 |
| | SCSI Turbo | F/C 2412 | 0-14 |
| | SCSI-2 F/W | F/C 2415 | 1-14 |
| | BMCA | F/C 2755 | 0-2 |
| | ESCON CU | F/C 2756 | 0-4 |
| | ESCON CE | F/C 2754 | 0-4 |
| | HIPPI | F/C 2735 | 0-2 |
| | FDDI S/R | F/C 2724 | 0-8 |
| | FDDI D/R | F/C 2723 | 0-8 |
| | FCS Dutr | F/C 1902 | 0-14 |
| | FCS 1GB | F/C 1904 | 0-4 |
| | SSA 2way | F/C 6214 | 0-8 |
| | SSA 8way | F/C 6216 | 0-8 |
| | SSA 4p Raid | F/C 6217 | 0-8 |
| | Token Ring | F/C 2970 | 0-8 |
| | Auto Token Ring | F/C 2972 | 0-8 |
| | 8-port Async | F/C 2930 | 0-14 |
| | ATM | F/C 2984 | 0-2 |
| | ATM 155 | F/C 2989 | 0-2 |
| | Hi-P Subsys | F/C 6212 | 0-8 |
| | 4 prt BusMstr | F/C 2700 | 0-8 |
| | 128 async | F/C 8128 | 0-7 |
| | RS422 | F/C 2940 | 0-15 |
| | X.25 | F/C 2960 | 0-8 |
| | Dig Trunc | F/C 6305 | 0-2 |
| | Portmastr | F/C 7006 | 0-8 |
| | Dig Trunk | F/C 6300 | 0-2 |
| | HPS-2 Adpt | F/C 4018 | 1-1 |
| | HPS-3 Adpt | F/C 4020 | 1-1 |

**Note:** If you order the High Performance Switch, you must order F/C 6212 for every node. If you order the SP Switch, you must order F/C 4020 for every node.

## Question 9: Defining Your System Images

After determining the quantity and the type of nodes you need, you now decide what system image you want installed on which nodes. The system image is the collection of SP components that is stored at a node. You can have a different system image on every node, the same system image on every node, or any combination in between. As you make this decision, there are performance and system management implications to consider.

The biggest implication here is that if all the node images are the same, the installation and backup/restore functions are much easier. As discussed in the disk storage question, whether you install your applications on each node or on one node greatly affects the amount of disk storage space required for each node. While local node copies are quicker, they require separate upgrades and system backups.

If you decided to have system partitions, you need to decide how many partitions you want and what nodes go with what partition. To fully understand partitioning, read Chapter 5, “Planning SP System Partitions” on page 101 before you make any decisions about system partitions.

## Specifying More Than One System Image

Worksheets 11, 12, and 13 help you lay out each system image that you want to define for the SP nodes. The control workstation is defined in the next section. Make as many photocopies of the worksheets as you require; fill out one for each image you plan.

IBM provides a minimal system image (SPIMG) with the PSSP. It may or may not contain all the parts of AIX that you want installed on each node. For example, it does not contain AIXwindows support. If you want only the AIX components in the SPIMG, you do not have to complete the component worksheets.

To specify system images, the `ABC Corporation` filled out Worksheet 11, Table 17 on page 46. To specify PSSP components, they filled out Worksheet 13, Table 18 on page 47.

Complete the component lists starting on page 230. Specify the components that match the AIX level you want. The components that come automatically with the system are already checked off. If you want just the SPIMG, simply reply **yes** to the SPIMG question. If you want other components, check off the additional pieces you want.

When you come to the question about where you want to install the rootvg, you are deciding on which internal disk drive the SPIMG should be placed. You may be planning to install external disks, but IBM recommends that the SPIMG be placed on an internal drive.

*Table 17. ABC Corporation's Specifying the System Images*

| Specifying System Images - Worksheet 11 | |
|---|---|
| **System Image Name** | SPIMG1 |
| **AIX Level** | 4.1 |
| **Partition Number** | 1 |
| **Install on Node Numbers** | 1,3,5,6,7,8 |
| **Specify *internal* disks where you wish to install rootvg** | disk 1 |
| **Check here if you want only the SPIMG minimal image** ____ | |
| **IBM Licensed Products** | |
| PSSP | |
| DB2 Parallel Edition | |
| IBM C for AIX | |
| IBM LoadLeveler | |
| CLIO/S | |
| IBM Parallel Environment for AIX | |
| IBM Recoverable VSD | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| **Additional AIX Components** | |
| bosext2.ate.obj- async terminal emulator | |
| bosext2.dosutil.obj - DOS utilities | |
| | |
| **Other Applications** | |
| NFS | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

*Table 18. File Set List for PSSP 2.2*

# PSSP 2.2 File Sets - Worksheet 13

**System Image Name** __spimg1_____

| √ | File Set | Description |
|---|---|---|
| | ssp.st | Low level application programming interface for loading, unloading, and querying the job switch resource table. |
| | ssp.ha | Availability subsystems which include heartbeat, group services, and event management. |
| | ssp.perlpkg | Perl4 and Perl5 |
| | ssp.pman | Problem management |
| | ssp.clients | SP Authenticated Client Commands |
| | ssp.basic | SP System Support Package |
| | ssp.css | SP Communication Subsystem Package (only if switch installed) |
| | ssp.sysman | Optional System Management Programs |
| | ssp.sysctl | SP Sysctl Package |
| | ssp.authent | SP Authentication Server |
| | ssp.public | Public Code Compressed Tarfiles |
| | ssp.docs | SP man Page and Info Files |
| | ssp.gui | SP System Monitor Graphical User Interface and Perspectives |
| | ssp.jm | SP Job Manager Package |
| | ssp.top | SP System Partition Support |
| | csd.vsd | IBM Virtual Shared Disk Package |
| | csd.cmi | Centralized Management Interface for IBM Virtual Shared Disk |
| | csd.hsd | IBM Virtual Shared Disk Data Striping package |
| | ssp.csd.vsd | IBM Virtual Shared Disk Package |
| | ssp.csd.cmi | SP Centralized Management Interface Package for IBM Virtual Shared Disk |
| | ssp.csd.hsd | IBM Virtual Shared Disk Data Striping package |
| | ssp.csd.gui | Perspectives for IBM Virtual Shared Disk |
| | ssp.mte | Magnetic Tape Extensions |
| | ssp.hacws | High Availability Control Workstation Support |
| | ptpe | |
| | ptpe.gui | |

**Note:**

For information on whether these file sets are installed on the control workstation and the node, refer to chapter 2 of the *Installation and Migration Guide*.

## Question 10. What Do You Need for Your Control Workstation?

When planning your control workstation you can view it as a server to the SP system applications. The subsystems running on the control workstation are the SP server applications for the SP nodes. The nodes are clients of the control workstation server applications. The control workstation server applications provide configuration data, security, hardware monitoring, diagnostics, a single point of control service, and, optionally, job scheduling data and a time source.

As in all servers the reliability of the servers will affect the availability of the clients. In this case the availability of the SP system as a whole is affected. See "Eliminating the Control Workstation as a Single Point of Failure" on page 91 for more details and what happens when a single control workstation configuration has a control workstation failure. When configuring your control workstation, availability of the resources should be a key consideration.

IBM offers multiple ways to configure the control workstation and each way enables a different level of reliability for the control workstation and the SP system:

- Single control workstation without using AIX fault tolerant functions.

  This configuration has no redundant or backup functions. Its advantage is a configuration that costs less and is less complex. Its disadvantage is that a single hardware or software component failure can affect the availability of the SP system.

- Single control workstation that utilizes AIX fault tolerant functions.

  This configuration has some redundant or backup functions but does not protect against all failures. Its disadvantage is that most software failures and base system hardware failures are not protected against. Its advantage is that it is a slightly more costly configuration than the single control workstation without using AIX fault tolerant functions but still less costly than an HACWS configuration.

- An HACWS (High Availability Control Workstation) configuration.

  This configuration provides the most reliability for the control workstation and the SP system. All hardware and software components are redundant which allows recovery from any single failure. Its disadvantage is that it costs more than the previous two control workstation configurations. Its advantage is that the SP system is better suited for production environments with this feature enabled.

  For more information on planning for HACWS, refer to Chapter 4, "Planning for a High Availability Control Workstation" on page 89.

## Changes for the Control Workstation

The major planning changes for the control workstation are the migration from a /**usr** server, support for system partitions, the support for High Availability Control Workstation, additional lppsource directories, and SPOTs.

### Migrating from /usr

If your AIX 3.2.5 and SP 1.2 was configured with a /**usr** server, you now must plan /**usr** space at the control workstation and at each node. See "Changes to /usr" on page 162 for more /**usr** migration information.

## Software and Hardware Requirements for Control Workstations

### Required Software

- 5765-393 AIX Operating System, Release 4.1 server
- 5765-529 PSSP 2.2
- 5765-423 C for AIX 3.1.3 Compiler or 5765-421 C Set ++ for AIX 3.1.3.
- IBM Performance Aide for AIX Version 4.1 (perfagent.server)

  This product provides the capability to monitor your SP system's performance, collects and displays statistical data for SP hardware and software, and simplifies run-time performance monitoring of a large number of nodes.
- One license is required for the SP. Concurrent licensing is recommended so the one license can float across the SP nodes and the control workstation. It is needed for **crash** to work effectively and to obtain IBM software support for the SP system. You can order the license as part of the SP system. It is not specifically required on the control workstation if a license server for AIX for C exists some place in the network and the SP is included in the license server's cell.

### Optional Software

- IBM AIX Hypertext Information Base Libraries V1.1 (5696-919) provides softcopy of the AIX V4.1 documentation. Some of these books are not available in hardcopy with your software order and must be ordered separately. Although this is optional, its inclusion is strongly recommended.

**Note:** The control workstation and its software are *not* part of the SP package and must be ordered separately. Make sure you have ordered them in time to arrive when the rest of your SP does. The HACWS software option is a priced feature of the PSSP, must be purchased in addition to the SP hardware, and is supplied on separate install media.

**Note:** For software requirements for the HACWS, refer to "Software Requirements for HACWS Control Workstation Configurations" on page 95.

### Supported Control Workstations

The SP system requires a RISC System/6000 workstation as a point-of-control for managing, monitoring, and maintaining the SP frames and individual processor nodes. See Chapter 4, "Planning Your Control Workstation" for more planning information about the control workstation. The control workstation you supply connects to each frame through an RS-232 cable and the SP Ethernet.

The following RS/6000s are supported as control workstations:

- RS/6000 7011 Model 25X
- RS/6000 7012 Model 3XX
- RS/6000 7030 Model 3XX

- RS/6000 7013 Model 5XX
- RS/6000 7009 Model C10 and C20
- RS/6000 7025 F30  PSSP 2.2 only
- RS/6000 7024 E20  PSSP 2.2 only
- RS/6000 7024 E30  PSSP 2.2 only

  These models require a 7010 Model 150 X-Station and display. Other models and manufacturers that meet or exceed this model may be used. An ASCII terminal is required as the console.
- RS/6000 7015 Model 9XX, R10, R20, or R24 in either the 7015-99X or 7015-R00 rack.

### Supported Control Workstations in Limited Environments

The following RS/6000 models are supported in limited environments:

- RS/6000 7006-41T/W is a supported control workstation if the High Availability Control Workstation (HACWS) feature is never going to be configured.
- RS/6000 7006-42T/W is a supported control workstation if the High Availability Control Workstation (HACWS) feature is never going to be configured or a new AIX 3.2.5 partition is not required. If an AIX 3.2.5 partition exists, it must have a 3.2.5 boot and install server as one of the SP nodes.

### Unsupported Control Workstations

The following RS/6000 models are **not supported** as control workstations:

- RS/6000 7008 Model XXX
- RS/6000 7011 Model 22X
- RS/6000 7011 Model M2X
- RS/6000 7011 Model 23X
- RS/6000 7007 Model N40
- RS/6000 7020 Model 40P
- RS/6000 7012 Model G30, G40
- RS/6000 7013 Model JXX
- RS/6000 7015 Model R40
- RS/6000 7015 Model R30
- RS/6000 7247-82X
- RS/6000 7248-1XX Model 43P
- RS/6000 7249-851

Any RS/6000 not listed in either the supported, unsupported, or limited environment section above is not supported.

The following table lists the maximum capacity of various model RISC System/6000 machines when used as the control workstation for the RISC System/6000 SP family of computers. You can use this table as a guide to determine if an existing workstation is appropriate.

Not all models in the following table, however, have actually been tested. The recommendations that follow are based on experience and input from various sites and are applicable **ONLY** when these models are used as a control workstation. If other roles or applications are run on the machine, such as running as a gateway, print server, or other service, these recommendations do not apply.

This list is subject to change at any time.

| Model | Processor | MHz | Racks (Max) | Nodes (Max) | Memory (Min) | Notes |
|---|---|---|---|---|---|---|
| N40 | | | | | | Not Supported |
| M20 | | | | | | Not Supported |
| 220 | | | | | | Not Supported |
| 320H | Power | 25 | 4 | 24 | 96MB | |
| 520H | Power | 25 | 4 | 25 | 96MB | |
| 230 | | | | | | Not Supported |
| 530H | Power | 33 | 4 | 32 | 96MB | |
| 340 | Power | 33 | 5 | 33 | 96MB | |
| 350 | Power | 41 | 5 | 40 | 96MB | |
| 550 | Power | 41.7 | 6 | 41 | 96MB | |
| 950 | Power | 42 | 6 | 43 | 96MB | |
| 355 | Power | 41 | 2 | 32 | 96MB | Using internal serial ports |
| 55L | Power | 41.6 | 7 | 54 | 96MB | |
| 340H | Power | 42 | 7 | 54 | 96MB | |
| 560 | Power | 50 | 8 | 60 | 96MB | |
| 365 | Power | 50 | 2 | 32 | 96MB | Using internal serial ports |
| 360* | Power | 50 | 9 | 65 | 96MB | |
| R10 | Power | 50 | 9 | 65 | 96MB | |
| 570 | Power | 50 | 9 | 65 | 96MB | |
| 970B | Power | 50 | 9 | 67 | 96MB | |
| 250 | 601 | 66 | 2 | 32 | 96MB | Using internal serial ports |
| 25W | 601 | 66 | 2 | 32 | 96MB | Using internal serial ports |
| 25T[1] | 601 | 66 | 2 | 32 | 96MB | Using internal serial ports |
| 25S | | | | | | Not Supported |
| 375 | Power | 62 | 2 | 32 | 96MB | Using internal serial ports |
| 370* | Power | 62 | 10 | 80 | 96MB | |
| 580 | Power | 62.5 | 16 | 122 | 96MB | |
| 980B | Power | 62.5 | 16 | 122 | 96MB | |
| 40P | | | | | | Not Supported |
| 41W* | 601 | 80 | 13 | 100 | 96MB | NOT supported for HACWS |
| 41T* | 601 | 80 | 13 | 100 | 96MB | NOT supported for HACWS |
| C10* | 601 | 80 | 13 | 100 | 96MB | |
| 58H | POWER2 | 55.5 | 32 | 256 | 128MB | |
| 380 | POWER2 | 59 | 26 | 206 | 128MB | |
| 3AT | | | | | | Not Supported |
| 390* | POWER2 | 67 | 32 | 256 | 128MB | |
| 3BT | | | | | | Not Supported |

| Model | Processor | MHz | Racks (Max) | Nodes (Max) | Memory (Min) | Notes |
|---|---|---|---|---|---|---|
| 590 | POWER2 | 66.6 | 64 | 512 | 128MB | |
| 59H | POWER2 | 66 | 64 | 512 | 128MB | |
| R20 | POWER2 | 66 | 64 | 512 | 128MB | |
| 39H* | POWER2 | 67 | 64 | 512 | 128MB | |
| 3CT | | | | | | Not Supported |
| 990 | POWER2 | 71.5 | 64 | 512 | 128MB | |
| R24 | POWER2 | 71.5 | 64 | 512 | 128MB | |
| 591 | POWER2 | 77 | 64 | 512 | 128MB | |
| 43P-100 | | | | | | Not Supported |
| 42W* | 604 | 120 | 16 | 128 | 96MB | NOT supported for HACWS |
| 42T* | 604 | 120 | 16 | 128 | 96MB | NOT supported for HACWS |
| C20 | 604 | 120 | 16 | 128 | 96MB | |
| 43P-120 | | | | | | Not Supported |
| 43P-133 | | | | | | Not Supported |
| J30 | | | | | | Not Supported |
| G30 | | | | | | Not Supported |
| R30 | | | | | | Not Supported |
| E20 | 604 | 120 | 16 | 128 | 96 | |
| E30 | 604 | 133 | 32 | 256 | 96 | |
| F30 | 604 | 133 | 32 | 256 | 96 | |

**Note:** * Needs an external ethernet router for > 64 nodes.

[1] Model 25T requires an Ethernet/IEEE 802.3 Tranceiver, Type 10Base2 for BNC and 10BaseT for twisted pair.

## Control Workstation Minimum Requirements

The minimum requirements for the control workstation are:

- At least 96MB of main memory. For better performance, 128MB of main memory is recommended.
- Four gigabytes of disk storage. If the SP is going to use an HACWS configuration, you can configure 2GB of disk storage in the rootvg volume group and 2GB in an external volume group.

  Because the control workstation is used as a NIM server, the number of unique filesets required for all the nodes in the SP system may be larger than a normal single system. You should plan to reserve 2GB of disk storage for the filesets, and 2GB for the operating system. This will allow adequate space for future maintenance, system **mksysb** images and LPP growth. Keep in mind that if you have nodes at different levels of PSSP, each node requires its own LPP source which will take up extra space.
- Physically installed with the RS-232 cable to within 12 meters of each SP frame.
- Equipped with the following I/O devices and adapters:
  - Three and a half inch diskette drive
  - Four or eight millimeter (or equivalent) tape drive
  - One RS-232 port for each SP frame
  - Keyboard and mouse
  - Color graphics adapter and color monitor. An X-station model 150 and display are required if a RS/6000 that does not support a color graphics adapter is used.

– An appropriate network adapter for your external communication network. The adapter does not have to be on the control workstation. If it is not on the control workstation, the SP Ethernet must extend to another host that is not part of the SP. A backup control workstation does not satisfy this requirement. This additional connection is used to access the control workstation from the network when the SP nodes are down.

– Ethernet adapters for connection to the SP Ethernets.

  Each Ethernet net adapter can have only 30 network stations on a given Ethernet cable. The control workstation and any routers are included in the 30 stations.

– A SCSI CD-ROM device

  This device is highly recommended but not required. It can be used to hold the Info Explorer database. Also, installation of AIX 4.1 is much faster with CD-ROM media.

### HACWS Minimum Requirements

The following requirements are in addition to the previous requirements:

- 2 Supported RS/6000 workstations

  Each of these RS/6000s must have the same set of I/O required for control workstations as listed above. They may be different models but the tty configuration **must** be exactly the same on each control workstation. The disks should be of the same type and configured the same way on both control workstations to allow the hdisk*x* numbers to be consistent between the two control workstations.

- External disk storage that is supported by HACMP and the control workstation being used:

  – 2 external disk controllers and mirrored disks are strongly recommended but not required.

    **Note:** If a single external disk controller is used the control workstation single point of failure has not been eliminated but moved to the disk subsystem.

- The HACWS connectivity feature #1245 on each SP frame

- An additional RS232 connection for HACMP communication is needed if target mode SCSI is not being used for the HACMP communication.

## Hardware Controller Interface Planning

Each frame of the SP must be attached to the control workstation by an RS-232 line connected to a serial port on the workstation.

**Note:** Most RISC System/6000 Systems are equipped with two serial ports as standard equipment. You may use these serial ports for the first two frames. On HACWS configurations one of these serial ports may be used for HACMP communication which will reduce the number of frames to one for RS/6000s such as the model 250 or any supported RS/6000 that has only two adapter slots in it.

If you are attaching more than two frames or if the two standard serial ports on the control workstation are needed for other uses, then you must add a

multiport serial adapter to the control workstation to provide the necessary connection points:

**FC 2930** 8-port asynchronous adapter
**FC 2995** multiport interface cable

or
**FC 2955** 16-port asynchronous adapter
**FC 2996** multiport interface cable

An alternative way to provide connection points and increase performance is to install the IBM 128-Port Async Subsystem, consisting of:

**FC 8128** 128-Port Asynchronous Controller
**FC 8130** Remote Asynchronous Node 16-Port EIA-232
**FC 8134** 128-Port Asynchronous RJ45 Connector

Complete one set of worksheets for each control workstation you will configure. The `ABC Corporation` completed the worksheets “SP Control Workstation Image” Worksheet 14, on page 55 and “SP Control Workstation Network” Worksheet 15, on page 55.

You should complete Worksheet 14 “SP Control Workstation Image”, on page 306 and Worksheet 15 “SP Control Workstation Network”.

*Table 19. Worksheet*

# Worksheet 14

# SP Control Workstation Image

| | | |
|---|---|---|
| **Control Workstation Name** | | _____cws01 |
| **Model** | ___7012 - Model 350 | |
| **Install rootvg on disk** | | ___1___ |
| **Disk Space** | ___4GB | |
| **Memory Size** | __128MB | |
| **Hardware Options and Adapters** | | |
| **Type** | | **Quantity** |
| ATM | | |
| Ethernet | | 1 |
| FDDI | | |
| Token Ring; Speed ___16MB_____ | | 1 |
| Multiport Serial Adapters | | |
| 8 mm tape drive | | 1 |
| CD-ROM | | 1 |
| **IBM Licensed Products** | | |
| | AIX | |
| | PSSP | |
| | C for AIX | |
| | LoadLeveler | |
| | perfagent | |
| | | |
| | | |
| | | |
| | | |
| **Other Applications** | | |
| √ | NFS | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

*Table 20. Control Workstation Network Worksheet*

# SP Control Workstation Network - Worksheet 15

**Name** _ABC Corporation_____ **Date** __June 25, 1995

**System Name** __spsystem1____ **Control Workstation Name** __cws01__

| Frame Hardware Control Connections (RS-232) | | | | Control Workstation Network Connections [b] | | | |
|---|---|---|---|---|---|---|---|
| **Frame Number** | **Serial Port for RS-232 Control Line[a]** | **tty Device** | | **Adapter** | **Hostname** | **IP Address** | **Netmask** |
| 1 | s1 | tty0 | | en0 | spcws01 | 129.40.60.1 | 255.255.255.192 |
| | | | | en0 | spcws01 | 129.40.60.1 | 255.255.255.192 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**a.** Use the SMIT **tty** menu or the **mkdev** command to configure these ports.
**b.** Use the SMIT **mkinet** menu or the **mkdev** command to configure your SP Ethernet connection.

# Chapter 3. Defining the Configuration that Fits Your Needs

This chapter provides the information you need to plan to configure your system before installing it. There is an SP Site Environment Planning Worksheet in Appendix C, “SP System Planning Worksheets” on page 215 to use with this chapter. Once completed, you'll use this worksheet to:

- Review your installation plan with your IBM installation team
- Help you configure your system during the installation.

Make copies of Worksheet 16, **SP Site Environment** (page 309) before you begin.

## Software Planning's Impact on Site and Hardware Planning

Planning and configuring your SP system software has an impact on the SP site plan you select. The following sections discuss some of the system planning decisions you need to make, and their impact on performance and site (hardware) planning.

## Planning Your Site Environment

You plan your site environment by entering site configuration information on the control workstation through SMIT panels or by using the **spsitenv** command. SMIT is the System Management Interface Tool, supplied as part of the PSSP software.

The installation and configuration scripts read the configuration information data and customize the SP configuration according to your choices. The entries you put on the worksheet are the entries you'll make on the SMIT panels.

You can easily change the choices discussed in the following sections any time after the installation. If you are unsure about any of these options, you can safely select the defaults, then change your selections later.

### Using the Site Environment Worksheet

The following sections help you make decisions about your site environment. These sections are listed in the same order as the items in the **SP Site Environment Worksheet** on page 309. A brief description of the function of each area along with a discussion of the alternatives should give you enough information to fill out the worksheet. Detailed information about these and other system administration issues is in the section on managing the SP system in the *Administration Guide*.

Remember, the defaults are designed to provide a workable SP system. You can change them later, if necessary.

© Copyright IBM Corp. 1996

# Understanding Network Install Image Choices

The *install_image* attribute lets you specify the name of the default network install image to be used for any SP node when the install image field is not set. The default is **bos.obj.ssp.414**, shipped with the SP System.

If you configure one or more nodes of your SP System as boot/install servers, each will act as an intermediate repository for a network install image of the AIX operating system. This network install image is a single file that occupies significant space on the file system of the boot/install server on which it resides.

You can reclaim this disk space by setting *remove_image* to **true**, which deletes this network install image after all new installation processes complete. Alternatively, you can retain the image to improve the speed of a successive install that uses this same image.

**Note:** This does not apply to the control workstation. The network install images are never automatically deleted from the control workstation.

## Site Environment Worksheet Entries

You can set two attributes for these options. *install_image* lets you set the name of the default image. *remove_image* specifies what to do with the image after all installations are complete.

*Table 21. Network Install Image Choices*

| | **Worksheet Entries To Be Filled In** |
|---|---|
| **To do this....** | *remove_image* |
| Remove the network install image after all installs have completed | **true** |
| Do not remove the network install image | **false** (default) |

**Note:**

- Change default attribute values to suit your environment.
- Blank entries imply that you make no substitutions for these values.

## Understanding Time Service Choices - Network Time Protocol (NTP)

By default the SP system uses Network Time Protocol (NTP) to synchronize the time-of-day clocks on the control workstation and SP nodes. There are several ways in which you may currently be synchronizing the time-of-day in your existing computing environment:

- You may already be using NTP, either locally or through the Internet
- You may be using some other time service software
- You may not have an established method for synchronizing the system clocks on the computing systems throughout your environment.

Kerberos ticket expiration depends on proper time synchronization, so the SP system provides several options for time keeping:

- If you have an established NTP time server, you can use it to synchronize and manage time on the SP system.
- You can choose an NTP time server from the Internet.
- You can run NTP locally on the SP system to generate a consensus time.
- You can choose not to use NTP at all, relying on another method at your site.

> **Note**
>
> The SP machines do not have system batteries. If you choose not to use NTP, you must have another way to manage clock synchronization.

- You cannot choose the control workstation or backup control workstation to be the time master.

See the chapter on managing NTP in the the *Administration Guide*.

### High Availability Control Workstation Considerations

If installing the High Availability Control Workstation and you select **timemaster** to use as your site's existing NTP time server, both control workstations must use the site time server.

If you have installed the High Availability Control Workstation and use the Internet configuration, both control workstations get time from the Internet. This assumes both control workstations have access to the Internet.

### Site Environment Worksheet Entries

There are three attributes to set for NTP. *ntp_version* defaults to **3** (the version shipped with the SP System). If your installation is using an earlier version of NTP, change this value. The other two attributes are described in Table 22 on page 62.

*Table 22. Time Service Choices*

| | Worksheet Entries To Be Filled In | |
|---|---|---|
| **To do this....** | *ntp_config* | *ntp_server* |
| Use your site's existing NTP time server to synchronize the SP system clocks. | **timemaster** | *hostname* of your current NTP time server |
| Use an NTP time service from the Internet to synchronize the SP system clocks. | **internet** | *hostnames* of time servers on the Internet* |
| Run NTP locally on the SP to generate a consensus time. | **consensus** (default) | |
| Do not use NTP on the SP; instead, use some other method to synchronize system clocks. | **none** | |

**Note:**

- Change default attribute values to suit your environment.
- Blank entries imply that you make no substitutions for these values.
- * Refer to **README.public** in **/usr/lpp/ssp/public** for information on Internet time servers.

## Understanding User Directory Mounting Choices—Automount Daemon (Amd)

Amd is an automatic file system mounter that you can use to mount users' home directories and other file systems dynamically as they are referenced. Amd manages directories specifically defined in the Amd map files. Using Amd on the SP system is optional.

The Amd daemon runs on the control workstation and on every node in the SP system. Amd works with NFS (Network File Systems) to mount or AFS to link directories on demand when they are first referenced and unmount or unlink them after a period of inactivity.

The SP system gives you the option of using Amd to provide remote access to users' home directories and their files. Alternatively, you can provide your own technique for mounting these directories.

See the chapter on managing Amd in the *Administration Guide*.

### Site Environment Worksheet Entries

Only one attribute applies to the Amd option.

*Table 23. User Directory Mounting Choices - Amd*

| | **Worksheet Entries To Be Filled In** |
|---|---|
| **To do this....** | *amd_config* |
| Use **Amd** supplied with SP Parallel System Support Programs | **true**(default) |
| Use some other means of mounting user directories to the SP | **false** |

**Note:**

- Change default attribute values to suit your environment.
- Blank entries imply that you make no substitutions for these values.

# Understanding Print Management Choices

Print files created on the SP system must be routed to a printer. As an alternative to managing print queues and printer configuration files for each node in your SP system, the SP includes an optional set of print management programs that you can use to collect print output and direct it to a print host. The SP print management package are programs that replace standard AIX print commands. These programs bypass the standard AIX print subsystem and route print output to your print server.

If you choose to use the Print Management Service to spool print output to one or more print servers, you can use the Print Management Service in either **open** or **secure** mode.

Open mode requires all users to have **rsh** privileges to the print hosts. Secure mode denies users **rsh** privileges; however, it requires the use of a special user account, with a default userid of **prtid**, to transfer the jobs to the print host. In secure mode, all print jobs are *owned* by this special user account. Your third option is to not use the SP print subsystem and use some other means of handling print output from your SP system. Standard AIX print queue support may be adequate for small systems.

See the chapter on managing print services in the *Administration Guide*.

## Site Environment Worksheet Entries

You have three options for handling print output.

*Table 24. Print Management Choices*

| | **Worksheet Entries To Be Filled In** | |
|---|---|---|
| **To do this....** | *print_config* | *print_id* |
| Use the SP print subsystem in open mode | **open** | |
| Use the SP print subsystem in secure mode | **secure** | **prtid** (default) (userid of your print host) |
| Do not use the SP print subsystem | **false** (default) | |

**Note:**

- Change default attribute values to suit your environment.
- Blank entries imply that you make no substitutions for these values.

## Understanding User Account Management Choices

User account management for the SP system is designed to fit in with your current computing environment. If you already have procedures in place for managing user accounts, you can configure the SP system to use them. Alternatively, you can use the set of commands and tools provided with the SP for this purpose. The SP uses a single /**etc**/**passwd** file replicated across all nodes in the SP system using the file collection technology. If you are using Network Information Service (NIS), these commands will utilize NIS. A set of customer commands is provided to interface to this function.

These options are offered to help you manage user accounts. These involve passwords and directory paths. Read the brief descriptions that follow and record your choices on the Site Environment Worksheet.

***Password Management:*** The *passwd_file* lets you specify the name of your password file.

The default name of the password file is /**etc**/**passwd**.

The *passwd_file_loc* attribute should contain the hostname of the machine where you maintain your password file. This defaults to your control workstation. The value of the *passwd_file_loc* cannot be one of the nodes in the SP system.

***Home Directories:*** Specify a default location for user home directories in the *homedir_server* attribute. If you are using Amd, the user management commands will use this hostname when building Amd maps. If you do not specify a default, the user management commands assume the host on which you enter the commands. You can override this value when adding or modifying a user account with the **spmkuser** and **spchuser** commands.

Use the *homedir_path* attribute to specify the path of user home directories. The default base path for user home directories is /**home**/*localHostname*. Change this value if you wish to set a different path as the default for your site. You can also override the default path with the **home** attribute on the **spmkuser** and **spchuser** commands.

See the chapter on managing accounts in the *Administration Guide*.

### Site Environment Worksheet Entries

Five attributes apply to SP User Management, but four of them are used only if you set *usermgmt_config* to **true**.

*Table 25. User Account Management Choices*

| | **Worksheet Entries To Be Filled In .....** | | | | |
|---|---|---|---|---|---|
| **To do this...** | *usermgmt_config* | *passwd_file_loc* | *passwd_file* | *homedir_server* | *homedir_path* |
| Do not use the SP user account management software | **false** | | | | |
| Use the SP user account management software | **true**(default) | password server hostname (ctl wkstn - default) | name of the password file **(/etc/passwd)** (default) | hostname of the home directory server *(ctl wkstn)* (default) | **/home/**<name of your home directory server> |

**Note:**

- Change default attribute values to suit your environment.
- Blank entries imply that you make no substitutions for these values.

# Understanding System File Management Choices—File Collections

The SP file collection technology simplifies the task of maintaining duplicate files across the nodes of the SP system. File collections provide a single point of control for maintaining a consistent version of one or more files across the entire system. You can make changes to the files in one place and the system replicates the updates on the other copies.

The files that are required on the control workstation, the file servers and the SP nodes are grouped into file collections. A file collection consists of a directory of files which includes special master files that define and control the collection.

The file collection structure is created along with the initial installation and configuration of your SP system. You must decide which files to specify for replication.

See the chapter on managing file collections in *Administration Guide*.

## Site Environment Worksheet Entries

The SP system gives you the option of using file collections or not using them. If you choose to use them you must specify a unique (unused) userid for the file collection daemon along with a unique (unused) port through which to communicate.

*Table 26. System File Management Choices*

| | **Worksheet Entries To Be Filled In** | | |
|---|---|---|---|
| **To do this....** | *filecoll_config* | *supman_uid* | *supfilesrv_port* |
| Do not use the SP file collection technology | **false** | | |
| Use the SP file collection technology | **true** (default) | unique user ID (default **102**, username **supman**) | unique port number (default **8431**) |

# Understanding Accounting Choices

The accounting utility lets you collect and report on individual and group use of the SP system. This accounting information can be used to bill users of the system resources or monitor selected aspects of the system's operation.

Because the level of hardware resources is probably not distributed evenly across your SP system, you may want to charge different rates for different nodes. SP accounting lets you define *classes* or groups of nodes for which accounting data is merged, providing a single report for the nodes in that class. In addition, you can suppress or disable the collection of accounting data. Individual nodes within a class may be enabled or disabled for accounting.

## Site Environment Worksheet Entries

The following attributes apply to SP accounting, but are used only if you set *spacct_enable* to **true**. Use *spacct_actnode_thresh* to specify the minimum percentage of nodes for which accounting data must be present. Use *spacct_exclusive_enable* to specify whether, by default, separate accounting records are generated for jobs having exclusive use of a node.

Use *acct_master* to specify which node is to act as the accounting master. The default value is **0** (the control workstation).

*Table 27. Accounting Choices*

| | **Worksheet Entries To Be Filled In .....** | | | |
|---|---|---|---|---|
| **To do this...** | *spacct_enable* | *spacct_actnode_thresh* | *spacct_exclusive_enable* | *acct_master* |
| Do not use the SP accounting | **false** (default) | | | |
| Use the SP accounting | **true** | **80** | **false** (default) | **0** |

**Note:**

- Change default attribute values to suit your environment.
- Blank entries imply that you make no substitutions for these values.

For information on this utility and how to set up an accounting system, see the chapter on accounting in the *Administration Guide*, and *AIX Version 4.1 System Management Guide*.

## Planning Your Network

This section contains some hints, tips and other information to help in tuning the SP system. These sections provide specific information on the SP and its subsystems. By no means is this section complete and comprehensive, but it addresses some SP-specific considerations. Refer to the *AIX Versions 3.2 and 4.1 Performance Tuning Guide* for additional AIX tuning information.

## System Topology Considerations

When configuring larger systems, you need to consider several topics when setting up your network. These are SP Ethernet, outside network connections, routers, gateways, and the High Performance Switch traffic.

When configuring the SP Ethernet, the most important consideration is the number of subnets you configure. Because of the limitation on the number of simultaneous network installs, the routing through the SP Ethernet can be complicated. Usually the amount of traffic on this network is low.

If you connect the SP Ethernet to your external network, you must make sure that the user traffic does not overload the SP network. If your outside network is a high speed network like FDDI or HIPPI, routing the traffic to the SP Ethernet can overload it. For gateways to FDDI and other high speed networks, you should route traffic over the switch. You should configure routers or gateways to distribute the network traffic so that one network or subnet is not a bottleneck.

If you expect a lot of traffic, then you should configure several gateways. You can monitor all the traffic on these networks using the standard network monitoring tools. For more information on these tools, refer to the *AIX Versions 3.2 and 4.1 Performance Tuning Guide*.

## Boot/Install Server Requirements

When planning for your SP Ethernet topology you should consider your network install server requirements. The network install process uses the SP Ethernet for transferring the install image from the install server to the SP nodes. Running lots of concurrent network installs will exceed the capacity of the SP Ethernet. The following are recommended guidelines for designing the SP Ethernet topology for efficient network installs. Many of the configuration options will require additional network hardware beyond the minimal node and control workstation requirements. There are also network addressing issues regarding to consider.

The boot/install server for the nodes in a PSSP 3.2.5 system partition must be on a node within that system partition.

## Single Frame Systems

For small systems, you can use the control workstation as the network install server. This means that the SP Ethernet is a single network connecting all nodes to the control workstation. When installing the nodes, you should limit yourself to installing 8 nodes at a time because this is the limit of acceptable throughput on the Ethernet. Figure 4 on page 70 shows an Ethernet topology for a single-frame system.

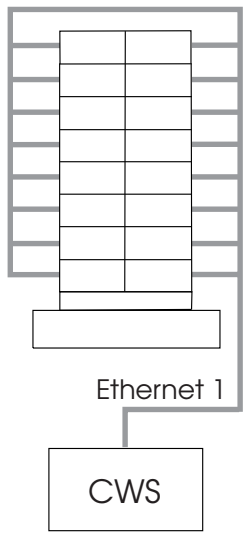



*Figure 4. Ethernet topology for a single-frame SP*

An alternative way to configure your system is to install a second Ethernet adapter in your control workstation, if you have an available I/O slot, and use two Ethernet segments to the SP nodes. Each network should be connected to half of the SP nodes. When network installing the frame, you can install all 16 nodes at the same time. Figure 5 shows this alternative Ethernet topology for a single-frame system.

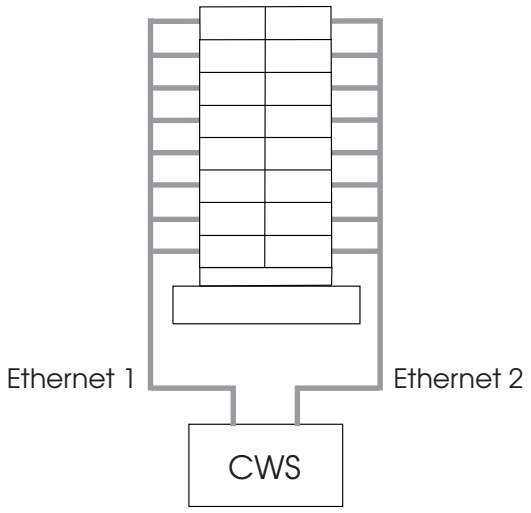



*Figure 5. Ethernet topology for a single-frame SP*

You have to set up your SP Ethernet routing so nodes on one Ethernet can communicate to nodes on the other network. You also need to set up your network mask so that each SP Ethernet is its own subnet within a larger network address. Consult your local Network Administrator about getting and assigning network addresses and network masks.

## Multiple Frame Systems

For multiple frame systems, you wants to spread the network traffic over multiple Ethernets, and keep the maximum number of simultaneous installs per network to eight. You can use the control workstation to network install specific SP nodes which will be the network install servers for the rest of nodes.

Following are three ways to accomplish this.

1. The first method uses a control workstation with one Ethernet adapter for each frame of the system, and one associated SP Ethernet per frame. So, if you have a system with four frames as in Figure 6, the control workstation must have enough I/O slots for four Ethernet adapters, and each adapter connects one of the four SP frame Ethernet segments to the control workstation. Using this method, you install the first eight nodes on a frame at a time, or up to 32 nodes if you use all four Ethernet segments simultaneously. Running two installs will install up to 64 nodes. Figure 6 shows an Ethernet topology for this multiple-frame system.

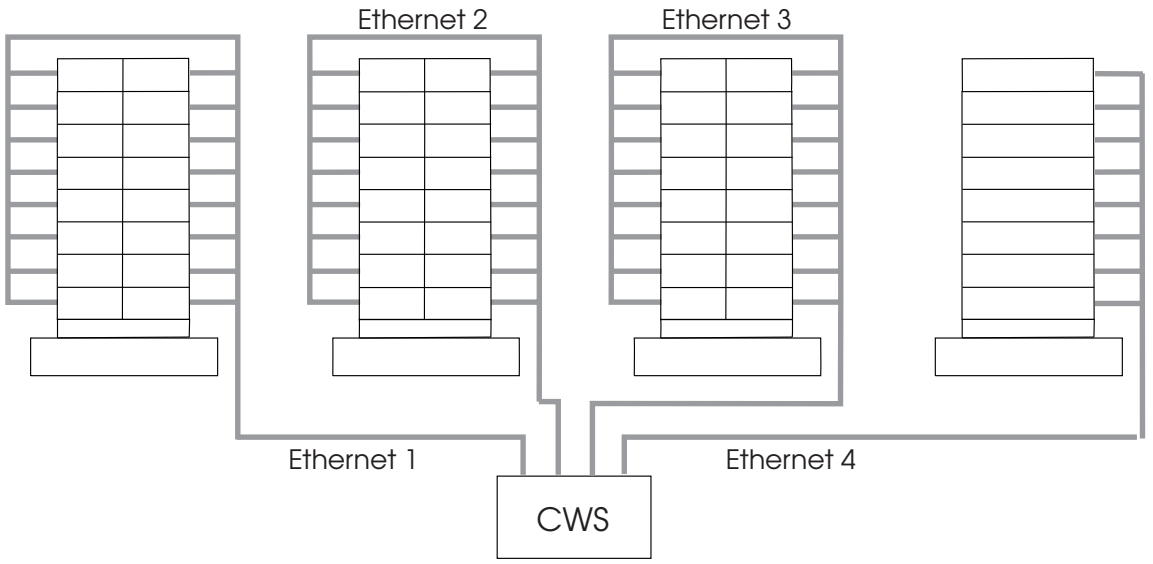



*Figure 6. Method 1 Ethernet topology for a multiple-frame SP*

Once again, you will have to set up your SP Ethernet routing so nodes on one Ethernet can communicate to nodes on another. You also need to set up your network mask so that each SP Ethernet is its own subnet within a larger network address. Consult your local Network Administrator about getting and assigning network addresses and network masks.

This method is applicable up to the number of slots your control workstation has available.

2. A second approach designates the first node in each frame as a network install server, and then the remaining nodes of that frame are set to be installed by that node. This means that, from the control workstation, you will have an SP Ethernet segment connected to one node on each frame. Then the network install node in each frame has a second Ethernet card installed which is connected to an Ethernet card in the rest of the nodes in the frame. Figure 7 on page 72 shows an Ethernet topology for this multiple-frame system.

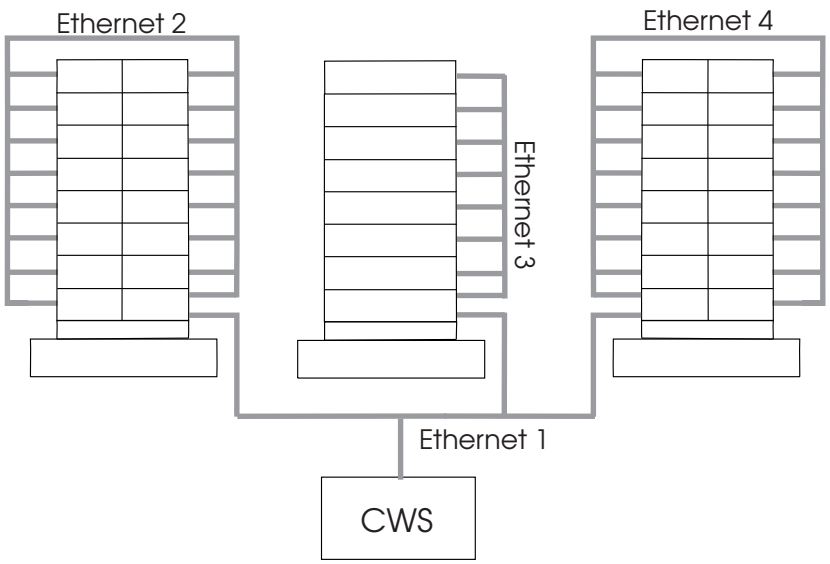



*Figure 7. Method 2 Ethernet topology for a multiple-frame SP*

When using this method, installing the nodes requires that you first install the network install node in each frame. The second set of installs will install up to eight additional nodes on the frame. The last install, if needed, installs the rest of the nodes in each frame.

Be forewarned that this configuration usually brings performance problems due to two phenomena:

a. All SP Ethernet traffic (installs, SDR activity, POE, etc.) is routed through the control workstation. The single control workstation Ethernet adapter becomes a bottleneck, eventually.

b. An application running on a node which produces a high volume of SP Ethernet traffic (for example, LoadLeveler) causes all subnet routing to go through the one control workstation Ethernet adapter. Moving the subject application to the control workstation may cut that traffic in half, but the control workstation must be large enough to accommodate that application.

You can improve the performance here by adding an external router, similar to that described in method 3.

3. A third method adds an external router to the topology of the previous approach. This router is made part of each of the frame Ethernets, so that traffic to the outside need not go through the control workstation. If the control workstation may also be attached externally, providing another route between nodes and the control workstation. Figure 8 on page 73 shows this Ethernet topology for such a multiple-frame system.

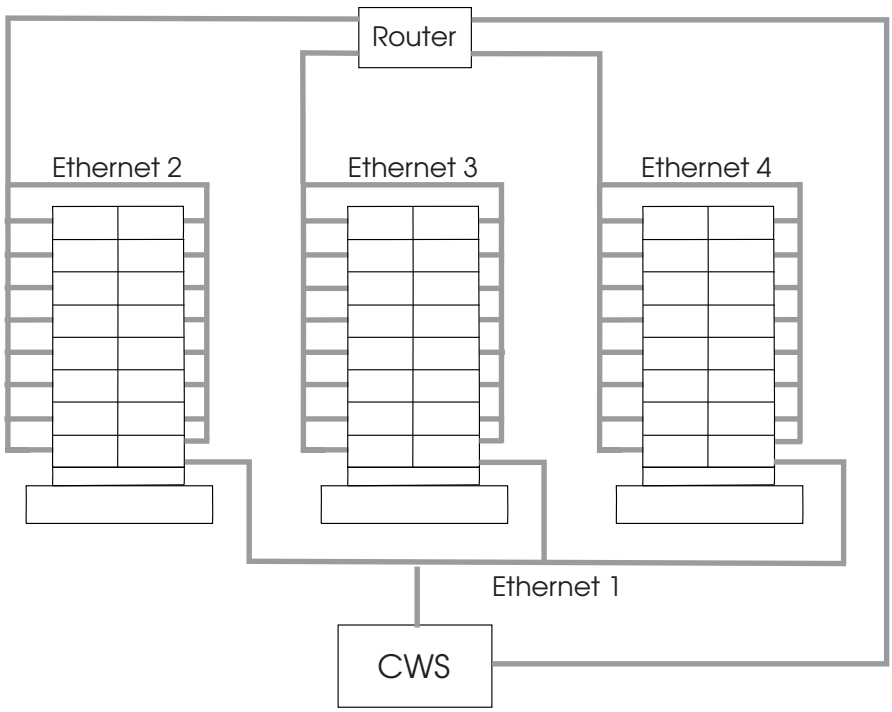



*Figure 8. Method 3 Ethernet topology for a multiple-frame SP*

An alternative to the router in this configuration is an Ethernet switch, which could have a high-speed network connection to the control workstation.

## Future Expansion Considerations and Large Scale Configurations

If your configuration will grow over time to a large configuration, you might want to dedicate your network install nodes in a different manner.

For very large configurations you might want to dedicate a frame of nodes as designated network install nodes, as shown in Figure 9 on page 74. In this configuration, each SP Ethernet from the control workstation is connected to up to eight network install nodes in a frame. These network install nodes are in turn connected to additional frames.

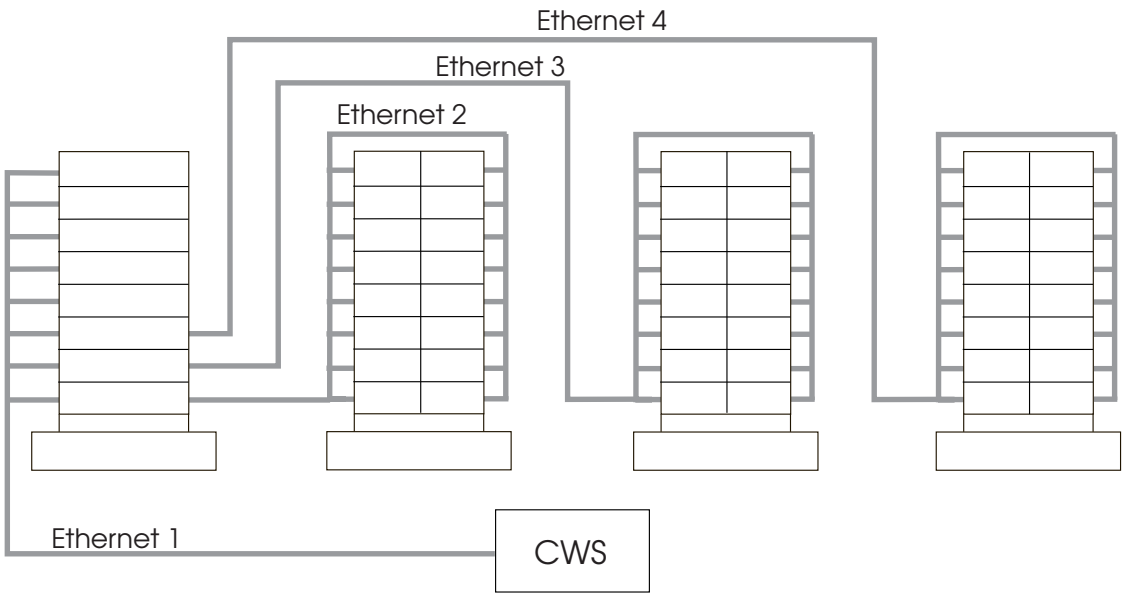



*Figure 9. Boot Server Frame Approach*

The advantage of this is that when you add an additional frame to your SP configuration, all you need to do is connect the new frame to one of the network install nodes, and reconfigure the system.

The network install procedure for this system is the same as for multiple frame systems. You first install the network install servers at a rate of eight per SP Ethernet segment. The network install servers then install eight other nodes until all nodes are installed.

The network address usually used for the SP Ethernet is a class C internet address. This address has a limit of 256 individual addresses before you need to add additional network addresses for the SP Ethernet. If your system is expected to grow beyond this number of nodes, you should plan with your Network Administrator additional network addresses for future SP Ethernet expansion. This will save you from having to re-assign the SP Ethernet addresses when you reach the address limit. In a system that consists of just Ethernet and the High Performance Switch, you cannot optimize so that you achieve peak performance on both networks. You have to decide which network you want to be affected.

## Location and Reference Rate of Customer Data

Customer application data can be delivered to applications running on the SP from file servers. These file servers can be either internal SP nodes or separate external systems. The location of the data, how often you refer to it, and whether it is accessed in read-only or both read and write modes affect the performance of applications using this data. Applications that have a high data reference rate, especially those that read and write data, benefit from having the data closely located to the node on which the application executes. The “co-location” of data and applications minimizes the amount of network processing required to move the data to and from its file server.

## Home Directory Server Planning

When planning for home directory servers, you must determine how much traffic will be generated by requests from the nodes to the server. Because some home directories are NFS, AFS, or DFS-mounted, you need to determine the amount of traffic in operations per second.

If the amount of traffic is greater than the capacity of a single network, you need to add additional networks and divide the number of nodes per network to the server. If the amount of traffic is greater than the capacity on the server, you need to configure additional servers, each connected to all networks.

## Authentication Servers

When you install the SP system, you must define one or more authentication servers. Authentication provides a more secure SP system by verifying the identify of clients that access key systems management facilities. Your SP system's control workstation can be an authentication server, as can other independent workstations. The SP nodes should not be used as secondary servers. At least one secondary server is recommended for improved availability and possibly improved performance. You can install and configure PSSP authentication servers or integrate your SP system into an existing authentication domain, such as an AFS cell. If you choose to use AFS (Version 3.4 for AIX) authentication servers, note in particular the section on the assignment of TCP/IP port numbers in the **/etc/services** file.

You should carefully consider whether the SP control workstation will be an authentication server. You may want to set up your servers on independent RS/6000 workstations that are isolated by physical location or have limited network access. Your primary authentication server must be installed and operating before you install and configure your control workstation, unless it will be the primary server.

See *AIX Version 4.1 System Management Guide* and the *Administration Guide* for more information.

## Understanding Node Hard Disk Choices

The *install_disk* attribute determines which disks are used to create the root volume group (**rootvg**) and to transfer the **mksysb** image during AIX network installation of a node. The default value of this attribute is **hdisk0**. Depending on your environment, you may have the installation include another hard disk.

If you plan to use the Alternate Boot System Image ability, the choice of two levels of software to boot per node, you must use only one disk in the *install_disk* attribute.

You may use more than one disk when the **mksysb** image is larger than the disk or when you need the root volume group to span multiple disks. The first disk in a node is not necessarily **hdisk0**. When you boot up a node, the first disk found is **hdisk0**. If you have a fast, wide external disk attached to a node, it may come up as **hdisk0**.

Check your disks to ensure your install image is on internal disks.

If you do not have either of these requirements, you should not install on more than one disk. If you have another disk, you can define a different volume group on that disk and import it. This lets you reinstall the node and import the volume group without having to back up and restore the data on the non-install disk.

To change the *install_disk* attribute, use the **spbootins** command with the **-h** option. See *IBM RISC System/6000 Scalable POWERparallel Systems: Command and Technical Reference* for more information on the **spbootins** command.

## Determining Space Requirements

The PSSP is packaged as the following installation images, **pssp**, **spimg**, **ssp.csd**, and **ssp.mte**. The following tables and calculations indicate the approximate space requirements.

### Estimating Requirements for lppsource

The **lppsource** is a required resource for the Network Installation Management facility used to install AIX on the nodes. The amount of space this resource uses depends on how you use the resource. In addition, if you have multiple lppsource files, each lppsource takes up additional space.

You can download all of the AIX file sets from the AIX installation media. Although this takes more space than the minimal required file sets, this may save time and effort if you intend to use **installp** for additional file sets that are not already installed on your nodes. This is the recommended method because it makes it easier to perform additional **installp** installations.

Alternatively, you may download only the AIX file sets required by NIM to perform the mksysb installations on the nodes. The list of the minimal AIX file sets required appears in the Installation Guide, Chapter 2, which defines how to download the file sets.

Downloading all of the AIX file sets requires approximately 1.5GB of disk space.

Downloading only the minimal AIX file sets requires approximately 450MB.

You also need to determine what lppsource levels you need. In general, you will need one lppsource level for each AIX level that you intend to install (AIX 4.1.4, 4.1.5, 4.2.0 and so on). Each level will take approximately the same amount as described previously.

### Estimating the Node Installation Image Requirements

When installing the nodes, a **mksysb** image is installed. The **mksysb** images are stored on the control workstation. **mksysb** images can vary in size from less than 100MB to larger than 700MB. If you intend to install one image on some nodes and another image on other nodes then you must also take into account the extra space requirements for multiple images.

## Other installp Image Requirements

If you want to install additional Licensed Program Products (LPP) that are not part of the AIX installation media and are not included in the PSSP LPP, then you should also include the space that they require in your calculations. For example, POE, PVME, C++ are all additional LPP's that would require space in **spdata**.

## Combining the Space Requirements

Use the following calculations to estimate the space needed:

```
lppsource + mksysb_images + pssp_lpp_image =total_additional_space
```

The minimum space required for PSSP is shown in the following example:

```
450MB     + 130MB                   + 50MB                 = 630MB
lppsource + PSSP spimg mksysb image + PSSP install fileset = Minimum
                                                             Space
```

Table 28 indicates the amount of space the image takes up prior to installation. See Table 29 on page 78 for the amount of additional space required after installing a particular image.

## Space Required for Storing installp Images

*Table 28. Space Required for Storing installp Images*

| installp Image | Space Required | Description |
|---|---|---|
| ssp | 115 MB | This image must be stored on the control workstation. The name of the image file is pssp.installp. |
| ssp.mte | 465 KB | This image can be stored on the control workstation or any other machine. |
| spimg | 130 MB + | This image must be stored on the control workstation. |
| ssp.csd | 2.6 MB | This image can be stored on the control workstation or any other machine. |
| ssp.hacws | 794 KB | This image must be stored on the control workstation. |
| ptpe | 6 MB | This image must be stored on the control workstation. |

## Space Used by Individual File Sets

*Table 29. Space Used by Individual File Sets*

| Space Used by PSSP image: ssp | |
|---|---|
| **File Set** | **Total Storage** |
| ssp.clients | 1 MB |
| ssp.basic | 7 MB |
| ssp.sysman | 7MB |
| ssp.css | 10 MB |
| ssp.jm | 5 MB |
| ssp.public | 26 MB |
| ssp.gui | 8 KB |
| ssp.docs | 61 MB |
| ssp.sysctl | 4 MB |
| ssp.authent | 540 KB |
| ssp.top | 18 MB |
| ssp.top.gui | 23 MB |
| ssp.st | 2 MB |
| ssp.ha | 23 MB |
| ssp.perlpkg | 43 MB |
| ssp.pman | 19 MB |
| **Space Used by PSSP image: ssp.mte** | |
| **File Set** | **Total Storage** |
| ssp.mte | 4 MB |
| **Space Used by PSSP image: spimg** | |
| **File Set** | **Total Storage** |
| spimg | |
| **Space Used by PSSP image: ssp.csd** | |
| **File Set** | **Total Storage** |
| ssp.csd.vsd | 2 MB |
| ssp.csd.cmi | 5 MB |
| ssp.csd.hsd | 3 MB |
| ssp.csd.sysctl | 2 MB |
| ssp.csd.gui | 5 MB |
| **Space Used by PSSP image: ssp.hacws** | |
| **File Set** | **Total Storage** |
| ssp.hacws | 6 MB |
| **Space Used by PSSP image: ptpe** | |
| **File Set** | **Total Storage** |
| ptpe | 9 MB |
| ptpe.gui | 10 MB |
| ptpe.docs | 16 MB |
| **Note:** The total storage can cross multiple file systems. | |

## Planning Your Network

This section discusses what you need to know to plan your network configuration. Instructions for completing the remaining system planning worksheets begin in Chapter 2, “Defining the System that Fits Your Needs” on page 9 and are summarized in Appendix C, “SP System Planning Worksheets” on page 215.

## Name, Address, and Network Integration Planning

You must assign IP addresses and host names for each network connection on each node and on the control workstation in your SP system. This repeats information contained in “Completing the SP Node Layout Worksheets” on page 36. This repetition is important because of the information's importance.

Because you probably want to attach the SP system to your site networks, you need to plan how this will be done. You need to decide:

- What routers and gateways you will use
- What default and network routes you need on your nodes
- How you will establish these default and network routes (that is, using **routed** or **gated** daemons or using explicit route statements).

You need to ensure that all of the addresses you assign are unique within your site network and within any outside networks to which you are attached, such as the Internet. Also, you need to plan how names and addresses will be resolved on your systems (that is, using DNS name servers, NIS maps, /**etc**/**host** files or some other method).

**Note**

All names and addresses of all IP interfaces on your nodes must be resolvable on the control workstation and on independent workstations set up as authentication servers before you install and configure the SP.

Once you have set the host names and IP addresses on the control workstation, you should not change them.

Some name resolution facilities let you map multiple IP interfaces to the same hostname. For the SP, IBM recommends that you assign unique hostnames to each IP interface on your nodes.

## Understanding the SP Networks

You can connect many different types of LANs to the SP system but regardless of how many you use, the LANS fall into one of the following categories:

***SP Ethernet:*** SP Ethernet is the name of the LAN that connects all SP nodes to the control workstation. The Parallel System Support Programs (PSSP) use this connection for netinstalls and other SP functions.

You can attach the Ethernet to other site networks and use it for other site-specific functions. You assign all addresses and names used for the Ethernet.

You can make the connections from the control workstation to the nodes in one of three ways. The method you choose should be one that optimizes network

performance for the functions required of the SP Ethernet by your site. The three connection methods are:

- Single-subnet, single-stage SP Ethernet in which one interface on the control workstation connects to all SP nodes.
- Multiple-subnet, single-stage SP Ethernet. There is more than one interface on the control workstation and each connects to a subset of the SP nodes.
- Multiple-subnet, multiple-stage SP Ethernet. A set of nodes, acting as routers to the remaining nodes on separate subnets, connects directly to the control workstation.

See “System Topology Considerations” on page 69 for sample configurations illustrating these connection methods.

The SP boot/install servers must be on the same subnet as their clients. In the case of a multiple-stage, multiple-subnet SP Ethernet, the control workstation is the boot/install server for the first node in each frame and those nodes are the boot/install servers for the other nodes in the frames.

Also, when booting from the network, nodes broadcast their host request over their en0 interface. Therefore, en0 of the node must be the Ethernet that is connected to the boot/install network.

***Additional LANs:*** The SP Ethernet can provide a means to connect all nodes and the control workstation to your site networks. However, it is likely that you will want to connect your SP nodes to site networks through other network interfaces. If the SP Ethernet is used for other networking purposes, the amount of external traffic must be limited. If too much traffic is generated on the SP Ethernet, the administration of the SP nodes may be severely impacted. For example, problems may occur with network installs, diagnostic function, and maintenance mode access. As an extreme case, if too much external traffic occurs, the nodes will hand when broadcasting for the network.

Ethernet, Fiber Distributed Data Interface (FDDI), and token-ring are also configured by the SP. Other network adapters must be configured manually. These connections can provide increased network performance in user file serving and other network related functions. You need to assign all the addresses and names associated with these additional networks.

***IP over the Switch:*** If your SP has a switch and you want to use IP for communications over the switch, each node needs to have an IP address and name assigned for its switch interface, the **css0** adapter. The **css0** adapter applies to both the High Performance Switch and the SP Switch. If hosts outside the SP switch network need to communicate over the switch using IP with nodes in the SP, those hosts must have a route to the switch network through one of the SP nodes.

If you are not enabling ARP on the switch, specify the switch network subnet mask and the starting node's IP address. After the first address is selected, subsequent node addresses are based on the switch port number. See “Understanding Node Numbering and Switch Node Numbering” on page 82. Unlike all other network interfaces, which can have sets of nodes divided into several different subnets, the switch IP network must be one contiguous subnet which includes all the nodes in the system.

If you want to assign your switch IP addresses as you do your other adapters, you must enable ARP for the **css0** adapter. If you enable ARP for the **css0** adapter, you may use whatever IP addresses you wish, and those IP addresses do not have to be in the same subnet for the whole system. They must all be resolvable by the host command on the control workstation.

***Subnetting Considerations:*** All but the simplest SP system configurations will likely include several subnets. Thoughtful use of netmasks in planning your networks can economize on the use of network addresses. Refer to *AIX Version 4.1 System Management Guide: Communications and Networks,* for information about Internet addresses and subnets.

As an example, consider an SP Ethernet, where none of the six subnets making up the SP Ethernet have more than 16 nodes on them. A netmask of 255.255.255.224 provides 30 discrete addresses per subnet, which is the smallest range that is usable in the wiring as shown. Using 255.255.255.224 as a netmask, we can then allocate the address ranges as follows:

- 129.34.130.1-31 to the control workstation to node 1 subnet
- 129.34.130.33-63 to the frame 1 subnet
- 129.34.130.65-96 to frame 2
- ...

In the same example, if we used 255.255.255.0 as our netmask, then we would have to use six separate Class C network addresses to satisfy the same wiring configuration (that is, 129.34.130.x, 129.34.131.x, 129.34.132.x, and so on).

## Planning Considerations for Network Router Nodes

When planning router nodes on your system, several factors can help determine the number of routers needed and their placement in the SP configuration. The number of routers you need may vary depending on your network type. (In some environments, router nodes may also be called gateway nodes.)

For nodes that use Ethernet or token ring as the routed network, a customer network running at full bandwidth results in a lightly loaded CPU on the router node. For nodes that use FDDI as the customer routed network, a customer network running at or near maximum bandwidth results in high CPU utilization on the router node. For this reason, you should not assign any additional role in the computing environment, such as a node in a parallel job, to a router using FDDI as the customer network. You also should not connect more than one FDDI to a router node.

Applications, such as POE and the Resource Manager, should run on nodes other than FDDI routers. However, Ethernet and token ring gateways can run with these applications.

For systems that use Ethernet or token-ring routers, traffic can be routed through the SP Ethernet but careful monitoring of the SP Ethernet will be needed to prevent traffic coming through the router from impacting other users of the SP Ethernet. For FDDI networks, traffic should be routed across the switch to the destination nodes. The amount of traffic coming in through the FDDI network can be up to 10 times the bandwidth the SP Ethernet can handle.

Information about configuring network adapters, and tuning the various network tunables on the nodes is in *Administration Guide*.

## Understanding Node Numbering and Switch Node Numbering

Use the information in this section for assigning IP addresses to the nodes and the node High Performance Switch interface.

### Slot Numbers

Each 79" SP frame contains eight drawers which have two slots each for a total of 16 slots. The 49" SP frame, used in the 3A2 and 3A3 models, has only four drawers and eight slots. When viewing a full-sized SP frame from the front, the 16 slots are numbered sequentially from bottom to top, left then right.

The position of a node in an SP is sensed by the hardware, and that position is the slot to which it is wired. That slot is the *slot number* of the node.

- A thin node occupies a single slot in a drawer and its slot number is the corresponding slot. (See thin nodes in Figure 10.)
- A wide node occupies two slots and its slot number is the odd-numbered slot. (See the wide nodes in Figure 10.)
- A 604 high node occupies four consecutive slots in a frame. Its slot number is the first (lowest number) of these slots.

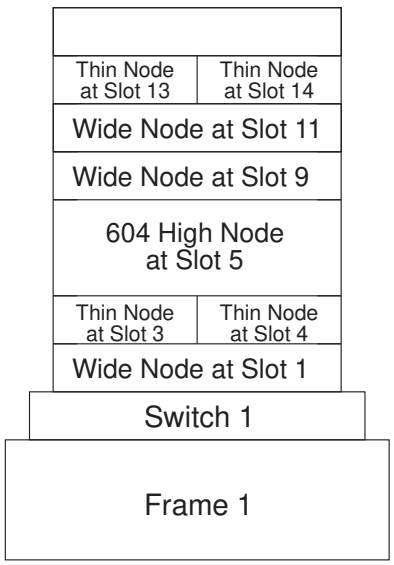



*Figure 10. Node-slot assignment*

Slot numbers are a frame concept. No matter how many frames your system has, the slots in each frame are numbered starting at 1.

### Node Placement

A frame full of thin nodes is called a *thin-node frame*. Similarly, you may have a *wide-node frame* or a *604 high-node frame*. In addition, a frame that contains nodes of different types is called a *mixed-node frame*.

In what follows, keep in mind that, so long as it physically fits, a wide node may always be placed where two thin nodes might be, and a 604 high node may always be placed where two wide nodes, or four thin nodes, might be.

Currently, the SP supports four frame configurations. Each configuration corresponds to a frame and its possible companion *expansion frames*. An expansion frame is a successor frame which shares the subject frame's switch. The capability for sharing a switch is affected by the number of nodes in the frame having the switch. There are restrictions on what constitutes a "supported" frame configuration. Figure 11 on page 84 illustrates the supported configurations.

A frame having a switch and using all 16 of its node ports has nothing to share, and, therefore, has zero expansion frames. A restriction is that if a frame has no dependable pattern of unused slots, then it cannot share its switch and has zero expansion frames. For example, any frame with a switch containing a thin node "threatens" to eventually use all of its node ports, and so is not a candidate for an expansion frame. For related reasons, thin nodes are not allowed in an expansion frame.

An example of a dependable pattern of unused slots is where the frame has only wide nodes. It could use at most eight switch ports, and so has eight to share with other frames. Those other frames are allowed to be configured as in either of the two middle configurations in Figure 11 on page 84. Once has one expansion frame and the other has two expansion frames. In configuration 2, only 604 high nodes are allowed in the two expansion frames.

Another example of a dependable pattern of unused slots is where the switched frame is a *604 high-node frame*: every node is a 604 high node, and each node starts at one of slots 1, 5, 9, or 13 as shown in configuration 4 of Figure 11 on page 84. Such a frame uses only four switch ports, and, therefore, its switch can support 12 additional nodes. A restriction here is that each expansion frame is also a *604 high-node frame*. Hence, each expansion frame also has a maximum of four nodes, and so there can be up to three expansion frames.

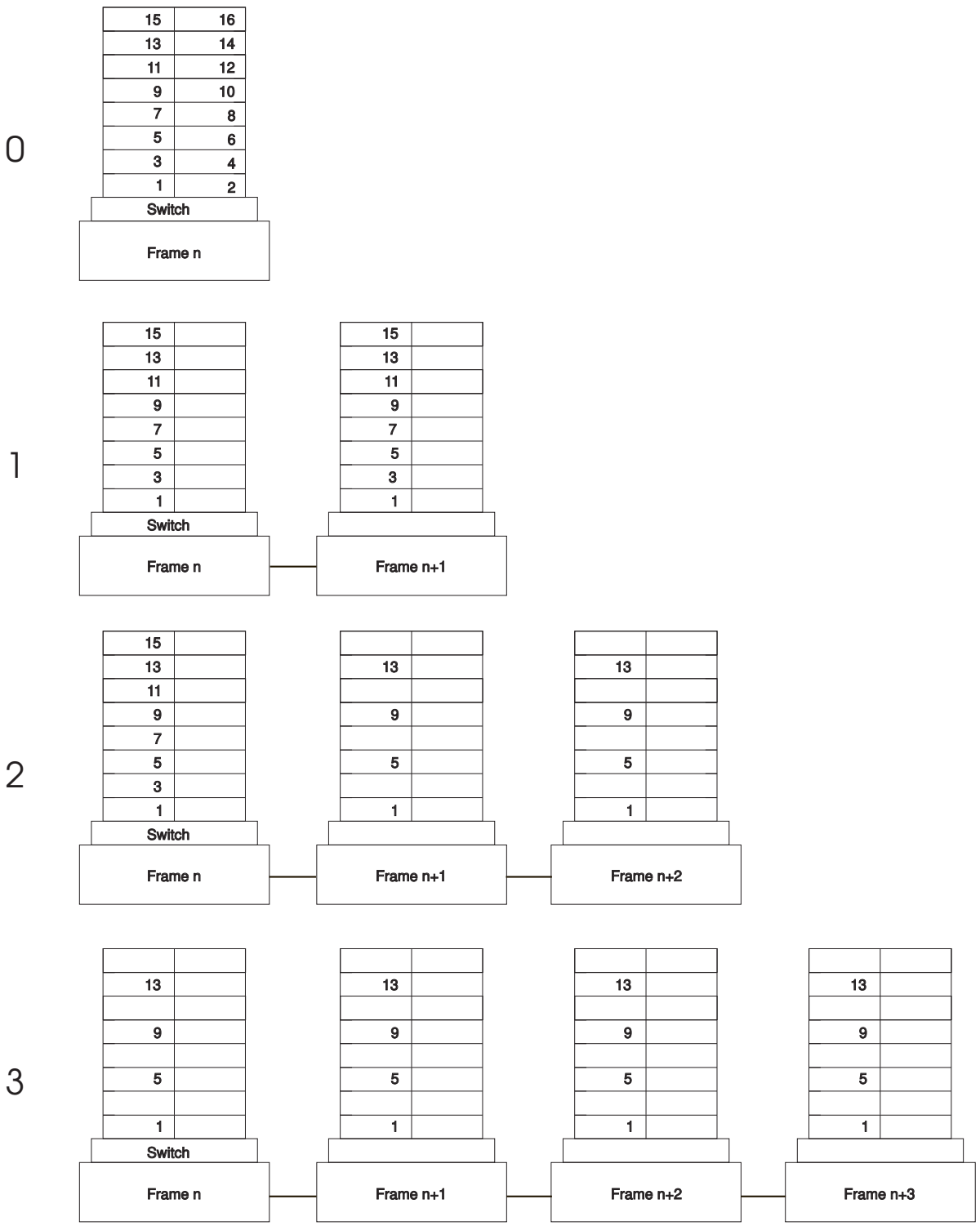



*Figure 11. Supported frame configurations (numbers shown are slot numbers)*

## Frame Numbers and Switch Numbers

The administrator establishes the frame numbers when the system in installed. Each frame is referenced by the tty port to which the frame supervisor is attached and is assigned a numeric identifier. The order in which the ttys are identified defines the sequence in which frames will be examined during the configuration process. This order is used to assign global identifiers to the switch ports and nodes. This is also the order used to determine which frames share a switch. Nodes in frames that do not contain any switch boards will be attached to the switch board in the first preceding frame with a switch board. The frames without switch boards are called *expansion frames*. A maximum of three expansion frames are supported per switch.

Expansion frames must be consecutive to the base frame number that contains a switch. For example, if frame *n* has three expansion frames, the expansion frames must be numbered *n+1*, *n+2*, and *n+3*. You can skip frame numbers as long as the next frame is not an expansion frame. A reason that the frame numbers might be skipped is to allow for the addition of expansion frames at a later time. If the frame numbers of existing frames had to be changed in order to add the expansion frame, then part or all of the system would have to be reconfigured.

It is possible to have an SP System configuration that contains more frames than switches. Each frame in the configuration should be assigned a frame number starting with 1 and progressing consecutively to the last frame (except in the case of expansion frames). If the frame contains a switch, the switch is assigned a number beginning with 1 and progressing consecutively to the last switch on the last frame. (See Figure 12 on page 86.) Within switch-only frames, called switch-expansion frames, each switch should be numbered consecutively, bottom to top, beginning with 1001.

The High Performance Switch Expansion Frame or the SP Switch Expansion Frame should be the last frame in the system. Frame numbers do not have to be contiguous. You should assign a frame number to the switch expansion frame that allows for the future addition of node frames.

When installing a Model 303 (all wide nodes with a High Performance Switch) without an FC 1010 Expansion Frame (all wide nodes without High Performance Switch), reserve the next frame number for future expansion. Frame numbering for these must be consecutive and the addition of FC 1010 at a later time may require you to reconfigure other frames in your system if the frame number following the Model 303 is unavailable. Similar comments apply to other expandable frames.

## Node Numbering for 79" Frames With a Switch

A *node number* is a global id assigned to a node. It is the primary means by which an administrator can reference a specific node in the system. Node numbers are assigned by the following formula:

*node_number* = ((*frame_number* - 1) x 16) + *slot_number*

where *slot_number* is the lowest slot number occupied by the node. Each type (size) of node occupies a consecutive sequence of slots. For each node, there is an integer n such that a thin node occupies slot *n*, a wide node occupies slots *n, n+1* and a 604 high node occupies *n, n+1, n+2, n+3*. For wide and high nodes, n must be odd.

Node numbers are assigned independent of whether the frame is fully populated. (See Figure 12 on page 86.)

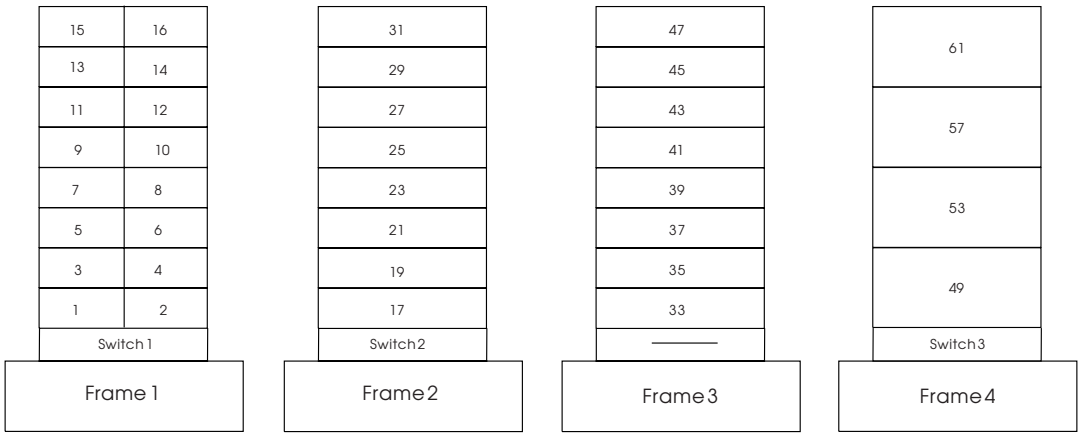



*Figure 12. Node Numbering for an SP System*

## Switch Port Numbering

In a switched system, the switch boards are attached to each other to form a larger communication fabric. Each switch provides some number of ports to which a node may connect. (16 ports for a full size switch, and 8 ports for each of the LC-8 and SP Switch-8 switches.) In larger systems, additional switch boards (intermediate switch boards) must be introduced to provide for switch board connectivity; such boards provide no node switch ports.

These node *switch ports* are numbered sequentially across the switch boards, starting with 0 on board 1. If a node is connected to switch port number *p* in this sequence, then the node *uses switch port number p*, or the node *is switch node number p*.

Switch port numbers are used internally in PSSP software as a direct index into the switch topology and to determine routes between switch nodes.

You can evaluate the following formulas to determine the switch port number to which a node is attached:

| If the node is: | Formula |
|---|---|
| Connected to a switch within its frame | switch_port_number = (switch_number - 1) X 16 + (slot_number - 1) |
| Connected to a switch outside of its frame (Expansion Frame) | switch_port_number = (switch_number - 1) X 16 + port_number |

Here, *switch_number* is the number of the switch board to which the node is connected and *port_number* is the port position on the switch board to which the node is connected.

For more information on switch port numbers, see Chapter 5, particularly Example 3.

## High Performance Switch-LC8 and SP Switch-8 Port Numbering

A system with a High Performance Switch-LC8 or SP Switch-8 cannot contain a 604 high node.

For the High Performance Switch-LC8 and SP Switch-8, a different algorithm is used for assigning nodes their node numbers and switch port numbers. A system with this kind of switch contains only switch port numbers 0 through 7.

The following algorithm is used to assign nodes their switch port numbers for systems with the High Performance Switch-LC8 and SP Switch-8:

1. Assign the node in slot 1 to **switch_port_number = 0**. Increment **switch_port_number** by 1.
2. Check the next slot. If there is a node in the slot, assign it the current **switch_port_number**, then increment the number by 1.

   Repeat until you reach the last slot in the frame or switch port number 7, whichever comes first.

Figure 13 and Table 30 contain sample switch port numbers for a system with a 49" frame and the LC-8 SP.

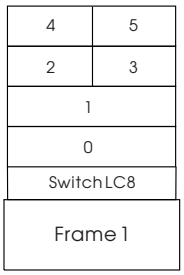



*Figure 13. Switch Port Numbering for the High Performance Switch-LC8, SP Switch-8, and 49" Frame (Model 3AX)*

*Table 30. Sample Switch Port Numbers for High Performance Switch LC8*

| Slot Number | Populated? | Node-Number | Switch-Port Number |
|---|---|---|---|
| 1 | Yes | 1 | 0 |
| 2 | No | | |
| 3 | Yes | 2 | 1 |
| 4 | No | | |
| 5 | Yes | 3 | 2 |
| 6 | Yes | 4 | 3 |
| 7 | Yes | 5 | 4 |
| 8 | Yes | 6 | 5 |
| 9 - 16* | No | | |

* Slot numbers 9-16 are used only for 79" models (3BX).

## IP Assignment

Switch node numbering is used to determine the IP address of the nodes on the switch. If your system is *not* ARP-enabled on the **css0** adapter, choose the IP address of the first node on the first frame. The switch port number is used as an offset added to that address to calculate all other switch IP addresses.

Figure 14 illustrates the switch port numbers for an SP system. It also illustrates how the switch port numbers are set for an expansion frame. In Figure 14, Switch 2 connects to the nodes in Frame 3. Specifically, the nodes of Frame 3 use the respective ports of Switch 2 not used by Frame 2. Based on the formula for a frame that does not have a switch, Frame 3's first slot has a switch port number of **17**:

*switch_port_number* = (*switch_number* - 1) X 16 + *port_number*
*switch_port_number* = ( 2 - 1) X 16 + 1
*switch_port_number* = 17

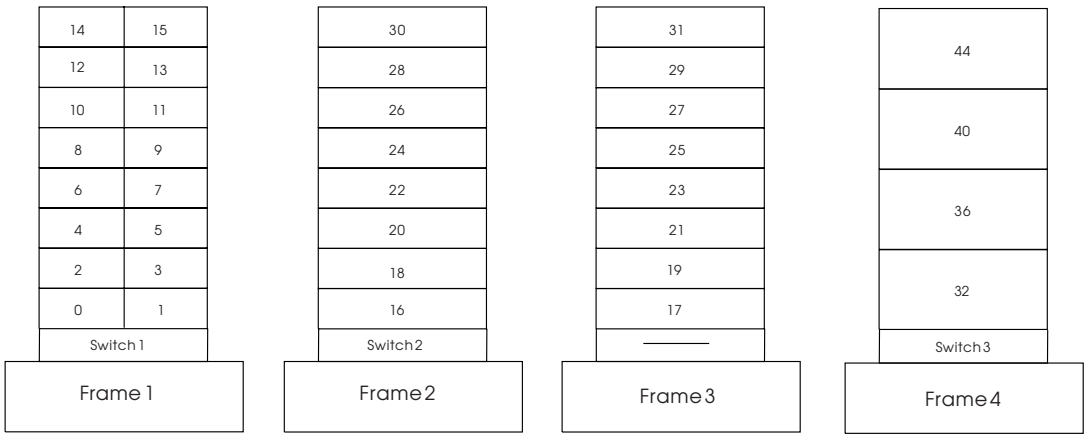



*Figure 14. Switch Node Numbering Sequence*

If ARP is enabled for the **css0** adapter, then the IP addresses may be assigned like any other adapter. That is, they may be assigned beginning and ending at any node, and they do not have to be contiguous addresses for all the **css0** adapters in the system.

# Chapter 4. Planning for a High Availability Control Workstation

**Note:** For specific information on planning your control workstation, refer to "Question 10. What Do You Need for Your Control Workstation?" on page 48.

Planning for a High Availability Control Workstation requires planning for both hardware and software. For hardware planning information read *IBM RISC System/6000 Scalable POWERparallel Systems: Site Planning*. That book describes the hardware components and cabling you need to install the High Availability Control Workstation successfully. For information on software requirements, refer to "Software Requirements for HACWS Control Workstation Configurations" on page 95.

The design of the SP High Availability Control Workstation is modeled on the AIX High Availability Cluster Multi-Processing/6000 Licensed Program (HACMP). HACWS utilizes HACMP running on two RS/6000 control workstations in a two-node rotating configuration. HACWS utilizes an external DASD that is accessed non-concurrently between the two control workstations for storage of SP related data. There is also a dual RS-232 frame supervisor card with a connection from each control workstation to each SP frame in your configuration. This HACWS configuration provides automated detection, notification, and recovery of control workstation failures.

## Overall System View of a High Availability Control Workstation

The SP system looks similar except that there are two control workstations connected to the SP Ethernet and TTY network. The frame supervisor TTY network is modified to add a standby link. The second control workstation is the backup. Figure 15 on page 90 shows a logical view of a High Availability Control Workstation. The figure shows disk mirroring, an important part of high availability planning.

© Copyright IBM Corp. 1996

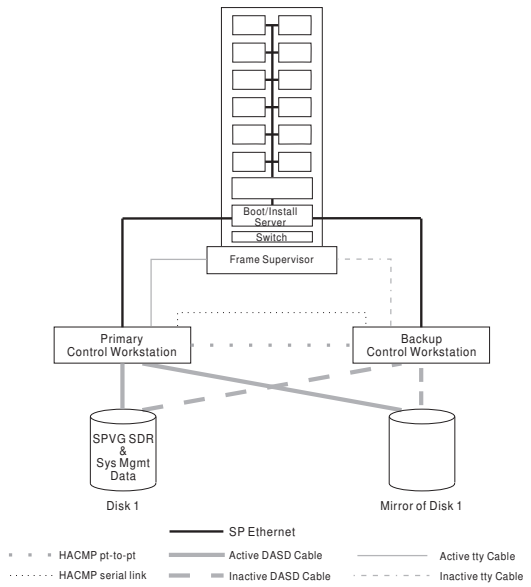



*Figure 15. High Availability Control Workstation With Disk Mirroring*

If the primary control workstation fails, there is a disruptive failover that switches the external disk storage, performs IP and hardware address takeover, restarts the control workstation applications, remounts file systems, resumes hardware monitoring, and lets clients reconnect to obtain services or to update control workstation data. This means that there is only one active control workstation at any time.

The primary and backup control workstations are also connected on a private point-to-point network and a serial TTY link or target mode SCSI. The backup control workstation assumes the IP address, IP aliases, and hardware address of the primary control workstation. This lets client applications run without changes. The client application, however, must initiate reconnects when a network connection fails.

The SP data is stored in a separate volume group on the external disk storage.

The backup control workstation can run other unrelated applications if desired. However, if the application on the backup control workstation takes significant resource, that application may have to be stopped during failover and reintegration periods.

## Benefits of a High Availability Control Workstation

High Availability Control Workstation is a major component of the effort to reduce the possibility of single point of failure opportunities in the SP. There are already redundant power supplies and replaceable nodes. There are many elements of hardware and software that could fail on a control workstation. In early releases, a control workstation failure usually quickly led to an unusable system. Also, the early releases did not allow a control workstation to be powered down for maintenance or updating without affecting the entire SP system.

## Difference Between Fault Tolerance and High Availability

Before planning whether to use High Availability Control Workstation, read the following section to understand the difference between high availability from fault tolerance.

## Fault Tolerance

The *fault tolerant* or *continuous availability* model relies on specialized hardware to detect a hardware fault and instantaneously switch to a redundant hardware component—whether the failed component is a processor, memory board, power supply, I/O subsystem, or storage subsystem.

Although this cutover is apparently seamless and offers non-stop service, a high premium is paid in both hardware cost and performance because the redundant components do no processing.

More importantly, the fault tolerant model does not address software failures, by far the most common reason for down time.

## High Availability

The *high availability* or *fault resiliency* model views availability not as a series of replicated physical components, but rather as a set of system-wide, shared resources that cooperate to provide essential services.

High availability combines software with industry-standard hardware to minimize down time by quickly restoring services when a system, component, or application fails. While not instantaneous, restoring services is rapid, often less than a minute.

The distinguishing factor between fault tolerance and high availability is that a fault tolerant environment offers no service interruption, versus a minimal service interruption in a highly available environment. Many sites are willing to absorb a small amount of down time with high availability rather than pay the much higher cost of providing fault tolerance. Moreover, in most highly available configurations, the backup processors are available for use during normal operation.

## IBM's Approach to High Availability for Control Workstations

For the reasons mentioned previously, IBM has taken the high availability approach to control workstation support for the SP system. The control workstation is a suitable candidate for high availability because it can typically withstand a short interruption, but must be restored quickly. In the SP configuration, the control workstation has been a possible single point of failure.

## Eliminating the Control Workstation as a Single Point of Failure

A *single point of failure* exists when a critical function is provided by a single component. If that component fails, the system has no other way to provide that function and essential services become unavailable.

The key facet of a highly available system is its ability to detect and respond to changes that could impair essential services. The SP software with High Availability Control Workstation lets a system continue to provide services critical to an installation even though a key system component—the control workstation—is

no longer available. When the control workstation becomes unavailable, either through planned event or inadvertent event, the SP high availability component is able to detect the loss and shift that component's workload to a backup control workstation.

Refer to the following tables for some of the consequences of failure of a control workstation that has not been backed up.

*Table 31. Effect of Failure of Non-High Availability Control Workstation on Mandatory Software*

| Major Software Component | Effect on SP System |
|---|---|
| Hardware Monitor | 1. No control of SP hardware except for the on/off switch on a node, and the use of the service laptop connected to a frame supervisor cable.<br>2. Nodes cannot be hot-plugged in or out of the frames controlled by the failed control workstation. |
| SDR | 1. Current running jobs continue to completion.<br>2. No new parallel jobs can start.<br>3. The Resource Manager daemons die because they cannot make contact with the SDR.<br>4. Serial jobs can continue to be started.<br>5. No hardware or software configuration changes can occur.<br>6. No installations can be started.<br>7. A switch fault will not complete processing, and the switch will remain in service mode if a fault occurs while the control workstation is unavailable.<br>8. No cluster shutdowns can occur.<br>9. A node can still be powered off and on manually, but this causes a switch fault. |
| Kerberos Authentication Server (if no backup server exists) | 1. Users cannot obtain new tickets via kinit.<br>2. Background processes using rcmdtgt to get ticket will fail.<br>3. Users cannot change passwords.<br>4. New users cannot be added to the authentication database. |
| Diagnostics | Diagnostics cannot be run on node boot disks. |
| File Collections Master | No new distributed file updates can occur. |
| Availability subsystems (em, gs, ts) | These subsystems will not restart upon node reboot. |

*Table 32 (Page 1 of 2). Effect of control workstation Failure on User Data on the Control Workstation*

| Major Software Component | Effect on SP System |
|---|---|
| User Management | You cannot make changes to a user data base stored on the control workstation. |
| Hardware Logging Daemon | 1. Hardware logging immediately stops.<br>2. Nodes cannot be hot plugged. |
| Error Logging Alerts | If sent by **mail** will be put in the node mail spool. |
| Accounting Master | 1. No consolidated accounting records are kept during down time.<br>2. Records are consolidated after the control workstation comes up. |

| Table 32 (Page 2 of 2). Effect of control workstation Failure on User Data on the Control Workstation | |
|---|---|
| **Major Software Component** | **Effect on SP System** |
| User File Server | 1. Running jobs may fail.<br>2. Jobs may not be able to access needed data. |
| Parallel Environment home node | Running parallel jobs will fail immediately. |

## Consequences of a High Availability Control Workstation Failure

When a failure occurs in a High Availability Control Workstation, the following steps take place automatically:

- The external disk storage is switched to the backup control workstation.
- The hardware and IP addresses are switched to the backup control workstation.
- The control workstation applications are restarted.
- The file systems are remounted.
- Hardware monitoring is resumed.
- Clients are allowed to reconnect to obtain data or to update control workstation data.

## System Stability With High Availability Control Workstation

When a control workstation fails, it causes significant loss of function in configuration, systems management, hardware monitoring, and the ability to handle a switch fault. The reliability of the whole system is compromised by the chance of a switch fault during a control workstation outage. Using the High Availability Control Workstation increases the mean time before failure (MTBF) of the entire system.

The failover is disruptive. Applications at the control workstation that are interrupted will not resume automatically and must be restarted. The interruption is momentary. Applications within nodes, that require no communication with the control workstation may not notice the failover. Applications relying on data from the SDR will be momentarily interrupted. In an environment where the resource manager allocates resources, an outage of hardware or software on the control workstation causes the entire system to stop running after a few minutes. The resource manager and its backup fail when they lose connection to the SDR. New parallel jobs cannot be started and existing parallel jobs cannot be controlled; they must either run to completion or be manually killed. Having a backup control workstation available prevents this problem.

Occasionally, you may need to take a control workstation down to maintain the hardware or software or to repair or update a component of the system. Using High Availability Control Workstation lets you schedule this upkeep without taking the entire system down. The serviceability of the SP is increased by the service time for the control workstation, which increases the mean time to repair (MTTR) of the system as a whole.

## Related Reliability Options for Control Workstations

Some configuration options that can make your control workstation more available are not part of the High Availability Control Workstation product. They include disk mirroring, uninterruptible power supplies, and dual disk controllers both internal and external.

## Uninterruptable Power Supply (UPS)

A UPS can supply electricity to a device to keep it running when main power is interrupted or is unreliable. Usually a UPS is not the sole source of power. Rather, it is typically used to smooth a fluctuating source or to provide enough power to enable a device to shut down gracefully. You can use a UPS in conjunction with all other means of assuring control workstation reliability. See *IBM RISC System/6000 System Overview and Planning* for the power consumption requirements of your control workstation.

## Power Independence

Each control workstation should be attached to a different electrical power source or breaker panel if possible. At the least they should be on separate circuits so that maintenance or failures in main power will affect only one control workstation.

## Single Control Workstation with Disk Mirroring

The process of mirroring occurs when each block of data written to one disk is also written to another disk. You always have a copy of your data in case one disk or disk adapter fails. As a middle ground to availability you can decide to have a single control workstation and mirror the root volume group to provide better availability of the control workstation. This requires twice the number of disks in the root volume group. See “Mirroring rootvg for Maximum Operating System Availability” in *AIX System Management Guide: Operating System and Devices*. That book describes how to create and manage mirrored rootvg volume groups.

## Spare Ethernet Adapters

You can cable spare SP Ethernet adapters into the existing Ethernet LAN segments for the SP and leave them in a defined but unavailable configuration state. When an Ethernet adapter fails, you can unconfigure the failing adapter and configure the spare Ethernet adapter for that LAN segment. You can use the spare adapter until the failed one is repaired or replaced. Note that the spare Ethernet adapter still counts as one of the stations in the 30 total stations you may have on an Ethernet LAN segment.

## Completing Planning Worksheets for High Availability Control Workstation

You'll need to complete the following worksheets in the AIX High Availability Cluster Multi-Processing/6000 documentation:

- *High Availability Control Workstation Planning* Worksheet, “Shared Volume Group/File System Worksheet (Non-Concurrent).”
- &hapins. Worksheet, “Defining Shared LVM Components for Non-Concurrent Access.”

As you complete the AIX High Availability Cluster Multi-Processing/6000 planning and installation steps, take the Non-Concurrent option whenever you are given the choice.

## Limits and Restrictions

The High Availability Control Workstation has the following limitations and restrictions:

- You cannot split the load across a primary and backup control workstation. Either the primary or the backup provides all the function at one time.
- The primary and backup control workstations must each be a RISC System/6000. You cannot use a node at your SP as a backup control workstation.
- The backup control workstation cannot be used as the control workstation for another SP system.
- The backup control workstation cannot be a shared backup of two primary control workstations.

  There is a one-to-one relationship of primary to backup control workstations; a single primary and backup control workstation combination can be used to control only one SP system.
- The Resource Manager is *not* restarted when control is transferred to a backup control workstation. The operator must decide whether to kill the currently running parallel jobs (suspend will not work) and restart the Resource Manager, or to wait until all the running jobs complete and then restart the Resource Manager. New parallel jobs cannot start until the resource manager is restarted.
- If your primary control workstation is a PSSP authentication server, the backup control workstation must be a secondary authentication server.

## Frame Supervisor Changes

Check with your IBM representative for information about ordering the necessary hardware.

---

## Software Requirements for HACWS Control Workstation Configurations

The software requirements for the control workstation include:

- Two licenses for AIX 4.1.4 server
- Two licenses for C for AIX.

  If the C for AIX license server is on the control workstation the backup control workstation should also have a license server with at least one license. If there is no license server on the backup control workstation, an outage on the primary control workstation will not allow the SP system access to a C for AIX license.
- A single license but two installations of PSSP 2.2 are required.
- Two 5696-933 HACMP/6000 High Availability Clustered Multiprocessing 4.2 licenses and software.

This is the High availability feature of HACMP (#5050). Both the client and server option of feature #5050 must be installed on both control workstations. Two licenses are required to be purchased.

- 5765-529 PSSP 2.2 Priced feature #3936 HACWS

  This is the customization software that is required for HACMP support of the control workstation. This is one license per SP system. A copy is installed on both control workstations.

## Required High Availability Control Workstation Components

Once you decide that the High Availability Control Workstation is right for your installation, you must order the following components:

- An AIX 4.1 license for each control workstation.
- The High Availability Control Workstation feature with its cables, hardware, and software. If you are installing a new SP, the High Availability Control Workstation software may be on the installation media, but you require the license to use it.
- Two licenses for HACMP/6000 Version 4.2; 5050 High Availability feature. (You do not need the 5051 feature.)

Planning and using the backup control workstation will be simpler if you configure your backup control workstation identical to the primary control workstation. Some components must be identical, others can be similar. For example, the TTY assignments on each must be identical and should be configured in the same slots on each. If you have the same number and type of disks on each, your planning and operation will be simpler. Otherwise you might have to plan recovery scripts that address HD0 on one control workstation and HD3 on the other.

## Sample Scenario: Setting Up a High Availability Control Workstation

Review the following example to understand how to set up your network configuration:

Assume that your system has a single control workstation named *dutchess.xyz.com* and it will serve as the primary control workstation after you install HACWS. The workstation you add will become the backup control workstation. The name of the backup control workstation is *ulster.xyz.com*.

The SP nodes get control workstation services by accessing the network interface whose name matches the hostname of the primary control workstation. In this example, the SP nodes get control workstation services by accessing *dutchess.xyz.com*. If the primary control workstation fails and the backup control workstation takes over, the backup control workstation assumes the network identity of *dutchess.xyz.com*.

The *dutchess.xyz.com* network interface gets configured on the control workstation currently providing the control workstation services. HACMP refers to *dutchess.xyz.com* as a service address (or service interface). The primary control workstation must use a different network address when it reboots in order to avoid a network address conflict between the two control workstations. HACMP refers to this alternate network address as a boot address (or boot interface). In this example, the boot address of the primary control workstation is *dutchess_bt.xyz.com*.

In addition, HACWS requires the backup control workstation must always be reachable via a network interface whose name matches its hostname. In this example, this name is *ulster.xyz.com*. This network interface does not get identified to HACMP. If you have no available adapter upon which to configure the *ulster.xyz.com* network interface, you can use an IP alias.

Each control workstation in this example configuration contains one ethernet adapter, connected to the SP Ethernet network. After the two control workstations are booted and before HACMP is started, their network configuration looks like the one illustrated in Figure 16 on page 98.

At this point, neither machine is providing control workstation services, so the *dutchess.xyz.com* network interface is not available. The ethernet adapter on the primary is configured with its boot address *dutchess_bt.xyz.com* and the ethernet adapter on the backup is configured with its boot address *ulster_bt.xyz.com*. Since there is only one network adapter, the network interface *ulster.xyz.com* must be configured as an IP alias on the backup control workstation.

**Note:** Both IP addresses 129.40.60.22 and 129.40.60.20 are assigned to the adapter **en0** on the backup control workstation. If another network adapter is available, you do not have to use an IP alias.

When the operator starts HACMP on both control workstations, the first control workstation to start HACMP becomes the active control workstation. (The operator selects the machine to become the active control workstation by starting HACMP on it first.) If HACMP is started first on the primary control workstation, then after HACMP is started on the backup control workstation, the control workstations look like the ones illustrated in Figure 17 on page 99.

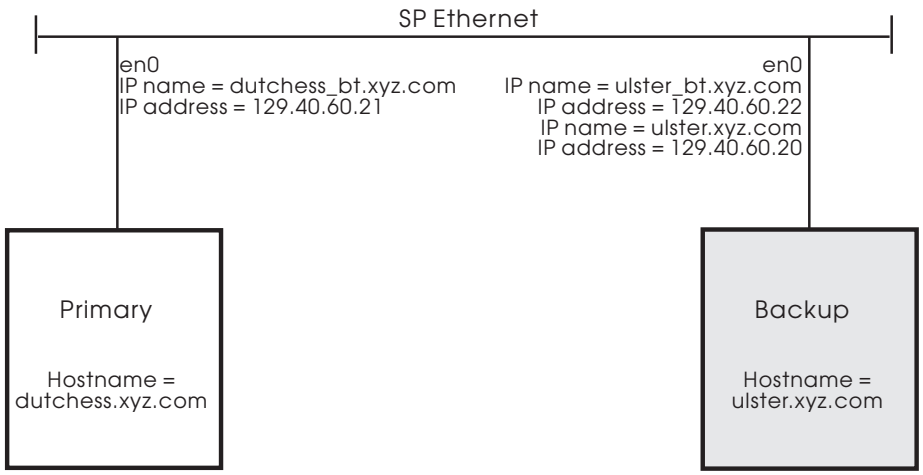



*Figure 16. Initial control workstation Network Configuration*

The only change to the network configuration is the boot address *dutchess_bt.xyz.com* on the primary control workstation has been replaced by the service address *dutchess.xyz.com*.

If the primary control workstation should fail and the backup control workstation take over, the control workstations look like the ones illustrated in Figure 18 on page 100.

If the primary control workstation is still running, then its ethernet adapter is back on its boot address *dutchess_bt.xyz.com*, and the boot address *ulster_bt.xyz.com* on the backup control workstation has been replaced by the service address *dutchess.xyz.com*. The SP nodes continue to get control workstation services by accessing *dutchess.xyz.com*.

**Note:** The network interface *ulster.xyz.com* remains configured on the backup control workstation.

You can identify multiple network interfaces to move back and forth between the two control workstations along with the control workstation services. Some possible reasons for doing this are:

- You have an SP system with a large number of nodes and multiple ethernet adapters on the control workstation connected to the SP Ethernet network.
- You want the control workstation to provide a separate network interface for each SP system partition.
- You want a network interface on an external network to allow workstations outside of the SP system transparently access the active control workstation.

Each of these network interfaces is effectively a service address. However, the number of service addresses identified to HACMP cannot exceed the number of network adapters. Use IP address aliasing to make up the difference.

In this example, each control workstation has only one network adapter. Since *dutchess.xyz.com* is defined to HACMP as a service address, any additional "effective" service addresses must be configured using IP address aliases. If you added an SP system partition whose network interface name on the control workstation is *columbia.xyz.com* to this example configuration, it would look like Figure 19 on page 100 when the backup control workstation is active.

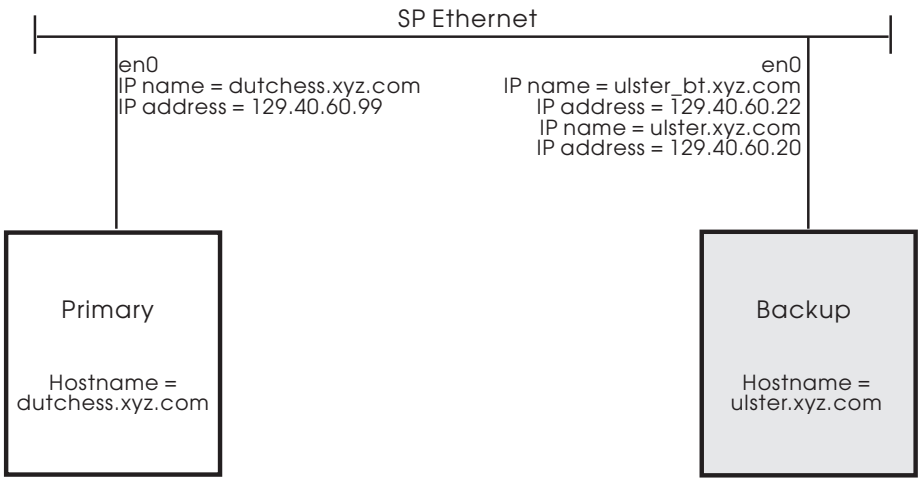



*Figure 17. Starting HACMP*

The HACMP service address *dutchess.xyz.com* is configured on adapter **en0** on the backup control workstation and the network interfaces *columbia.xyz.com* and *ulster.xyz.com* are configured on adapter **en0** as IP aliases. The service address *dutchess.xyz.com* is identified to HACMP. For each service address that is identified to HACMP, there must be boot addresses for both control workstations. The boot address *dutchess_bt.xyz.com* is identified to HACMP for the primary control workstation, and the boot address *ulster_bt.xyz.com* is identified to HACMP for the backup control workstation

At this point, if you have not done so already, you need to do the following:

1. Determine the control workstation service addresses for your configuration.
2. Determine which service addresses should be identified to HACMP and which service addresses need to be configured using IP aliases. The hostname of the primary control workstation (*dutchess.xyz.com*) must always be identified to HACMP as a service address. Remember the number of service addresses identified to HACMP cannot exceed the number of network adapters.
3. Determine the boot addresses for your configuration. The number of boot addresses on each control workstation will match the number of service addresses defined to HACMP. For example, if you identify three service addresses to HACMP, then you need to identify six boot addresses—three boot addresses on each control workstation.
4. Make sure the hostname of the backup control workstation (*ulster.xyz.com*) is always a valid network interface on the backup control workstation.
5. If your site uses a name server, make sure that all of these network interfaces have been added to your name server.

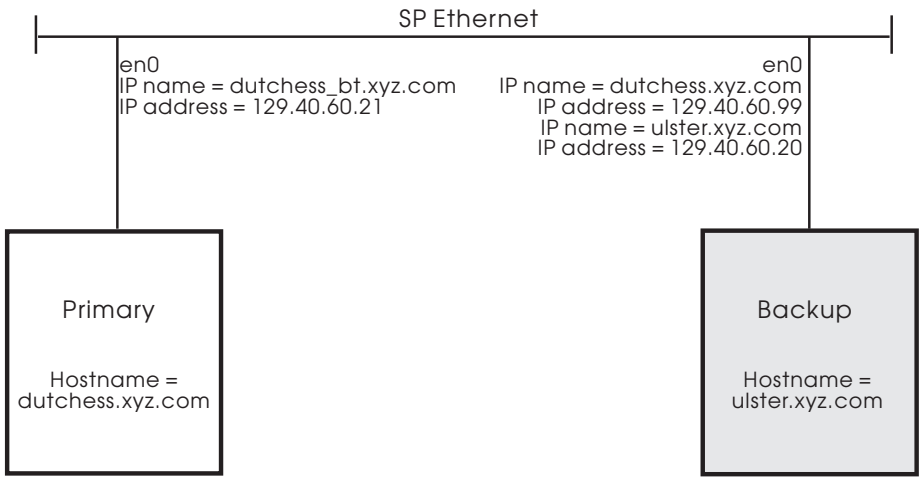



*Figure 18. control workstation Failover*

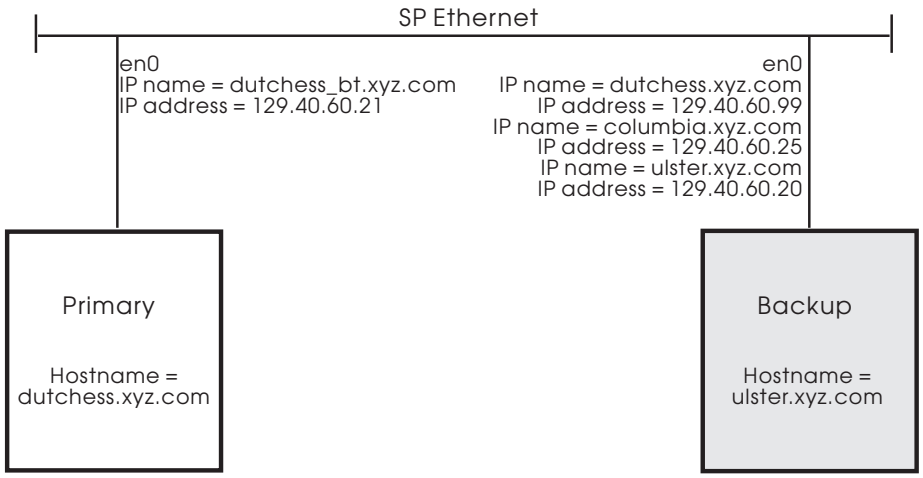



*Figure 19. Adding a System Partition*

# Chapter 5. Planning SP System Partitions

This chapter describes how to plan for system partitioning. It describes the predefined system partitioning layouts shipped with the SP system software and introduces you to the System Partitioning Aid which allows you to create new system partitioning layouts which better suit your needs. System partitioning can apply to any system, whether it contains a switch or not, except for the HiPS-LC8 switch.

For more specific information on how to partition your system, refer to the IBM RISC System/6000 Scalable POWERparallel Systems: Administration Guide.

## What is System Partitioning

System partitioning is the process of dividing your system into non-overlapping sets of nodes in order to make your system more efficient and more tailored to your needs.

A system partition is, at the most elementary level, a group of nodes (not including the control workstation). In essence, a system partition is an SP Subsystem which consists of sufficient pieces (nodes, control workstation, data, commands, and so on) of the SP system to form a logical SP.

With system partitions, you may ensure that switch applications running on one group of nodes are not inadvertently affected by activity on other nodes in the system.

System partitioning affects communication which occurs over the switch only; other communication paths are unaffected. System partitioning also provides environmental controls that allow the system administrator to control and monitor only the current system partition.

## How Do You Partition the System?

Your SP System has a particular configuration defined by its frames and nodes. The SP comes with a set of predefined system partition layouts for each standard configuration. These layouts have been selected in a way which meets minimal throughput capabilities. In addition, the SP comes with the System Partitioning Aid software which allows you to construct your own layouts. If none of the predefined layouts meets your system partitioning needs, you may define your own using the System Partitioning Aid or you may submit a Request for Price Quote (RPQ) to IBM to request additional layouts. See your IBM representative for more information on the RPQ process.

## Default System Partition

Taking advantage of system partitioning is something you do by choice. However, the partitioning atmosphere is always present to some extent. In the beginning, when you have installed the PSSP software, but before you intentionally partition your system, there is one system partition which contains all of the nodes and its name is the same as the name of the control workstation. This is the *default* or *persistent* system partition. It always exists. When you choose a different partition

© Copyright IBM Corp. 1996

layout, one of the resulting partitions is this default system partition. A new system partition is formed by taking nodes from an existing system partition(s) and collecting them as a new group.

## Benefits of System Partitions

You gain the following benefits from using system partitions:

- The ability to run switch-based applications on a set of nodes without interfering with switch work on another set, regardless of application or node failures. In particular, the ability to isolate switch traffic, preventing it from affecting switch traffic in another system partition.
- The ability to separate a test area for application development from your production area.
- The ability to install and test new releases and migrate applications without affecting current work.
- The ability to have one operator manage, at a system level, more than one logical system from a single control workstation.
- The ability to separate system administration for each partition.

### Change Management and Non-Disruptive Migration

You can test new levels of AIX, PSSP, LPPs, application programs, or other software on a system currently running a production workload without disrupting that workload. Such a system partitioning solution assumes that there are spare nodes available to set aside in a test system partition. This solution lets you run migration scenarios on the test partition nodes without interfering with day-to-day operations on the rest of the system. You can form and manage system partitions and then customize the partitions with software. These types of partitions are usually relatively static and long-lived entities.

### Multiple Production Environments

You may also need to create multiple production environments with the same non-interfering characteristics as in “Change Management and Non-Disruptive Migration.” With system partitions these environments are sufficiently isolated that the workload in one environment is not adversely affected by the workload in another environment. This is especially true for services whose usage is not monitored and not charged for, but which have critical implications for jobs performance, for example, the switch. System partitions let you isolate switch traffic in one system partition from the switch traffic in other system partitions.

## Example 1 -The basic 16-node system

Figure 20 shows a simple 16-node system that contains one frame, one switch board, and 16 thin nodes installed. In this example, the nodes are named Node01, Node02, and so on up through Node16. You may name your nodes any way you want, but the nodes are also known by *node numbers*, and the node numbers are assigned in the same manner as they are named in this example: from bottom to top, left node then right.

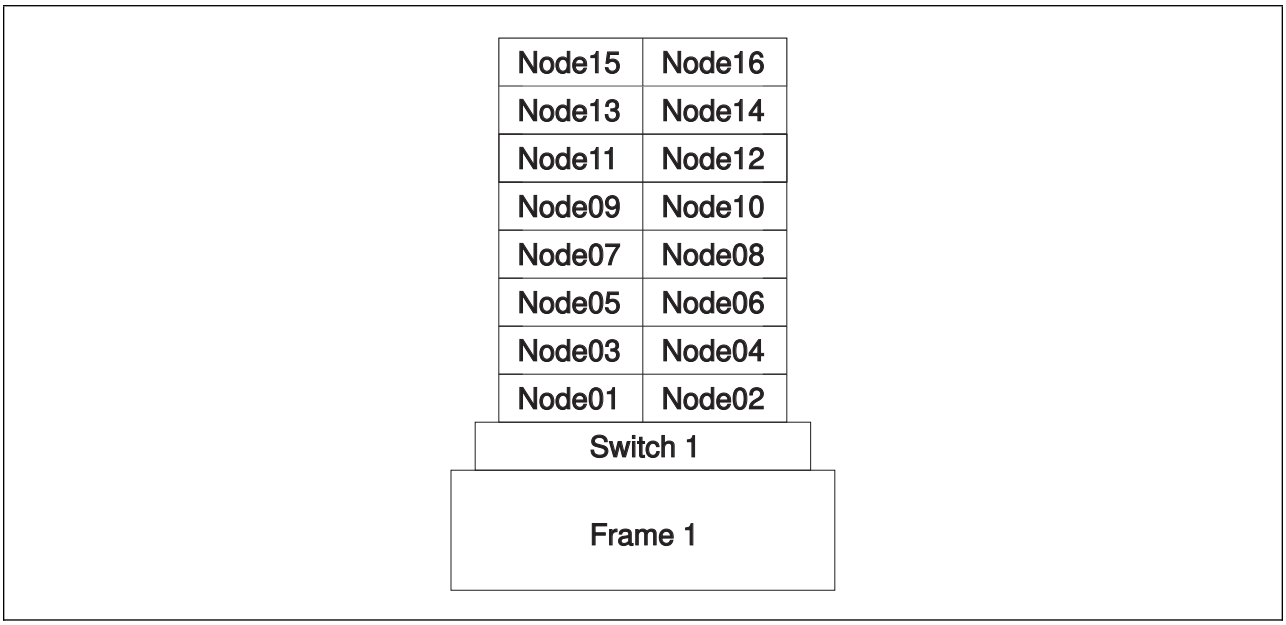



*Figure 20. Simple 1-frame system*

Assume that you owned this system, and that your day-to-day operations revolved around software called Application A, Version 1. Also, assume that you are interested in upgrading to Version 2 of Application A, and wish to try out the new version while still relying on Version 1.

After evaluating your current workload, you determine that any 12 nodes are sufficient to perform your normal activity and, therefore, you would like to set 4 nodes aside to try out Version 2. This means you wish to partition your 16-node system into 2 subsystems: a 12-node system partition and a 4-node system partition.

When you consult the predefined layouts shipped with your system, you find that several 4_12-layouts are provided for your 16-node system, and you decide to go with the following (listing node numbers rather than node names):

```
                Partition 1                 Partition 2
                -----------                 -----------
          nodes  1,2,3,4,5,6             nodes 11,12,15,16
                 7,8,9,10,13,14
```

You adopt this configuration using a simple SMIT panel, and begin running your production load on Partition 1. Your choice is pictured in Figure 21 on page 104.

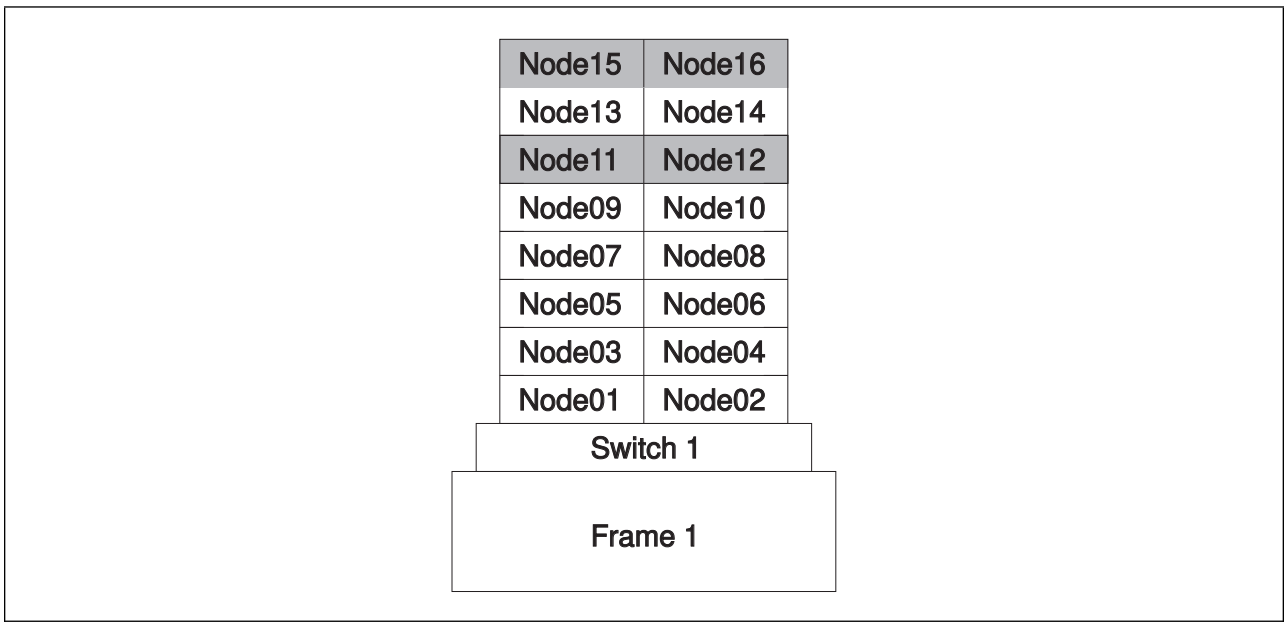



*Figure 21. Partitioned 1-frame system*

Next you install Version 2 of Application A (together with any prerequisite software and hardware) on the nodes of Partition 2, provide Partition 2 with suitable test data, and begin executing trial runs of Version 2 on Partition 2.

Again, the switch intensive portions of the applications of interest (Application A, Version 1 and Application A, Version 2) will run independently in their respective partitions. That is, your daily production runs and the Version 2 trial runs will not affect each other — in regard to switch performance. This is because the 4_12-layouts provided were constructed with that goal.

## Using a Switch in a Partition

The SP supports the following switches:

- High Performance Switch
- Scalable POWERparallel Switch (SP Switch)
- High Performance Switch-LC8 (cannot be partitioned)
- SP Switch-8

## The Physical Makeup of a Switch Board

Actually, your choice in Example 1 was not necessarily as simple as suggested. A full *switch board* (whether the High Performance Switch or SP Switch) consists of 8 *switch chips* as shown in Figure 22 on page 105. Each chip has 8 *ports* to which nodes and other switch chips may connect.

Precisely 4 of the switch chips may have nodes connected to them, as on the left side of the board in Figure 22 on page 105. These chips are called *node switch chips*. Due to physical choices made in the SP frame, the nodes are connected as shown in the figure. Notice the following:

1. Nodes 1, 2, 5 and 6 are attached to switch chip 5.

**Note:** Nodes connected to the same chip may communicate with each other via that chip.

2. Nodes 3, 4, 7 and 8 are attached to switch chip 6.
3. Nodes 9, 10, 13 and 14 are attached to switch chip 4.
4. Nodes 11, 12, 15 and 16 are attached to switch chip 7.
5. There are no direct links among chips 4-7, nor among chips 0-3.
6. Each of chips 4-7 is directly connected to all of chips 0-3. Therefore, for example, the nodes on switch chip 4 may communicate with the nodes on switch chip 7 via any of chips 0-3.

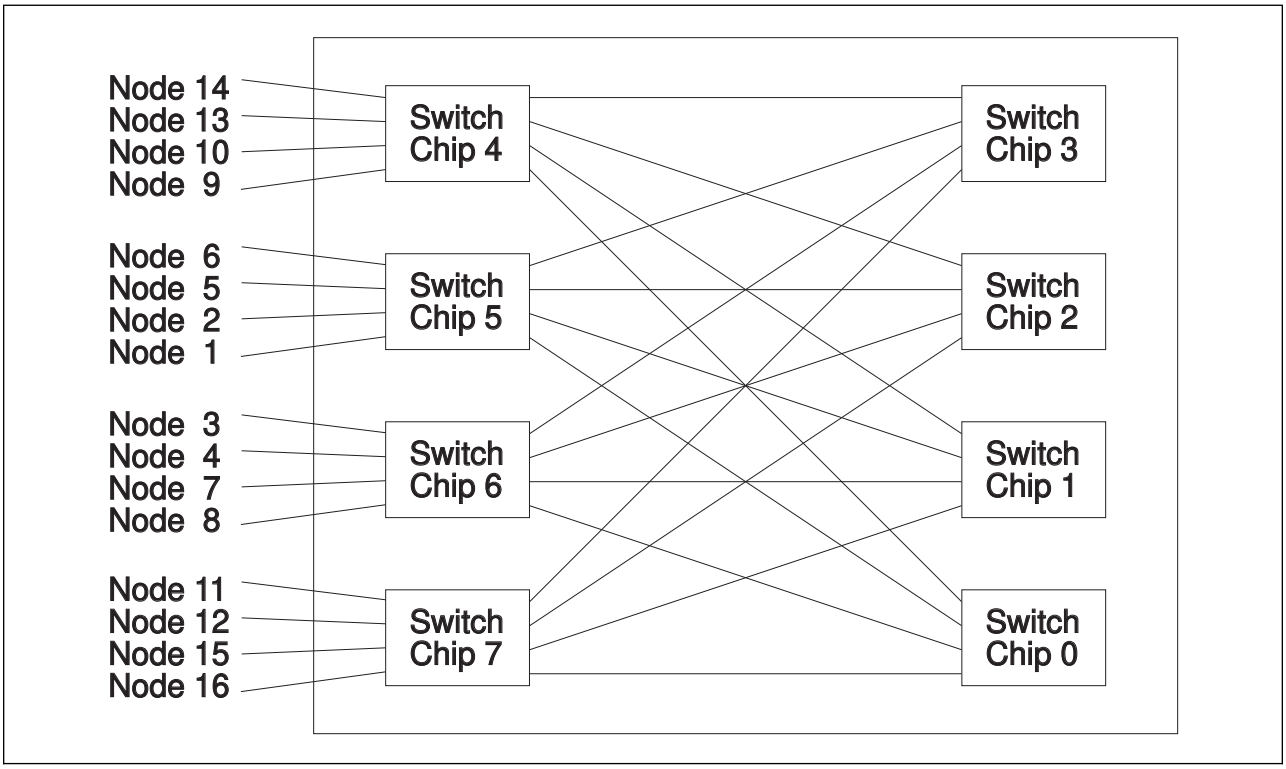



*Figure 22. Full switch board*

Chips 0-3 are called *link switch chips*, and are also used in multi-frame systems to connect the various switch boards to each other using ports not shown in the figure.

Systems with switches are assumed to be used in performance-critical parallel computing. One major objective in partitioning a system with a switch is to keep the switch communication traffic in one switch partition from interfering with that of another. In order to ensure this, each switch chip is placed completely in one system partition.

Any link which joins switch chips in different partitions is disabled, so traffic of one partition cannot enter the physical bounds of another partition. The result of the partitioning choice you made in Example 1 is shown in Figure 23 on page 106. Notice that the links from Chip 7 are missing in the diagram, indicating they have been logically removed from the active configuration, or disabled.

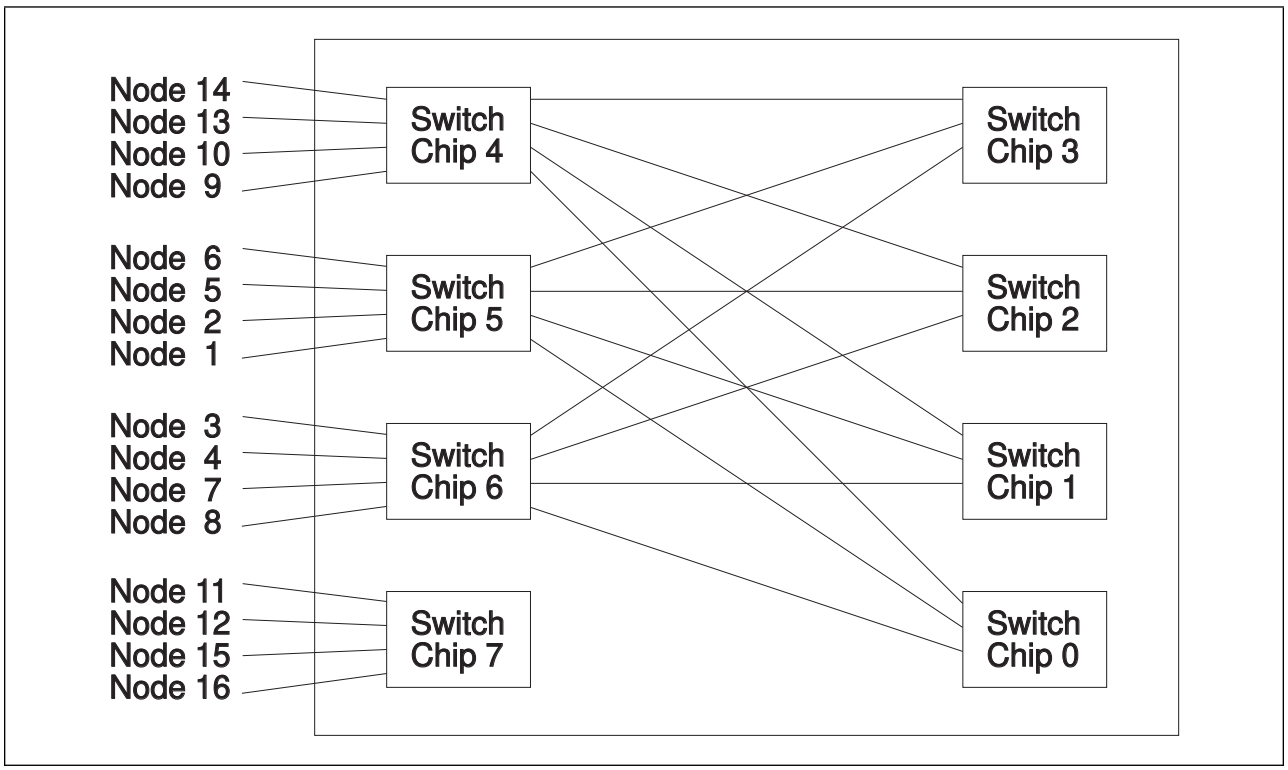



*Figure 23. Nodes 11,12,15,16 partitioned off*

## Systems With a Low Cost Switch

There are two supported low cost switches: the High Performance Switch-LC8 and the SP Switch-8. If your system contains one of these switches, then your system partitioning capabilities are restricted. If you have an SP Switch-8, your switch has only 2 chips with nodes attached. So, if you have the maximum 8 nodes attached to the switch, you have 2 possible configurations: a single-partition 8-node system, or 2 system partitions of 4 nodes each.

If your system has a High Performance Switch-8, all of your nodes are connected to a single switch chip, and, therefore, only a single partition is possible.

## Switchless Systems

One main consideration when planning for system partitions is the use of a switch. Partitioning, however, is also applicable to switchless systems. If you have a switchless system, and later add a switch, you may have to rethink your system partition choice. In fact you may want to reinstall ssp.top so that any special switchless configurations you have constructed are removed from the system.

If you choose one of the supplied layouts, your partitioning choice is "switch smart": your layout will still be usable when the switch arrives. This is because the predefined layouts are constrained to be usable in a system with a switch.

Such a layout may be unsatisfactory, however, for your switchless environment, in which case you may use the System Partitioning Aid to build your own layout.

## Example 2 - A Switchless System

Figure 24 shows a switchless system having one frame and only 7 nodes. Partitioning this system might be helpful for migration testing similar to that discussed in Example 1. In this case, since there is no switch, we are not bound by switch chip-related rules. We can assign nodes to partitions in any way we want.

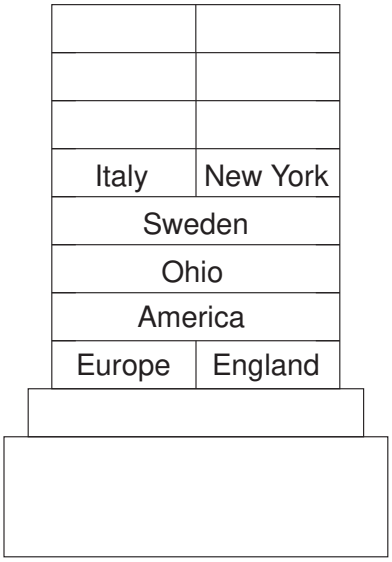



*Figure 24. One sparse frame with no switch*

So, for example, suppose you wanted to divide into 2 pieces as follows:

1. In Partition 1, group the Europe node and its affiliates, which are Italy, Sweden, and England.
2. In Partition 2, group the America node and its affiliates, which are New York and Ohio.

Using node numbers, you have:

```
                Partition 1                 Partition 2
                -----------                 -----------
          nodes  1,2,7,9                nodes  3,5,10
```

This configuration does not match any of the predefined layouts. Therefore, you would use the System Partitioning Aid to construct it.

## The System Partitioning Aid

The System Partitioning Aid allows you to create a new system partition layout. In other words, if none of the layouts shipped with the SP meets your needs, you can use the System Partitioning Aid to generate one that does; and you may save this new layout for future reference.

The System Partitioning Aid provides both a Graphical User Interface (GUI) and command line interface. Once you are an "experienced partitioner", or in simple environments, the command line interface may serve your needs. While learning, or for more complex situations, you may find the GUI interface beneficial.

The System Partitioning Aid supports the partitioning of systems with up to 128 nodes, whether switchless or switched (contains one or more switches). However, any SP system must be switch-wise homogeneous: system partitioning does NOT allow a High Performance Switch system to be joined with an SP Switch system to form a single system; nor does it support the joining of switched and switchless systems.

Details on the System Partitioning Aid appear in the IBM RISC System/6000 Scalable POWERparallel Systems: Administration Guide and the IBM RISC System/6000 Scalable POWERparallel Systems: Command and Technical Reference but this chapter provides examples which help you understand its value.

## Accessing Data Across System Partitions

In addition to the restrictions on switch traffic, as illustrated in Example 1, data cannot generally be shared across system partitions. Therefore:

- Access to IBM Virtual Shared Disks (VSDs) and pseudo-tape devices across system partitions is not supported.
- Twin-tailed disks cannot span system partitions.
- A physical file system, that is, the logical volumes containing the files, cannot span system partitions.
- You can use a distributed file system to mount filesystems across partition boundaries, just as you would use a distributed file system from one SP to another. Keep in mind that doing this may affect nodes in both partitions in terms of both CPU and network utilization.

## The Relationship of SP Resources to System Partitions

The SP can have a variety of both hardware and software resources associated with it. This section discusses how these resources interact with each other with regard to system partitions.

## Single Point of Control with System Partitions

You manage a partitioned SP system from a single point of control using the control workstation. From an administrative point of view, each partition is a logical SP system within one common administrative domain. This means that:

- Only one control workstation is needed. (If using a High Availability Control Workstation, two workstations are available, but only one is used as the control workstation at any point in time.).
- The hardware monitor allows an administrator to control and monitor the entire system or a system partition. The administrator can issue commands that affect one, several, or all system partitions.
- There is one Kerberos server for the entire system.

  **Service Note**

  Make sure you have applied the required corrective service to any PSSP 1.2 system partition for proper Kerberos operation.

- There is one user name space for the entire system.

- There is one accounting master for the entire system.
- The boot/install functions of a server node ignore system partition boundaries. However, a boot/install server must be at the same AIX and PSSP level as the nodes it is serving. Thus, an AIX 3.2.5 and PSSP 1.2 boot/install server is required for nodes in any AIX 3.2.5 and PSSP 1.2 system partitions.

### The SP_NAME Environment Variable

The entire SP is one administrative domain for the system administrator, who manages the system partitions as logical SP systems. An administrator restricts interaction to a specific system partition by setting the SP_NAME environment variable to the name or IP address of that system partition.

On the control workstation, the administrator is in an environment for one system partition at a time, as defined by the SP_NAME environment variable. Any task performed at the control workstation that requires information from the SDR gets the information for the current system partition. The operator must either set the SP_NAME environment variable or issue a command that sets it. If SP_NAME is not set, the environment is the default (or persistent) system partition.

## The SDR in a Partitioned System

The SDR contains data about the entire SP system. Generally, this data is separated into *system* (global) and *partitioned* classes. Requests made to the SDR, whether in software or manually, require an appropriate name or IP address for the system partition. If no such identifier is specified, the value of SP_NAME is used.

On the control workstation, the administrator is in an environment for one system partition at a time as identified by the SP_NAME environment variable. Any task performed at the control workstation that gets information from the SDR gets the information for the current system partition. Also, all global data (data affecting **all** system partitions) is accessible from any system partition.

## Networking Considerations

System partitioning does not require physical changes to the networking configurations of a system. You should consider certain effects that may warrant a physical change.

Ethernet interference, causing slower performance, may occur between nodes on the same physical Ethernet subnetwork. If these nodes are in different system partitions, an action such as booting all the nodes in one system partition may adversely affect the other system partition. You should consider creating system partitions aligned on the physical Ethernet subnetwork boundaries. This is fairly straightforward for system partitioning where the partitioning is on frame boundaries.

There is no connectivity over the switch between system partitions. This means that a gateway node with routing set up to the switch network may require routing changes if the gateway is to remain a gateway for more than one system partition. You can do this using explicit host routes on the gateway node, or by enabling ARP on all system partitions and redefining the IP addresses within a system partition as a different subnetwork.

## Boot/Install Servers for AIX 3.2.5 and PSSP 1.2 System Partitions

If you plan to configure your system with AIX 3.2.5 and PSSP 1.2 system partitions, you must configure a node in one of the AIX 3.2.5/PSSP 1.2 system partitions as the boot/install server for the nodes in such system partitions.

### Choosing Boot/Install Servers for Your 3.2.5 Partition

If you have selected one or more of your partitions as a 3.2.5 base, you also need to make at least one, but preferably two, nodes in that partition a boot/install server for the other 3.2.5 nodes. You need to do this because when the 3.2.5 nodes are installed during preload, they are installed using a 3.2.5 control workstation. After the nodes have been installed and customized, the control workstation is reinstalled with 4.1. At this point, if the 3.2.5 nodes are pointing at the control workstation they will NOT be able to be reinstalled. Therefore, you should choose one node as a boot/install server for the other nodes. In addition, you should choose a second node to serve as a backup boot/install server for the first boot/install server selected previously.

When you choose a node to act as a boot/install server, the node keeps a copy of a **mksysb** in a separate file system. Therefore, you must plan for the space required to hold the **mksysb**, which must encompass all the relevant PSSP software.

## Running Multiple Levels of Software Within a Partition

Remember that a system partition is an SP subsystem -- essentially a smaller SP carved out of the real one. You cannot expect the smaller SP to do what the larger cannot. The system is designed to operate where all nodes are at the same PSSP release and service level. This particularly applies to the additonal LPPs designed for the SP system. With PSSP 2.2, more flexibility is introduced to support migration and make it easier to upgrade production applications. For additional information on this support, consult the bulletin titled *Implementing Coexistence with PSSP 2.2*, which is available at:

```
http://www.rs6000.ibm.com/tech/
```

on the Web.

PSSP 2.2 supports system partition where in each partition, one of the following holds:

- All nodes running PSSP 2.2
- All nodes running PSSP 2.1
- All nodes running PSSP 1.2
- Nodes running either PSSP 2.2 or PSSP 2.1
- Nodes running either PSSP 2.2 or PSSP 1.2

## Overview of Rules Affecting Resources and System Partitions

The SP resources must conform to certain rules if they are to be a part of a system partition. The following list provides an overview of these rules:

- An un-partitioned SP is treated as a single system partition.
- The number of system partitions you can define is dependent upon the size of your SP and depends on the way that nodes are connected together. In order

to achieve isolation between system partitions, the nodes connected to the same switch chip belong to the same partition.

- Each system partition in a system having a switch has a primary node for switch initialization. If the switch is an SP Switch, then each system partition also has a backup primary node.
- Each system partition has an associated topology file which defines the portion of the switch network which it owns. Switch initialization occurs within a system partition -- for that portion of the switch fabric defined by the corresponding topology file.
- Switch operations and message traffic are managed within a system partition.
- It is recommended that all nodes within a single system partition be at the same service level of AIX, PSSP, and other SP software.
- Jobs controlled by the Resource Manager are contained within a system partition and each system has both a primary and backup Resource Manager. The Resource Manager pools cannot cross system partition boundaries. and only one system partition can be part of any one LoadLeveler cluster when the Resource Manager is used by LoadLeveler. In addition, a LoadLeveler class must be within a single system partition when the Resource Manager is used by LoadLeveler.
- The IBM Virtual Shared Disk support and the pseudo-tape device driver cannot cross system partition boundaries. The IBM Recoverable Virtual Shared Disks and twin-tailed disks must be connected to nodes within the same system partition.

  A physical file system, that is, the logical volumes containing the files, cannot span system partitions.
- Each system partition has its own node heartbeat function which supports the host_responds system monitor facility. ???? More ????.
- HACMP clusters do not span system partition boundaries.

## System Partitioning for Systems with Multiple Node Types

There are three physical node images supported in the SP: thin, wide, and 604 high. These physical images affect the membership possibilities of system partitions. To understand how you can run multiple node types within a partition, you need to understand node slots. A *node slot* is the space that one thin node can occupy.

***Thin Node Frames:*** There are 16 node slots in an SP frame. Figure 25 on page 112 shows how the slots are numbered in a frame. In Example 1, we considered a 1-frame system of 16 thin nodes. In that case, there is one node per slot, and the number of a node is precisely the number of the slot it occupies.

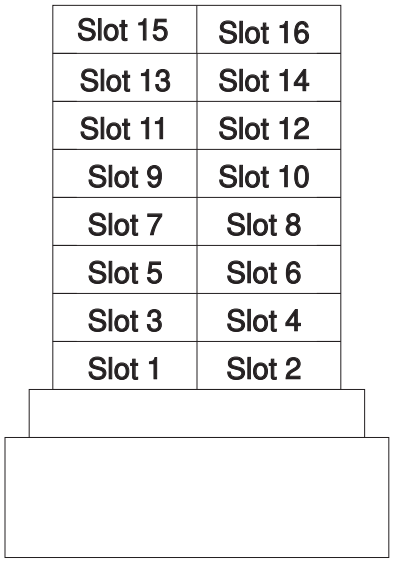



*Figure 25. One frame with slots numbered*

***Partitioning with Wide and 604 high Nodes:*** A wide node occupies two adjacent slots (a drawer) and a 604 high node occupies four adjacent slots (2 adjacent drawers). The correspondence between node numbers and slot numbers is a topic of Example 3. For now, remember a node's node number is the lowest numbered slot which it occupies. As you plan your system partitions, think in terms of slots. Then you can decide what combination of thin, wide, and 604 high nodes you want to occupy those slots.

Figure 26 on page 113 shows a frame populated with 3 wide, 1 604 high, and 6 thin nodes. The nodes in that figure have been given simple names using their node number. Note that nodes 2, 8, 10, 11, 12, and 14 do not exist. The preceeding discussion expands to the following complete summary for the slots for the frame of Figure 25:

- Slots 1 and 2 contain wide node 1
- Slot 3 contains thin node 3
- Slot 4 contains thin node 4
- Slot 5 contains thin node 5
- Slot 6 contains thin node 6
- Slots 7 and 8 contain wide node 7
- Slots 9, 10, 11, and 12 contain 604 high node 9
- Slots 13 and 14 contain wide node 13
- Slot 15 contains thin node 15
- Slot 16 contains thin node 16

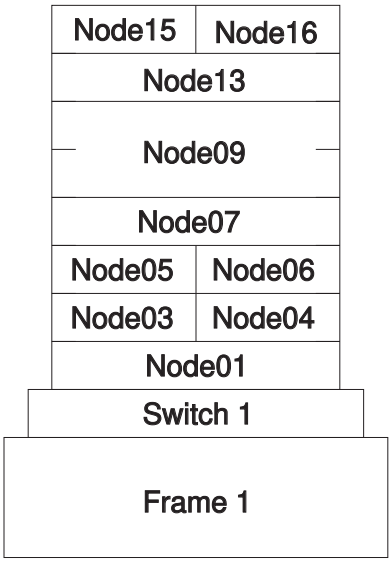



*Figure 26. Varied Node, 1-frame System*

In a switched SP, the switch chip is the basic building block of a system partition: if a switch chip is placed in a partition, then any nodes connected to that chip's *node switch ports* are members of that partition, also. So, any system partition in a switched SP is comprised physically of switch chips, any nodes attached to ports on those chips, and links which join those nodes and chips.

A system partition can be no smaller than a switch chip and the nodes attached to it; and those nodes would occupy some number of slots in the SP system. The following are examples of what is possible for a single switch chip to which nodes attach:

- Four thin nodes attached (4 slots)
- Three thin nodes attached (3 slots) and one unused node switch port
- Two wide nodes attached (4 slots) and 2 unused node switch ports
- One wide node and two thin nodes attached (4 slots) and 1 unused node switch port
- One wide node one thin node attached (2 slots) 2 unused node switch ports
- One 604 high node and two thin nodes attached (6 slots) and 1 unused node switch port

  **Note:** A 604 high node occupies 4 adjacent slots. The 604 high node is attached to one switch chip at one port.
- One 604 high node and one wide node attached (6 slots) and 2 unused switch ports
- ...

In practice, every slot is assigned to some chip, via fictitious nodes if necessary, so that if that slot is later filled with a node, it is not a major reconfiguration event.

## Example 3 - An SP with 3 frames, 2 switches, and various node sizes

**Note:**

*Please recognize that you may not be able to order the system discussed in this example. This system has nodes located in legitimate locations. However, the models available for order from IBM may not include this configuration. After time passes, however, you may add, delete and move nodes of your system such that you arrive at a similar system.*

Figure 27 shows a 3-frame system containing wide nodes, thin nodes and 604 high nodes. The nodes have been named in accordance with their frame and slot location.

There is a switch in each of the first and third frames. The second frame is sharing the first frame's switch, which is possible because the configuration matches number 1 in Figure 11 on page 84. At most 16 nodes we may connect to a switch board, and since Frames 1 and 2 have only 11 nodes total, there even appears to be room for some future expansion.

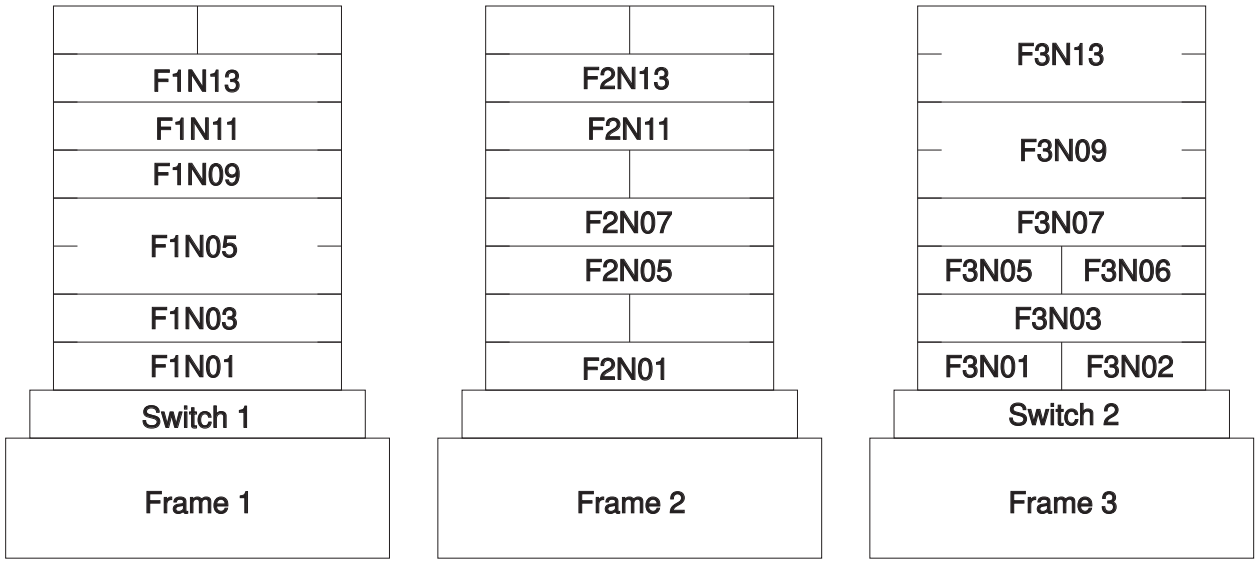



*Figure 27. Three frames with 2 switches*

The nodes in a system are assigned node numbers sequentially across the frames, bottom to top, and left to right, except that node numbers are skipped to accomodate later expansion and node shifting. Put another way, the first 16 node numbers are assigned to the 16 slots of the first frame, the next 16 node numbers to the 16 slots of the second frame, and so on. The following are cases where node numbers are skipped:

1. A wide node takes up a second slot
   - For example, there is no F1N14, or node number 14, because wide node F1N13 occupies both of slots 13 and 14 of Frame 1
   - and there is no F2N08, or node number 24, because wide node F2N07 occupies both of slots 7 and 8 of Frame 2
2. A 604 high node takes up three additional slots

- for example, F1N06, F1N07 and F1N08 (node numbers 6-8) cannot exist because 604 high node F1N05 takes up all of slots 5-8 in Frame 1

3. A slot is left empty
   - For example, there is no F1N15, or node number 15, because slot 15 in Frame 1 is unoccupied
   - And there is no F2N03, or node number 19, because slot 3 of Frame 2 is unoccupied

So, how do the nodes in this system attach to the switches? Each switch may have 16 nodes attached. Therefore, the system has 32 *node switch ports*. It is necessary that the system know to which of these ports each node is connected. These node switch ports are numbered 0 through 31, and the *switch port number* of a node is the number of the node switch port to which it is connected. The switch port number of a node is sometimes called its *switch node number*.

In the 16-node system of Example 1, a node's switch port number is one less than its node number, because switch port numbers start at zero. Therefore, node number 1 has switch port 0, and so on up through node number 16 which has switch port number 15.

**Note:** Although this discussion may sound complicated, it really isn't. Just keep in mind that a node generally sits in the midst of a large system, and at any point in time, you might care about any one of the following:

- Where does the node sit in its frame? (slot number)
- What is the node's position relative to all the rest of the nodes in the system? (node number)
- Where does the node connect to the switch fabric? (switch port number, or switch node number)

You may ascertain the current node number mapping for a system under operation by issuing the command **sysparaid -i**.

When possible, switch connections are made as illustrated in Example 1. Therefore, in Frame 1 of Figure 27 on page 114, F1N03 sits in slot 3, is node number 3 and has switch port number 2. The wide node F1N01 is node number 1 and uses switch port number 0.

There is no node number 2, and so switch port number 1 is not used by Frame 1. However, F2N01 in Frame 2 needs a switch port, and is a likely candidate to take the place of the missing node number 2 on Switch 1. So, F2N02 occupies slot 1 of Frame 2, is node number 17 in the system, and uses switch port number 1.

Continuing along this track, F1N05 uses switch port number 4, and F2N05 uses switch port 5. Switch port 6 is unused since there is no F1N07, but switch port 7 is unused by F2N07.

Switch port numbers continue on with the next switch of the system. So, F3N01 uses switch port 16, F3N02 uses switch port 17, and so on. However, the F3N01 is node number 33 and F3N02 is node number 34.

Now, assume you wished to partition this system as follows:

```
Partition 1 - F1N01, F2N01, F1N05, F2N05,
              F1N03, F2N07
Partition 2 - F1N09, F1N13, F2N13
              F1N11, F2N11
Partition 3 - F3N01, F3N02, F3N05, F3N06,
              F3N03, F3N07,
              F3N09, F3N13
```

The nodes are listed in this order on purpose — by switch chip. This layout is not among the predefined ones shipped with the SP. So, you may employ the System Partitioning Aid to help specify this layout. First, recognize that for this system to ever have been operational, the system was installed and its specific makeup (existing frames, existing switches, node names, node types, node numbers, switch port numbers, etc.), was stored in the SDR. So, the System Partitioning Aid has that data to build upon. To specify the system partitioning layout you want, you may do one of the following:

1. Invoke the System Partitioning Aid from the command line, specifying the partitions via node lists in an input file.
2. Bring up the GUI version of the System Partitioning Aid, and select the nodes for each partition using a pointer device.

   **Note:** The GUI version of the System Partitioning Aid is available only under the new *Perspectives*. Also, one may actually plan for such a system before it is realized. This topic is discussed in Appendix A, “The System Partitioning Aid – A Brief Tutorial” on page 167.

In either case, the System Partitioning Aid will not allow you to do something inappropriate like split a switch chip among partitions; nor define a partition having extremely poor bandwidth or reliability over the switch. (See the IBM RISC System/6000 Scalable POWERparallel Systems: Administration Guide for addititonal information on such restrictions.) When you are satisfied, the System Partitioning Aid will save your layout information in an appropriate directory. Note that layouts are classified based on chip assignments and the maximum number of nodes which may be attached to those chips. Therefore, this layout would be saved as an 8_8_16-layout. (8+8+16 = 32 nodes is the maximum number of nodes which may attach to 2 switches.)

## System Partitioning Configuration Directory Structure

System partitioning is supported by the SP software's ssp.top option. You may choose to install this support when you install PSSP on the control workstation. This provides the system with a directory of predefined system partitioning layouts, as well as the System Partitioning Aid, a tool for building additional layouts. The directory is represented in Figure 28 on page 118. An introduction to the System Partitioning Aid is provided in Appendix A, “The System Partitioning Aid – A Brief Tutorial” on page 167.

For system partitioning purposes, a system is cataloged by its switch configuration. How many node slots in the system are used, and what type of nodes the system contains play a role in how you wish to partition your system. *However, the quantity and kinds of switches determine the options.*

A switch board to which nodes are connected is called a *Node Switch Board* or *NSB*. In larger systems, it becomes impossible to adequately connect all pairs of

NSB switch boards to each other, and so additional switches boards are inserted just to provide additional connectivity. These "extra" switch boards have no nodes attached, just other switch boards. So, such a switch board is called an *Intermediate Switch Board* or *ISB*.

For example, the 1-frame system considered in Example 1 is classified as a 1nsb0isb system: it has 1 NSB and 0 ISBs. The system of Example 3 had 3 frames, but only 2 switch boards, and is a 2nsb0isb system.

The **syspar_configs** directory within the **spdata** file system serves as the home for all system partition configuration information. Figure 28 on page 118 shows this directory structure. In this figure, the subdirectory 2nsb0isb is expanded to illustrate the predefined layouts available for such systems:

1. Such a system has a maximum of 32 nodes -- 2 switches with up to 16 nodes each.
2. Using the predefined layouts shipped with the SP, such a system may be configured as (partitioned into) 4_28, 8_24, or 16_16 subsystems; or it may be used as an undivided 32-node system.

   **Note:**

   a. “Example 3 - An SP with 3 frames, 2 switches, and various node sizes” on page 114 illustrates how to construct a new 8_8_16 layout. You could use the System Partitioning Aid to save this layout, in which case, the System Partitioning Aid would have introduced a corresponding new config.8_8_16 directory in the 2nsb0isb subtree. Within that new config-level directory, a layout subdirectory would be introduced named layout.<name_desired> where <name_desired> is a name we specified to the System Partitioning Aid.

   b. “Example 2 - A Switchless System” on page 107 illustrates (implicitly) how to construct a new, switchless 4_12 layout. Although only 7 nodes were available, we had a full frame for which the maximum size system is 16; categorization is based on the maximum number of nodes, and any unlisted nodes go in the last partition. If you used the System Partitioning Aid to save this layout, the System Partitioning Aid would save it in the 1nsb0isb subtree as 1nsb0isb/config.4_12/layout/layout.<name_desired> where <name_desired> is a name we specified to the System Partitioning Aid.
3. For the 4_28 case, there are 8 different layouts available — one for each of the 8 node switch chips in the 2 switches.
4. For each available layout, the corresponding subdirectory contains a description file (layout.desc), and the specifics of the individual system partitions: its nodelist file and its topology file.

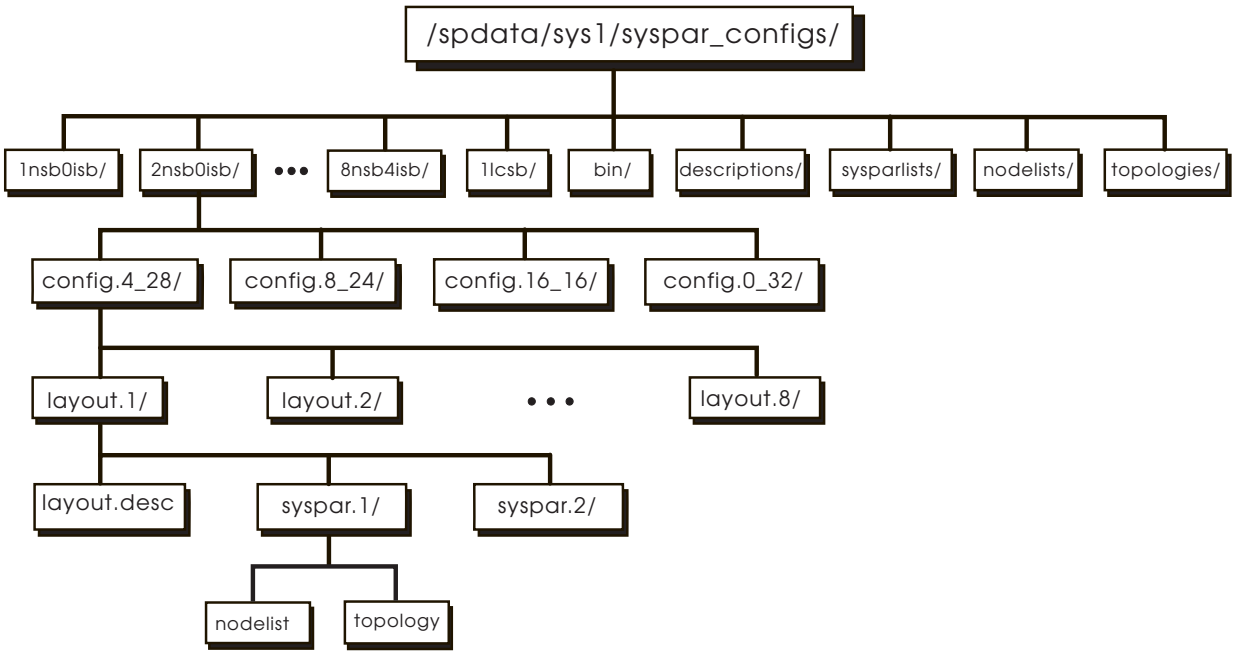



*Figure 28. The Directory Structure Of System Partition Information*

The higher-level directories **descriptions sysparlists**, **nodelists** and **topologies** contain the files common to various configuration layouts. For predefined layouts, the low-level files **layout.desc**, **nodes.syspar**, **nodelist**, and **topology** are actually links into these higher-level directories. For layouts constructed via the System Partitioning Aid, no links are used; the actual files are stored at these lower levels.

The specifics of each of the predefined configurations appears in Appendix A. You may wish to consult that information in conjunction with worksheets you completed in Appendix C, “SP System Planning Worksheets” on page 215.

# Chapter 6. Planning for Security

Analyzing company resources and protecting these resources is part of the administrator's duties. Your resources with regard to PSSP include the following:

- System and application data, user programs, and user data
- Communications devices and communication access methods
- Login permissions. Specifically, who can login, when they can login, and how much resource each user can have.
- Authentication, passwords, and Kerberos tickets.

This chapter describes how authentication services work in the SP so that you can plan your authentication use.

## Authentication in the SP System

If you are unfamiliar with Kerberos terminology, you may want to review the definitions of these and other terms used to describe the security facilities in the *Administration Guide*.

The SP authentication services are based on Version 4 of MIT's Kerberos security facility. It is a *de facto* standard authentication protocol that has several implementations, including use by AFS. Authentication allows networked applications (applications that have client and server parts executing on different hosts) to securely determine their mutual identities through a trusted third party. This includes the Kerberos authentication and key distribution center (KDC). This service is provided by one or more Authentication servers (daemons) running on systems that are accessible from application client server systems, providing credentials that they use to perform the authentication task.

When there is more than one authentication server system, one is the primary server and all others are secondary servers. The primary server also maintains the master copy of the authentication database. Secondary servers operate using copies of the master database, updated periodically at the discretion of the system administrator. The authentication database contains an encrypted key (password) for each client and server entity, known in Kerberos terminology as a *principal*.

## Authentication Principals

The identities that the authentication service verifies are registered in the authentication database. There are basically two kinds of principals: users, who assume the role of clients when they invoke authenticated services; and the services that these users invoke. SP authentication principals are defined across a collection of systems known collectively as the local authentication realm. Each realm has a primary authentication server, any number of secondary servers, and client systems (systems that have PSSP authenticated services installed but are not authentication servers).

Each principal's full identifier has the form: `name.instance@realm`.

where: `name` is a user of service name

© Copyright IBM Corp. 1996

`instance` is a qualifier used to identify multiple principals with the same name. For users, this allows the assignment of different roles and privileges to each instance. For services, instance is used to distinguish between identical application servers running on multiple hosts. For PSSP authenticated services, it is derived from the hostname used to access a particular instance of the server daemon.

`realm` is the name of the realm in which the principal is defined. The entire SP system, including its control workstation is always in a single realm.

Ordinarily, a user principal is known by a simple name that is the same as the AIX login name. It is not required to be the same, however, because principal names are managed separately and logging into the SP system as an AIX user is independent of the procedure for establishing one's identity as an authentication principal. User principals are defined by authentication administrators; the first is defined when the primary authentication server is configured. Administrators of the PSSP authentication database have principal identities of <name>.admin. AFS authentication administration does not use instances in its principal identifiers.

Examples of user principals on an SP system are:

```
frank
root.admin
operator
melissa.admin
kelly.sysprog
```

## SP Service Principals

Because authenticated application services are provided by separate servers (daemons) on individual workstations or nodes, each instance of a daemon must be distinguished from others like it running on different hosts. Client programs identify the target of a request by a hostname that represents a particular network interface on the server host. The hostname is supplied explicitly by the client interface, such as on the rsh command; or it is provided implicitly as with the SP_NAME environment variable used by the System Monitor interface. The service principal associated with a particular target hostname is identified as <*service*>.<*host*> where:

<*host*> is the short form of the fully-resolved hostname, converted to lower-case. Therefore, for example, if a target node has three network interfaces:

1. The internal ethernet with hostname SP12, which resolves to Node12
2. A token ring with hostname tr12.abc.com
3. An SP Switch with hostname sw12, which resolves to Switch12.abc.com

PSSP authenticated services will define three service principals for this node named rcmd.node12, rcmd.tr12, and rcmd.switch12, that it will use to perform authentication on client requests arriving through the respective interfaces.

The SP system includes versions of the **/usr/lpp/ssp/rcmd/bin/rsh** and **/usr/lpp/ssp/rcmd/bin/rcp** commands that use SP authentication services. These commands are used by SP installation and configuration scripts and are available for general use by system administrators. The SP System Monitor command-line and graphical interfaces, and the remote execution facilities of **dsh** and **sysctl** also use authentication services. This suite of administration tools uses two service principals: the System Monitor applications use the **hardmon** principal, and the

other facilities use the **rcmd** principal. Instances of **hardmon** are defined on the SP control workstation and on other RISC System/6000 workstations on which the SP authentication services are initialized. Instances of the **rcmd** service principal are defined on the same systems as the **hardmon** principal, plus each SP node.

## Administrative Principals

Initializing authentication services requires defining at least one user principal, who is authorized to perform installation tasks. A system administrator, logged on as **root**, must assume the identity of this principal. When you use authentication services provided by AFS or another Kerberos implementation, this principal should already exist in the authentication database. For SP authentication services and other MIT Kerberos Version 4 implementations, the administrator's principal can have any name with an instance of **admin**. An AFS principal has administrative authority if it has an **admin** attribute in its definition.

## Deciding on Your Authentication Configuration

This section describes the various ways you can configure an SP system in an authentication realm. The following sections illustrate the possible authentication configurations used with the control workstation. The configurations also include other RISC System/6000 workstations on which you install SP authentication services, and non-RISC System/6000 workstations, when the authentication servers are configured in each of the supported manners. The control workstation and the SP nodes are always in a single authentication realm, which may optionally include other workstations and even other SP systems. The authentication servers can be on any workstation in the realm, but not on SP nodes. If you have AFS installed on your workstations, you may choose to use AFS servers for authentication, but are not required to do so. If you do not use AFS, you may use SP authentication servers or other MIT Kerberos Version 4 servers. The SP nodes will have authentication services installed for all authentication configurations.

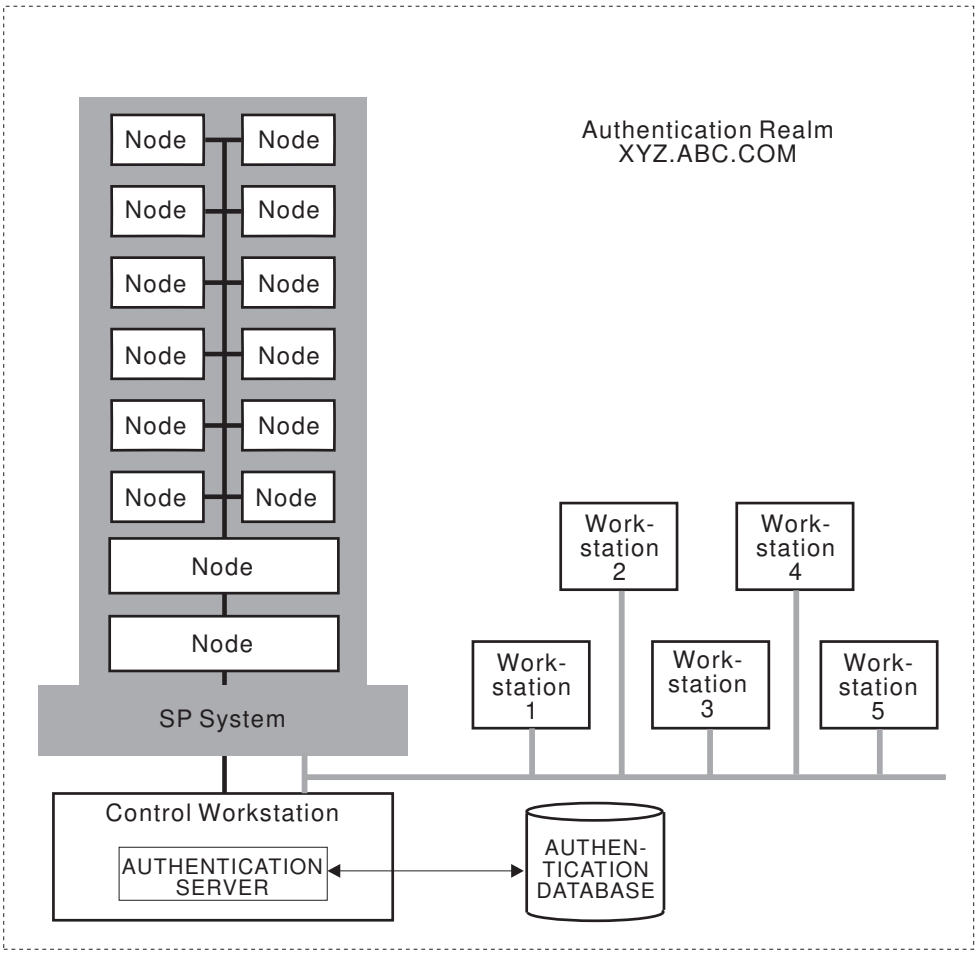



*Figure 29. The control workstation as primary authentication server*

**CWS-Primary**

Figure 29 illustrates this configuration as follows:

- The control workstation is the primary authentication server, with the SP authentication server (fileset ssp.authent) and authenticated services (fileset ssp.client) installed.
- Other RISC System/6000 workstations may be secondary authentication servers, with the SP authentication server installed.
- Other RISC System/6000 workstations may have SP authenticated services installed.

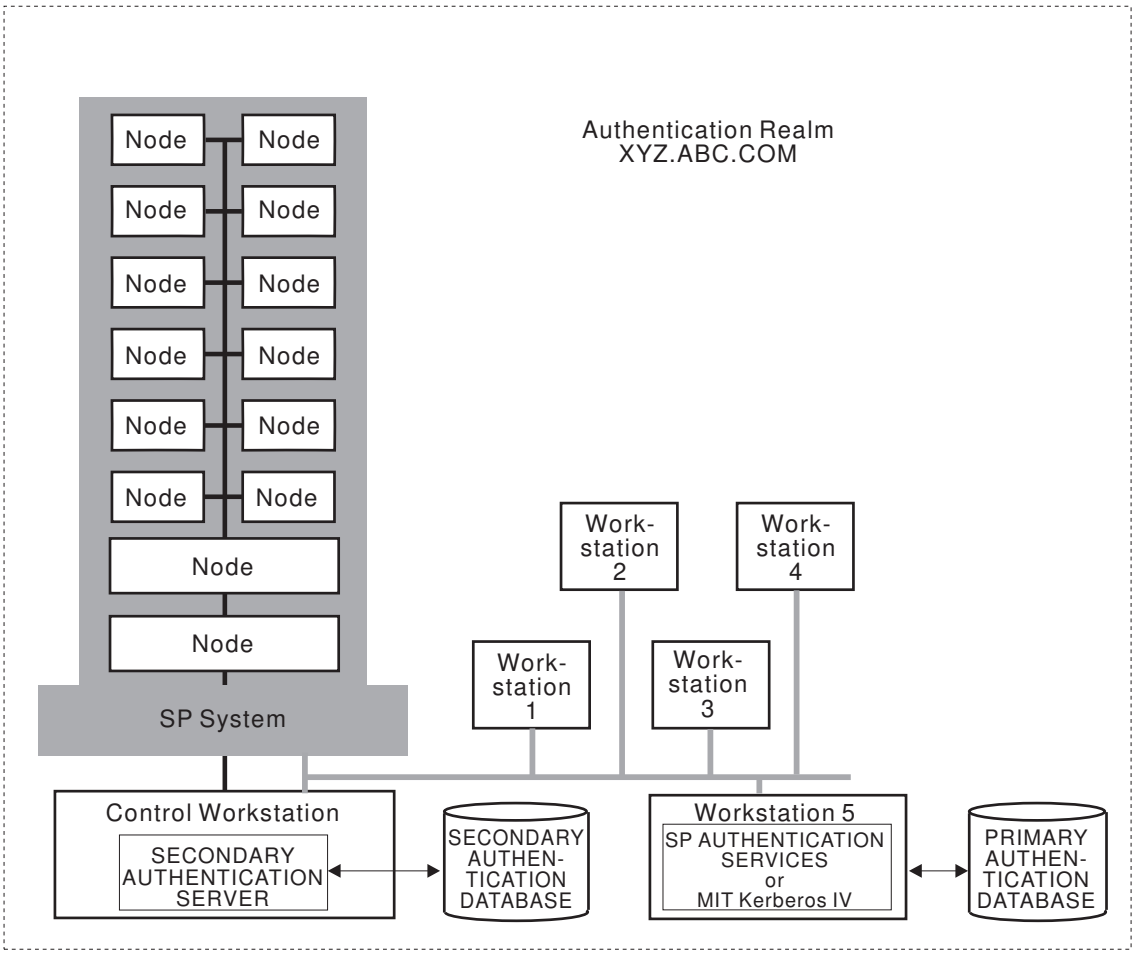



*Figure 30. The control workstation as secondary authentication server*

**CWS-Secondary**

Figure 30 illustrates this configuration as follows:

- The primary authentication server is either:
  1. A RISC System/6000 workstation with the SP authentication server (fileset ssp.authent) and authenticated services (fileset ssp.clients) installed.
  2. A workstation with another MIT Kerberos Version 4 implementation.
- The control workstation is a secondary authentication server, with the SP authentication server and authenticated services installed.
- Other RISC System/6000 workstations may be secondary authentication servers, with the SP authentication server installed.
- Other RISC System/6000 workstations may have SP authenticated services installed.

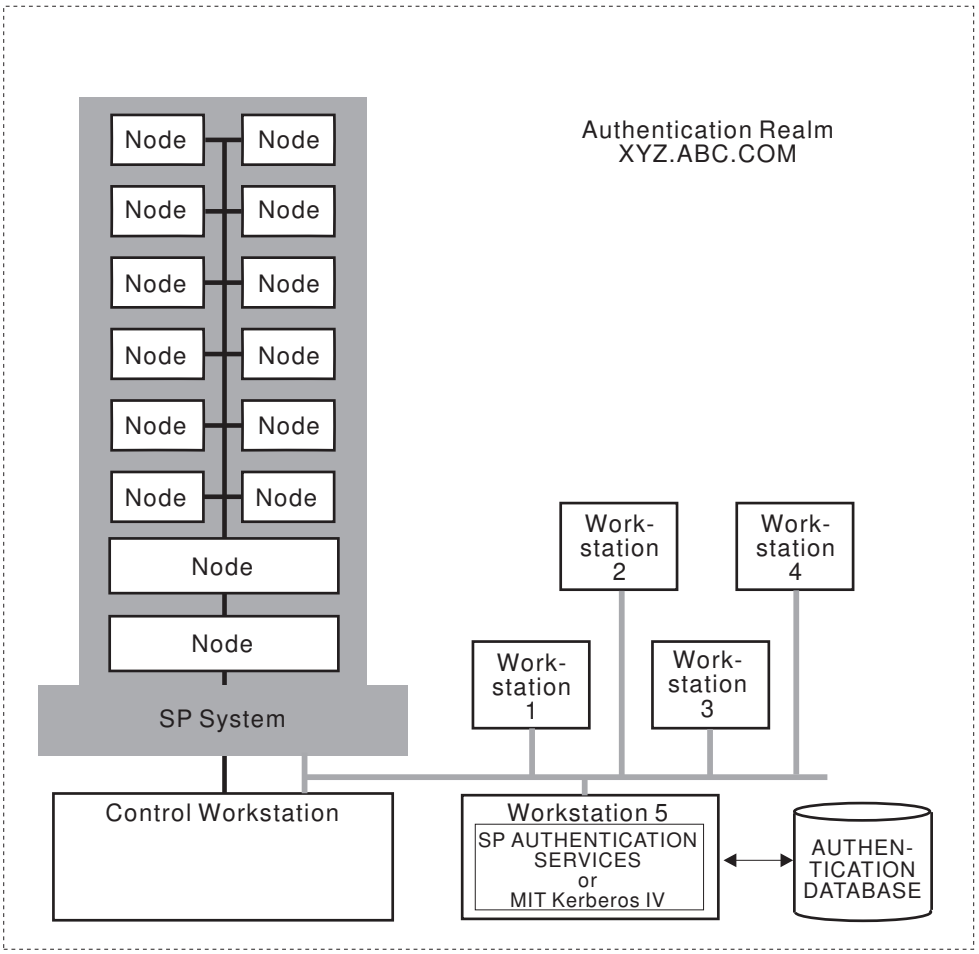



*Figure 31. The control workstation as client of authentication server*

**CWS-Client**

Figure 31 illustrates this configuration as follows:

- The primary authentication server is either:
  1. A RISC System/6000 workstation with the SP authentication server (fileset ssp.authent) and authentication services (fileset ssp.clients) installed.
  2. A workstation with another MIT Kerberos Version 4 implementation.
- Other RISC System/6000 workstations may be secondary authentication servers, with the SP authentication server installed.
- The control workstation has SP authenticated services installed.
- Other RISC System/6000 workstations may have SP authenticated services installed.

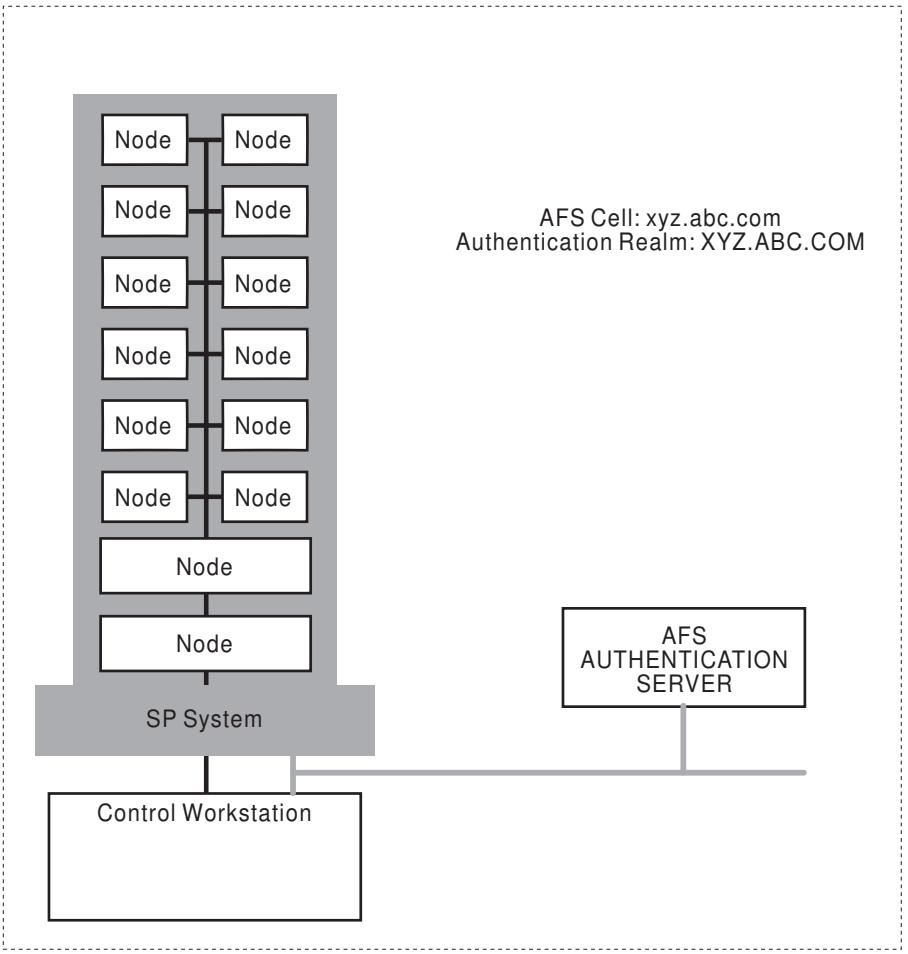



*Figure 32. Using AFS authentication services on the SP system*

**AFS Server**

Figure 32 illustrates this configuration as follows:

- The authentication servers are AFS servers, on the control workstation or other workstations.
- All workstations, including the control workstation, have AFS client services installed.
- The control workstation has SP authenticated services (fileset ssp.clients) installed. installed.
- Other RISC System/6000 workstations may have SP authenticated services installed.

## Deciding on Authentication Realms

If you are using AFS authentication servers, your authentication realms are the same as your AFS cells. The name of the local realm for the SP system will be automatically set to the name of the AFS cell of the control workstation, and is converted to upper case.

When you are not using AFS, the following considerations apply. A SP system must be installed in a single authentication realm. This is the case if you are installing SP authentication on only the control workstation. The authentication realm could be an existing realm, consisting of systems using another Kerberos

implementation, to which you add the SP system. You can give the realm any name you like or default the authentication realm name to the domain part of the server's hostname, converted to upper case.

Whenever you have additional SP systems or other workstations using authenticated services, you must decide whether you want them all in the same realm, sharing a single set of principals in one master authentication database. Generally a single realm is easier to manage and easier for users who don't have to concern themselves with selecting the correct realm when identifying a principal.

If there is to be any use of authenticated services between two different authentication realms, each realm must have a unique name. If you choose to have multiple realms, and there are systems in both whose hostnames have the same domain part, you can configure only one using the default authentication realm name. If there is any chance that you would add additional authentication realms and want to use authenticated services between systems in them, it is best to create your own non-default, and presumably meaningful realm names when you plan your configuration.

See the section on working with authentication realms in *IBM RISC System/6000 Scalable POWERparallel Systems: Administration Guide* for more information.

## Creating the Authentication Configuration Files

For some of these configurations, you need to create a configuration file (**/etc/krb.conf**) that lists the local realm name and all server hostnames. The following list identifies the cases in which you must provide the **/etc/krb.conf** file, and shows simple examples:

**CWS-Primary**
Optional - you must supply the file only if there will be one or more secondary servers on RISC System/6000 workstations.. If the **/etc/krb.conf** file is not supplied, **setup_authent** creates a file listing the local host as the primary server. For example:

```
XYZ.COM
XYZ.COM spcw.xyz.com admin server
XYZ.COM ksecondary.xyz.com
```

**CWS-Secondary**
Required - control workstation is listed as a secondary server. This requires that the **krb.conf** file is first created on the primary authentication server and is copied to the control workstation. For example:

```
XYZ.COM
XYZ.COM kprimary.xyz.com  admin server
XYZ.COM spcw.xyz.com
```

**CWS-Client**
Required - control workstation is not listed in configuration file. This requires that the **krb.conf** file is first created on the primary authentication server and is copied to the control workstation. For example:

```
XYZ.COM
XYZ.COM kprimary.xyz.com  admin server
XYZ.COM ksecondary.xyz.com
```

**CWS-AFS** None - file is derived automatically from AFS configuration files. AFS uses the configuration files /**usr**/**vice**/**etc**/**CellServDb** and /**usr**/**vice**/**etc**/**ThisCell**.

Refer to the file format man pages **krb.conf** in the *Commands and Technical Reference* for more information and examples.

## Selecting the Authentication Options to Install

Selecting SP options for installation depends on where the authentication server is located. SP authentication code is distributed in two separately installable options. **ssp.authent** contains only parts required on a system that is to be a authentication server. The remainder of Kerberos and authenticated services is distributed in **ssp.clients**.

You must install **ssp.clients** on the SP control workstation, even in the case where you intend to use AFS or MIT Kerberos Version 4 authentication. You should also install it on any other RISC System/6000 workstation that you plan to be a authentication server or from which you plan to perform system management tasks using System Monitor commands, AIX remote commands, or the **sysctl** remote command execution facility. Workstations using MIT Kerberos Version 4 authentication do not require **ssp.clients** if they are not using SP system management tools. All SP nodes will have **ssp.clients** installed.

You must install **ssp.authent** on the control workstation, if it is to be a authentication server, either primary or secondary. You can also install **ssp.authent** on any other RISC System/6000 workstation that you plan to be an authentication server. You will not be able to install it if the system already has an MIT Kerberos Version 4 implementation installed. If you want to install the SP authentication facilities, you must first remove the other Kerberos implementation.

## Checklists for Authentication Planning

### Using SP or MIT Kerberos 4 Authentication Servers

Decide what authentication realms your network will have.

For each realm:

1. Decide on the name of the realm.
2. Determine the administrative principal you will use for installing the SP authentication on the control workstation and other RISC System/6000 workstations. Either this administrative user or another that you define later must be assigned UID 0 in order to perform SP installation tasks that require both root privileges and Kerberos administrative authority.
3. Decide which system is the primary server.

   If it will be an SP authentication server:

   - Make sure no other Kerberos system is installed.

   Otherwise, it must be an existing (primary) Kerberos server.

- Make sure the authentication server is installed and running.
- Make sure the kshell service (rsh/rcp daemon) is available.
- Make sure that network interfaces and name resolution are set up to allow it to access the primary server.

4. Decide which systems will be secondary servers.
5. Make sure that network interfaces and name resolution are set up to allow it to access the primary server and the SP system.

   If any

   - Decide how you will order the entries in the **/etc/krb.conf** configuration file.
   - Decide how often you want to automatically propagate the authentication database from the primary server to the secondaries.
   - For each secondary server
     - Make sure no other Kerberos system is installed.
     - Make sure that network interfaces and name resolution are set up to allow it to access the primary server.

6. Identify any other RISC System/6000 systems that will be clients.

   If any other RISC System/6000 systems will be clients:

   - Decide how you will order the entries in the **/etc/krb.conf** configuration file.
   - Make sure that network interfaces and name resolution are set up to allow it to access the primary server and the SP system.

## Using AFS Authentication Servers

If you choose to use AFS authentication services with your SP system, take into account the following unique considerations:

1. Any RISC/6000 workstation on which you are installing the SP authentication support, including the control workstation, must have already been set up as either an AFS client system or as an AFS server.
2. If the AFS configuration files, **CellServDB** and **ThisCell**, are installed in a directory other than **/usr/vice/etc**, or if the **kas** program is not installed in **/usr/afsws/etc** or **/usr/afs/etc**, you must create symbolic links at the directory level so the SP **setup_authent** program can find these files.
3. You must have a user defined with the AFS **admin** attribute that can be used during SP authentication setup and installation. This user will also be the default user defined with administrative authority in the System Monitor's access control list file. You can add other administrators later.
4. In order for users to use the authentication service on the SP nodes, you must also install AFS client services on those systems. See the instructions for AFS client customization of the SP nodes in the sample file **afsclient.cust** in the *IBM RISC System/6000 Scalable POWERparallel Systems: Administration Guide*.
5. The authentication server (**kaserver**) in AFS Version 3.4 for AIX 4.1 accepts Kerberos Version 4 protocol requests using the well-defined **udp** port assigned to the **kerberos** service. Whereas AIX 3.2.5 did not define a Kerberos service in the **/etc/services** file distributed with the base operating system, AIX 4.1 assigned the Kerberos Version 5 port number 88 to work with DCE. PSSP

authentication services based on MIT Kerberos Version 4, uses a default port number of 750. The PSSP commands use the service name **kerberos4** to avoid this conflict with the Kerberos 5 service name. For PSSP authentication commands to communicate with an AFS 3.4 **kaserver** on AIX 4.1, you must do one of the following steps:

a. Stop the **kaserver**, redefine the **udp** port number for the **kerberos** service to 750 on the AFS Authentication server system, then restart the **kaserver**.

b. Add a statement to /**etc**/**services** that defines the **udp** port for the **kerberos4** service as 88 on the SP control workstation and on any other independent workstation that will be a client system for PSSP authenticated services.

## Authentication Worksheets

Complete Worksheet 17, Table 53 on page 310 with your authentication information. If you use PSSP authentication servers, fill outTable 54 on page 311 . If you use an AFS authentication server, fill out Table 55 on page 311.

Be aware that these worksheets ask you for passwords. Keep these worksheets, when filled out, in a secure location.

# Chapter 7. Planning to Record and Diagnose System Problems

## Configuring the AIX Error Log

The AIX Error Log facility is configured by default to be 1 MB in size. When the log fills up, it wraps around and overwrites existing entries. In this release, the SP software is utilizing the AIX Error Log more frequently. Therefore, you should increase the size to at least 4MB. You can do this once for all nodes with the **dsh** command after the nodes are installed.

```
dsh -a /usr/lib/errdemon -s 4096000
```

## Configuring the BSD Syslog

### Control Workstation

The SP installation configures the Berkeley Software Distribution (BSD) syslog subsystem on the control workstation only to write all syslog messages for its daemons to the **daemon.notice** facility. (All kernel error messages are logged via the AIX Error Log Facility.) If the control workstation already has the **daemon.notice** facility configured, it does not change the previous configuration.

### SP Nodes

The BSD syslog facility is not configured on the SP nodes when it is installed. By default, AIX does not configure the BSD syslog. The configuration file for BSD syslog is /**etc**/**syslog.conf**. Configure the syslog if you want entries made there. Note also that any SP error logs are also written to the AIX Error Log and usually contain more information about probable cause and possible recovery or diagnostic actions. In AIX, the predominant error logging facility is the AIX error log and only code that was ported from 'other sources' contains the calls to syslog and logger. The AIX kernel does not use syslog for error logging.

The File Collections facilities can be used to manage the /**etc**/**syslog.conf** file if all the nodes have the same configuration file. Administrators should be aware that the amount of information that syslog collects may consume network resources on an SP system if they are forwarded to a single node. Additionally, the SP multiplexes the /**dev**/**console** tty cables onto a single cable per frame. If /**dev**/**console** is used for syslog messages performance problems may occur. If you want syslog messages, IBM recommends that they be logged on a per-node basis, and that you use tools such as **dsh** and **sysctl** to view and manage them.

See the *Diagnosis and Message Guide* for more information about error logging.

© Copyright IBM Corp. 1996

## System Error Logging Tools and Logs

SP has many commands and facilities that create logs of system events. The following table lists these commands or functions and some of the items that are logged:

*Table 33. System error logging commands and functions*

| Category | Log/Command to Issue | Source Nodes |
|---|---|---|
| **ssp** (general) | **/usr/lpp/ssp/bin/splstdata -n** > *filename* | Control workstation only |
| cw**ssp** (general) | **/usr/lpp/ssp/bin/splstdata -s** > *filename* | Control workstation only |
| **ssp** (general) | **/usr/lpp/ssp/bin/splstdata -e** > *filename* | Control workstation only |
| **css** | **/usr/lpp/ssp/css/css_dump** > *filename* | Switch primary and suspect nodes |
| **css** | **/usr/lpp/ssp/css/fs_dump** > *filename* | Switch primary and suspect nodes |
| **css** | **/usr/lpp/ssp/css/css.snap** > *filename* | Switch primary and suspect nodes |
| **css** | **/usr/lpp/ssp/css/css.snap** > *filename* | Switch primary and suspect nodes |
| **css** | **/usr/lpp/ssp/css/vdidi2 -v -d** > *filename* | All nodes on switch |
| **css** | **/usr/lpp/ssp/css/vdidi3 -v -d** > *filename* | All nodes on switch |
| **css** | **/var/adm/SPlogs/css/*** | Switch primary and suspect nodes |
| **css** | **/var/adm/SPlogs/css/Ecommands.log** | Control workstation only |
| **css** | **/tmp/Enodes.SDR** | Switch primary only |
| **css** | **/tmp/node_list** | Switch primary only (High Performance Switch) |
| **Amd** | **/etc/amd/amd_maps/*** | All nodes and the control workstation |
| **Amd** | **/etc/exports** | The Amd server (usually the control workstation) |
| **Amd** | **/etc/filesystems** | The Amd server (usually the control workstation) |
| **Amd** | **/etc/amd/amq** > *filename* | All nodes and the control workstation |
| **Amd** | **/bin/df** > *filename* | All nodes and the control workstation |
| **Amd** | **/var/adm/SPlogs/amd/amd.log** | control workstation only |
| **sysmon** | **/usr/lpp/spp/config/data_eng.rc.console** | All nodes and the control workstation |
| **sysmon** | **/usr/adm/spmon.log** | Control workstation only |
| **sysmon** | **stty** < **/dev/tty0** > *filename* | Control workstation only |
| **sysmon** | **/usr/lpp/spp/config/core** | All nodes and the control workstation |
| **sysmon** | **/tmp/delog.*** | All nodes and the control workstation |
| **sysmon** | **spmon -d** > *filename* | Control workstation only |
| **jm** | **/tmp/jmd_err** | Primary jm node and the control workstation |
| **jm** | **/tmp/jmd_out** | Primary jm node and the control workstation |
| File collections | **/var/adm/SPlogs/filec/*** | Control workstation and suspect nodes |
| **sysman** | **/var/adm/SPlogs.sysman/*** | All nodes |
| SDR | **/var/adm/SPlogs/sdr/*** | Control workstation only |

## SP Specific Logs

SP creates the following logs during normal operations. You will have a set of these logs for each system partition.

**/var/adm/SPlogs/cs/cstart**.*timestamp*.**pid**
**/var/adm/SPlogs/cs/cshut**.*timestamp*.**pid**
**/var/adm/SPlogs/sysman/***node***console.log**
**/var/adm/SPlogs/sysman/***node***config.log**
**/var/adm/SPlogs/sysman/***node***firstboot.log**
**/var/adm/SPlogs/spacs/spacs.log**
**/var/adm/SPlogs/css/rc.switch.log**
**/var/adm/SPlogs/css/daemon.stderr**
**/var/adm/SPlogs/css/daemon.stdout**
**/var/adm/SPlogs/css/fs_daemon_print.file**
**/var/adm/SPlogs/css/worm.trace**
**/var/adm/SPlogs/css/flt**
**/var/adm/SPlogs/css/router.log**
**/var/adm/SPlogs/css/toplogy.data**
**/var/adm/SPlogs/css/out.top**
**/var/adm/SPlogs/css/dtbx.trace**
**/var/adm/SPlogs/spmon/nc/nc.***frameid.slotid*
**/var/adm/SPlogs/spmon/hmlogfile.***nnn*
**/var/adm/SPlogs/spmon/hm_frame_packet_dump**
**/var/adm/SPlogs/spmon/hm_response_dump**
**/var/adm/SPlogs/spmon/hm_sldata_dump**
**/var/adm/SPlogs/spmon/splogd.state_changes.***timestamp*
**/var/adm/SPlogs/SPdaemon.log**
**/var/adm/SPlogs/sdr/sdrlog.***nnn*
**/var/adm/SPlogs/sdr/SDR_config.log**
**/var/adm/SPlogs/sysctl/sysctld.log**
**/var/adm/SPlogs/kerberos/admin_server.syslog**
**/var/adm/SPlogs/kerberos/kerberos.log**
**/var/adm/SPlogs/kerberos/kerberos.slave_log**
**/var/adm/SPlogs/kerberos/kpropd.log**
**/var/adm/SPlogs/amd/amd.log**
**/var/adm/SPlogs/filec/logs**
**/var/adm/SPlogs/**
**/tmp/jmd_out**
**/tmp/jmd_err**

## Finding and Using Error Messages

Most error messages generated by the SP are listed and explained in *Diagnosis and Message Guide*. The second section of that book lists the messages in numerical order. Each message should have a part labeled “User Response” that describes the actions, if any, that you should take when you encounter the message. If the information in a message does not help resolve the problem, you should have users follow a pre-defined path for resolving the problem.

## Getting Help from IBM

If you require help from IBM in resolving an SP system problem, you can get assistance by calling IBM Support at the following numbers. Before you call, be sure you have the following information:

1. Your access code (customer number). This number was entered on Worksheet 4, "SP Planning" on page 219.
2. The SP product number: **5765-543**.

   This is important information that will speed the correct routing of your call.
3. The name and version of the operating system you are using.
4. A telephone number where you can be reached.

The person with whom you speak will ask for the above information and then give you a time period during which an IBM SP representative will call you back.

In the United States:

The number for IBM software support is **1-800-237-5511**.
The number for IBM hardware support is **1-800-IBM-SERV**.

Outside the United States, contact your local IBM Service Center.

## Sending Problem Data to IBM

You may be asked to produce a system dump and send it to the IBM support office. Refer to *IBM RISC System/6000 Scalable POWERparallel Systems: Administration Guide* for instructions on how to produce this information.

### Customers Within the United States

To send the data to IBM, label the tape or diskette with the problem number and mail it to:

IBM RS/6000 Scalable POWERparallel Systems
Dept. 39KA, M/S P961, Bldg. 415
522 South Road
Poughkeepsie, N.Y. 12601-5400

ATTN: APAR Processing

### Customers Outside the United States

Your local IBM Service Center can provide you with the address to use.

## Opening a Problem Management Record (PMR)

A PMR is an online software record used to keep track of software problems reported by customers.

Follow your local support/service procedures for opening a PMR.

**Note:** To aid in quick problem determination and resolution, it will be very useful to have the SDR data specific to the problem included in the PMR. You can obtain the SDR data using the **splstdata** command. Use the appropriate command flag to view data relevant to the problem. For example:

**splstdata -e** Lists environment choices

**splstdata -n** Lists node information

**splstdata -s** Lists switch information

For more information on **splstdata**, refer to *IBM RISC System/6000 Scalable POWERparallel Systems: Command and Technical Reference*.

---

# IBM Tools for Problem Resolution

IBM offers several tools to help you with efficient problem resolution. Although they are not part of SP, they work with it.

## Service Director/6000

Service Director/6000 analyzes AIX error logs and runs diagnostics against those error logs. If a Service Request Number is created, a record of that is created, the product automatically sends a message (call home) to IBM and a Problem Management Report (PMR) is opened. You can define which systems have the Service Director/6000 clients and servers and the level of error log forwarding or network access.

## NetView for AIX

NetView for AIX manages multi-vendor networks by polling the base AIX SNMP daemon agents to gather information for display and action by network control desk. It also performs automatic discovery of the network (creation and maintaining topological network maps); performance management for monitoring network statistics and displaying critical network resource status and statistical summaries for analysis and corrective actions; and fault management for verifying the integrity of the network, utilizing thresholding and filtering algorithms for easier alert notification, and defining and implementing corrective actions to SNMP traps.

Note that NetView for AIX is not supported on the control workstation.

## EMEA Service Planning Applications

The EMEA Service Planning offering, available directly from EMEA, runs a set of application programs managed by **cron** and the AIX Error Notification Facility to collect data from the ErrorLog, Syslog, /**var**/**adm**, and /**tmp** from individual nodes. The data is stored at the control workstation. The application, if required by events in the logs, calls the support center and opens a PMR.

# Chapter 8. Planning for PSSP-Related LPPs

This chapter briefly discusses planning information for PSSP-related Licensed Program Products (LPPs) with regard to PSSP. For detailed information on the individual LPPs, refer to the “Related Publications” on page xii.

## Planning for IBM Virtual Shared Disk and IBM Recoverable Virtual Shared Disk

An IBM Virtual Shared Disk (VSD) lets application programs executing on different nodes of a cluster access a raw logical volume as if it were local at each of the nodes. In actuality, the logical volume is located at *one* of the nodes called a *server* node.

The IBM Recoverable Virtual Shared Disk (RVSD) program product lets you configure nodes as primary and secondary VSD server nodes. RVSD provides transparent switchover to a secondary server node when the primary server node for a set of virtual shared disks fails.

You should plan how you are going to use VSD and RVSD before you install the hardware. Each VSD cluster or RVSD must all be in the same system partition. You can, however, have separate VSDs in separate system partitions, but they cannot communicate directly with each other. See Chapter 5, “Planning SP System Partitions” on page 101 for system partition planning information.

RVSDs require twin-tailed disk storage which must be installed before you define or use the RVSDs.

## Planning for IBM Virtual Shared Disk Communications

In this release VSDs can transfer data directly through the High Performance Switch. You must have the high performance switch (css0) defined to use this interface. If not, VSD will automatically use the IP interface. Non-switch connections such as HIPPI or Ethernet will also use the IP interface.

When you define VSDs you specify the high performance switch or other connection method. See the *Administration Guide* for detailed VSD planning information.

**Note**:

In the design of Logical Volume Manager (LVM), each logical partition maps to one physical partition (PP) and each physical partition maps to a number of disk sectors. The design of LVM limits the number of physical partitions that LVM can track per disk to 1016. In most cases, not all the 1016 tracking partitions are used by a disk. The default size of each physical partition during a **mkvg** command is 4MB, which implies that individual disks up to 4GB can be included into a volume group.

If a disk larger than 4GB is added to a volume group (based on usage of the default 4MB size for the physical partition), the disk addition fails. The warning

© Copyright IBM Corp. 1996

message provided will be: *The physical partition size of <number A> requires the creation of <number B> partitions for hdiskX.*.

The system limitation is 1016 physical partitions per disk. Specify a larger physical partition size in order to create a volume group on this disk. Note that the size of the partition determines the granularity by which logical volumes (and file systems) could be increased in size in a given volume group definition. Moreover, this setting could not be overidden once a volume group is defined. If you intend to dedicate DASD for a database with large tables on external DASD, you should consider using a large partition size.

There are two instances where this limitation is enforced:

1. You try to use **mkvg** to create a volume group and the number of physical partitions on a disk in the volume group exceeds 1016. The workaround to this limitation is to select from the physical partition size ranges of: 1, 2, (4), 8, 16, 32, 64, 128, 256 Megabytes and use the **mkvg -s** option.
2. The disk that violates the 1016 limitation attempts to join a pre-existing volume group with the **extendvg** command.

You can recreate the volume group with a larger partition size allowing the new disk to work or create a standalone volume group consisting of a larger physical size for the new disk. If the install code detects that the rootvg drive is larger than 4GB, it will change the **mkvg -s** value until the entire disk capacity can be mapped to the available 1016 tracks. This install change also implies that all other disks added to rootvg, regardless of size, will also be defined at that physical partition size. For RAID systems, the /dev/hdiskX name used by LVM in AIX may really consist of many non-4GB disks. In this case, the 1016 requirement still exists. LVM is unaware of the size of the individual disks that may really make up /dev/hdiskX. LVM bases the 1016 limitation on the AIX recognized size of /dev/hdiskX, and not the real physical disks that make up /dev/hdiskX.

In some instances, you will experience a problem adding a new disk to an existing volume group or in creating a new volume group. The warning message provided by LVM will be: *Not enough descriptor area space left in this volume group.*

Either try adding a smaller PV or use another volume group. On every disk in a volume group, there exists an area called the volume group descriptor area (VGDA). This space allows you to take a volume group to another AIX system and importvg the volume group into the AIX system. The VGDA contains the names of disks that make up the volume group, their physical sizes, partition mapping, logical volumes that exist in the volume group, and other pertinent LVM management information. When you create a volume group, the mkvg command defaults to allowing the new volume group to have a maximum of 32 disks in a volume group. However, as bigger disks have become more prevalent, this 32 disk limit is usually not achieved because the space in the VGDA is used up faster, as it accounts for the capacity on the bigger disks. This maximum VGDA space, for 32 disks, is a fixed size which is part of the LVM design. Large disks require more management mapping space in the VGDA, causing the number and size of available disks to be added to the existing volume group to shrink. When a disk is added to a volume group, not only does the new disk get a copy of the updated VGDA, but all existing drives in the volume group must be able to accept the new, updated VGDA. The exception to this description of the maximum VGDA is rootvg. In order to provide AIX users more free disk space, when rootvg is created, mkvg does not use the maximum limit of 32 disks that are allowed into a volume group. Instead in AIX

3.2, the number of disks picked in the install menu of AIX is used as the reference number by mkvg -d during the creation of rootvg. For AIX 4.1, this -d number is 7 for one disk and one more for each additional disk picked. For example, if two disks are picked, the number is 8 and if three disks are picked, the number is 9, and so on. This limit does not prohibit you from adding more disks to rootvg during post-install. The amount of free space left in a VGDA, and the number size of the disks added to a volume group, depends on the size and number of disks already defined for a volume group. If you require more VGDA space in the rootvg, then use the **mksysb** and **migratepv** commands to reconstruct and reorganize your rootvg (the only way to change the -d limitation is recreation of a volume group). Note: It is recommended that you do not place user data onto rootvg disks. This separation provides an extra degree of system integrity.

The logical volume control block (LVCB) is the first 512 bytes of a logical volume. This area holds important information such as the creation date of the logical volume, information about mirrored copies, and possible mount points in the journaled filesystem (JFS). Certain LVM commands are required to update the LVCB, as part of the algorithms in LVM. The old LVCB is read and analyzed to see if it is a valid. If the information is valid LVCB information, the LVCB is updated. If the information is not valid, the LVCB update is not performed and the following warning message is issued: *Warning, cannot write lv control block data*

Most of the time, this is a result of database programs accessing raw logical volumes (and bypassing the JFS) as storage media. When this occurs, the information for the database is literally written over the LVCB. Although this may seem fatal, it is not the case. Once the LVCB is overwritten, you can still do the following:

- Expand a logical volume
- Create mirrored copies of the logical volume
- Remove the logical volume
- Create a journaled filesystem to mount the logical volume.

There are limitations to deleting LVCBs. The logical volumes with deleted LVCB's face possible, incomplete importation into other AIX systems. During an importvg, the LVM command scans the LVCB's of all defined logical volumes in a volume group for information concerning the logical volumes. If the LVCB is deleted, the imported volume group will still define the logical volume to the new AIX system, which, is accessing this volume group, and you can still access the raw logical volume. However, any journaled file system information is lost and the associated mount point will not be imported into the new AIX system. You must create new mount points and the availability of previous data stored in the filesystem is not assured. Also, during this import of logical volume with an erased LVCB, some non-jfs information concerning the logical volume, which is displayed by the **lslv** command, cannot be found. When this occurs, the system uses default logical volume information to populate the logical volume's ODM information. Therefore, some output from **lslv** will be inconsistent with the real logical volume. If any logical volume copies still exist on the original disks, the information will not be correctly reflected in the ODM database. Use **rmlvcopy** and **mklvcopy** commands to rebuild any logical volume copies and synchronize the ODM.

## Planning for Parallel ESSL

Parallel ESSL is a scalable mathematical subroutine library that supports parallel processing applications on IBM RISC System/6000 Scalable POWERparallel Systems (SP) and on clusters of IBM RISC System/6000 workstations. Parallel ESSL supports the Single Program Multiple Data (SPMD) programming model and provides subroutines in six major areas of mathematical computations. It is tuned for optimal performance on the SP consisting of POWER2 nodes with the High Performance Switch, High Performance Switch-LC8, SP Switch, or SP Switch-8.

Parallel ESSL provides subroutines in the following computational areas:

- Level 2 PBLAS
- Level 3 PBLAS
- Linear Algebraic Equations
- Eigensystem Analysis and Singular Value Analysis
- Fourier Transforms
- Random Number Generation

**For Parallel ESSL for AIX Version 4:** The subroutines run under the AIX operating system and can be called from application programs written in Fortran, C, C++, and High Performance Fortran (HPF). On the SP, Parallel System Support Programs (PSSP) is also required.

For communication, Parallel ESSL includes the Basic Linear Algebra Communications Subprograms (BLACS), which use the Parallel Environment (PE) Message Passing Interface (MPI). Communications using the User Space (US) require either the High Performance Switch, High Performance Switch-LC8, SP Switch, or SP Switch-8. Communications using the Internet Protocol (IP) may use Ethernet, Token Ring, FDDI, High Performance Switch, High Performance Switch-LC8, SP Switch, or SP Switch-8. For computations, Parallel ESSL uses the ESSL/6000 subroutines. The Parallel ESSL package includes the IBM AIX ESSL/6000 product.

To order the IBM Parallel ESSL for AIX Version 4, specify:

- Program number 5765-422 for all geographies, except EMEA.
- Program number 5765-B50 for EMEA.

**For Parallel ESSL for AIX Version 3.2.5:** The subroutines run under the AIX operating system and can be called from application programs written in Fortran, C, and C++. On the SP, Parallel System Support Programs (PSSP) is also required.

For communication, Parallel ESSL includes the BLACS, which use the Parallel Environment (PE) Message Passing Library (MPL). Communications using the User Space (US) require the High Performance Switch. Communications using the Internet Protocol (IP) may use Ethernet, Token Ring, FDDI, or High Performance Switch. For computations, Parallel ESSL uses the ESSL/6000 subroutines. The Parallel ESSL package includes the IBM AIX ESSL/6000 product.

To order IBM Parallel ESSL for AIX Version 3.2.5, specify program number 5765-645.

## Planning for Parallel Environment

The IBM Parallel Environment for AIX (PE) program product is designed to help you develop parallel programs and execute them on the IBM RISC System/6000 Scalable Parallel Systems or a networked cluster of RISC System/6000 processors. The main PE components are:

- **Message Passing and Collective Communications Application Programming Interface (API) Subroutine Library**, which help application developers parallelize their code.
- **Parallel Operating Environment (POE)**, that provides the ability to create and execute parallel application programs.
- **Parallel Debuggers**, to assist in debugging parallel applications.
- **Visualization Tool (VT)**, a trace generation and display system to visualize performance characteristics of your program and system.

You should be aware that parts of the PE installation steps may interact with or be affected by PSSP component installations, particularly **ssp.css** and **ssp.clients**. See the *IBM Parallel Environment for AIX: Installation, (GC28-1980)* for details on planning and installing Parallel Environment, particularly if you are interested in the following:

- Installing PE on a Control Workstation.
- Installing PE to run off the rack, with the **ssp.clients** fileset.
- Installing CSS after POE has been installed.

## Planning for Performance Monitor (PTPE)

Performance Toolbox Parallel Extensions for AIX (PTPE) is a performance monitor for the SP system. When installed on your SP, it allows easy access to performance information about both SP hardware and software (LPPs). This information is available as both run-time (current) and archived (historical) data that you can analyze, manipulate, print, and import to a database, should you so desire.

PTPE builds on the capabilities of Performance Toolbox for AIX, adding monitoring functions specific to the SP System. You can use PTPE to examine the current performance state of any node in your SP system. You decide what performance information to display, and view or print it from any node in the system.

PTPE collects and archives performance statistics for each SP node. It calculates averages for common performance information for all SP nodes. All PTPE data is available for display to help you evaluate performance of the SP at both the node and system level.

The translation table consumes 13,200,012 bytes (roughly 12.6 MB). As a result, the filesystem containing the **/var/adm/ptpe** directory needs to have at least 13 MB available space when PTPE is installed and started for the first time. If this space is not available, PTPE will not start. Once PTPE has successfully started, the complete table space is reserved in the directory even if 50,000 statistics aren't available (so PTPE can assimilate new statistics if they become available at a later time).

Administrators should set up a logical volume, containing at least 4 LP's (16 MB) on each node where PTPE is to run. Create a new filesystem for the logical volume, and mount the filesystem over the /**var**/**adm**/**ptpe** directory. This will ensure that PTPE has enough DASD to start.

Administrators also need to become part of the **perfmon** user group, and thoughtfully lay out the monitoring hierarchy.

## Planning for LoadLeveler

LoadLeveler is an IBM software product that lets you build, submit, and process both serial and parallel jobs on your RS/6000 workstation, Silicon Graphics systems, Sun SPARCstation systems, and Hewlett-Packard systems. LoadLeveler is recommended, but not required, for batch processing on the SP system, and is included with the SP.

LoadLeveler provides workload management capabilities on the RS/6000 SP and other heterogeneous workstations running UNIX operating systems. (RS/6000, Sun, HP, and SGI workstations) It allows you to view individual nodes as a single computational resource.

LoadLeveler is an integral piece of the total System Management solution on the RS/6000 SP. LoadLeveler can take advantage of features provided in the Parallel Systems Support Programs (PSSP), such as Event Management and Performance Monitoring. LoadLeveler will also interoperate with other schedulers to support batch job processing on other hardware platforms. These schedulers can include Network Queueing System (NQS) and the IBM Network Queuing System/MVS (NQS/MVS).

## Compatibility

The current release of LoadLeveler for AIX is 1.3. It is currently available for AIX 4.1 only. Planned availability for LoadLeveler 1.3 for Sun, HP and SGI is year-end 1996. Support for AIX 4.2 is also planned for year-end 1996. LoadLeveler 1.3 for AIX allows OEM platforms to participate in the LoadLeveler 1.3 cluster as submit only nodes at this time. Submit only binaries for Sun, HP, and SGI will be provided at LoadLeveler 1.3 general availability.

LoadLeveler 1.2.x and LoadLeveler 1.3 are not compatible. There have been changes to the protocol used between daemons and changes in the format of the job_queue. You must upgrade all LoadLeveler nodes to LoadLeveler 1.3 or maintain two separate LoadLeveler clusters, one for LoadLeveler 1.3 and one for LoadLeveler 1.2.x.

In order to migrate from LoadLeveler 1.2.x to LoadLeveler 1.3, you must drain the startd and schedd daemons in the cluster, shutdown LoadLeveler, install LoadLeveler 1.3, convert the job_queue file, and then restart LoadLeveler. For detailed instructions, refer the the README file distributed with LoadLeveler 1.3.

## Planning for a highly available LoadLeveler cluster

LoadLeveler provides features within the product for automatic recovery in the event of failure of the central manager in the batch configuration and of the domain nameserver running ISS in the interactive configuration. Additionally, the availability of individual compute nodes and filesystems in the LoadLeveler cluster can be enhanced by using the High Availability Cluster Multi-Processing (HACMP) product as well as the High Availability Control Workstation (HACWS) optional feature of the PSSP. For details on how to configure LoadLeveler for High Availability, refer to the ITSO Redbook titled "Implementing High Availability on the RS/6000 SP" (SG24-4742-00).

## Performance Monitoring of LoadLeveler

LoadLeveler can utilize the Performance Toolbox Parallel Extensions (PTPE) optional feature of PSSP 2.2 to collect performance information on scheduling and executing nodes.

In general, planning the LoadLeveler installation for batch processing requires making the following configuration decisions. You must decide what is suitable to your environment.

- Select a node to serve as central manager and one or more alternate central managers. The central manager can be any node in the cluster. In selecting one, consider the current workload and network access. Note that no new work can be performed while the central manager is down, and no queries can be made about any of the running jobs without the central manager.
- Determine which nodes will be scheduling nodes, execution nodes, submit-only nodes, and public submit nodes.
- Determine where to locate home and local directories. For maximum performance, keep the log, spool, and execute directories in a local file system.
- Determine if LoadLeveler daemons should communicate over the switch. It may not be desirable in your environment to have the daemons communicate over the switch. You need to evaluate the network traffic in your system to determine if LoadLeveler IP communications over the switch is desirable.
- Determine if HACMP is necessary to provide failover capability of individual compute nodes or the switch. If using LoadLeveler in conjunction with HACMP, decide which nodes will be grouped together for backup purposes. (HACMP can only provide capability for up to eight nodes.) Each backup node needs to know which set of seven nodes it will back up. This relationship is defined in the form of HACMP resource groups.
- Determine if the SP workload includes parallel batch jobs. If you want to use the High Performance switch for parallel jobs in user mode, or if you want the Resource Manager to coordinate machine usage between interactive and batch jobs in the SP system you must configure the Resource Manager.

Other planning considerations:

1. LoadLeveler requires a **common name space** for the entire LoadLeveler cluster. To run jobs on any machine in the LoadLeveler cluster, you must have the same uid (system ID number for a user) and gid (system ID number for a group) on every machine in the cluster. If you do not have a user ID on one machine, your jobs will not run on that machine.
2. LoadLeveler works in conjunction with the NFS or AFS filesystems. Allowing users to share filesystems to obtain a single, network-wide image, is one way to make managing LoadLeveler easier.

3. Some nodes in the LoadLeveler cluster might have special software installed that users might need to run their jobs successfully. You should configure LoadLeveler to distinguish those nodes from other nodes using, for example, job classes.

If you plan to use LoadLeveler Interactive Session Support (ISS), you must decide:

.

- Which node will act as the ISS domain name server?
- Which node will act as the backup ISS domain name server?
- What metric will be used for each pool of servers?

Each pool can be configured to use a different metric to determine how sessions are distributed to individual servers. The available options are: ROUNDROBIN, CUSTOM, and LOADLEVELER. Refer to "Using and Administering LoadLeveler" (SC23-3989) for complete details on the applicability of each type of metric.

## Planning for PVMe

The IBM PVMe for AIX program product is an implementation of the application program interface (API) defined by the public domain package PVM (Parallel Virtual Machine). The IBM PVMe for AIX program product now provides source and object compatibility with PVM 3.3.7, which is developed at Oak Ridge National Laboratory. If you currently run PVM applications, you will realize faster performance using PVMe on your RS/6000 SP.

## Planning for Parallel I/O File System

The Parallel I/O File System (PIOFS) is designed for serial or parallel applications that require large temporary files and high I/O bandwidth. PIOFS provides a global namespace and lets you create files as large as 128 Terabytes that span multiple server nodes.

## Planning for NetTape

IBM provides two network tape products for AIX:

- IBM Network Tape Access and Control System for AIX (NetTape), program number 5765-637
- IBM Tape Library Connection (Tape Library Connection), program number 5765-643

NetTape is a program that provides consolidated tape operations and transparent access to a wide variety of remote tape devices on a network of AIX workstations and supports both RISC System/6000 workstations and RISC System/6000 Scalable POWERparallel Systems.

The Tape Library Connection builds on NetTape, adding support for robotic tape library devices. These devices include the IBM 3494 and IBM 3495 Tape Library Dataservers and StorageTek** tape library devices. NetTape is a prerequisite product for the Tape Library Connection.

## Planning for IBM Client Input Output/Sockets (CLIO/S)

Client Input Output/Sockets provides high-speed transparent data transfer and tape access between MVS/ESA systems and AIX systems or between AIX systems. It provides a set of user commands and application programming interfaces that run on either MVS or AIX. CLIO is compatible with and complimentary to NetTape when comprehensive tape access across both AIX and MVS is required.

If you currently have an MVS system, and if you plan to move large amounts of data (many gigabytes) between the MVS system and the SP, you may need CLIO/S. CLIO/S provides high-speed, low-overhead transfers over fast channel-to-channel connections. These channel to channel connections require the IBM ESCON Channel Adapter or the IBM Block Multiplexer Channel Adapter cards (and associated microcode) in the SP. Planning for CLIO/S requires participation by both MVS and SP system planners.

# Customizing Your System

| **Chapter 9. Planning for Expanding or Modifying Your System** . . . . . 149

| **Chapter 10. Planning for Migration** . . . . . 159

© Copyright IBM Corp. 1996

# Chapter 9. Planning for Expanding or Modifying Your System

As your organization's processing needs and resources change, you may find that your current system setup no longer meets your needs. You may want to add/remove/upgrade nodes, frames, or switches; or your changing needs may require you to perform other hardware or software modifications to your system. Planning ahead when you first configure your system can make future changes easier.

This chapter discusses the most common topics you should consider prior to expanding or modifying your system. In addition, several sample scenarios illustrate the most common ways of expanding your system.

Chapter 4 of the *Installation and Migration Guide*, "Reconfiguring your System", discusses how to add, delete, or replace hardware in your system. Prior to expanding or modifying your system in any way, you should read this chapter to understand how to plan for the change. Careful planning will help ensure your system is back up and running as soon as possible.

The *Site Planning Guide* discusses site planning considerations such as planning for additional floor space or power concerns. Be sure to consult that book prior to expanding or modifying your system.

**Note:** There are many different ways that you can configure your system and each configuration requires you to plan for system setup. IBM tests and supports the most common configurations. Keep in mind that the more complex your specific configuration, the less the chance that IBM has tested that configuration. If you decide to expand or modify your configuration in a manner that is not addressed in this chapter or book, you should consult with your IBM representative prior to modifying your setup.

## Questions to Answer Before Expanding/Modifying/Ordering Your System

This section poses some of the most common questions you should consider prior to ordering or changing your system. These topics are illustrated in the scenarios presented later in this chapter.

To reduce the rhetoric which follows, we limit this discussion to an expansion of an existing system. Further, we focus our attention on the 3-frame system pictured below. This system has frames numbered 1, 2 and 4, and has several unused node slots. Each of Frames 1 and 4 has has a switch, but Frame 2 does not. Frame 2 is an *expansion frame* whose nodes use the switch in Frame 1.

© Copyright IBM Corp. 1996

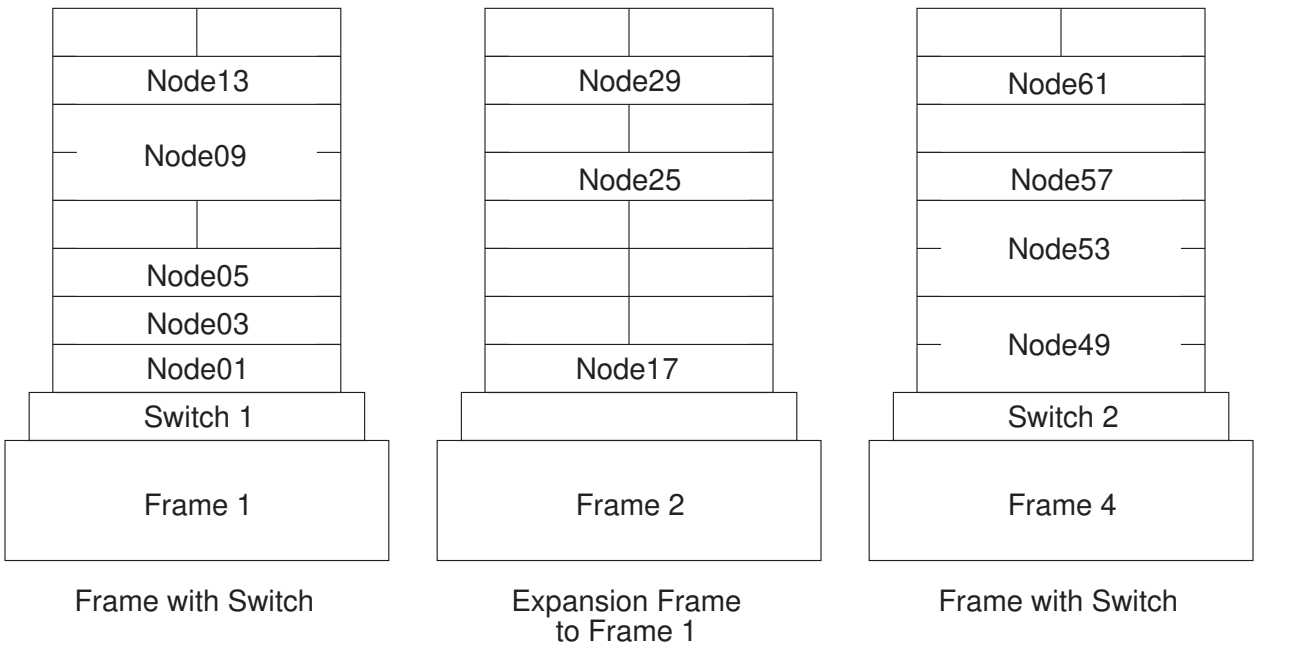



*Figure 33. Sample System: 3-frame, 1-switch*

## How large do I want my system to grow?

Prior to expanding your system, you should plan ahead for how large you want your system to eventually grow. Planning will encourage you to leave unused frame numbers for future expansion, and will help you avoid having to move nodes between frames. Our Sample System may grow in any of the following ways:

- Nodes - insert nodes in empty slots;
- Frame - add any of Frames 3, 5, 6, ...
- Switch - install a switch in Frame 2

## How do I reduce system down time?

Expanding a system can require that the system be shut down for an extended period of time. When adding a frame or switch to the system, there is often a great deal of cable wiring required. If you know that you want your system to grow in the future by adding nodes, frames, or switches, you may want to consider purchasing some of the hardware in advance. By purchasing in advance, you can set up the hardware and cables with the future in mind, preventing you from some cable rewiring, node movement, and reconfiguration complexities at a later date. This can substantially reduce the amount of time your system will be down during future expansion activity.

Notice in our Sample System that all 8 of the nodes in Frames 1 and 2 could reside in a single frame, but then many expansion choices would require adding a frame, moving nodes, cabling frames to each other, and so on. Such modifications cannot be done without considerable down time. However, the chosen configuration allows for some expansion without any major difficulties.

## What must I understand before adding a switch(es)?

If you are thinking about increasing the number of switches in your system, at least one of the following is pertinent:

- 1 switch to 2 switches

  Cables need to be added, but the first switch could continue running until the new switch is ready for installation tests.

- 2 switches to 3 switches, or 3 switches to 4 switches

  Cables must be rerouted. This scenario can cause a significant amount of system down-time. For highest availability, consider installing more frames initially, with empty slots for future node additions.

- 4 switches to 5 or more switches

  Addition of a switch-only frame requires re-cabling, typically taking several days to accomplish. This is a complex scenario that requires detailed planning.

- 6 to 8 switches

  Once configured with a switch-only frame, additional frames can be added without cabling changes to other frames. With careful planning, system outages can be reduced, although installation tests do require checking the entire switch network.

## What network topology topics do I need to consider?

Whenever you modify your system by adding additional hardware, your network topology is affected. This section discusses networking topics you should consider prior to adding any hardware to your system:

- Nameserver

  Every node in your system has a name assigned to it which is resolved by the nameserver you are using. The nameserver translates the symbolic name assigned to a node into its internet address. As you contemplate adding nodes to your system, plan ahead for the names you will assign to the nodes and how your nameserver will resolve them.

- Available addresses

  Nodes have internet addresses assigned to them, as well as names. While you are planning to add nodes to your system, you need to also plan for the additional internet addresses that will be assigned to these nodes. In addition, while planning the addresses for these network interfaces, you might reserve additional addresses for expansion the next time your system grows.

  If you are using a netmask that limits the number of addresses you can have, you can change your netmask to free up addresses, or you can elect to use a different subnet.

## What control workstation topics do I need to consider?

You need to make sure that the control workstation you currently have is capable of supporting the larger system. It must have sufficient processor speed, DASD, and other hardware - serial ports, Ethernet adapters, and so on. See Chapter 2, “Question 10. What Do You Need for Your Control Workstation?” on page 48.

## What system partitioning topics should I consider?

Migration install enhancements do not require the system to be partitioned, but there are many situations when partitions may be advantageous, including:

- Testing new levels of software or equipment in isolation.
- Grouping common resources together for critical production workloads. Isolation may be necessary, all or part of the time, for security, separation of workloads, reduced performance interference between workloads, and to allow for more orderly migration.
- Handling changes in total system workloads, particularly when large parallel jobs are being run.
- Introducing major new applications.

The simplest planning guideline with regard to partitioning is to group nodes together in a common frame(s) if they are to belong to the same partition. Even with the new *System Partitioning Aid* (see Chapter 5, “Planning SP System Partitions” on page 101) there are are some restrictions on subdividing switches. Bounding system partitions along frame boundaries also makes adding expansion frames easier, and keeps the system more available.

## What expansion frame topics should I consider?

In some configurations, a frame may exist that contains nodes and a switch, but where the nodes do not completely use up the node switch ports. For example, a frame filled with eight wide nodes only uses eight node switch ports, leaving eight ports free. You may be able to add one or more expansion frames immediately after such a frame to allow the nodes in the expansion frames to take advantage of these unused switch ports. In our Sample System, Frame 2 is an expansion frame, and frame number 3 has been reserved for the addition of a second expansion frame to share Frame 1's switch.

Similarly, if a frame having a switch is filled with four 604 high nodes, only 4 node switch ports will be occupied, leaving 12 unused. Up to 3 expansion frames may be inserted to make use of these 12 ports. For example, a single frame may be inserted containing any of 4 thin nodes, 4 wide nodes, 4 604 high nodes, or some mixture of node types.

Note that the expansion frame's number is dependent upon the frame to which it is attached. If the frame containing a switch is number 1, the first associated expansion frame must be numbered 2, the second 3, and the third 4. Therefore, if you foresee adding expansion frames to your system in the future, number your frames to allow for the insertion of expansion frames. Otherwise, the frames which immediately follow must be completely reconfigured.

If your system is organized for partitioning, you may want to leave unused slots for additional nodes, adding an extra frame if necessary; or by leaving gaps in the frame numbers to allow specific frame additions. This is particularly useful if the partition needs a mix of thin, wide, and 604 high nodes.

Again, plan ahead for growth when you assign network addresses. This is easier to manage if you have reserved space for growth in your frame and partition layout.

## What boot/install server topics should I consider?

You should (generally) add a boot/install server for every 16 nodes being added.

## Scenario 1: Expanding the Sample System by Adding a Node

Note in the Sample System that slots 5, 6, 7 and 8 of Frame 2 are empty, and so we may install any of a thin, wide or 604 high Node 21 at slot 5 of Frame 2. Further, if proper cabling has been used, only Nodes 1, 17 and 5 are connected to the switch chip to which Node 21 would normally connect; that is, Node 21's normal switch port on Switch 1 is unused. (See Chapter 5, “Planning SP System Partitions” on page 101 for more information on node switch port assignment.) So, we may indeed physically install Node 21 in this system as if it were there originally.

To install this new node in the system, and start it running on the switch:

1. Physically install the new node, including cabling to the switch.
2. Enter the new node's network data into the SDR.
3. Install the software on the node using a mksysb image.
4. Perform post-install customization.
   - Add required PTFs
   - Adjust file systems
   - Configure applications
   - Perform installation tests.
   - etc.
5. Bring the new node up on the switch; how depends on your switch type:
   - High Performance Switch -- Perform an **Estart**.
   - SP Switch -- Use the **Eunfence** command.
6. Perform switch installation test.

## Scenario 2: Expanding the Sample System by Adding a Frame

Before addressing specific examples for the Sample System, review the possibilities for frame expansion, and general concerns.

## Frame Expansion Possibilities

When you add a frame to your system, you can add the frame at the end of your system, between two existing frames, or even at the beginning. A special case of the first two possibilities is an expansion frame.

***Expansion Frames:*** In some configurations, a frame may exist that contains nodes and a switch but the nodes do not completely use up the switch ports. One or more expansion frames may be added immediately following this frame whose nodes will share the preceding frame's switch.

***Adding a frame at the end of the system:*** IBM recommends that you add frames only to the end of your system if you have not planned ahead for other expansion. Otherwise you will have to reconfigure the System Data Repository (SDR), and perhaps have to move nodes to accommodate your needs.

***Adding a frame in between two existing frames:*** This is fairly straight forward if the frame number was reserved, whether or not the new frame is an expansion frame. However, if the frame number was not reserved, there can be much work to

do. The new frame splits the old system into 2 pieces, and the second piece (the higher numbered frames) must be redefined to the system. Further, for a switched system, some amount of recabling will be necessary, prior to the cabling of the new frame to the existing system.

***Adding a frame to the beginning of a system:*** If your system has a switch, the first frame in the system must have a switch. Therefore, if you plan on inserting the additional frame in the first position in your system, that frame must contain a switch.

If your system does not have a switch, you can insert the additional frame in the first position without any such restriction.

Beyond this item, this case has some of the same overhead as the previous case: the entire old system is the "second piece".

## General Concerns for Adding a Frame(s)

The following are topics you need to consider when adding a new frame to your system.

1. Control workstation

   When adding a frame to a system, you need to ensure that the control workstation has enough spare serial ports to support the additional frames. One serial port is required for each additional frame. If you do not have enough ports, you will need to upgrade the control workstation.

   If you use HACWS, there are 2 control workstations to consider here.

2. Types of nodes in the existing configuration

   You need to consider what types of nodes you already have and what types you will be adding in the additional frame. For example, consider how thin, wide, and 604 high nodes work together.

3. Switch

   You need to consider the implications involved if your system has a switch, either a High Performance Switch or an SP switch.

   - If you currently have one switch and are adding a second switch, you need to add the cables for the second switch. During this time, the first switch may be able to run until the new frame is ready for installation tests.
   - If you currently have two switches and add a third switch or you have three switches and add a fourth switch, you need to add and, perhaps, reroute cables. This scenario can cause a signification amount of system down-time. For highest availability, consider installing more frames with empty slots for future node additions.

4. SP Ethernet Network

   You need to consider the ethernet network being used. Ask yourself whether you want to separate the ethernet into multiple subnets. For example, do you want to have one network per frame with one boot/install server per frame or do you want to boot all of the frames from the control workstation?

   Also, consider the bandwidth of the default thin wire ethernet. This ethernet can load approximately 8 nodes at a time. With larger systems, there are

higher technology ethernets available that can allow you to load software at a faster rate than with the thin wire ethernet.

5. IP Addresses

   Your decision for the previous concern will play a role in planning for IP addresses. You need to ensure that the nodes that will occupy the additional frame will have IP addresses. If you are using a netmask that limits the number of addresses you can have, you can either modify your netmask to free up addresses or you may need to use a different subnet.

6. System Partitioning

   If you have a partitioned switched system, and the new frame is an expansion frame, you may not need to re-partition, because partitioning for a switched system assumes the maximum number of nodes are present; so the expansion frame nodes are already handled. However, at this point you may decide you do not like where the new nodes have implicitly resided, in which case you must re-partition.

   If the new frame has its own switch, then you are increasing the number of switches in the system. If your system is partitioned, in this case you will need to repartition the system because partitioning had not previously accounted for these new nodes.

   If you have a partitioned switchless system, you must re-partition, because partitioning in this case is based on the number of nodes actually installed.

## Scenario 2-A: Adding an Expansion Frame to the Sample System

**Note:** See "Node Placement" on page 82, particularly Figure 11 on page 84, for the specifics on valid node placement, and Chapter 5, "Planning SP System Partitions" on page 101 for more information on assignment of nodes to switch ports.

Consider Frame 1 of the Sample System. It has only 5 nodes, and so 11 node switch ports are available for other nodes to use. Given Frame 1's configuration, 8 ports are actually set aside for Frame 1, and so 8 ports are available for expansion frames. Frame 2 uses only 2, but reserves at least 4. Specifically, Frame 2's nodes are located such that a second expansion frame of 4 nodes is valid. So, we may insert a Frame 3 with up to 4 nodes and cable all these nodes to Frame 1's switch.

Therefore, we need to accomplish the following:

1. Install the new hardware, and attach the new frame to the CWS via a 232 port.
2. Cable the new nodes to the Frame 1 switch.
3. Run the **spframe** command to establish the SDR entries for the new nodes.
4. Enter the new nodes' network data into the SDR.
5. Install the software on the new nodes using a mksysb image.
6. Perform post-install customization.
   - Add required PTFs
   - Adjust file systems
   - Configure applications
   - etc.
7. Bring the new nodes up on the switch; how depends on your switch type:
   - High Performance Switch -- Use the **Estart** command.
   - SP Switch -- Use the **Eunfence** command.

8. Perform installation tests.

### Scenario 2-B: Adding a Frame at the End of the Sample System

For the Sample System, we could add a Frame 5 which is an expansion frame for Frame 4. Frame 4's switch has several unused ports, and Frame 4 has only 4 nodes which they are located such that Frame 4 may be expanded by as many as 3 frames. So, Frame 5 would be the first of these expansion frames. This expansion would be done like that done in Scenario 2-A.

Alternatively, we may want to add a frame after Frame 4 which has its its own switch. Given the preceding discussion, we might want to designate the new switched frame as Frame 8 (or 6 or 7) to reserve space for Frame 4 expansion frames to come later. This case is more complicated, because we are adding a new switch, and hence changing an important part of the system. The following modifications must be made to the 2-A list:

- In addition to cabling the new nodes to the new switch, the new switch must be cabled to the existing switches.
- After adjusting the file systems in post-install customization, we must select a new switch configuration to indicate the new switch structure.
- Before bringing up the switch, use the **Eclock** command to get the system switches synchronized.
- Bringing the new nodes up on the switch requires use of the **Estart** command, at least on any partition containing new nodes.

### Scenario 2-C: Adding a Frame in Between Two Existing Frames

Suppose we wanted to insert a frame between Frames 1 and 2, where this new frame will also be an expansion frame to Frame 1. To accomplish this expansion, we must first delete Frame 2 from the system, and then add Frame 2 (the new frame) and Frame 3 (the previous Frame 2) to the system. Note that the old Frame 2 nodes will be rebuilt as Frame 3 nodes. We must:

1. Save mksysb images of the original Frame 2 nodes; one image per unique node.
2. Use the **spdelfram** command to remove Frame 2 configuration data from the SDR.
3. Add the new Frame 2 as in Scenario 2-A above.
4. Add the new Frame 3 as in Scenario 2-A, using the newly saved mksysb images as appropriate.

## Scenario 3: Expanding the Sample System by Adding a Switch

Before going through the scenario, review the list of topics to consider when planning to add a switch. See “The Physical Makeup of a Switch Board” on page 104 to understand how a switch works.

1. Switch type

   What type of switch will you be adding? The table below describes the types available.

   If you are adding any of the switches in the table, an IBM Customer Engineer installs the switch hardware on your &sname1. System.

2. Frame support

   Prior to adding the switch, you need to consider which frames the switch will support and record your information on the Switch Configuration Worksheet.

| Switch Type | Description | Feature Code |
|---|---|---|
| High Performance Switch | This switch connects all the processor nodes, providing scalable high-performance communication between processor nodes for parallel job execution. This switch uses the High Performance Switch Adapter-2 (feature code 4018). Older systems may contain the High Performance Switch Adapter-1 (feature code 4017), which is not supported by current software. | 4010 |
| Scalable POWERparallel Switch (SP Switch) | This switch represents the newest level of switch function. Like the High Performance Switch, it connects all the processor nodes, providing enhanced scalable high-performance communication between processor nodes for parallel job execution. | 4011 |
| High Performance Switch-LC8 | This switch provides high-performance switch function for small systems (up to 8 total nodes). | 4007 |
| Scalable POWERparallel Switch-8 (SP Switch-8) | This switch provides enhanced high-performance switch function for small systems (up to 8 total nodes). | 4008 |

### The Switch Scenario

The Sample System has 3 frames, but only 2 switches. Frame 2 has no switch since it is an expansion frame using Frame 1's switch. Suppose you choose to give Frame 2 its own switch – apparently a preliminary step to further changes. So, Frame 2 will no longer be an expansion frame. You must:

1. Quiesce switch traffic.
2. Install the new switch in Frame 2.
3. Re-cable the nodes of Frame 2 to the new switch.
4. Cable the new switch (now Switch 2) in Frame 2 to the switches in Frames 1 and 4, and re-cable the switch in Frame 4 (now Switch 3) to the switch in Frame 1.
5. Choose a new switch configuration which matches the expanded system.
6. Use **Eclock** to synchronize the switches.
7. Set the nodes of Frame 2 to the "customize" boot status. Then reboot the Frame 2 nodes, or run **pssp_script**, to get the these nodes recustomized for their new switch.

8. Use the **Estart** command, once for each system partition, to bring up the new switch fabric.
9. Perform install tests to assure the new hardware and connections perform correctly.

# Chapter 10. Planning for Migration

The term *migration* has traditionally caused confusion because it has been used to define several different operations in the past. In this chapter, migration is defined to refer to customer actions necessary to upgrade their SP systems to new software levels. This includes any software upgrades needed to add or change hardware. In contrast, the term *coexistence* is a software product attribute that allows customers to change fewer components at a time. Product coexistence can increase system availability because it reduces the number and duration of system outages during migration.

This chapter provides planning information to migrate from your system to AIX 4.1.4 and PSSP 2.2. The step-by-step migration instructions appear in the *Installation and Migration Guide*.

## Migrating to PSSP 2.2

Review the following table to determine which SP software products can exist in partitions with specific levels of PSSP and AIX.

| In a partition running: | These products can exist: |
|---|---|
| PSSP 1.2 and AIX 3.2.5 (5765-296) | • LoadLeveler 1.2.0<br>• PE 1.2.1<br>• PVME 1.3.1<br>• PESSL 1.1<br>• PIOFS 1.1<br>• RVSD 1.0<br>• CLIO/S 2.2 |
| PSSP 2.1 and AIX 4.1.3 or AIX 4.1.4 (5765-299) | • LoadLeveler 1.2.1 or 1.3<br>• PE 2.1.01.11<br>• PVME 2.1<br>• PESSL 1.2<br>• PIOFS 1.1 and 1.2<br>• RVSD 1.1<br>• CLIO/S 2.2 |
| PSSP 2.2 and AIX 4.1.4 (5765-299) | • LoadLeveler 1.2.1 and 1.3<br>• PE 2.2<br>• PVME 2.2<br>• PESSL 1.2<br>• PIOFS 1.2<br>• Performance Manager 1.1<br>• RVSD 1.2<br>• CLIO/S 2.2<br>• NetTape 1.1.1 |
| PSSP 2.2 and AIX 4.2 (Year-end 1996) (5765-299) | • LoadLeveler 1.3<br>• PE 2.2<br>• PVME 2.2<br>• PESSL 1.2<br>• PIOFS 1.2<br>• Performance Manager 1.1<br>• RVSD 1.2<br>• CLIO/S 2.2<br>• NetTape 1.1.1 |

© Copyright IBM Corp. 1996

## Summary of Install Enhancements for PSSP 2.2

PSSP 2.2 currently provides additional support or will provide this additional support by year-end 1996 as follows:

- AIX Migration install support on SP nodes.
- AIX NIM interface enhancements for SP nodes.
  - Boot install capability to do AIX migration install, which preserves user file systems and user installed LPPs.
  - Ability to installp PSSP and other LPP product upgrades.
  - Ability to support more than one AIX level from a boot install server.
  - Ability to support more than one PSSP version from a boot/install server.
- Use of shared libraries for AIX and SP interfaces that avoids having to relink applications.
- By year-end 1996, binary compatibility with AIX 4.2 on PSSP 2.2.

## Migrating the Control Workstation

In order to install PSSP 2.2, the control workstation must be at the AIX 4.1.4 level. There are three AIX install methods from which you may choose:

**Complete overwrite**
The overwrite installation overwrites everything on the disk selected for installation. This method is required if the AIX level on the control workstation is not 3.2.5 or 4.1.

**Preservation installation**
Preservation installation saves some of the data on the disk selected for installation but overwrites the /**usr**, **root**, /**var** and /**tmp** file systems. This method is not recommended or supported by SP installation. documentation.

**Migration installation**
Migration installation upgrades the Base Operating System. Other software product files and configuration data are saved. This method is recommended for database or other server nodes.

Note that there are special installation steps for systems at AIX 3.2.5 required if you are using system partitions.

If your system is at AIX 4.1.3, you may also upgrade to AIX 4.1.4 by installing PTFs using the **installp** command.

To upgrade the control workstation to PSSP 2.2, use the installp process and select those install options that you want on your system. If you had PSSP 1.2 or PSSP 2.1 installed, the upgrade is a migration install and the System Data Repository (SDR) is automatically upgraded for the new release.

If you did an AIX overwrite install, but restored the SDR and Kerberos files, the PSSP install also upgrades the SDR. If you did an overwrite install from a PSSP level prior to PSSP 1.2, you must recreate the SDR by redefining the nodes, frames, and networking resources. This is essentially a new system install.

**Note**

The 64-port asynchronous adapter is not supported in AIX 4.1. This card connects the RS232 line from the control workstation to the frame supervisor cards in each frame. If you have this card, you must replace it with either multiple 16-port cards or with the 128 port card.

## Migration Starting Points

You can migrate your system to AIX 4.1.4 and PSSP 2.2 from one of the starting points described in the following table, using one or more install methods. Nodes at different levels can coexist in the same partition:

*Table 34. Migration starting points*

| **Hardware**: | **To migrate to**: | | |
|---|---|---|---|
| | AIX 4.1.4 | PSSP 2.2 | AIX 4.2.x (year-end 1996) |
| CWS at AIX 3.2.3 or 3.2.4 | Use *overwrite* install. | Use **installp** | Use *overwrite* install. |
| CWS at AIX 3.2.5, PSSP 1.2 | Use *overwrite* or *migration* install. | Use **installp** | Use *overwrite* or *migration* install. |
| CWS at AIX 4.1.3, PSSP 2.1 | Use PTF **installp** or *overwrite* process. | Use **installp** | Use *overwrite* or *migration* install. |
| CWS at AIX 4.1.4, PSSP 2.1 | Already at current level | Use **installp** | Use *overwrite* or *migration* install. |

## Using System Partitions in Migration

You can use the System Partitioning function to create a test system partition to test the upgraded software on the nodes without affecting your current production environment. The control workstation must be upgraded to PSSP 2.2 in order to do this. Because the upgraded control workstation is required to manage and control the production system partition, its stability is important. During your migration scenario, you may want to just upgrade the control workstation and leave the nodes alone (all running AIX 3.2.5 and PSSP 1.2) to test the stability of the system for a period of time.

See the *Installation and Migration Guide*, for the detailed steps for migration installation and how to set up multiple system partitions for production and test environments.

Once the control workstation is upgraded to AIX 4.1.4, it cannot boot/install AIX 3.2.5 nodes.

The control workstation can be used to install AIX 3.2.5 and PSSP 1.2 PTFs. However, there is no ability to recover from disk or other failures that require a system backup to be restored.

Boot install requires an AIX 3.2.5 boot install server node. However, because boot install uses only the Ethernet, the server node can reside in a different system partition than the AIX 3.2.5 client nodes.

When there are only one or two AIX 3.2.5 nodes left in the system, you might look to alternate backup recovery procedures (such as SCSI tape drive).

## Migrating SP Nodes

Before migrating nodes to PSSP 2.2, you may want to verify that the current level works with the control workstation. Bring up some or all of the nodes and run the different install verification tests. Run normal applications on the nodes to verify compatibility.

If you choose to migrate with system partitions, select a configuration or use the System Partitioning Aid to generate a custom set of layouts. Apply the configuration before booting the nodes and run verification tests in each partition.

Make sure that you have planned for the restrictions documented in the following sections and the new features before upgrading the nodes to PSSP 2.2.

### Changes to /usr

AIX 4.1 no longer supports a /usr server. When you migrate your control workstation and nodes to AIX 4.1 you must allow space at the control workstation and each node for the /usr directory and its subdirectories. This space is typically from 200MB to 800MB.

Evaluate your space needs for LPPs and other programs so that you can make sure to have the needed disk space available at installation or migration time.

IBM C for AIX, V3 (Program 5765-423), is a prerequisite of the PSSP. This is necessary for service of the PSSP. Without the compiler's pre-processor, dump diagnosis tools such as crash, will not function fully. You need at least a one-user license, but if you intend to do C development work, you will have to decide how many users you want to support at a given time. For more details, see the *AIX 4.1 Installation Guide*, SC23-2550-02.

### Perspectives

Perspectives, which is a new feature of PSSP 2.2:

- Supports a PSSP 1.2 partition with equivalent function to the System Monitor GUI.
- Supports a PSSP 2.1 partition with equivalent function to the System Monitor GUI.
- Supports a PSSP 2.2 partition with equivalent function to the System Monitor GUI.

## Upgrading AIX on SP Nodes

Each node has an SDR attribute on the control workstation that controls boot install. The object indicates if a boot install is requested for AIX overwrite or migration install, or for node customization. Values for AIX level, PSSP level, and boot install server are provided along with default values for the system partition to which the node belongs.

When a node is first added to the system, defaults are created for the node's object. When changing node values to upgrade on the next boot, make sure that the boot server node has been configured and has access to the AIX and PSSP

releases requested. For example, an AIX 3.2.5 node upgrade requires the boot server value to change to a node that has AIX 4.1 installed.

The **setup_server** command checks the SDR for partition and node object data and sets up NIM on the specified boot install servers. On small SP systems, the control workstation is the boot install server for AIX 4.1 nodes.

## Upgrading PSSP on SP Nodes

The **installp** command runs on the SP nodes to upgrade PSSP and other SP licensed products. The source image is on the control workstation and contains all of the selectable installp options such as **ssp.basic** and **ssp.client**.

PSSP is installed automatically as part of an overwrite or migration boot install. The required options are installed by an SP extension of NIM. Other options can be selectively installed by a customized script file called **script.cust** which is shipped with the product.

Other methods of starting PSSP installp are by issuing parallel commands or through NIM or through a boot server node. Unlike the control workstation, nodes are customized after PSSP is installed, by the boot install *custom* option. Node values are read from SDR and most are recorded as AIX ODM entries and read during node boot.

## Migration Starting Points

This section discusses the different paths that you can choose to migrate to PSSP 2.2. Migrating to PSSP 2.2 can encompass hardware upgrades and hardware reconfiguration, in addition to software upgrades. The addition of the 604 high nodes will often involve expansion frames. In many instances, these nodes will replace existing nodes and may be added to a pool of nodes to handle a specific application. Generally, adding new nodes with new software support requires upgrading the control workstation and installing the equipment. Since software changes to other nodes should not be required, this type of migration is covered in the reconfiguration chapter in the *Installation and Migration Guide*.

| **Hardware**: | **To migrate to**: | | |
|---|---|---|---|
| | AIX 4.1.4 | PSSP 2.2 | AIX 4.2.x (year-end 1996) |
| Node at AIX 3.2.3 or 3.2.4 | Use *overwrite* install. | Use **installp** | User *overwrite* install. |
| Node at AIX 3.2.5 | Use *overwrite* or *migration* install<br>See note below. | Use **installp or boot_install** | Use *overwrite* or *migration* install |
| Node at AIX 4.1.3 | Use **installp** PTF | Use **installp** | Use *migration* install. |
| Node at AIX 4.1.4 | Already at current level | Use **installp** | Use *migration* install. |
| **Note:**<br>For AIX upgrades, you may always choose to use an *overwrite* install because this process may be faster than a *migration* install. | | | |

## Coexistence with PSSP 2.2 and Earlier Releases

PSSP 2.2 supports coexistence in the same system partition with PSSP 1.2 nodes or with PSSP 2.1 nodes. This special migration support is documented in a technical bulletin available on the RS/6000 home page on the World Wide Web and through your IBM marketing representative. The bulletin is titled *Implementing Coexistence with PSSP 2.2* and is available in:

```
http://www.rs6000.ibm.com/tech/
```

# Appendices

© Copyright IBM Corp. 1996

# Appendix A. The System Partitioning Aid – A Brief Tutorial

PSSP includes a tool to facilitate system partitioning activity. The objectives of this application are to enhance understanding of system partitioning, and to allow you to create system partitioning configurations beyond those provided with PSSP. This application, called the *System Partitioning Aid*, is provided in two forms:

**sysparaid** a command line interface (CLI) which is text-file based;

**spsyspar** a graphical user interface (GUI) which provides capability to view graphical representations of system partitioning layout alternatives, and to dynamically create new alternatives.

The GUI makes use of the command line interface, and requires the *SP Perspectives* code for graphics support. Both interfaces allow you to verify candidate layouts, and allow you to save a new, valid layout to disk. The new layout is then available to be made the active configuration at a later date. This allows you to plan ahead for configuration changes.

This appendix describes the GUI, and then the CLI version of this application. This is the order of exposure recommended for the inexperienced partitioner. In addition, this appendix presents a partitioning exercise which addresses the example in Chapter 5 of this document.

© Copyright IBM Corp. 1996

## The GUI – "spsyspar"

The GUI version of the System Partitioning Aid provides a dynamic view of the system partitioning layout, allowing you to modify the layout interactively.

The command **spsyspar** brings up the window shown in Figure 34. This window consists of five screen areas:

| | |
|---|---|
| **Pull Down Menu Bar** | Menus provide pull down access to actions. |
| **Tool Bar** | Icons provide immediate execution of certain actions. |
| **Nodes Pane** | Graphic representation of targeted system partitioning layout. |
| **System partitions Pane** | Iconic representation of system partitions in the current layout. |
| **Information Area** | Displays information about the object or screen area at the current cursor location. (Resides at very bottom of window.) |

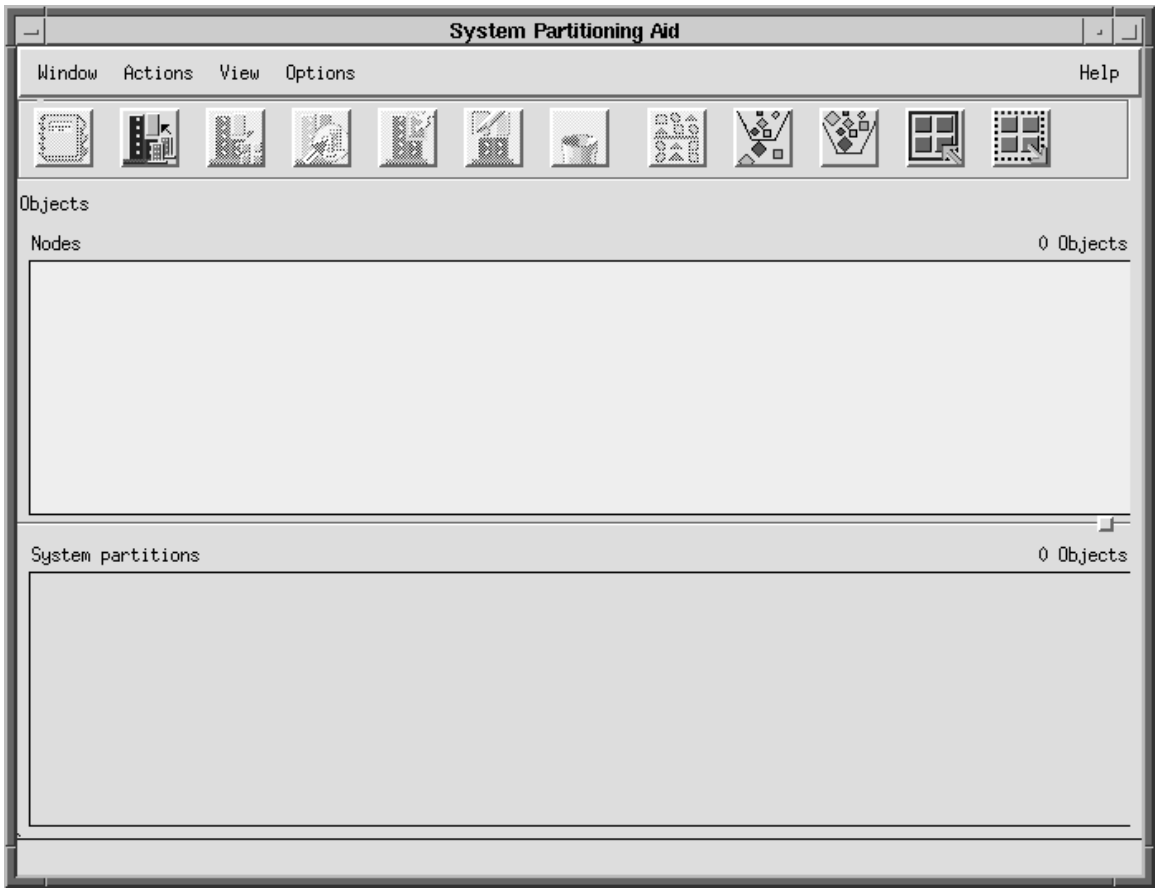



*Figure 34. spsyspar's Main Window*

In Figure 34, the Nodes and System Partitions panes are empty. If an SDR exists, **spsyspar** treats the active system partitioning layout as the current target, and pictures it in the object panes. So, on an active system, **spsyspar** does not come up with empty panes: the Nodes pane contains the frames and nodes of the system, and the System partitions pane contains system partition icons.

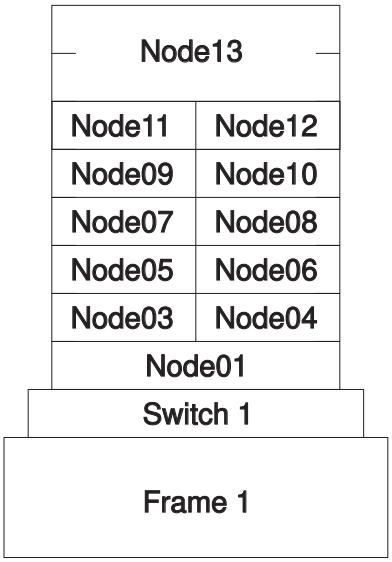



*Figure 35. Sample 1-Frame System (1 wide, 10 thin, and 1 high nodes)*

For example, assume you invoked **spsyspar** on the control workstation for the 1-frame system pictured in Figure 35, where there is 1 wide node, 10 thin nodes and 1 604 high node. If the active system partitioning layout has the bottom half of the frame in system partition "Alpha" and the top half in system partition "Beta", then **spsyspar** presents the window shown in Figure 36 on page 170. A single frame is presented in the Nodes pane, with the nodes pictured as defined (thin, wide, or 604 high) in the SDR. Icons for partitions Alpha and Beta are shown in the System partitions pane.

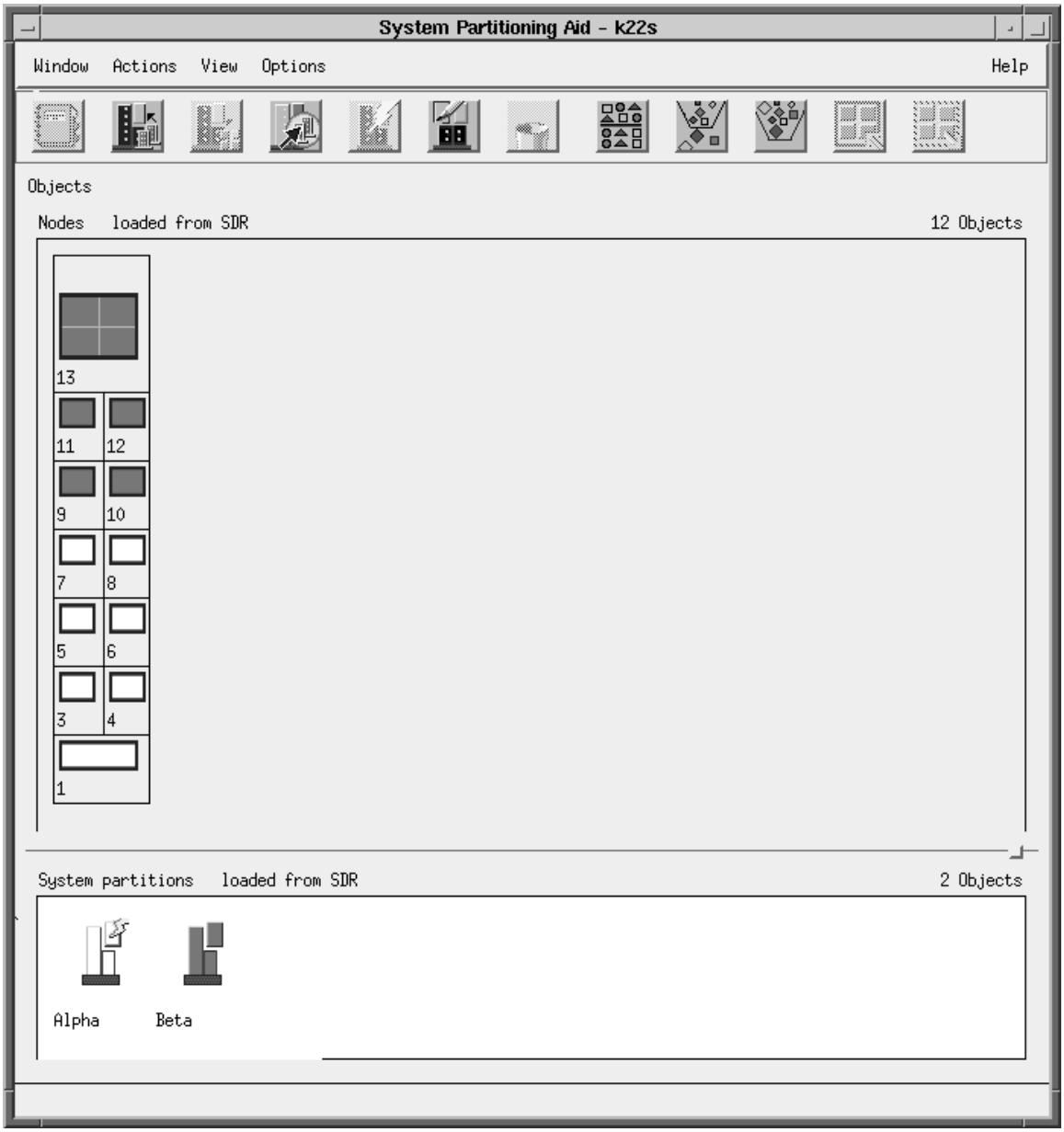



*Figure 36. Main Window for Sample System*

The **spsyspar** window is a standard window which you can move and size like any other window. The Nodes and System partitions panes become scrollable when appropriate. Also, the division of real estate between these two panes is controlled via the small box located between them and at the right side of the window; that box is called a "sash".

In Figure 36, notice that the title of the window contains " - k22s". "k22s" is the name of the control workstation of the target system. Also, if you look closely at the "System partition" pane of Figure 36, you'll see that the Alpha partition is marked with a "lightening bolt". This signifies that Alpha is the *active partition*. Hence, any partition-specific activity, such as assignment of nodes, would be directed at partition Alpha. In addition, the brighter colored System partitions pane is the pane of "focus". This affects the choices available from the Tool Bar and the Pull Down Menu – items not applicable for the current focus are grayed out.

## Tool Bar Actions

The Tool Bar consists of several icons which allow you to execute important actions. These actions are also available through the Pull Down Menu Bar.

### View and Modify Information About Selected Objects (Notebook)

The availability of the icons of the Tool Bar is generally affected by the nodes and/or system partitions previously selected. Actions which are not available appear grayed-out. For example, if you clicked on node 8 in the Nodes pane, and then select the first Tool Bar icon, which pictures a notebook, a new window comes up named "View Node 8" containing data relevant to node 8. This window appears in Figure 37.

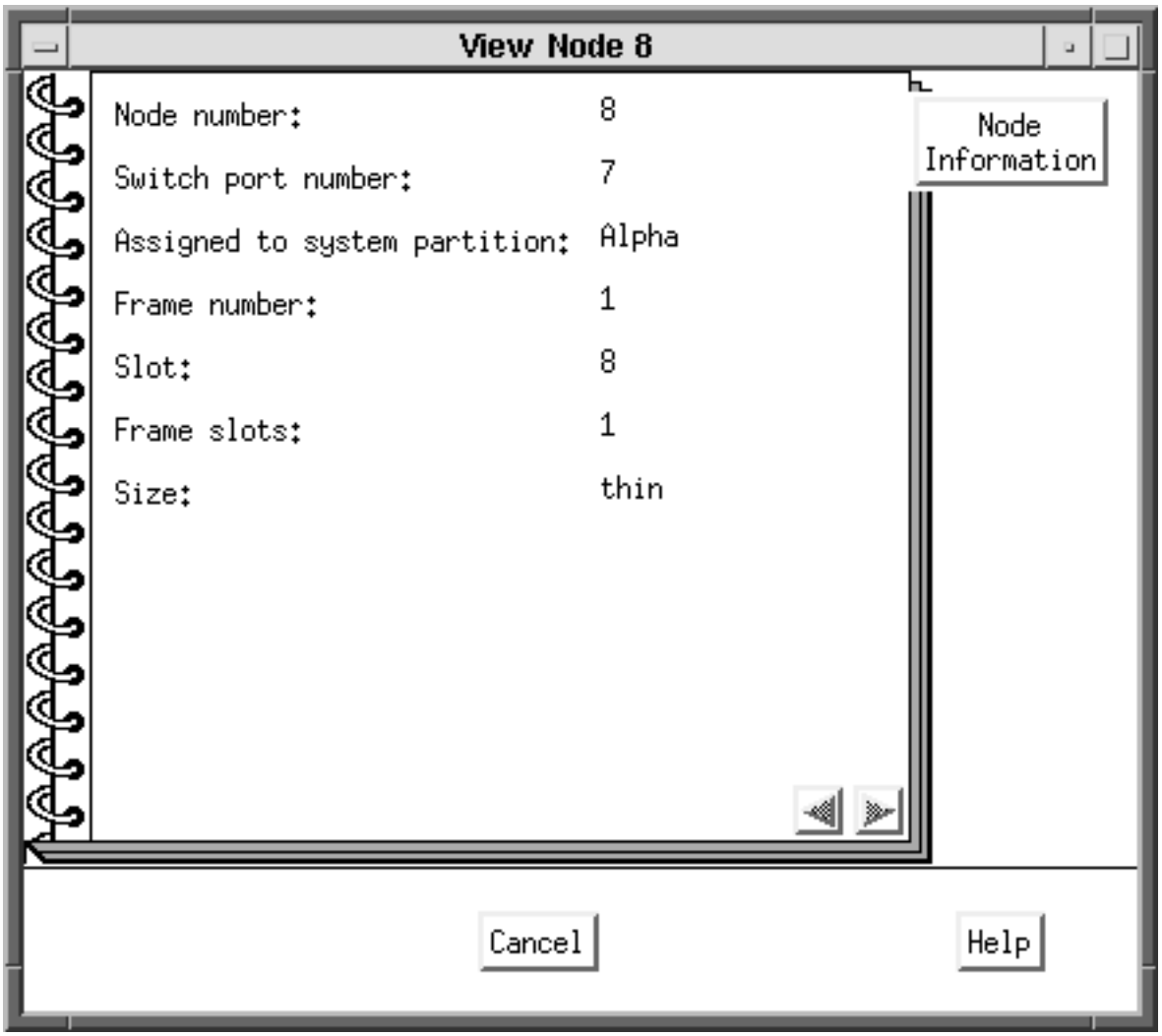



*Figure 37. Notebook for Node 8 of Sample System*

If you instead click on partition Alpha in the system partitions pane, and then select the notebook icon, you get a window named "View/Modify System Partition Alpha", which contains data for system partition Alpha. This system partition notebook is more complicated than a node notebook, and contains each of the following pages, which are shown in Figure 38 on page 172 for this example:

**Definition** partition name and description, together with current **spsyspar** session parameters;

| | |
|---|---|
| **Nodes** | a list of information for the nodes in this partition; |
| **Topology File** | view of the topology file specifying this partition; |
| **Chip Allocation** | switch chips allocated to this partition, if the configuration was not shipped by IBM; |
| **Performance** | performance numbers for this partition, if the configuration was not shipped by IBM; |

**Note:** A configuration is either one of those shipped by IBM with PSSP in the directory /**spdata**/**sys1**/**syspar_configs**, or it was added later by a user of the System Partitioning Aid. The configurations shipped by IBM satisfy certain minimal bandwidth criteria, but partitions created using the System Partitioning Aid may not satisfy that criteria. Configurations created via the System Partitioning Aid are evaluated for correctness and performance. Hence, provision is made for the "Chip Allocation" and "Performance" pages of the system partition notebook to record such data for a user-created layout.

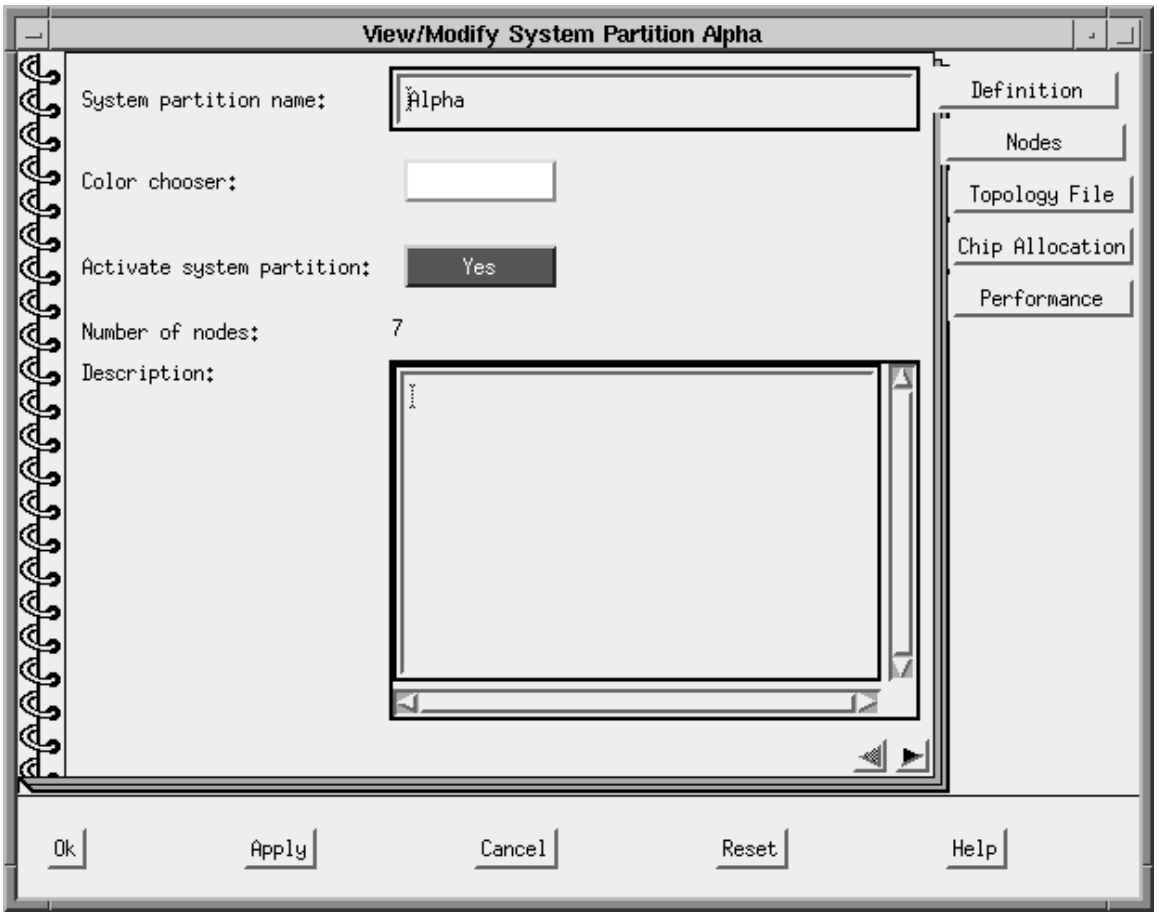



*Figure 38. Notebook for Partition Alpha of Sample System*

You can modify each attribute on the "Definition" page of the partition notebook, except the number of nodes. The other pages of the notebook are read-only.

## Display Previously Defined and User Generated System Configurations

Select the second icon on the Tool Bar to display available system partitioning configurations. The resulting dialog box appears in Figure 39 and displays the configurations that you can select. Clicking on one of these configurations expands that configuration to show the corresponding layouts available – both those shipped by IBM and the ones created by users. In Figure 39, configuration 8_8 has been expanded showing there are three layouts available under this configuration.

If you click on a layout and press the "Open" button, **spsyspar** now treats that layout as the target system. This makes **spsyspar** useful in planning for future expansion. If the layout is for a configuration which matches the real system, the user has a choice of seeing nodes pictured as defined in the SDR. The default, and the only possibility if the SDR is unavailable, is to show only thin nodes with all slots populated, since **spsyspar** cannot know the correct node types to show, and so depicts all nodes as thin.

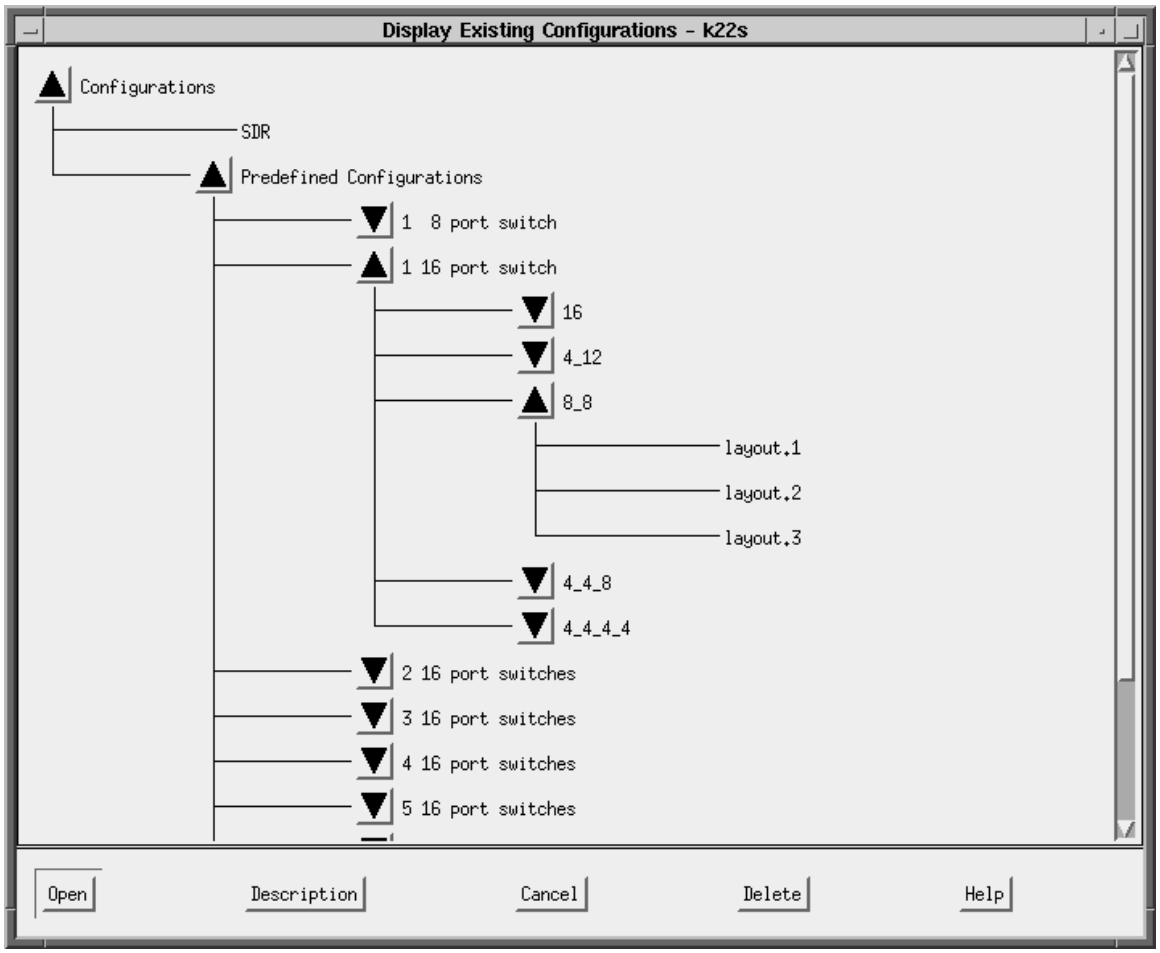



*Figure 39. Alpha Notebook for Sample System*

You also have the opportunity to read the description of a layout, or delete a layout created by a user. By looking at the description for layout.3 under configuration 8_8, you would see it is equivalent to the layout depicted in Figure 36 on page 170.

### Place Selected Nodes into an Active Partition

You may set the active partition by selecting a partition in the System partitions pane and then choosing "Selective Active" under the "Actions" pull down. (See also the description for the fifth icon below.) Once an active partition is set, you may select nodes in the nodes pane and then select the third icon. This moves any selected nodes into the active partition. In addition, any nodes attached to the same switch chip(s) as the node(s) selected are also placed in the active partition. A message appears informing the user that this has happened.

In our example, if Beta is the active partition, and node 1 is selected, then clicking on the third icon moves nodes 1, 5, and 6 from partition Alpha to partition Beta.

### Generate Files Used to Define System Configuration

The fourth icon checks whether the current system partition layout is equivalent to one which already exists, and if not, builds the corresponding layout in the appropriate location on disk. Then this new layout may be chosen as the active configuration at a later time.

### Activate a System Partition for Node Assignment

The fifth icon provides an alternative way of setting the active partition. This is equivalent to choosing "Selective Active" under the "Actions" pull down. The current active partition is marked with a lightening bolt.

### Define a New System Partition

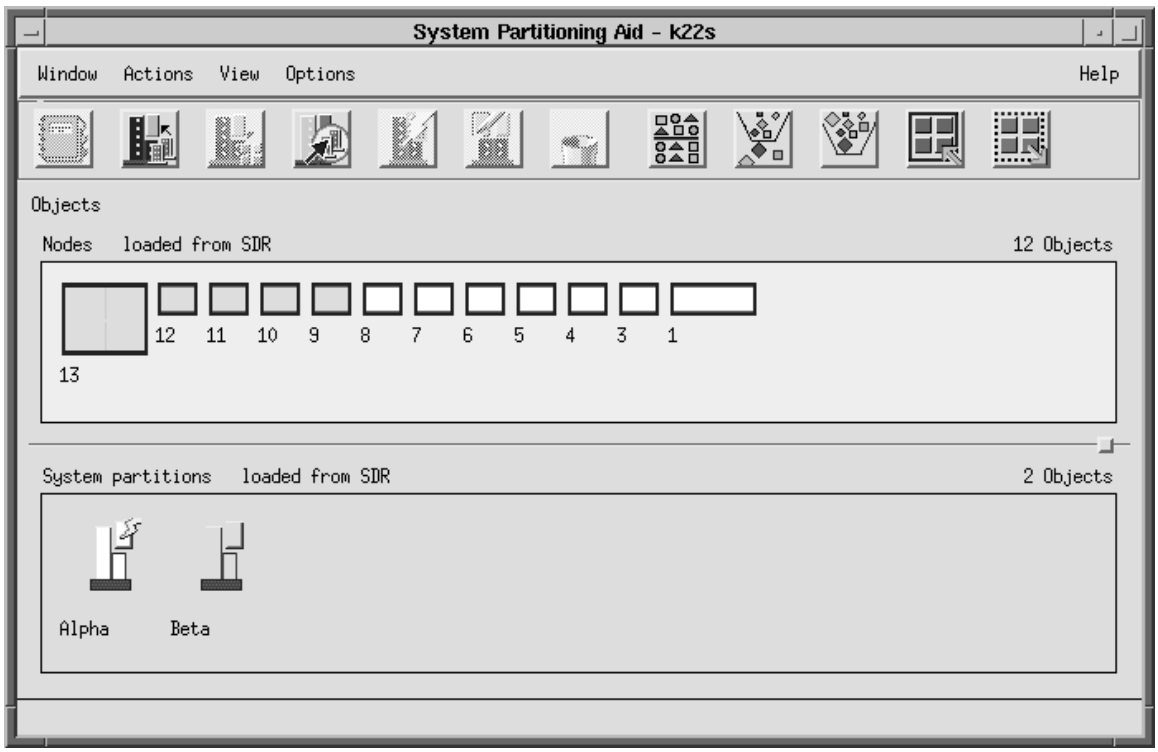
The sixth icon brings up a "Define System Partition" dialog box which is actually the "Definition" page in a new system partition's notebook. You can specify the name, description, and color of the new partition. Of course, this new partition has no nodes yet, because you must first perform a "Place selected nodes ..." for this new partition. The new partition is also set as the active one to prepare for specifying member nodes.

### Remove Selected System Partition

The seventh icon deletes the selected system partition from the current layout. If the selected partition has nodes assigned and is currently the active partition, you cannot delete the partition until all nodes of the partition have been reassigned to another partition(s). If the selected partition has no nodes assigned and is currently the active partition, it cannot be deleted until a different partition becomes the active partition.

### Sort the Objects in the Current Pane

The eighth icon sorts the node or system partition objects in the respective pane, depending on which pane is currently active. For the Nodes pane, this makes sense and is only available for use if the icon view of the nodes has been set via the "View" Pull Down Menu item. The icon view dispenses with frames and simply represents all the nodes as independent entities. The icon view of the Nodes pane has been selected in Figure 40 on page 175, and the nodes have sorted in descending order.




| *Figure 40. Descending sort in Nodes pane (Icon View)*

### Filter the Objects in the Current Pane

The ninth icon allows you to define a filter, and uses that filter to control which objects in the active pane are seen. In our example, if the node pane is selected, specifying the filter "1*" for inclusion as shown in Figure 41 causes the frame to be redrawn with only nodes 1, 10, 11, 12, and 13 shown. Alternatively, you may select those nodes in the Nodes pane, and choose the "Filter by what is selected" option on the "Filter Nodes" dialog window.

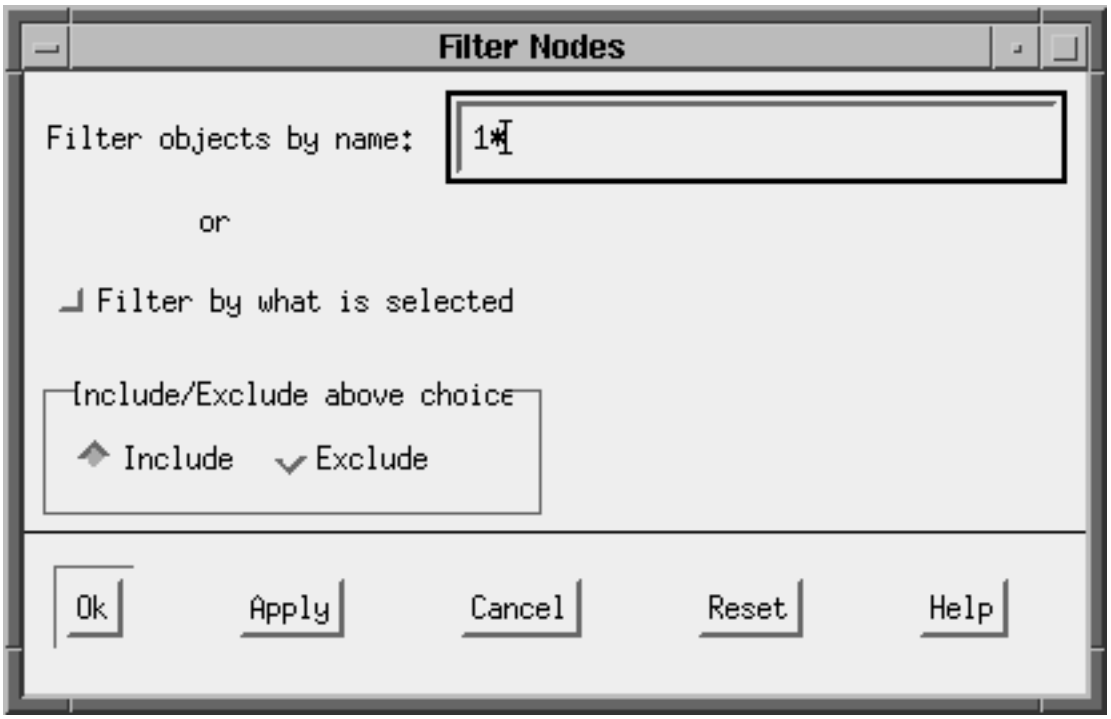



*Figure 41. Filter menu with "1*" filter specified for Nodes pane*

If you select the System partitions pane, specifying the filter B* for inclusion results in only the Beta system partition being shown: both in the Nodes pane and the partitions pane. A filter may be imposed on each pane.

### Remove Any Filter Being Applied to the Objects in the Current Pane

The tenth icon undoes any filtering for the currently active pane.

### Select All Objects in the Current Pane

The eleventh icon applies only to the Nodes pane. It marks all the nodes as if they had been sequentially selected. Then, you may deselect nodes one at a time to achieve the desired combination.

### Deselect all Objects in the Current Pane

The twelfth icon also applies only to the Nodes pane. It clears all selections from the pane so you can start from the beginning again.

## The CLI – "sysparaid"

Use the command **sysparaid** to verify the validity of a system partitioning configuration without invoking the GUI. Optionally, you may request the corresponding layout files be constructed and saved for activation later.

The CLI **sysparaid** is invoked by the GUI **spsyspar** to handle a graphically specified layout. In that case the **spsyspar** code constructs the necessary input data and option specifications for the user.

When working with **sysparaid** directly, you must provide these inputs and options. The syntax for the CLI is shown below. For complete syntax, refer to "SP Command and Technical Reference".

```
sysparaid  [ -s layout_name | a_fully_qualified_path ]
             input_file  [topology_file]
```

where

- *input_file*

  is the input file specifying the system partitions.

- *topology_file*

  is an optional topology file to be used in evaluating the candidate system partitioning layout. This file is the master topology file for the target system, and is necessary when this file is not present in the **/spdata/sys1/syspar_configs/topologies** directory.

- -s

  Specifies that the configuration layout data is to be saved for later use. If *layout_name* is specified as a simple string, the results are stored at the appropriate location in the system partition directory tree, under the directory named layout.*layout_name*. If *a_fully_qualified_path* is specified, the results are stored at that location only.

The input file must specify the size of the system, number of partitions to be used, which nodes are in which partition and so on. The format of the input file is shown in Figure 42 on page 178 and the file shown is shipped with PSSP in **ssp.top** as "inpfile.template" in the directory **/spdata/sys1/syspar_configs/bin**.

Recall the Sample System of Figure 35 on page 169, and the Alpha and Beta partitions of Figure 36 on page 170. An input file for **sysparaid** which specifies that layout is the file "my_part_in" presented in Figure 43 on page 178.

```
This file is a template for the input file to the System Partitioning Aid.
Copy this into a new file,  fill all fields as described.
Frame Type of 16 slot frames is tall and that of 8 slot frames is short.
Select one of the four keywords provided for Switch type.
Nodes may be identfied using either node numbers or switch port
numbers.
Select one of the two options provided for Node Numbering Scheme.
System Partition Name, Number of Nodes in the System Partition
and list of nodes in the System Partition must be provided for
all system partitions. The node list can be provided in one of
the following formats:
      - A list with one entry on each line
      - A range of the form X - Y
      - A combination of the above options
      - For the last partition the keyword remaining_nodes may be
        used provided all nodes or switch ports not in the last
        system partition have been specified in other system
        partitions.
Comment lines enclosed between /* and */ may be deleted.
New comments may be added provided they follow the comment
convention.
*********************************************************************
   Number of Nodes in System:
   Number of Frames in System:
   Frame Type: tall   short
   Switch Type:  HiPS   SP   LC8   SP8   NA
   Number of Switches in Node Frames:
   Number of Switches in Switch Only Frames:
   Number of System Partitions:
   Node Numbering Scheme:  node_number    switch_port_number
   System Partition Name:
   Number of Nodes in System Partition:
   List of nodes in system partition
```

*Figure 42. inpfile.template provided with PSSP*

```
   Number of Nodes in System:  12
   Number of Frames in System:  1
   Frame Type:  tall
    Switch Type:  HiPS
       Number of Switches in Node Frames:  1
       Number of Switches in Switch Only Frames:  0
       Number of System Partitions:  2
       Node Numbering Scheme:  node_number
       System Partition Name:  Alpha
       Number of Nodes in System Partition:  7
       List of nodes in system partition
       1
       3 - 8
       System Partition Name:  Beta
       Number of Nodes in System Partition:  5
       List of nodes in system partition
       9 - 13
```

*Figure 43. my_part_in file.*

You could execute **sysparaid** as follows to check for validity:

```
sysparaid  my_part_in
```

(If the global system topology file is not present in the **/spdata/sys1/syspar_configs/topologies** directory, you must provide that topology file.) **sysparaid** examines the inputs and recognizes that this layout is equivalent to the layout shipped by IBM as:

```
/spdata/sys1/syspar_configs/1nsb0isb/config.8_8/layout.3
```

If **sysparaid** did not find an existing equivalent layout, it would report that the layout is valid, and you could rerun **sysparaid** specifying the **-s** (save) option with a directory in which to place the results. The results would consist of

| | |
|---|---|
| **layout.desc** | file describing this system partitioning layout; |
| **nodes.syspar** | file with shorthand listing of partition contents; |
| **spa.snapshot** | file listing ownership of switch chips by partition; |
| **syspar.1.Alpha** | directory for Alpha - node list, topology, snapshot, metrics files; |
| **syspar.2.Beta** | directory for Beta - node list, topology, snapshot, metrics files. |

## Example 3 of Chapter 5

The picture of the 3-frame system discussed in Chapter 5 is reproduced in Figure 44 below. Suppose you plan to have this system at some point in the future, and wish to partition it in the manner described in “Example 3 - An SP with 3 frames, 2 switches, and various node sizes” on page 114:

```
Partition 1 - F1N01, F2N01, F1N05, F2N05,
              F1N03, F2N07
Partition 2 - F1N09, F1N13, F2N13
              F1N11, F2N11
Partition 3 - F3N01, F3N02, F3N05, F3N06,
              F3N03, F3N07,
              F3N09, F3N13
```

This layout is not one of those shipped by IBM, and so you would create it using the System Partitioning Aid. Further, if this system is not "in hand", then **spsyspar** cannot picture the system correctly, and shows only thin nodes.

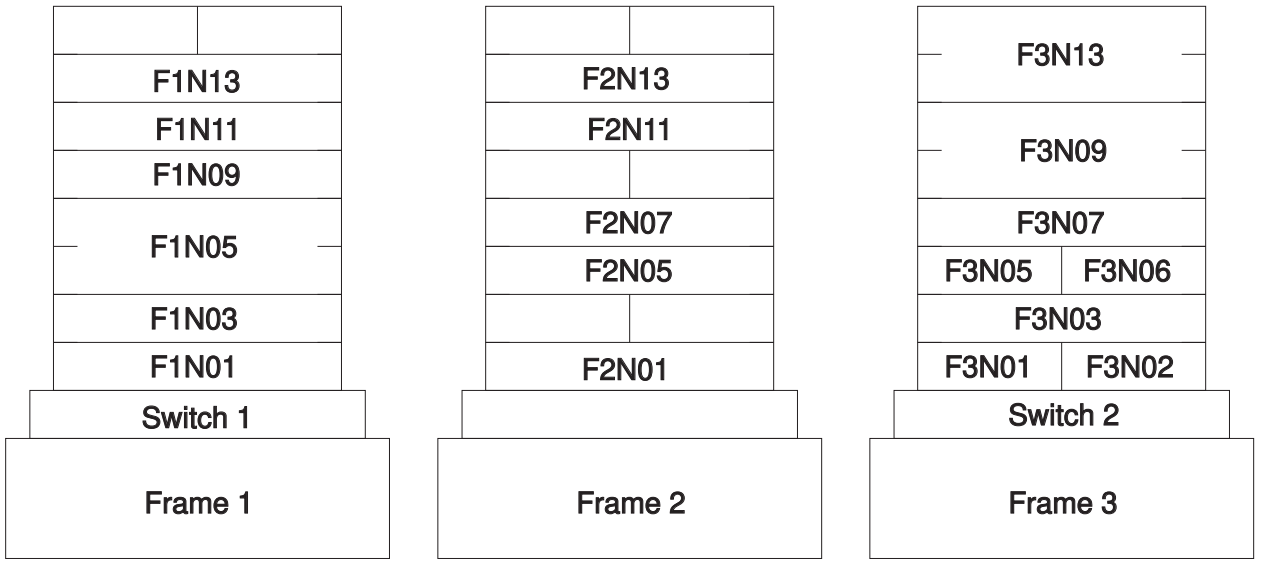



*Figure 44. Three frames with 2 switches*

1. Start by bringing up **spsyspar**.
2. Click on the "Display previously defined ..." icon. (The second Tool Bar icon.)
3. Select the "2 16 port switches" and select the "32" configuration. You find there is only one such layout. Select this layout and open it. You now have a 2-frame, 32-node system as shown in Figure 45 on page 181. The system partition name "alice blue" is a default choice, which matches the default color chosen by the tool.

Understand that the first frame in the figure really represents both of Frames 1 and 2: Frame 2 is an expansion frame for Frame 1 since it shares Frame 1's switch. Also, the nodes in the second frame pictured would be in Frame 3 of the real system, and would be numbered starting at 33, rather than 16. Once you complete this exercise, you will save a layout which you can use correctly once the real system is available. Partitioning is based on switch chips, not on node numbers.

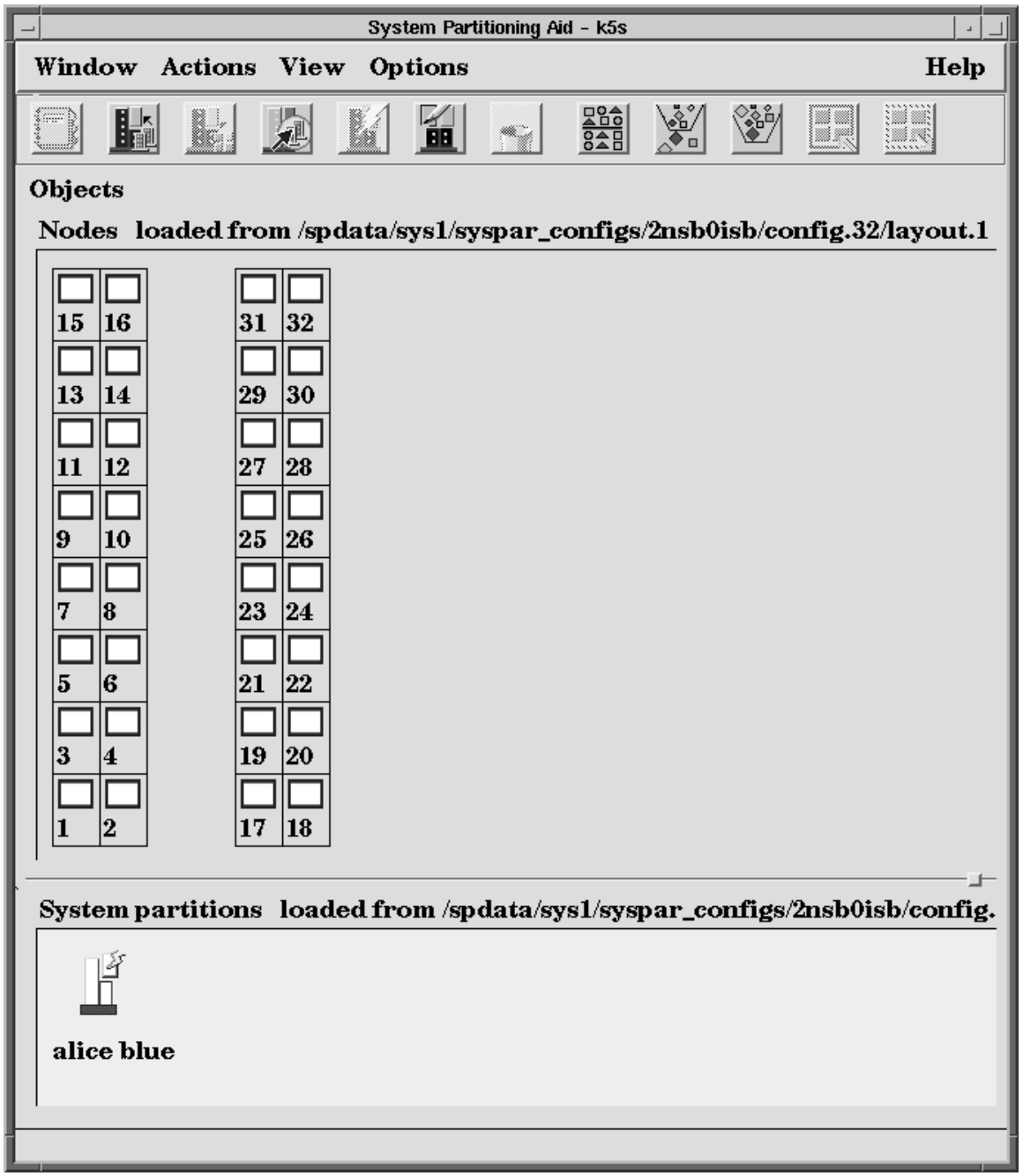



*Figure 45. Main Window for Example 3 of Chapter 5*

Your objective for system partitions is to divide the system pictured in Figure 45 into 3 pieces: the lower half of Frame 1, the upper half of Frame 1, and Frame 2. You may perform the following tasks to accomplish this, and arrive at Figure 46 on page 183:

1. In the notebook for the existing partition (the default partition) change the partition name to "Par1".
2. Select the "Define a new system partition" icon (the one with the pencil) and define a new partition with name "Par2".
3. Repeat the previous step for "Par3".

4. Make Par2 active. (Use the lightning bolt icon)
5. Select node 9 and then assign it to Par2. (Third icon.) Note that nodes 9, 10, 13 and 14 move to Par2 because they all connect to the same switch chip.
6. Select on node 12, and then assign it to Par2. (Third icon.) Nodes 11, 15 and 16 also join Par2.
7. Make Par3 active. (Use the lightning bolt icon)
8. Select nodes 21, 23, 25, and 27, and assign these nodes to Par3 by clicking on the third icon. Notice that all the Frame 3 nodes are placed in Par3 due to the sharing of switch chips.

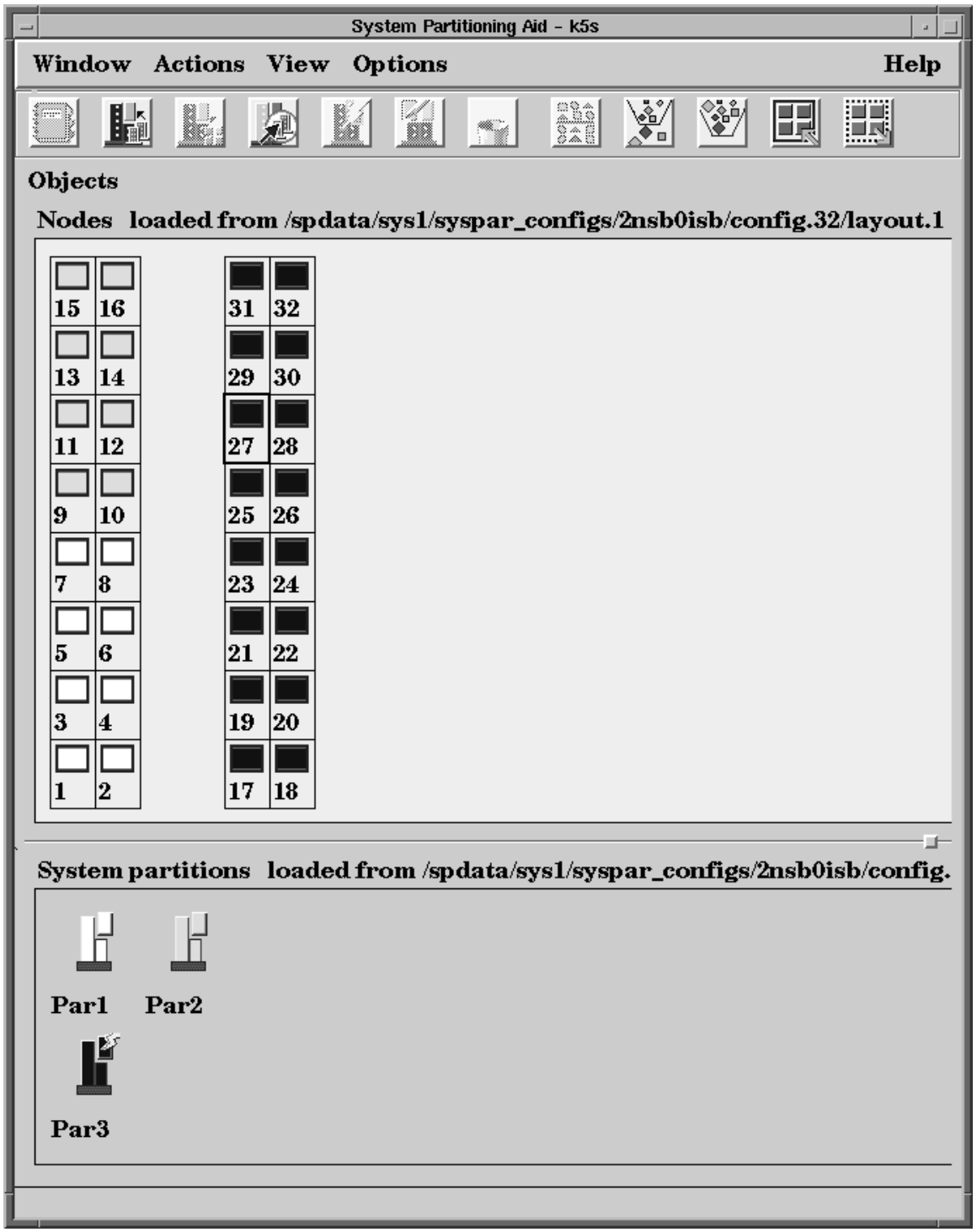



*Figure 46. System Partitioning for Example 3 of Chapter 5*

To make the system represented look more like our system, you can use filtering on the Nodes pane. To do this, follow these steps:

1. Select all the nodes which should be in the system.
2. Select the filtering icon, and choose "Filter by what is selected."

The result is depicted in Figure 47 on page 184. For the real system, Nodes 5, 25 and 29 will be 604 high. Figure 47 on page 184 looks good in this respect. However, Nodes 6 and 8 distort our perception of Node 5.

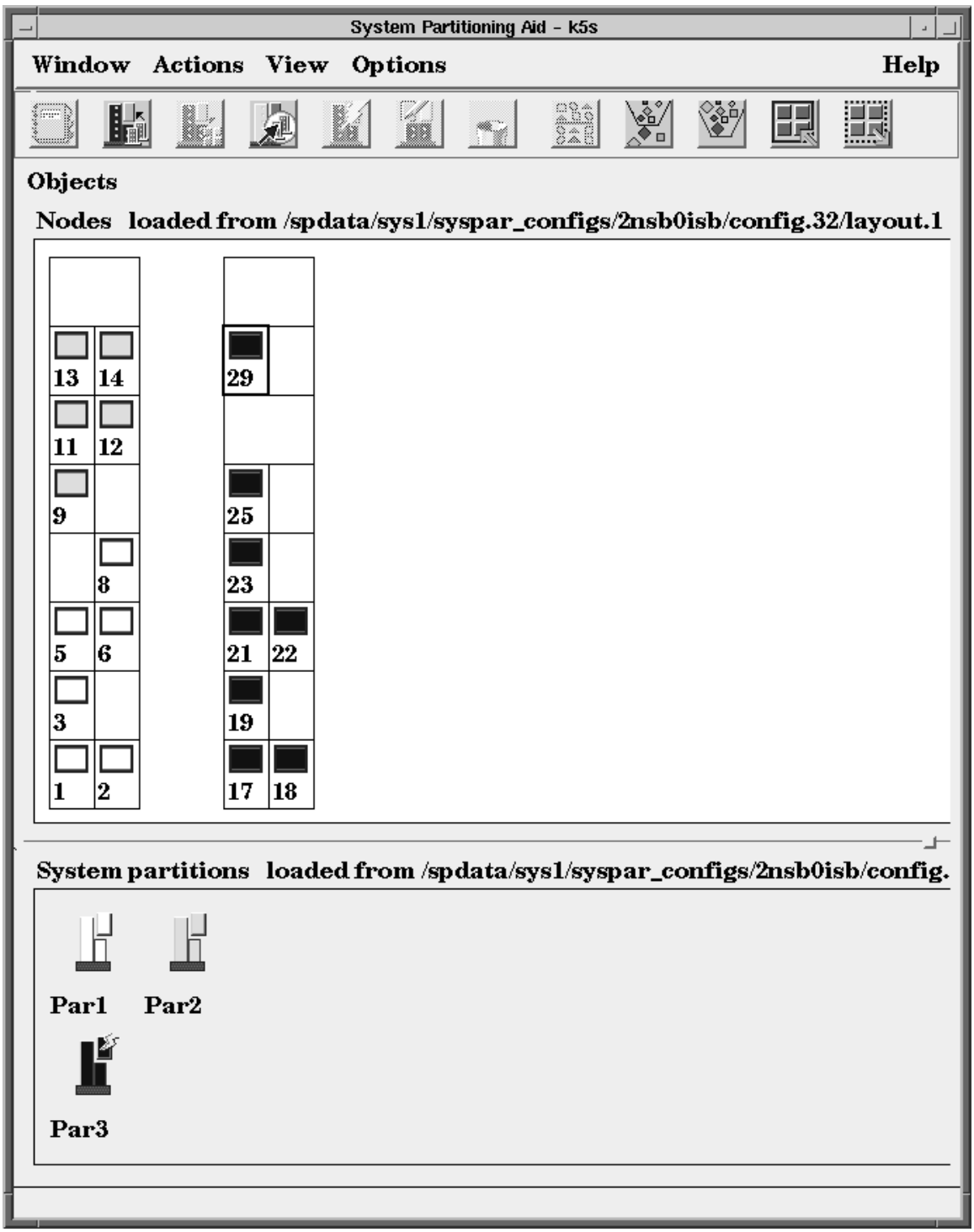



*Figure 47. System Partitioning for Example 3 of Chapter 5*

Validate and save the new layout by clicking on the fourth Tool Bar icon, "Generate files used to define system configuration." The resulting window appears in

Figure 48 on page 185. The code wants to store this new layout as an 8_8_16 configuration of a 2nsb0isb system, which is correct. (If you remove the filter you applied earlier, you indeed see partitions of 8, 8 and 16 nodes.) You can choose the directory extension, (the example uses directory extension "mine_1"). Therefore, the name of the directory containing the new layout is "layout.mine_1".

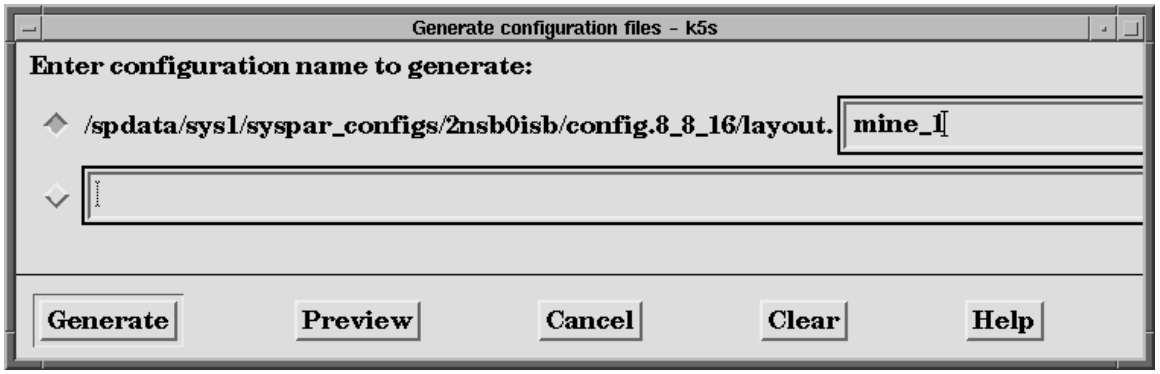



*Figure 48. Dialog box for specifying name of new layout*

Click on "Generate" and receive the message in the following figure. Note the warning about losing the configuration. You should backup the layouts you create before reinstalling PSSP or **ssp.top**.

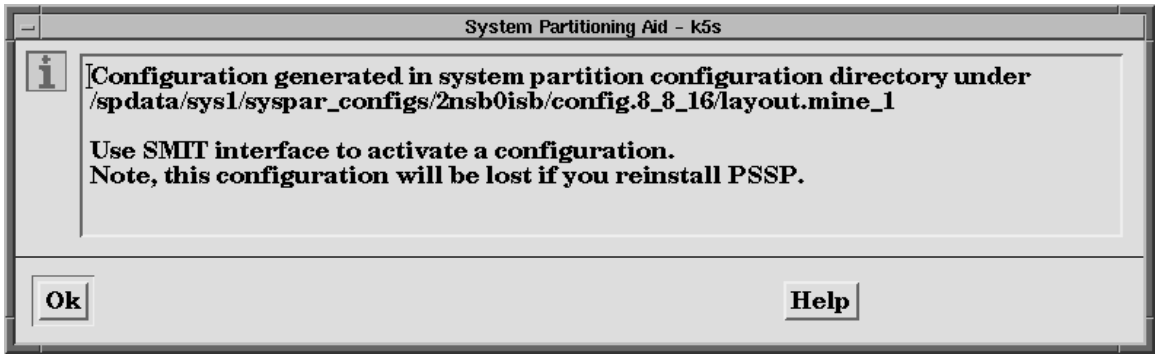



*Figure 49. Message issued when new layout has been saved*

## The CLI

Recall that the GUI (**spsyspar**) invokes the CLI (**sysparaid**) to validate and save a new layout. The previous GUI activity finished the job by issuing the command:

```
spsyspar  -s mine_1  inputfile
```

where `inputfile` is as shown in Figure 50 on page 186. (**spsyspar** chooses the correct global topology file based on the "Number of Switches ..." entries in this input file.)

```
Number of Nodes in System:  32
Number of Frames in System:  2
Frame Type:  tall
Switch Type:  HiPS
Number of Switches in Node Frames:  2
Number of Switches in Switch Only Frames:  0
Number of System Partitions:  3
Node Numbering Scheme:  switch_port_number
System Partition Name:  Par1
Number of Nodes in System Partition:  8
0-7
System Partition Name:  Par2
Number of Nodes in System Partition:  8
8 - 15
System Partition Name:  Par3
Number of Nodes in System Partition:  16
16 - 31
```

*Figure 50. CLI input file from "spsyspar"*

If yoo use the CLI directly, you can use an input file similar to that in Figure 50, but representing the facts more precisely:

- The system has 3 frames and 2 switches.
- Existing nodes in the bottom half of Frames 1 and 2 are in Par1.
- Existing nodes in the top of Frames 1 and 2 are in Par2.
- Existing nodes in Frame 3 are in Par3.

Figure 51 on page 187 is the appropriate input file.

```
Number of Nodes in System:  19
Number of Frames in System:  3
Frame Type:  tall
Switch Type:  HiPS
Number of Switches in Node Frames:  2
Number of Switches in Switch Only Frames:  0
Number of System Partitions:  3
Node Numbering Scheme:  switch_port_number
System Partition Name:  Par1
Number of Nodes in System Partition:  6
0-2
4-6
System Partition Name:  Par2
Number of Nodes in System Partition:  5
8
10-13
System Partition Name:  Par3
Number of Nodes in System Partition:  8
16 - 18
20 - 22
24
28
```

*Figure 51. Alternate CLI input file*

## Other files and data

When you save a new layout, supplemental files are saved in the respective directory. These include chip allocation files and performance files. For example, if you look at the **layout.mine_1** directory saved earlier, the **syspar.2.Par1** subdirectory contains the files **spa.snapshot** and **spa.metrics**.

The spa.snapshot data is available for viewing in the GUI as the "Chip Allocation" page of Par1's notebook. (First icon.) This GUI presentation is produced in Figure 52 on page 188. Par1 is completely contained in Frames 1 and 2 and so only uses Switch 1, denoted NSB 1 (Node Switch Board 1) in spa.snapshot. The 2 chips on the left are the node-attached chips, and the 2 chips on the right provide connectivity between those chips. A rule which **sysparaid** adheres to is any 2 node chips in a partition must have 2 link switch chips through which to communicate. This guarantees minimal, acceptable bandwidth and reliability characteristics.

A summary of the chip assignments for all partitions is stored in an spa.snapshot file at the layout.mine_1 directory level.

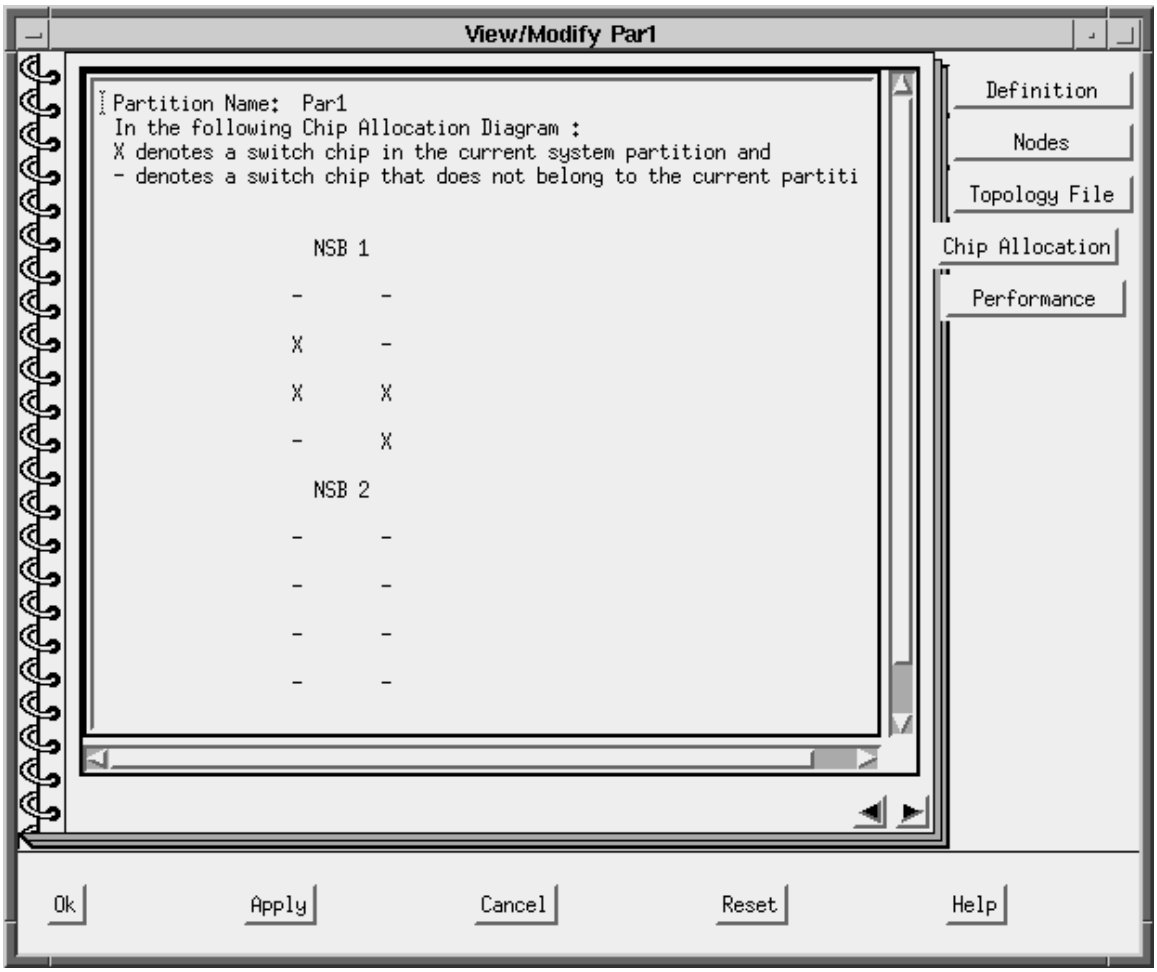



*Figure 52. Switch chips allocated to system partition Par1*

The spa.metrics data is available in the GUI on the "Performance" page of Par1's notebook. This GUI presentation is given in Figure 53 on page 189. Chips 5 and 6 are the node chips of Figure 52. The bandwidth numbers for Par1 are less than 100%. This measure is a comparison to the unpartitioned case where all 4 link switch chips would be available for the nodes on chips 5 and 6 to communicate through. So, in some cases, total traffic throughput between nodes of Par1 is cut by as much as half from the unpartitioned case. On average, that communication is only cut to 87.5%, since some of the nodes are on the same chip.

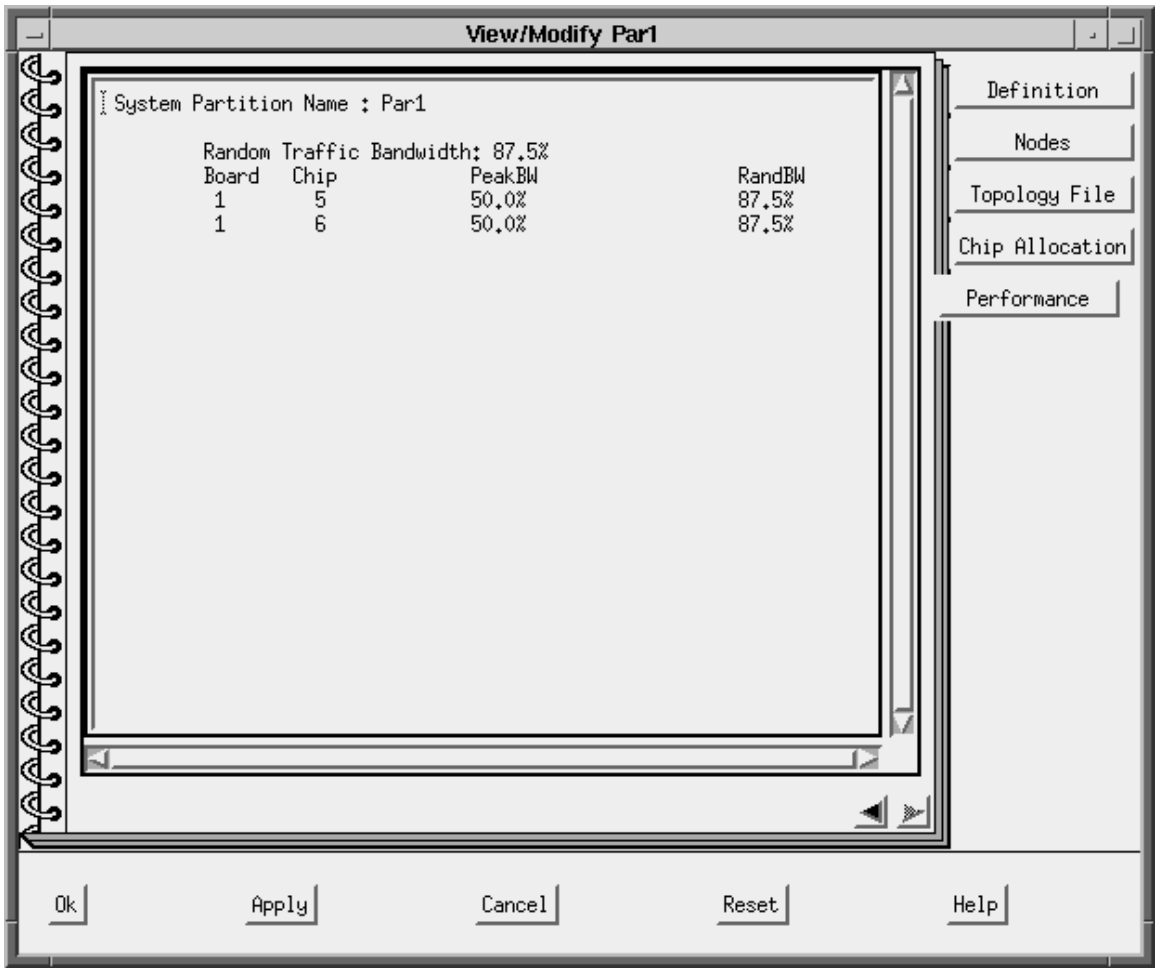



*Figure 53. Performance numbers for system partition Par1*

# Appendix B. System Partitioning

This appendix contains a description for each of the system partitioning layouts, ordered by system size, that IBM provides.

## 8 Switch Port System

### Layout for 4_4 Partition of 8 Switch Port System with a SP Switch-8

This layout is the only layout choice for a 4_4 system partition configuration of an 8 switch port system with no intermediate switch boards.

#### Layout 1

This is the description of the only layout choice for a 4_4 system partition configuration of an 8 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5

***Partition 2 contains switch_port_numbers:*** 2, 3, 6, 7

### Layout for 8 Partition of 8 Switch Port System with a SP Switch-8

This layout is the only layout choice for an 8 system partition configuration of an 8 switch port system with no intermediate switch boards.

#### Layout 1

This is the description of the only layout choice for an 8 system partition configuration of an 8 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 7

## 16 Switch Port System

### Layouts for 8_8 Partition of 16 Switch Port System

The following are the layout choices for an 8_8 system partition of a 16 switch port system with no intermediate switch boards:

#### Layout 1

This is the description of one of the layout choices for an 8_8 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5, 8, 9, 12, 13

***Partition 2 contains switch_port_numbers:*** 2, 3, 6, 7, 10, 11, 14, 15

© Copyright IBM Corp. 1996

### Layout 2

This is the description of the layout choices for an 8_8 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5, 10, 11, 14, 15

***Partition 2 contains switch_port_numbers:*** 2, 3, 6 - 9, 12, 13

### Layout 3

***Partition 1 contains switch_port_numbers:*** 0 - 7

***Partition 2 contains switch_port_numbers:*** 8 - 15

## Layouts for 4_4_8 Partition of 16 Switch Port System

The following are the layout choices for a 4_4_8 system partition of a 16 switch port system with no intermediate switch boards.

### Layout 1

This is the description of the layout choices for a 4_4_8 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5

***Partition 2 contains switch_port_numbers:*** 8, 9, 12, 13

***Partition 3 contains switch_port_numbers:*** 2, 3, 6, 7, 10, 11, 14, 15

### Layout 2

This is the description of the layout choices for a 4_4_8 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5

***Partition 2 contains switch_port_numbers:*** 2, 3, 6, 7

***Partition 3 contains switch_port_numbers:*** 8 - 15

### Layout 3

This is the description of the layout choices for a 4_4_8 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5

***Partition 2 contains switch_port_numbers:*** 10, 11, 14, 15

***Partition 3 contains switch_port_numbers:*** 2, 3, 6 - 9, 12, 13

### Layout 4

This is the description of the layout choices for a 4_4_8 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 2, 3, 6, 7

***Partition 2 contains switch_port_numbers:*** 8, 9, 12, 13

***Partition 3 contains switch_port_numbers:*** 0, 1, 4, 5, 10, 11, 14, 15

### Layout 5

***Partition 1 contains switch_port_numbers:*** 2, 3, 6, 7

***Partition 2 contains switch_port_numbers:*** 10, 11, 14, 15

***Partition 3 contains switch_port_numbers:*** 0, 1, 4, 5, 8, 9, 12, 13

### Layout 6

This is the description of the layout choices for a 4_4_8 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 8, 9, 12, 13

***Partition 2 contains switch_port_numbers:*** 10, 11, 14, 15

***Partition 3 contains switch_port_numbers:*** 0 - 7

## Layouts for 4_12 Partition of 16 Switch Port System

The following are the layout choices for a 4_12 system partition of a 16 switch port system.

### Layout 1

This is the description of the layout choices for a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5

***Partition 2 contains switch_port_numbers:*** 2, 3, 6 - 15

### Layout 2

This is the description of the layout choices for a 4_12 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 8, 9, 12, 13

***Partition 2 contains switch_port_numbers:*** 0 - 7, 10, 11, 14, 15

### Layout 3

This is the description of the layout choices for a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 2, 3, 6, 7

***Partition 2 contains switch_port_numbers:*** 0, 1, 4, 5, 8 - 15

### Layout 4

This is the description of the layout choices for a 4_12 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 10, 11, 14, 15

***Partition 2 contains switch_port_numbers:*** 0 - 9, 12, 13

## Layouts for 4_4_4_4 Partition of 16 Switch Port System

This layout is the only layout choice for a 4_4_4_4 system partition of a 16 switch port system.

### Layout 1

This is the description of the layout choices for a 4_4_4_4 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5

***Partition 2 contains switch_port_numbers:*** 8, 9, 12, 13

***Partition 3 contains switch_port_numbers:*** 2, 3, 6, 7

***Partition 4 contains switch_port_numbers:*** 10, 11, 14, 15

## Layouts for 16 Partition of 16 Switch Port System

This layout is the only layout choice for a 16 system partition of an 16 switch port system.

### Layout 1

This is the description of the layout choices for a 16 system partition configuration of a 16 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15

---

# 32 Switch Port System

## Layouts for 8_24 Partition of 32 Switch Port System

The following are the layout choices for an 8_24 system partition of a 32 switch port system.

### Layout 1

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5, 8, 9, 12, 13

***Partition 2 contains switch_port_numbers:*** 2, 3, 6, 7, 10, 11, 14 - 31

### Layout 2

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 2, 3, 6, 7, 10, 11, 14, 15

***Partition 2 contains switch_port_numbers:*** 0, 1, 4, 5, 8, 9, 12, 13, 16 - 31

### Layout 3

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5, 10, 11, 14, 15

***Partition 2 contains switch_port_numbers:*** 2, 3, 6 - 9, 12, 13, 16 - 31

### Layout 4

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 2, 3, 6 - 9, 12, 13

***Partition 2 contains switch_port_numbers:*** 0, 1, 4, 5, 10, 11, 14 - 31

### Layout 5

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 8 - 15

***Partition 2 contains switch_port_numbers:*** 0 - 7, 16 - 31

### Layout 6

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 7

***Partition 2 contains switch_port_numbers:*** 8 - 31

### Layout 7

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16, 17, 20, 21, 24, 25, 28, 29

***Partition 2 contains switch_port_numbers:*** 0 - 15, 18, 19, 22, 23, 26, 27, 30, 31

### Layout 8

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 18, 19, 22, 23, 26, 27, 30, 31

***Partition 2 contains switch_port_numbers:*** 0 - 17, 20, 21, 24, 25, 28, 29

### Layout 9

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16, 17, 20, 21, 26, 27, 30, 31

***Partition 2 contains switch_port_numbers:*** 0 - 15, 18, 19, 22 - 25, 28, 29

### Layout 10

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 18, 19, 22 - 25, 28, 29

***Partition 2 contains switch_port_numbers:*** 0 - 17, 20, 21, 26, 27, 30, 31

### Layout 11

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 24 - 31

***Partition 2 contains switch_port_numbers:*** 0 - 23

### Layout 12

This is the description of the layout choices for an 8_24 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 23

***Partition 2 contains switch_port_numbers:*** 0 - 15, 24 - 31

## Layouts for 4_28 Partition of 32 Switch Port System

The following are the layout choices for a 4_28 system partition of a 32 switch port system.

### Layout 1

This is the description of the layout choices for a 4_28 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0, 1, 4, 5

***Partition 2 contains switch_port_numbers:*** 2, 3, 6 - 31

### Layout 2

This is the description of the layout choices for a 4_28 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 8, 9, 12, 13

***Partition 2 contains switch_port_numbers:*** 0 - 7, 10, 11, 14 - 31

### Layout 3

This is the description of the layout choices for a 4_28 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 2, 3, 6, 7

***Partition 2 contains switch_port_numbers:*** 0, 1, 4, 5, 8 - 31

### Layout 4

This is the description of the layout choices for a 4_28 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 10, 11, 14, 15

***Partition 2 contains switch_port_numbers:*** 0 - 9, 12, 13, 16 - 31

### Layout 5

This is the description of the layout choices for a 4_28 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16, 17, 20, 21

***Partition 2 contains switch_port_numbers:*** 0 - 15, 18, 19, 22 - 31

### Layout 6

This is the description of the layout choices for a 4_28 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 24, 25, 28, 29

***Partition 2 contains switch_port_numbers:*** 0 - 23, 26, 27, 30, 31

### Layout 7

This is the description of the layout choices for a 4_28 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 18, 19, 22, 23

***Partition 2 contains switch_port_numbers:*** 0 - 17, 20, 21, 24 - 31

### Layout 8

This is the description of the layout choices for a 4_28 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 26, 27, 30, 31

***Partition 2 contains switch_port_numbers:*** 0 - 25, 28, 29

## Layouts for 16_16 Partition of 32 Switch Port System

This layout is the only layout choice for a 16_16 system partition of a 32 switch port system.

### Layout 1

This is the description of the layout choices for a 16_16 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15

***Partition 2 contains switch_port_numbers:*** 16 - 31

## Layouts for 32 Partition of 32 Switch Port System

This layout is the only layout choice for a 32 system partition of a 32 switch port system.

### Layout 1

This is the description of the layout choices for a 32 system partition configuration of a 32 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 31

---

# 48 Switch Port System

## Layouts for 16_32 Partition of 48 Switch Port System

The following are the layout choices for a 16_32 system partition of a 48 switch port system.

### Layout 1

This is the description of the layout choices for a 16_32 system partition configuration of a 48 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 31

***Partition 2 contains switch_port_numbers:*** 32 - 47

### Layout 2

This is the description of the layout choices for a 16_32 system partition configuration of a 48 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15, 32 - 47

***Partition 2 contains switch_port_numbers:*** 16 - 31

### Layout 3

This is the description of the layout choices for a 16_32 system partition configuration of a 48 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 47

***Partition 2 contains switch_port_numbers:*** 0 - 15

## Layouts for 48 Partition of 48 Switch Port System

This layout is the only layout choice for a 48 system partition of a 48 switch port system.

### Layout 1

This is the description of the layout choices for a 48 system partition configuration of a 48 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 47

---

# 64 Switch Port System

## Layouts for 16_48 Partition of 64 Switch Port System

The following are the layout choices for a 16_48 system partition of a 64 switch port system.

### Layout 1

This is the description of the layout choices for a 16_48 system partition configuration of a 64 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 47

***Partition 2 contains switch_port_numbers:*** 48 - 63

### Layout 2

This is the description of the layout choices for a 16_48 system partition configuration of a 64 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 31, 48 - 63

***Partition 2 contains switch_port_numbers:*** 32 - 47

### Layout 3

This is the description of the layout choices for a 16_48 system partition configuration of a 64 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15, 32 - 63

***Partition 2 contains switch_port_numbers:*** 16 - 31

### Layout 4

This is the description of the layout choices for a 16_48 system partition configuration of a 64 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 63

***Partition 2 contains switch_port_numbers:*** 0 - 15

## Layouts for 32_32 Partition of 64 Switch Port System

The following are the layout choices for a 32_32 system partition of a 64 switch port system.

### Layout 1

This is the description of the layout choices for a 32_32 system partition configuration of a 64 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 31

***Partition 2 contains switch_port_numbers:*** 32 - 63

### Layout 2

This is the description of the layout choices for a 32_32 system partition configuration of a 64 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15, 32 - 47

***Partition 2 contains switch_port_numbers:*** 16 - 31, 48 - 63

### Layout 3

This is the description of the layout choices for a 32_32 system partition configuration of a 64 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15, 48 - 63

***Partition 2 contains switch_port_numbers:*** 16 - 47

## Layouts for 64 Partition of 64 Switch Port System

This layout is the only layout choice for a 64 system partition of a 64 switch port system.

### Layout 1

This is the description of the layout choices for a 64 system partition configuration of a 64 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 63

---

# 80 Switch Port System With 0 Intermediate Switch Boards

## Layouts for 16_64 Partition

The following are the layout choices for a 16_64 system partition of a 80 switch port system.

### Layout 1

This is the description of the layout choices for a 16_64 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 63

***Partition 2 contains switch_port_numbers:*** 64 - 79

### Layout 2

This is the description of the layout choices for a 16_64 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 47, 64 - 79

***Partition 2 contains switch_port_numbers:*** 48 - 63

### Layout 3

This is the description of the layout choices for a 16_64 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 31, 48 - 79

***Partition 2 contains switch_port_numbers:*** 32 - 47

### Layout 4

This is the description of the layout choices for a 16_64 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15, 32 - 79

***Partition 2 contains switch_port_numbers:*** 16 - 31

### Layout 5

This is the description of the layout choices for a 16_64 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 79

***Partition 2 contains switch_port_numbers:*** 0 - 15

## Layouts for 32_48 Partition

The following are the layout choices for a 32_48 system partition of an 80 switch port system.

### Layout 1

This is the description of the layout choices for a 32_48 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 31

***Partition 2 contains switch_port_numbers:*** 32 - 79

### Layout 2

This is the description of the layout choices for a 32_48 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15, 32 - 47

***Partition 2 contains switch_port_numbers:*** 16 - 31, 48 - 79

### Layout 3

This is the description of the layout choices for a 32_48 system partition configuration of a 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15, 48 - 63

***Partition 2 contains switch_port_numbers:*** 16 - 47, 64 - 79

### Layout 4

This is the description of the layout choices for a 32_48 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15, 64 - 79

***Partition 2 contains switch_port_numbers:*** 16 - 63

### Layout 5

This is the description of the layout choices for a 32_48 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 47

***Partition 2 contains switch_port_numbers:*** 0 - 15, 48 - 79

### Layout 6

This is the description of the layout choices for a 32_48 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 31, 48 - 63

***Partition 2 contains switch_port_numbers:*** 0 - 15, 32 - 47, 64 - 79

### Layout 7

This is the description of the layout choices for a 32_48 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 31, 64 - 79

***Partition 2 contains switch_port_numbers:*** 0 - 15, 32 - 63

### Layout 8

This is the description of the layout choices for a 32_48 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 32 - 63

***Partition 2 contains switch_port_numbers:*** 0 - 31, 64 - 79

### Layout 9

This is the description of the layout choices for a 32_48 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 32 - 47

***Partition 2 contains switch_port_numbers:*** 64 - 79

### Layout 10

This is the description of the layout choices for a 32_48 system partition configuration of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 48 - 79

***Partition 2 contains switch_port_numbers:*** 0 - 47

## Layouts for 80 Partition

This layout is the only layout choice for an 80 system partition of an 80 switch port system.

### Layout 1

This is the description of the layout choices for an 80 partition of an 80 switch port system with no intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 79

---

# 80 Switch Port System With Intermediate Switch Boards

## Layouts for 16_16_48 Partition

The following are the layout choices for a 16_16_48 system partition of an 80 switch port system.

### Layout 1

This is the description of the layout choices for a 16_16_48 partition of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15

***Partition 2 contains switch_port_numbers:*** 16 - 63

***Partition 3 contains switch_port_numbers:*** 64 - 79

### Layout 2

This is the description of the layout choices for a 16_16_48 system partition configuration of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 31

***Partition 2 contains switch_port_numbers:*** 0 - 15, 32 - 63

***Partition 3 contains switch_port_numbers:*** 64 - 79

### Layout 3

This is the description of the layout choices for a 16_16_48 partition of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 32 - 47

***Partition 2 contains switch_port_numbers:*** 0 - 31, 48 - 63

***Partition 3 contains switch_port_numbers:*** 64 - 79

### Layout 4

This is the description of the layout choices for a 16_16_48 partition of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 48 - 63

***Partition 2 contains switch_port_numbers:*** 0 - 47

***Partition 3 contains switch_port_numbers:*** 64 - 79

## Layouts for 16_64 Partition

The following are the layout choices for a 16_64 system partition of an 80 switch port system.

### Layout 1

This is the description of the layout choices for a 16_64 partition of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 64 - 79

***Partition 2 contains switch_port_numbers:*** 0 - 63

### Layout 2

This is the description of the layout choices for a 16_64 partition of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 48 - 63

***Partition 2 contains switch_port_numbers:*** 0 - 47, 64 - 79

### Layout 3

This is the description of the layout choices for a 16_64 partition of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 32 - 47

***Partition 2 contains switch_port_numbers:*** 0 - 31, 48 - 79

### Layout 4

This is the description of the layout choices for a 16_64 partition of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 31

***Partition 2 contains switch_port_numbers:*** 0 - 15, 32 - 79

### Layout 5

This is the description of the layout choices for a 16_64 partition of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15

***Partition 2 contains switch_port_numbers:*** 16 - 79

## Layouts for 80 Partition

This layout is the only layout choice for an 80 system partition of an 80 switch port system.

### Layout 1

This is the description of the layout choices for an 80 system partition configuration of an 80 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 79

---

# 96 Switch Port System

## Layouts for 32_64 Partition

This layout is the only layout choice for a 32_64 system partition of a 96 switch port system.

### Layout 1

This is the description of the layout choices for a 32_64 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 64 - 95

***Partition 2 contains switch_port_numbers:*** 0 - 63

## Layouts for 16_32_48 Partition

The following are the layout choices for a 16_32_48 system partition of a 96 switch port system.

### Layout 1

This is the description of the layout choices for a 16_32_48 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15

***Partition 2 contains switch_port_numbers:*** 16 - 63

***Partition 3 contains switch_port_numbers:*** 64 - 95

### Layout 2

This is the description of the layout choices for a 16_32_48 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 31

***Partition 2 contains switch_port_numbers:*** 0 - 15, 32 - 63

***Partition 3 contains switch_port_numbers:*** 64 - 95

### Layout 3

This is the description of the layout choices for a 16_32_48 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 32 -47

***Partition 2 contains switch_port_numbers:*** 0 - 31, 48 - 63

***Partition 3 contains switch_port_numbers:*** 64 - 95

### Layout 4

This is the description of the layout choices for a 16_32_48 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 48 - 63

***Partition 2 contains switch_port_numbers:*** 0 - 47

***Partition 3 contains switch_port_numbers:*** 64 - 95

## Layouts for 16_80 Partition

The following are the layout choices for a 16_80 system partition of a 96 switch port system.

### Layout 1

This is the description of the layout choices for a 16_80 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15

***Partition 2 contains switch_port_numbers:*** 16 - 95

### Layout 2

This is the description of the layout choices for a 16_80 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 31

***Partition 2 contains switch_port_numbers:*** 0 - 15, 32 - 95

### Layout 3

This is the description of the layout choices for a 16_80 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 32 - 47

***Partition 2 contains switch_port_numbers:*** 0 - 31, 48 - 95

### Layout 4

This is the description of the layout choices for a 16_80 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 48 - 63

***Partition 2 contains switch_port_numbers:*** 0 - 47, 64 - 95

### Layout 5

This is the description of the layout choices for a 16_80 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 64 - 79

***Partition 2 contains switch_port_numbers:*** 0 - 63, 80 - 95

### Layout 6

This is the description of the layout choices for a 16_80 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 80 - 95

***Partition 2 contains switch_port_numbers:*** 0 - 79

## Layouts for 96 Partition

This layout is the only layout choice for a 96 system partition of a 96 switch port system.

### Layout 1

This is the description of the layout choices for a 96 system partition configuration of a 96 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 95

---

# 112 Switch Port System

## Layouts for 48_64 Partition

This layout is the only layout choice for a 48_64 system partition of a 112 switch port system.

### Layout 1

This is the description of the layout choices for breakup is one of the layout choices for a 48_64 partition with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 63

***Partition 2 contains switch_port_numbers:*** 64 - 111

## Layouts for 16_48_48 Partition

The following are the layout choices for a 16_48_48 system partition of a 112 switch port system.

### Layout 1

This is the description of the layout choices for a 16_48_48 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 63

***Partition 2 contains switch_port_numbers:*** 64 - 111

***Partition 3 contains switch_port_numbers:*** 0 - 15

### Layout 2

This is the description of the layout choices for a 16_48_48 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains node slots:*** 0 - 15, 32 - 63

***Partition 2 contains switch_port_numbers:*** 64 - 111

***Partition 3 contains switch_port_numbers:*** 16 - 31

### Layout 3

This is the description of the layout choices for a 16_48_48 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 31, 48 - 63

***Partition 2 contains switch_port_numbers:*** 64 - 111

***Partition 3 contains switch_port_numbers:*** 32 - 47

### Layout 4

This is the description of the layout choices for a 16_48_48 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 47

***Partition 2 contains switch_port_numbers:*** 64 - 111

***Partition 3 contains switch_port_numbers:*** 48 - 63

## Layouts for 16_96 Partition

The following are the layout choices for a 16_96 system partition of a 112 switch port system.

### Layout 1

This is the description of the layout choices for a 16_96 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15

***Partition 2 contains switch_port_numbers:*** 16 - 111

### Layout 2

This is the description of the layout choices for a 16_96 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 31

***Partition 2 contains switch_port_numbers:*** 0 - 15, 32 - 111

### Layout 3

This is the description of the layout choices for a 16_96 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 32 - 47

***Partition 2 contains switch_port_numbers:*** 0 - 31, 48 - 111

### Layout 4

This is the description of the layout choices for a 16_96 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 48 - 63

***Partition 2 contains switch_port_numbers:*** 0 - 47, 64 - 111

### Layout 5

This is the description of the layout choices for a 16_96 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 64 - 79

***Partition 2 contains switch_port_numbers:*** 0 - 63, 80 - 111

### Layout 6

This is the description of the layout choices for a 16_96 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 80 - 95

***Partition 2 contains switch_port_numbers:*** 0 - 79, 96 - 111

### Layout 7

This is the description of the layout choices for a 16_96 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 96 - 111

***Partition 2 contains switch_port_numbers:*** 0 - 95

## Layouts for 112 Partition

This layout is the only layout choice for a 112 system partition of a 112 switch port system.

### Layout 1

This is the description of the layout choices for a 112 system partition configuration of a 112 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 111

---

# 128 Switch Port System

## Layouts for 16_48_64 Partition

The following are the layout choices for a 16_48_64 system partition of a 128 switch port system.

### Layout 1

This is the description of the layout choices for a 16_48_64 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 64 - 127

***Partition 2 contains switch_port_numbers:*** 16 - 63

***Partition 3 contains switch_port_numbers:*** 0 - 15

### Layout 2

This is the description of the layout choices for a 16_48_64 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 64 - 127

***Partition 2 contains switch_port_numbers:*** 0 - 15, 32 - 63

***Partition 3 contains switch_port_numbers:*** 16 - 31

### Layout 3

This is the description of the layout choices for a 16_48_64 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 64 - 127

***Partition 2 contains switch_port_numbers:*** 0 - 31, 48 - 63

***Partition 3 contains switch_port_numbers:*** 32 - 47

### Layout 4

This is the description of the layout choices for a 16_48_64 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 64 - 127

***Partition 2 contains switch_port_numbers:*** 0 - 47

***Partition 3 contains switch_port_numbers:*** 48 - 63

### Layout 5

This is the description of the layout choices for a 16_48_64 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 63

***Partition 2 contains switch_port_numbers:*** 80 - 127

***Partition 3 contains switch_port_numbers:*** 64 - 79

### Layout 6

This is the description of the layout choices for a 16_48_64 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 63

***Partition 2 contains switch_port_numbers:*** 64 - 79, 96 - 127

***Partition 3 contains switch_port_numbers:*** 80 - 95

### Layout 7

This is the description of the layout choices for a 16_48_64 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 63

***Partition 2 contains switch_port_numbers:*** 64 - 95, 112 - 127

***Partition 3 contains switch_port_numbers:*** 96 - 111

### Layout 8

This is the description of the layout choices for a 16_48_64 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 63

***Partition 2 contains switch_port_numbers:*** 64 - 111

***Partition 3 contains switch_port_numbers:*** 112 - 127

## Layouts for 16_112 Partition

The following are the layout choices for a 16_112 system partition of a 128 switch port system.

### Layout 1

This is the description of the layout choices for a 16_112 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 16 - 127

***Partition 2 contains switch_port_numbers:*** 0 - 15

### Layout 2

This is the description of the layout choices for a 16_112 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 15, 32 - 127

***Partition 2 contains switch_port_numbers:*** 16 - 31

### Layout 3

This is the description of the layout choices for a 16_112 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 31, 48 - 127

***Partition 2 contains switch_port_numbers:*** 32 - 47

### Layout 4

This is the description of the layout choices for a 16_112 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 47, 64 - 127

***Partition 2 contains switch_port_numbers:*** 48 - 63

### Layout 5

This is the description of the layout choices for a 16_112 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 63, 80 - 127

***Partition 2 contains switch_port_numbers:*** 64 - 79

### Layout 6

This is the description of the layout choices for a 16_112 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 79, 96 - 127

***Partition 2 contains switch_port_numbers:*** 80 - 95

### Layout 7

This is the description of the layout choices for a 16_112 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 95, 112 - 127

***Partition 2 contains switch_port_numbers:*** 96 - 111

### Layout 8

This is the description of the layout choices for a 16_112 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 111

***Partition 2 contains switch_port_numbers:*** 112 - 127

## Layouts for 64_64 Partition

This layout is the only layout choice for a 64_64 system partition of an 128 switch port system.

### Layout 1

This is the description of the layout choices for a 64_64 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 63

***Partition 2 contains switch_port_numbers:*** 64 - 127

## Layouts for 128 Partition

This layout is the only layout choice for a 128 system partition of a 128 switch port system.

### Layout 1

This is the description of the layout choices for a 128 system partition configuration of a 128 switch port system with 4 intermediate switch boards.

***Partition 1 contains switch_port_numbers:*** 0 - 127

# Appendix C. SP System Planning Worksheets

This chapter contains the following SP system planning worksheets:

*Table 35. List of SP Planning Worksheets*

| Number | Name | Page |
|---|---|---|
| 1 | SP Preliminary Application List | 216 |
| 2 | IBM Program Products to Order | 217 |
| 3 | External Disk Storage Needs | 218 |
| 4 | SP Planning | 219 |
| 5, 6 | SP Network Diagrams (several copies) | 220 |
| 7 | SP Hardware Configuration by Node | 223 |
| 8 | SP Node Network Configuration | 223 |
| 9 | SP High Performance Switch Configuration | 41 |
| 10 | Adapters Supported on AIX 3.2.5 and AIX 4.1.3 | 226 |
| 10a | 604 High Node Adapters | 228 |
| 11 | SP System Image Worksheet (SPIMG) | 229 |
| 12a | SP Component Lists For System Images | 230 |
| 12b | SP Component Lists For AIX 4.1 Components | 234 |
| 13 | Components List for PSSP 1.2 and 2.1 | 304 |
| 14a | SP Control Workstation System Image | 306 |
| 14b | Select a Time Zone | 307 |
| 15 | SP Control Workstation Network | 308 |
| 16 | SP Site Environment | 309 |
| 17 | SP Authentication Worksheets | 310 |

Make photocopies of these worksheets as required. Instructions for using the worksheets are contained in Chapter 2, “Defining the System that Fits Your Needs” on page 9, in Chapter 3, “Defining the Configuration that Fits Your Needs” on page 59, and in Chapter 6, “Planning for Security” on page 119.

© Copyright IBM Corp. 1996

*Table 36. Preliminary List of Applications*

## Worksheet 1
## SP Preliminary List of Applications

| Application | Parallel √ | Need Switch √ |
|---|---|---|
| | √ n ? | √ n ? |
| | √ n ? | √ n ? |
| | √ n ? | √ n ? |
| | √ n ? | √ n ? |
| | √ n ? | √ n ? |
| | √ n ? | √ n ? |
| | √ n ? | √ n ? |
| | √ n ? | √ n ? |

**Note:**

√ means that you want this application.

n means that you do not want this application.

? means that you do not know if you want this application.

*Table 37. IBM Program Products To Order*

## Worksheet 2

## IBM Program Products

| Order | Program Product | Program Number | Level |
|---|---|---|---|
| | IBM C for AIX | 5675-423 | 3 |
| | IBM Parallel System Support Programs for AIX (PSSP) | 5765-296 | 1.2 |
| | IBM Parallel System Support Programs for AIX (PSSP) | 5765-529 | 2.2 |
| | IBM LoadLeveler | 5765-145 | 1.2.1 |
| | IBM LoadLeveler | 5765-145 | 1.3 |
| | IBM Client Input Output/Sockets (CLIO/S) | 5648-129 | 2.2 |
| | IBM Parallel Environment for AIX | 5765-543 | 2.2 |
| | IBM Parallel Optimization Subroutine Library | 5765-392 | 1.3.0 |
| | IBM Parallel Engineering and Scientific Subroutine Library | 5765-422 | 1.1 |
| | IBM Parallel I/O File System for AIX | 5765-297 | 1.2 |
| | IBM PVMe for AIX | 5765-544 | 2.2 |
| | IBM Recoverable Virtual Shared Disk | 5765-444 | 1.1.1 |
| | x3270 | 5765-011 | 1.2.2 |
| | NetTape | 5765-637 | 1.1 |
| | Tape Library Connection | 5765-643 | 1.1 |
| | | | |
| | | | |

**Note:** Add other AIX program products that you expect to use such as the C Set ++ for AIX or other compilers.

*Table 38. External Disk Storage Needs*

| Worksheet 3 | | |
|---|---|---|
| **Check the external disk subsystems you require** | | |
| **How Many** | **External Disk Subsystem** | **Disk Space (MB)** |
| | 7133 (4.5 to 72GB) | |
| | 7134 (4.5 to 72GB) | |
| | 7135 (4.5 to 135GB) | |
| | 7137 (4 to 33GB) | |

*Table 39. Overall System Information Worksheet*

# SP Planning - Worksheet 4

**Customer Name** _____ **Date** _____

**Customer Number**_____

**Customer Contact** _____ Phone _____

**IBM Contact** _____ **Phone** _____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **SP Model** | ___ 202 | ___ 302 | ___ 402 | ___ 2A2 | ___ 3A2 | ___ 3B2 | ___ 203 |
| | ___ 303 | ___ 403 | ___ 2A3 | ___ 3A3 | ___ 3B3 | ___ 204 | ___ 304 |
| | ___ 404 | ___ 2A4 | ___ 3A4 | ___ 3B4 | ___ 205 | ___ 305 | ___ 405 |
| | ___ 2A5 | ___ 3A5 | ___ 3B5 | ___ 206 | ___ 306 | ___ 406 | |

| Number of Frames | Number of Switches | Number of Thin Nodes (F/C 2002) | Number of Wide Nodes (F/C 2003) | Number of Thin Node 2s (F/C 2004) | Number of Wide Nodes (F/C 2005) | Number of 604 High Nodes |
|---|---|---|---|---|---|---|
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |

| | | | | | |
|---|---|---|---|---|---|
| External Disk Storage | 7133 _____ | 7134 _____ | 7135 _____ | 7137 _____ | _____ |

Fill in the remainder of this chart after you place your order.

RS/6000 SP System Number _____

RS/6000 SP Purchase Order Number _____

Control Workstation System Number _____

Control Workstation Purchase Order Number _____

Peripheral Order Numbers _____

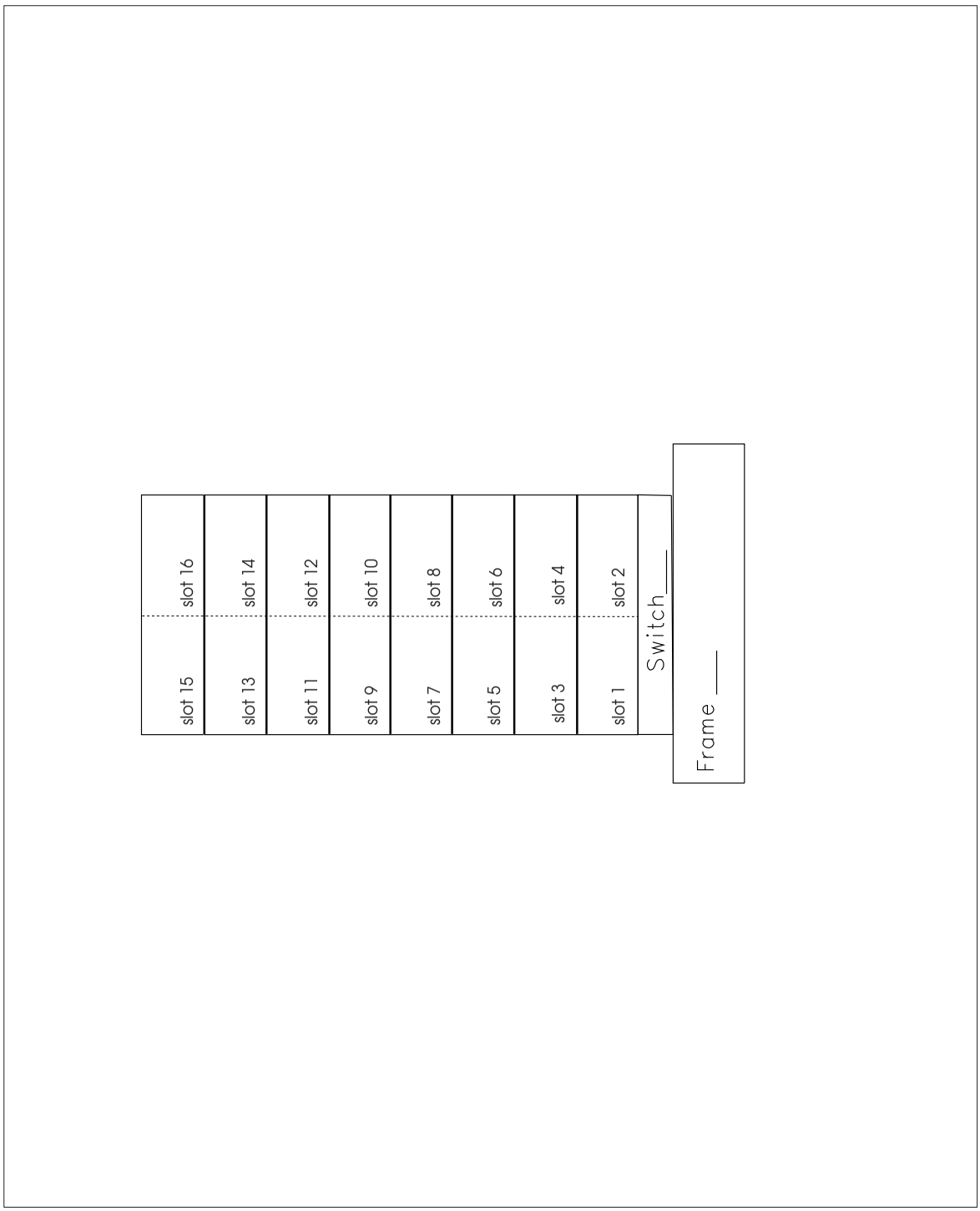



*Figure 54. SP Node Layout Worksheet For One Frame.*

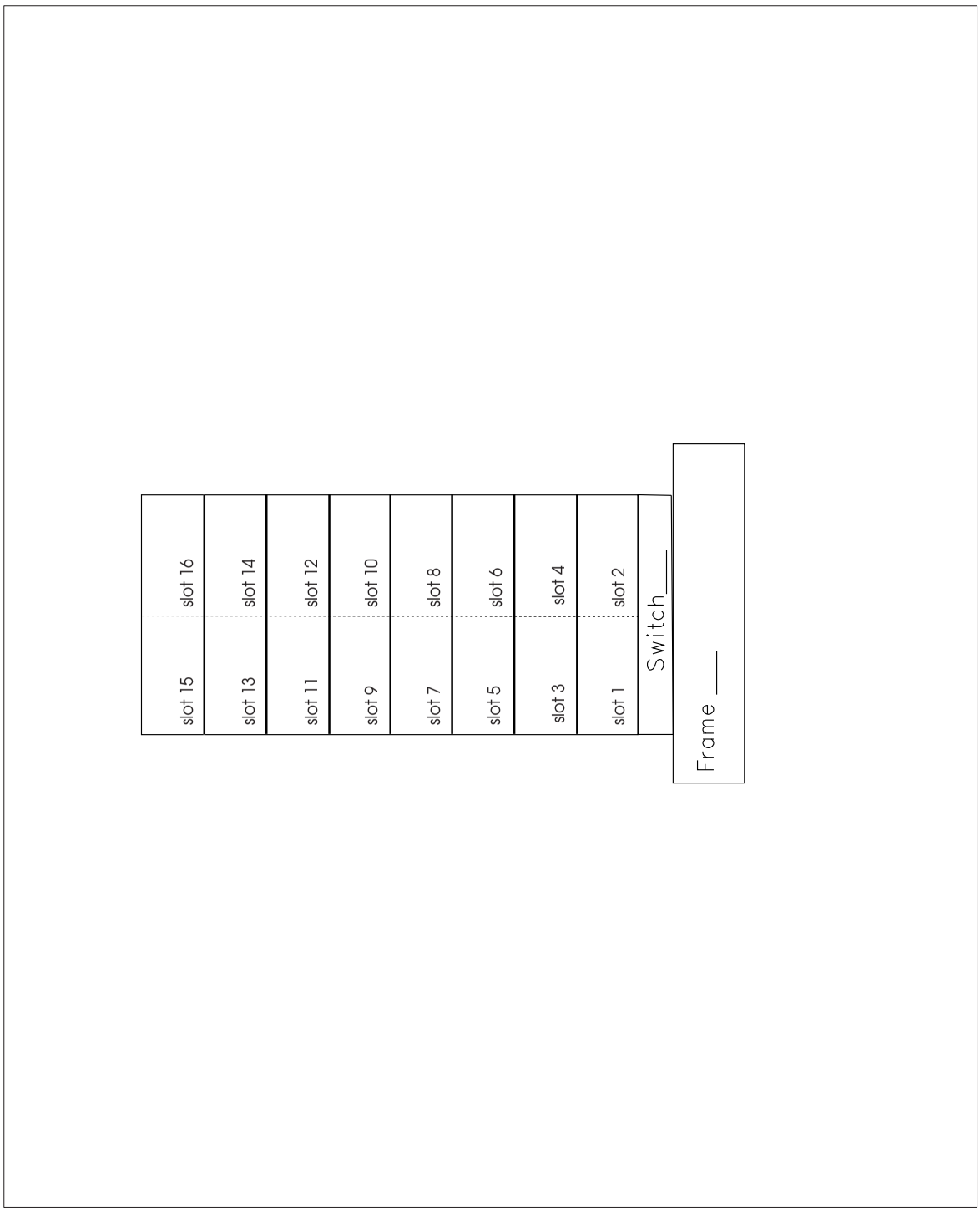



*Figure 55. Extra SP Node Layout Worksheet For One Frame*

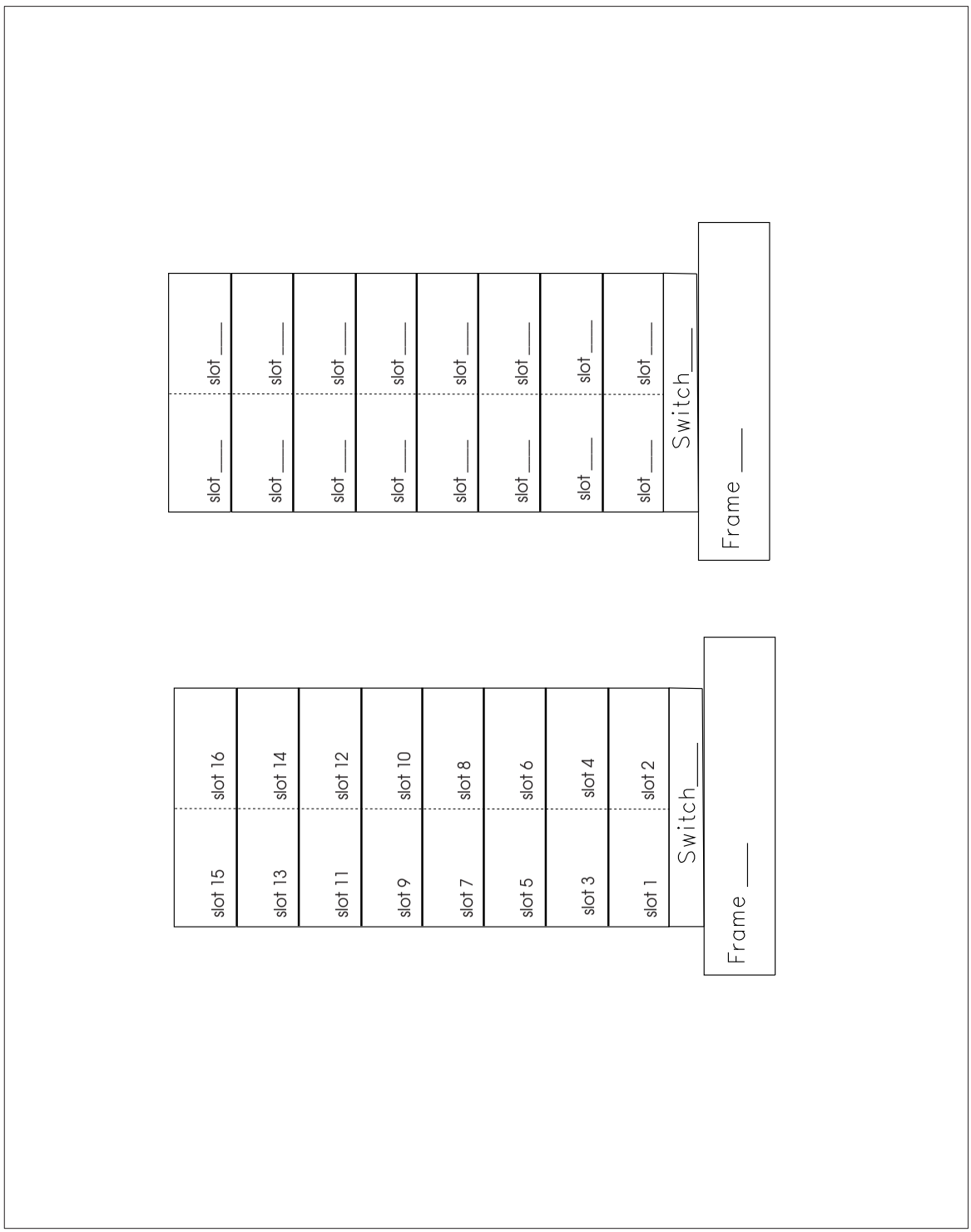



*Figure 56. Node Layout Worksheet For Two Frames*

*Table 40. Hardware Configuration By Node*

## SP Hardware Configuration by Node - Worksheet 7

**Frame Number _____ Switch Number _____**

| Slot Number | Node Number | Node Type | Processor Memory | Internal Disk | L2 Cache | Adapters |
|---|---|---|---|---|---|---|
| Slot 1 | | | | | | |
| Slot 2 | | | | | | |
| Slot 3 | | | | | | |
| Slot 4 | | | | | | |
| Slot 5 | | | | | | |
| Slot 6 | | | | | | |
| Slot 7 | | | | | | |
| Slot 8 | | | | | | |
| Slot 9 | | | | | | |
| Slot 10 | | | | | | |
| Slot 11 | | | | | | |
| Slot 12 | | | | | | |
| Slot 13 | | | | | | |
| Slot 14 | | | | | | |
| Slot 15 | | | | | | |
| Slot 16 | | | | | | |

*Table 41. Node Network Configuration Worksheet*

# SP Node Network Configuration - Worksheet 8

**Company Name**_____ **Date** _____ **Frame Number** ____ **Token Ring Speed** _____

| | **SP Ethernet Netmask** _____ *(en0 adapters)* | | **Default Route** | **Additional Adapter Netmask** _____ | | |
|---|---|---|---|---|---|---|
| | **Hostname** [2] | **IP Address** | | **Adapter Name** | **Hostname** | **IP Address** |
| slot 1 | | | | | | |
| slot 2 | | | | | | |
| slot 3 | | | | | | |
| slot 4 | | | | | | |
| slot 5 | | | | | | |
| slot 6 | | | | | | |
| slot 7 | | | | | | |
| slot 8 | | | | | | |
| slot 9 | | | | | | |
| slot 10 | | | | | | |
| slot 11 | | | | | | |
| slot 12 | | | | | | |
| slot 13 | | | | | | |
| slot 14 | | | | | | |
| slot 15 | | | | | | |
| slot 16 | | | | | | |

**1.** Wide nodes occupy two frame slots and use the *odd-numbered* slot number.

604 high nodes occupy four frame slots.

**2.** AIX is case sensitive. Use lower case for the hostname and addresses.

*Table 42. High Performance Switch Configuration Worksheet*

## High Performance Switch Configuration - Worksheet 9

**Frame Number ____ Switch Number ____ Netmask _____**

| Slot Number | Switch Node Number | Hostname | IP Address |
|---|---|---|---|
| Slot 1 | | | |
| Slot 2 | | | |
| Slot 3 | | | |
| Slot 4 | | | |
| Slot 5 | | | |
| Slot 6 | | | |
| Slot 7 | | | |
| Slot 8 | | | |
| Slot 9 | | | |
| Slot 10 | | | |
| Slot 11 | | | |
| Slot 12 | | | |
| Slot 13 | | | |
| Slot 14 | | | |
| Slot 15 | | | |
| Slot 16 | | | |

*Table 43 (Page 1 of 2). Adapters Supported*

## Adapters Supported - Worksheet 10

| √ | Adapter | Feature code | Wide node[1] | Thin node[2] | Number of slots Required | AIX support level |
|---|---|---|---|---|---|---|
| | Internal Ethernet | Standard | | x | 0 | 4.1.4 |
| | FCS Dwtr | 1902 [6][7] | x | x | 1 | 4.1.4 |
| | FCS 1GB | 1904 [7] | x | x | 1 | 4.1.4 |
| | FCS 266MB | 1906 | x | x | 1 | 3.2.5 |
| | SCSI-2 Ext I/O | 2410 | x | x | 1 | 4.1 |
| | SCSI Turbo | 2412 | x | x | 1 | 4.1 |
| | SCSI F/W DIF | 2415 | x | x | 1 | 4.1 |
| | SCSI F/W DIF | 2416 | x | x | 1 | 4.1 |
| | SCSI EXT I/O | 2420 | x | x | 1 | 4.1 |
| | FDDI D/R | 2723 [3] | x | x | 1 | 4.1 |
| | FDDI S/R | 2724 | x | x | 1 | 4.1 |
| | HIPPI | 2735 | x | | 5[4] | 4.1 |
| | ESCON Chan Em. | 2754 | x | x | 2 | 3.2.5 |
| | BMCA | 2755 | x | x | 1 | 4.1 |
| | ESCON CNTRL | 2756 | x | x | 2 | 4.1 |
| | Token Ring | 2970 | x | x | 1 | 4.1 |
| | Token Ring | 2972 | x | x | 1 | 4.1 |
| | Ethernet | 2980 | x | x | 1 | 4.1 |
| | Ether BNC | 2994 | x | x | 1 | 4.1 |
| | ATM 100 | 2984 | x | x | 1 | 4.1 |
| | ATM 155 | 2989 [7] | x | x | 1 | 4.1 |
| | HI-P Subsys | 6212 | x | x | 1 | 4.1 |
| | HPS-TB2 | 4018 | x | x | 1 | 4.1 |
| | SPSw-TB3 | 4020 | x | x | 1 | 4.1 |
| | SSA | 6214 | x | x | 1 | 4.1 |
| | SSA | S6216 [7] | x | x | 1 | 4.1 |
| | SSA 4RD | 6217 | x | x | 1 | 4.1 |

*Table 43 (Page 2 of 2). Adapters Supported*

| | | | | | | |
|---|---|---|---|---|---|---|
| | 8-port async | 2930 [8] | x | x | 1 | 4.1 |

**Note:**

[1]: There are a total of 7 MCA slots available per wide node.

[2]: There are a total of 4 MCS slots available per thin node.

[3]: FDDI D/R adapters (F/C 2723) have a mandatory prerequisite of FDDI S/R adapters (F/C 2724)

[4]: The HIPPI feature uses 3 physical MCA slots and requires a total of 5 MCA slots to satisfy power and thermal requirements.

[6]: FCS Daughter card F/C 1902 does not require a micro channel slot.

[7]: These adapters are not supported on any 62MHz node, 201, 301, 2001, 1001.

[8]: This adapter has a co-requisite of 2995 feature cable.

**Note:** You cannot have a combination of High Performance Switch and SP Switch adapters.

*Table 44. 604 High Node Adapters Supported*

## High Node Adapters Supported - Worksheet 10a

| √ | Adapter | Feature code | Quantity Per High Node |
|---|---|---|---|
| | Ethernet | F/C 2980 | 1-12 |
| | SCSI F/W Dif | F/C 2416 | 0-14 |
| | SCSI Turbo | F/C 2412 | 0-14 |
| | SCSI-2 F/W | F/C 2415 | 1-14 |
| | BMCA | F/C 2755 | 0-2 |
| | ESCON CU | F/C 2756 | 0-4 |
| | ESCON CE | F/C 2754 | 0-4 |
| | HIPPI | F/C 2735 | 0-2 |
| | FDDI S/R | F/C 2724 | 0-8 |
| | FDDI D/R | F/C 2723 | 0-8 |
| | FCS Dutr | F/C 1902 | 0-14 |
| | FCS 1GB | F/C 1904 | 0-4 |
| | SSA 2way | F/C 6214 | 0-8 |
| | SSA 8way | F/C 6216 | 0-8 |
| | SSA 4p Raid | F/C 6217 | 0-8 |
| | Token Ring | F/C 2970 | 0-8 |
| | Auto Token Ring | F/C 2972 | 0-8 |
| | 8-port Async | F/C 2930 | 0-14 |
| | ATM | F/C 2984 | 0-2 |
| | ATM 155 | F/C 2989 | 0-2 |
| | Hi-P Subsys | F/C 6212 | 0-8 |
| | 4 prt BusMstr | F/C 2700 | 0-8 |
| | 128 async | F/C 8128 | 0-7 |
| | RS422 | F/C 2940 | 0-15 |
| | X.25 | F/C 2960 | 0-8 |
| | Dig Trunc | F/C 6305 | 0-2 |
| | Portmastr | F/C 7006 | 0-8 |
| | Dig Trunk | F/C 6300 | 0-2 |
| | HPS Adpt-2 | F/C 4018 | 1-1 |
| | HPS Adpt-3 | F/C 4020 | 1-1 |

*Table 45. Specifying the System Images (SPIMG)*

## Specifying System Images - Worksheet 11

| |
|---|
| **System Image Name** |
| **AIX Level** |
| **Partition Number** |
| **Install on Node Numbers** |
| **Specify** *internal* **disks where you wish to install rootvg** |
| **Check here if you want only the SPIMG minimal image ____** |
| **IBM Licensed Products** |
| AIX |
| PSSP |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| **Additional AIX Components** |
| |
| |
| |
| **Other Applications** |
| |
| |
| |
| |
| |
| |
| |
| |

*Table 46 (Page 1 of 4). AIX 3.2.5 Components - System Image*

## SP Components List for AIX 3.2.5 - Worksheet 12a

| Select.[1] | AIX 3.2.5 Part Name | Description |
|---|---|---|
| default | blkmux.obj | Block Multiplexer Channel Adapter Software Support |
| default | fddi.obj | FDDI Software Support |
| default | xlccmp.obj | AIX XL C Compiler |
| default | txtfmt.tfs.obj | Text Formatting Services |
| default | txtfmt.spell.obj | Writer's Tools |
| default | txtfmt.bib.obj | Bibliography Support |
| default | txtfmt.xpv.obj | Troff Xpreviewer |
| default | txtfmt.ts.obj | TranScript Tools |
| default | txtfmt.graf.obj | Base Graphic Commands |
| default | txtfmt.hplj.fnt | Printer Font Support |
| default | txtfmt.ibm3812.fnt | Printer Font Support |
| default | txtfmt.ibm3816.fnt | Printer Font Support |
| default | txtfmt.tfs.data | Text Formatting Services |
| default | txtfmt.spell.data | Writer's Tools |
| default | txtfmt.bib.data | Bibliography Support |
| default | bosnet.tcpip.obj | TCPIP Applications |
| default | bosnet.ncs.obj | Network Computing System |
| default | bosnet.nfs.obj | Network File System/NIS/RPC Libs & Utils |
| default | bosnet.snmpd.obj | Simple Network Management Protocol Daemon (Agent) |
| default | bosext2.dlcfddi.obj | FDDI Data Link Control |
| default | bosext2.acct.obj | Accounting |
| default | bosext2.dlc8023.obj | IEEE Ethernet (802.3) Data Link Control |
| default | bosext2.dlcether.obj | Standard Ethernet Data Link Control |
| default | bosext2.dlctoken.obj | Token-Ring Data Link Control |
| default | bosext1.extcmds.data | Extended Commands |
| default | bosext1.csh.obj | C Shell |
| default | bosext1.extcmds.obj | Extended Commands |
| default | bosext1.mh.obj | Mail Handler |
| default | bosext1.uucp.obj | Unix to Unix Copy Program |
| default | bosext1.ecs.obj | Remote Customer Services |
| default | bosext1.vdidd.obj | CGI Device Drivers |
| default | bosadt.bosadt.data | Base Application Development Toolkit |
| default | bosadt.bosadt.obj | Base Application Development Toolkit |
| default | bosadt.prof.obj | Base Profiling Support |

| *Table 46 (Page 2 of 4). AIX 3.2.5 Components - System Image* | | |
|---|---|---|
| default | bosadt.lib.obj | Base Development Libraries & Include Files |
| default | bos.data | Base Operating System |
| default | bsmEn_US.msg | Base System Messages - U.S. English |
| default | bsl.en_US.aix.loc | AIX Locale - English (United States) |
| default | bsl.en_US.pc.loc | PC Locale - English (United States) |
| default | pci.obj | AIX DOS Server for use with AIX Access for DOS Users |
| default | bosext2.lrn.data | Learning Basic Operating System Information |
| default | bosext2.ate.obj | Asynchronous Terminal Emulator |
| default | bosext2.dlcqllc.obj | X.25 QLLC Data Link Control |
| default | bosext2.dlcsdlc.obj | SDLC Data Link Control |
| default | bosext2.dosutil.obj | DOS Utilities |
| default | bosext2.games.obj | Games |
| default | bosext2.x25app.obj | X.25 Applications, API, Sample Source |
| default | bosadt.xde.obj | AIXwindows Development Environment |
| default | INed.obj | INed Editor |
| default | bsl.aix31.imk.loc | AIX3.1 Input keymaps |
| cws | X11fnt.iso88591.aix.fnt | AIXwindows Latin 1 (ISO8859-1) Fonts |
| cws | X11fnt.ibm850.pc.fnt | AIXwindows Latin 1 (IBM-850) Fonts |
| cws | X11fnt.coreX.fnt | AIXwindows Core X11 Fonts |
| cws | X11fnt.oldX.fnt | AIXwindows Miscellaneous X Fonts |
| cws | X11mEn_US.msg | AIXWindows NL Message files |
| cws | X11dev.motif1.2.obj | AIXwindows Motif 1.2 Developer Support |
| cws | X11dev.motif1.2.src | AIXwindows Motif 1.2 Sample Programs |
| cws | X11dev.im | AIXwindows Development Sample Input Method Servers |
| cws | X11dev.obj | AIXwindows Development Libraries & Include Files |
| cws | X11dev.src | AIXwindows Development Sample Programs Version |
| cws | X11rte.motif1.2.obj | AIXwindows Motif 1.2 Run Time Support |
| cws | X11rte.obj | AIXwindows Run Time Environment |
| cws | X11rte.ext.obj | AIXwindows Run Time Environment Extensions |
| | bspiEn_US.info | Base System Programming Information - US English |
| | bssiEn_US.info | Base System Standard Information - US English |
| | X11fnt.iso88592.fnt | AIXwindows Latin 2 (ISO8859-2) Fonts |
| | X11fnt.iso88593.fnt | AIXwindows Latin 3 (ISO8859-3) Fonts |
| | X11fnt.iso88594.fnt | AIXwindows Latin 4 (ISO8859-4) Fonts |
| | X11fnt.iso88595.fnt | AIXwindows Cyrillic (ISO8859-5) Fonts |

| Table 46 (Page 3 of 4). AIX 3.2.5 Components - System Image | | |
|---|---|---|
| | X11fnt.iso88597.aix.fnt | AIXwindows Greek (ISO8859-7) Fonts |
| | X11fnt.iso88599.aix.fnt | AIXwindows Turkish (ISO8859-9) Fonts |
| | X11fnt.kanji.aix.fnt | AIXwindows Kanji Fonts |
| | X11deviEn_US.info | User Interface Programming Information - US English |
| | X11mzh_TW.msg | AIXwindows NL Message files |
| | X11mko_KR.msg | AIXwindows NL Message files |
| | X11mSv_SE.msg | AIXwindows NL Message files |
| | X11mEs_ES.msg | AIXwindows NL Message files |
| | X11mNo_NO.msg | AIXwindows NL Message files |
| | X11mJa_JP.msg | AIXwindows NL Message files |
| | X11mIt_IT.msg | AIXwindows NL Message files |
| | X11mDe_DE.msg | AIXwindows NL Message files |
| | X11mFr_FR.msg | AIXwindows NL Message files |
| | X11mNl_BE.msg | AIXwindows NL Message files |
| | infoxl.obj | Extended License Info Package |
| | des.obj | Data Encryption Standards Library (US) |
| | hanfs.obj | Highly Available Network File System |
| | bosrcs.obj | Remote Customer Support and Services |
| | bsmzh_TW.msg | Base System Messages - Traditional Chinese |
| | bsmko_KR.msg | Base System Messages - Korean |
| | bsmSv_SE.msg | Base System Messages - Swedish |
| | bsmEs_ES.msg | Base System Messages - Spanish |
| | bsmNo_NO.msg | Base System Messages - Norwegian |
| | bsmJa_JP.msg | Base System Messages - Japanese |
| | bsmIt_IT.msg | Base System Messages - Italian |
| | bsmDe_DE.msg | Base System Messages - German |
| | bsmFr_FR.msg | Base System Messages - French |
| | bsmNl_BE.msg | Base System Messages - Dutch (Belgium) |
| | bsl.ko_KR.aix.loc | AIX Locale - Korean |
| | bsl.zh_TW.aix.loc | AIX Locale - Traditional Chinese |
| | bsl.da_DK.aix.loc | AIX Locale - Danish |
| | bsl.da_DK.pc.loc | PC Locale - Danish |
| | bsl.de_CH.aix.loc | AIX Locale - German (Switzerland) |
| | bsl.de_CH.pc.loc | PC Locale - German (Switzerland) |
| | bsl.de_DE.aix.loc | AIX Locale - German |
| | bsl.de_DE.pc.loc | PC Locale - German |
| | bsl.el_GR.aix.loc | AIX Locale - Greek |
| | bsl.en_GB.aix.loc | AIX Locale - English (Great Britain) |
| | bsl.en_GB.pc.loc | PC Locale - English (Great Britain) |

| Table 46 (Page 4 of 4). AIX 3.2.5 Components - System Image | | |
|---|---|---|
| | bsl.es_ES.aix.loc | AIX Locale - Spanish |
| | bsl.es_ES.pc.loc | PC Locale - Spanish |
| | bsl.fi_FI.aix.loc | AIX Locale - Finnish |
| | bsl.fi_FI.pc.loc | PC Locale - Finnish |
| | bsl.fr_BE.aix.loc | AIX Locale - French (Belgium) |
| | bsl.fr_BE.pc.loc | PC Locale - French (Belgium) |
| | bsl.fr_CA.aix.loc | AIX Locale - French (Canada) |
| | bsl.fr_CA.pc.loc | PC Locale - French (Canada) |
| | bsl.fr_CH.aix.loc | AIX Locale - French (Switzerland) |
| | bsl.fr_CH.pc.loc | PC Locale - French (Switzerland) |
| | bsl.fr_FR.aix.loc | AIX Locale - French |
| | bsl.fr_FR.pc.loc | PC Locale - French |
| | bsl.is_IS.aix.loc | AIX Locale - Icelandic |
| | bsl.is_IS.pc.loc | PC Locale - Icelandic |
| | bsl.it_IT.aix.loc | AIX Locale - Italian |
| | bsl.it_IT.pc.loc | PC Locale - Italian |
| | bsl.ja_JP.com.loc | Japanese Character Support |
| | bsl.ja_JP.aix.loc | AIX Locale - Japanese |
| | bsl.ja_JP.pc.loc | PC Locale - Japanese |
| | bsl.nl_BE.aix.loc | AIX Locale - Dutch (Belgium) |
| | bsl.nl_BE.pc.loc | PC Locale - Dutch (Belgium) |
| | bsl.nl_NL.aix.loc | AIX Locale - Dutch |
| | bsl.nl_NL.pc.loc | PC Locale - Dutch |
| | bsl.no_NO.aix.loc | AIX Locale - Norwegian |
| | bsl.no_NO.pc.loc | PC Locale - Norwegian |
| | bsl.pt_PT.aix.loc | AIX Locale - Portuguese |
| | bsl.pt_PT.pc.loc | PC Locale - Portuguese |
| | bsl.sv_SE.aix.loc | AIX Locale - Swedish |
| | bsl.sv_SE.pc.loc | PC Locale - Swedish |
| | bsl.tr_TR.aix.loc | AIX Locale - Turkish |
| | bsl.lat-1.fnt.loc | -1 HFT Latin-1 Font Library |
| | bsl.greek.fnt.loc | HFT Greek Font Library |
| | bsl.turki.fnt.loc | HFT Turkish Font Library |

**Note:** [1]Use the first column as follows:
blank - Check off (√) if you want this component
default - Included on all nodes and the control workstation
cws - Included by default *only* on the control workstation.

*Table 47 (Page 1 of 12). AIX 4.1 Components Compact List*

# SP Compact Components List for AIX 4.1 - Worksheet 12b

| Select | AIX 4.1 Part Name |
|---|---|
| **Note:** Refer to "Filesets Included in Packages" on page 245 for detailed list and descriptions of AIX 4.1 component list. | |
| | OpenGL.GL32.adt |
| | OpenGL.GL32.dev |
| | OpenGL.GL32.rte |
| | OpenGL.OpenGL_X.adt |
| | OpenGL.OpenGL_X.dev |
| | OpenGL.OpenGL_X.rte |
| | OpenGL.OpenGL_X.tools |
| | OpenGL.info.en_US |
| | OpenGL.msg.De_DE |
| | OpenGL.msg.En_US |
| | OpenGL.msg.Es_ES |
| | OpenGL.msg.Fr_FR |
| | OpenGL.msg.It_IT |
| | OpenGL.msg.Ja_JP |
| | OpenGL.msg.Nl_BE |
| | OpenGL.msg.No_NO |
| | OpenGL.msg.Sv_SE |
| | OpenGL.msg.de_DE |
| | OpenGL.msg.en_US |
| | OpenGL.msg.es_ES |
| | OpenGL.msg.fr_FR |
| | OpenGL.msg.it_IT |
| | OpenGL.msg.ja_JP |
| | OpenGL.msg.ko_KR |
| | OpenGL.msg.nl_BE |
| | OpenGL.msg.no_NO |
| | OpenGL.msg.sv_SE |
| | OpenGL.msg.zh_TW |
| | PEX_PHIGS.PEX.adt |
| | PEX_PHIGS.PEX.rte |
| | PEX_PHIGS.dev |
| | PEX_PHIGS.graPHIGS.adt |
| | PEX_PHIGS.graPHIGS.fnt |
| | PEX_PHIGS.graPHIGS.rte |
| | PEX_PHIGS.info.en_US |
| | PEX_PHIGS.msg.De_DE |
| | PEX_PHIGS.msg.En_US |
| | PEX_PHIGS.msg.Es_ES |

| *Table 47 (Page 2 of 12). AIX 4.1 Components Compact List* | |
|---|---|
| | PEX_PHIGS.msg.Fr_FR |
| | PEX_PHIGS.msg.It_IT |
| | PEX_PHIGS.msg.Ja_JP |
| | PEX_PHIGS.msg.Nl_BE |
| | PEX_PHIGS.msg.No_NO |
| | PEX_PHIGS.msg.Sv_SE |
| | PEX_PHIGS.msg.de_DE |
| | PEX_PHIGS.msg.en_US |
| | PEX_PHIGS.msg.es_ES |
| | PEX_PHIGS.msg.fr_FR |
| | PEX_PHIGS.msg.it_IT |
| | PEX_PHIGS.msg.ja_JP |
| | PEX_PHIGS.msg.ko_KR |
| | PEX_PHIGS.msg.nl_BE |
| | PEX_PHIGS.msg.no_NO |
| | PEX_PHIGS.msg.sv_SE |
| | PEX_PHIGS.msg.zh_TW |
| | PEX_PHIGS.rte |
| | Soft5080 |
| | Soft5080.fnt |
| | Soft5080.msg.Ja_JP |
| | Soft5080.msg.en_US |
| | SoftWindows |
| | UMS |
| | UMS.info.en_US |
| | UMS.loc |
| | UMS.msg.De_DE |
| | UMS.msg.En_US |
| | UMS.msg.Es_ES |
| | UMS.msg.Fr_FR |
| | UMS.msg.It_IT |
| | UMS.msg.Ja_JP |
| | UMS.msg.Nl_BE |
| | UMS.msg.No_NO |
| | UMS.msg.Sv_SE |
| | UMS.msg.de_DE |
| | UMS.msg.en_US |
| | UMS.msg.es_ES |
| | UMS.msg.fr_FR |
| | UMS.msg.it_IT |
| | UMS.msg.ja_JP |
| | UMS.msg.ko_KR |
| | UMS.msg.nl_BE |
| | UMS.msg.no_NO |

| *Table 47 (Page 3 of 12). AIX 4.1 Components Compact List* | |
|---|---|
| | UMS.msg.sv_SE |
| | UMS.msg.zh_TW |
| | Wabi |
| | Wabi.info.en_US |
| | X11.Dt |
| | X11.adt |
| | X11.apps |
| | X11.base |
| | X11.compat |
| | X11.fnt |
| | X11.info |
| | X11.info.en_US |
| | X11.loc |
| | X11.man.en_US |
| | X11.motif |
| | X11.msg.De_DE |
| | X11.msg.En_US |
| | X11.msg.Es_ES |
| | X11.msg.Fr_FR |
| | X11.msg.It_IT |
| | X11.msg.Ja_JP |
| | X11.msg.Nl_BE |
| | X11.msg.No_NO |
| | X11.msg.Sv_SE |
| | X11.msg.de_DE |
| | X11.msg.en_US |
| | X11.msg.es_ES |
| | X11.msg.fr_FR |
| | X11.msg.it_IT |
| | X11.msg.ja_JP |
| | X11.msg.ko_KR |
| | X11.msg.nl_BE |
| | X11.msg.no_NO |
| | X11.msg.sv_SE |
| | X11.msg.zh_TW |
| | X11.samples |
| | X11.vsm |
| | X11.x_st_mgr |
| | afs |
| | blkmux |
| | bos |
| | bos.INed |
| | bos.acct |
| | bos.adt |

| *Table 47 (Page 4 of 12). AIX 4.1 Components Compact List* | |
|---|---|
| | bos.compat |
| | bos.data |
| | bos.diag |
| | bos.dlc |
| | bos.dosutil |
| | bos.games |
| | bos.iconv |
| | bos.ifor_ls |
| | bos.info.en_US |
| | bos.info.rte |
| | bos.loc.adt |
| | bos.loc.com |
| | bos.loc.fnt |
| | bos.loc.iso |
| | bos.loc.pc |
| | bos.loc.pc_compat |
| | bos.loc.utf |
| | bos.lrn |
| | bos.mh |
| | bos.msg.De_DE |
| | bos.msg.En_US |
| | bos.msg.Es_ES |
| | bos.msg.Fr_FR |
| | bos.msg.It_IT |
| | bos.msg.Ja_JP |
| | bos.msg.Nl_BE |
| | bos.msg.No_NO |
| | bos.msg.Sv_SE |
| | bos.msg.de_DE |
| | bos.msg.en_US |
| | bos.msg.es_ES |
| | bos.msg.fr_FR |
| | bos.msg.it_IT |
| | bos.msg.ja_JP |
| | bos.msg.ko_KR |
| | bos.msg.nl_BE |
| | bos.msg.no_NO |
| | bos.msg.sv_SE |
| | bos.msg.zh_TW |
| | bos.net |
| | bos.pci |
| | bos.perf |
| | bos.powermgt |
| | bos.rcs |

| *Table 47 (Page 5 of 12). AIX 4.1 Components Compact List* | |
|---|---|
| | bos.rte.mp |
| | bos.rte.up |
| | bos.som |
| | bos.sysmgt |
| | bos.sysmgt.smit.softlic |
| | bos.terminfo |
| | bos.txt |
| | cics.base |
| | cics.books |
| | cics.client |
| | cics.info.en_US |
| | cics.msg.Ja_JP |
| | cics.msg.en_US |
| | cics.msg.ja_JP |
| | cics.msg.ko_KR |
| | cics.msg.zh_CN |
| | cics.server |
| | cluster |
| | dce.cdmf |
| | dce.cds |
| | dce.dfsnfs |
| | dce.edfs |
| | dce.priv |
| | dce.security |
| | dce.tools |
| | devices.base |
| | devices.buc.00004001 |
| | devices.buc.00004002 |
| | devices.buc.00004005 |
| | devices.buc.00004006 |
| | devices.buc.00004007 |
| | devices.graphics |
| | devices.ide.cdrom |
| | devices.ide.disk |
| | devices.isa.IBM0010 |
| | devices.isa.PNP80CC |
| | devices.isa.c1x |
| | devices.isa.cxia |
| | devices.isa.ethernet |
| | devices.isa.pcmcia |
| | devices.isa.sio |
| | devices.isa.tokenring |
| | devices.isa_sio.IBM0005.IBM8301 |
| | devices.isa_sio.IBM000E |

| *Table 47 (Page 6 of 12). AIX 4.1 Components Compact List* | |
|---|---|
| | devices.isa_sio.IBM000E.NA |
| | devices.isa_sio.IBM0012.NA |
| | devices.isa_sio.IBM0013.NA |
| | devices.isa_sio.IBM0017 |
| | devices.isa_sio.IBM0017.NA |
| | devices.isa_sio.IBM001C |
| | devices.isa_sio.IBM001D.NA |
| | devices.isa_sio.PNP0303 |
| | devices.isa_sio.PNP0400 |
| | devices.isa_sio.PNP0401 |
| | devices.isa_sio.PNP0501 |
| | devices.isa_sio.PNP0600 |
| | devices.isa_sio.PNP0700 |
| | devices.isa_sio.PNP0E00 |
| | devices.isa_sio.PNP0F03 |
| | devices.isa_sio.baud |
| | devices.isa_sio.baud.NA |
| | devices.isa_sio.fda |
| | devices.isa_sio.km |
| | devices.isa_sio.ppa |
| | devices.isa_sio.sa |
| | devices.mca.8787 |
| | devices.mca.8d77 |
| | devices.mca.8ee3 |
| | devices.mca.8ee4 |
| | devices.mca.8ee5 |
| | devices.mca.8ef2 |
| | devices.mca.8ef3 |
| | devices.mca.8ef4 |
| | devices.mca.8ef5 |
| | devices.mca.8efc |
| | devices.mca.8f70 |
| | devices.mca.8f78 |
| | devices.mca.8f96 |
| | devices.mca.8f97 |
| | devices.mca.8f98 |
| | devices.mca.8f9a |
| | devices.mca.8fa2 |
| | devices.mca.8fba |
| | devices.mca.8fbc |
| | devices.mca.8fc8 |
| | devices.mca.8ff4 |
| | devices.mca.8ffd |
| | devices.mca.dee6 |

| *Table 47 (Page 7 of 12). AIX 4.1 Components Compact List* | |
|---|---|
| | devices.mca.deff |
| | devices.mca.df5f |
| | devices.mca.df9f |
| | devices.mca.dfe5 |
| | devices.mca.e1ff |
| | devices.mca.edd0 |
| | devices.mca.edd1 |
| | devices.mca.edd2 |
| | devices.mca.edd3 |
| | devices.mca.edd5 |
| | devices.mca.edd6 |
| | devices.mca.efc6 |
| | devices.mca.eff0 |
| | devices.mca.f6f8 |
| | devices.mca.f6fe |
| | devices.mca.fe92 |
| | devices.mca.fed9 |
| | devices.mca.ffe1 |
| | devices.msg.De_DE |
| | devices.msg.En_US |
| | devices.msg.Es_ES |
| | devices.msg.Fr_FR |
| | devices.msg.It_IT |
| | devices.msg.Ja_JP |
| | devices.msg.Nl_BE |
| | devices.msg.No_NO |
| | devices.msg.Sv_SE |
| | devices.msg.de_DE |
| | devices.msg.en_US |
| | devices.msg.es_ES |
| | devices.msg.fr_FR |
| | devices.msg.it_IT |
| | devices.msg.ja_JP |
| | devices.msg.ko_KR |
| | devices.msg.nl_BE |
| | devices.msg.no_NO |
| | devices.msg.sv_SE |
| | devices.msg.zh_TW |
| | devices.pci.00100100 |
| | devices.pci.00100300 |
| | devices.pci.0e100091 |
| | devices.pci.14101300 |
| | devices.pci.14101800 |
| | devices.pci.14101b00 |

| Table 47 (Page 8 of 12). AIX 4.1 Components Compact List | |
|---|---|
| | devices.pci.14101c00 |
| | devices.pci.1c104ac2 |
| | devices.pci.22100020 |
| | devices.pci.3353b088 |
| | devices.pci.3353c088 |
| | devices.pci.3353c188 |
| | devices.pci.3353c288 |
| | devices.pci.3353c388 |
| | devices.pci.86808404 |
| | devices.pci.PNP0A00 |
| | devices.pci.PNP0A03 |
| | devices.pci.ed101073 |
| | devices.pcmcia.a4000200 |
| | devices.pcmcia.a4001d00 |
| | devices.pcmcia.a4001e00 |
| | devices.pcmcia.ethernet |
| | devices.pcmcia.serial |
| | devices.pcmcia.tokenring |
| | devices.rs6ksmp.base |
| | devices.rspc.base |
| | devices.scsi.disk |
| | devices.scsi.scarray |
| | devices.scsi.tape |
| | devices.scsi.tm |
| | devices.serial.gio |
| | devices.serial.sb1 |
| | devices.serial.tablet1 |
| | devices.sio.fda |
| | devices.sio.ktma |
| | devices.sio.ppa |
| | devices.sio.sa |
| | devices.ssa.disk |
| | devices.sys.PNP0A03 |
| | devices.sys.mca |
| | devices.sys.pci |
| | devices.sys.sga |
| | devices.sys.sgabus |
| | devices.sys.slc |
| | devices.sys.wga |
| | devices.tty |
| | dps |
| | dsmit |
| | dsmit.msg.De_DE |
| | dsmit.msg.En_US |

| Table 47 (Page 9 of 12). AIX 4.1 Components Compact List | |
|---|---|
| | dsmit.msg.Es_ES |
| | dsmit.msg.Fr_FR |
| | dsmit.msg.Ja_JP |
| | dsmit.msg.Nl_BE |
| | dsmit.msg.Sv_SE |
| | dsmit.msg.de_DE |
| | dsmit.msg.en_US |
| | dsmit.msg.es_ES |
| | dsmit.msg.fr_FR |
| | dsmit.msg.ja_JP |
| | dsmit.msg.ko_KR |
| | dsmit.msg.nl_BE |
| | dsmit.msg.sv_SE |
| | dsmit.msg.zh_TW |
| | dtext |
| | encina.monitor |
| | encina.msg.en_US |
| | essl |
| | essl.book.en_US |
| | essl.info.en_US |
| | essl.ps.en_US |
| | fsf |
| | gw |
| | gw.ubp |
| | hcon |
| | hcon.info.en_US |
| | hcon.loc |
| | hcon.msg.De_DE |
| | hcon.msg.En_US |
| | hcon.msg.Es_ES |
| | hcon.msg.Fr_FR |
| | hcon.msg.It_IT |
| | hcon.msg.Ja_JP |
| | hcon.msg.Nl_BE |
| | hcon.msg.Sv_SE |
| | hcon.msg.de_DE |
| | hcon.msg.en_US |
| | hcon.msg.es_ES |
| | hcon.msg.fr_FR |
| | hcon.msg.it_IT |
| | hcon.msg.ja_JP |
| | hcon.msg.ko_KR |
| | hcon.msg.nl_BE |
| | hcon.msg.sv_SE |

| *Table 47 (Page 10 of 12). AIX 4.1 Components Compact List* | |
|---|---|
| | hcon.msg.zh_TW |
| | hcon.terminfo |
| | icraft |
| | icraft.info.en_US |
| | icraft.msg.En_US |
| | icraft.msg.Ja_JP |
| | icraft.msg.en_US |
| | icraft.msg.ja_JP |
| | infoxl |
| | internet_server |
| | ipfx |
| | ipx |
| | netbios |
| | netware |
| | perfagent |
| | perfagent.info.en_US |
| | perfmgr |
| | pkg_gd |
| | printers |
| | printers.msg.De_DE |
| | printers.msg.En_US |
| | printers.msg.Es_ES |
| | printers.msg.Fr_FR |
| | printers.msg.It_IT |
| | printers.msg.Ja_JP |
| | printers.msg.Nl_BE |
| | printers.msg.No_NO |
| | printers.msg.Sv_SE |
| | printers.msg.de_DE |
| | printers.msg.en_US |
| | printers.msg.es_ES |
| | printers.msg.fr_FR |
| | printers.msg.it_IT |
| | printers.msg.ja_JP |
| | printers.msg.ko_KR |
| | printers.msg.nl_BE |
| | printers.msg.no_NO |
| | printers.msg.sv_SE |
| | printers.msg.zh_TW |
| | printers.rte |
| | sde.Dt |
| | sde.loc.Ja_JP |
| | sde.loc.ja_JP |
| | sde.msg.Ja_JP |

| *Table 47 (Page 11 of 12). AIX 4.1 Components Compact List* | |
|---|---|
| | sde.msg.ja_JP |
| | sde.tools |
| | sna |
| | sna.books |
| | sna.msg.en_US |
| | sna.msg.ja_JP |
| | sna.snapi |
| | sna.toolkit |
| | sna.xsna |
| | sx25 |
| | sx25.adt |
| | sx25.info.en_US |
| | sx25.msg.De_DE |
| | sx25.msg.En_US |
| | sx25.msg.Es_ES |
| | sx25.msg.Fr_FR |
| | sx25.msg.It_IT |
| | sx25.msg.Ja_JP |
| | sx25.msg.Nl_BE |
| | sx25.msg.de_DE |
| | sx25.msg.en_US |
| | sx25.msg.es_ES |
| | sx25.msg.fr_FR |
| | sx25.msg.it_IT |
| | sx25.msg.ja_JP |
| | sx25.msg.ko_KR |
| | sx25.msg.nl_BE |
| | sx25.msg.zh_TW |
| | uimx |
| | uimx.msg.En_US |
| | uimx.msg.Ja_JP |
| | uimx.msg.en_US |
| | uimx.msg.ja_JP |
| | uimx.msg.ko_KR |
| | uimx.msg.zh_TW |
| | xlC.C |
| | xlC.C++ |
| | xlC.C.readme.ibm |
| | xlC.cpp |
| | xlC.info.en_US.C |
| | xlC.info.en_US.C++ |
| | xlC.ipf.en_US.C++ |
| | xlC.loc.en_US.C++ |
| | xlC.msg.De_DE |

| Table 47 (Page 12 of 12). AIX 4.1 Components Compact List | |
|---|---|
| | xlC.msg.Ja_JP |
| | xlC.msg.de_DE |
| | xlC.msg.en_US |
| | xlC.msg.ja_JP |
| | xlC.ps.en_US.C |
| | xlC.ps.en_US.C++ |
| | xlC.rte |
| | xldb |
| | xlfrte |
| | xlfrte.msg.en_US |

## Filesets Included in Packages

| Package | Description |
|---|---|
| OpenGL.GL32.adt package includes the following fileset(s); | |
| OpenGL.GL32.adt.demos 4.1.1.0 | GL Application Development Toolkit Demos |
| OpenGL.GL32.adt.include 4.1.3.0 | GL Application Development Toolkit Include Files |
| OpenGL.GL32.adt.samples 4.1.3.0 | GL Application Development Toolkit Sample Source |
| OpenGL.GL32.adt.util 4.1.3.0 | GL Application Development Toolkit Utilities Source |
| OpenGL.GL32.dev package includes the following fileset(s); | |
| OpenGL.GL32.dev.buc.00004002 | 4.1.3.0 GL GXT500 Device Dependent Software |
| OpenGL.GL32.dev.mca.8ee3 4.1.3.0 | GL GT4 Device Dependent Software |
| OpenGL.GL32.dev.mca.8fbc 4.1.3.0 | GL GXT1000 Device Dependent Software |
| OpenGL.GL32.dev.mca.8ffd | 4.1.3.0 GL GTO Device Dependent Software |
| OpenGL.GL32.rte package includes the following fileset(s); | |
| OpenGL.GL32.rte.base 4.1.3.0 | GL Base Runtime Environment |
| OpenGL.OpenGL_X.adt package includes the following fileset(s); | |
| OpenGL.OpenGL_X.adt.doc 4.1.0.0 | OpenGL Application Development Toolkit Documentation |
| OpenGL.OpenGL_X.adt.include | 4.1.3.0 OpenGL Application Development Toolkit Include Files |
| OpenGL.OpenGL_X.adt.samples | 4.1.3.0 OpenGL Application Development Toolkit Samples |
| OpenGL.OpenGL_X.dev package includes the following fileset(s); | |
| OpenGL.OpenGL_X.dev.buc.00004001.com.PPC | 4.1.3.0 OpenGL GXT100 Common Software - PowerPC |
| OpenGL.OpenGL_X.dev.buc.00004002.PPC | 4.1.3.0 OpenGL GXT500 Device Dependent Software - PowerPC |
| OpenGL.OpenGL_X.dev.buc.00004006.PPC | 4.1.0.0 OpenGL GXT150L Device Dependent Software - PowerPC |
| OpenGL.OpenGL_X.dev.buc.00004007.P1 | 4.1.1.0 OpenGL GXT155L Device Dependent Software - Power1 |
| OpenGL.OpenGL_X.dev.buc.00004007.P2 | 4.1.0.0 OpenGL GXT155L Device Dependent Software - Power2 |
| OpenGL.OpenGL_X.dev.buc.00004007.PPC | 4.1.0.0 OpenGL GXT155L Device Dependent Software - PowerPC |
| OpenGL.OpenGL_X.dev.mca.8ee3 | 4.1.0.0 OpenGL GT4 Device Dependent Software |
| OpenGL.OpenGL_X.dev.mca.8fbc | 4.1.3.0 OpenGL GXT1000 Device Dependent Software |
| OpenGL.OpenGL_X.dev.pci.14101b00.PPC | 4.1.0.0 OpenGL GXT150P Device Dependent Software - PowerPC |
| OpenGL.OpenGL_X.rte package includes the following fileset(s); | |
| OpenGL.OpenGL_X.rte.base | 4.1.3.0 OpenGL Base Runtime Environment |
| OpenGL.OpenGL_X.rte.soft.P1 | 4.1.3.0 OpenGL Soft Runtime Environment - Power1 |
| OpenGL.OpenGL_X.rte.soft.P2 | 4.1.0.0 OpenGL Soft Runtime Environment - Power2 |

| Package | Description |
|---|---|
| OpenGL.OpenGL_X.rte.soft.PPC | 4.1.0.0 OpenGL Soft Runtime Environment - PowerPC |
| OpenGL.OpenGL_X.tools package includes the following fileset(s); | |
| OpenGL.OpenGL_X.tools.base | 4.1.3.0 OpenGL Base Tools |
| OpenGL.OpenGL_X.tools.debugger | 4.1.3.0 OpenGL Debugger |
| OpenGL.OpenGL_X.tools.glperf | 4.1.0.0 OpenGL GLperf Performance Tools |
| OpenGL.OpenGL_X.tools.viewperf | 4.1.0.0 OpenGL Viewperf Performance Tools |
| OpenGL.info.en_US package includes the following fileset(s); | |
| OpenGL.info.en_US.GL32 | 4.1.3.0 AIXWindows/3D GL Programming - U.S. English |
| OpenGL.info.en_US.OpenGL_X | 4.1.3.0 AIXWindows/3D OpenGL Programming - U.S. English |
| OpenGL.msg.De_DE package includes the following fileset(s); | |
| OpenGL.msg.De_DE.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - German IBM-850 |
| OpenGL.msg.En_US package includes the following fileset(s); | |
| OpenGL.msg.En_US.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - U.S. English IBM-850 |
| OpenGL.msg.Es_ES package includes the following fileset(s); | |
| OpenGL.msg.Es_ES.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Spanish IBM-850 |
| OpenGL.msg.Fr_FR package includes the following fileset(s); | |
| OpenGL.msg.Fr_FR.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - French IBM-850 |
| OpenGL.msg.It_IT package includes the following fileset(s); | |
| OpenGL.msg.It_IT.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Italian IBM-850 |
| OpenGL.msg.Ja_JP package includes the following fileset(s); | |
| OpenGL.msg.Ja_JP.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Japanese |
| OpenGL.msg.Nl_BE package includes the following fileset(s); | |
| OpenGL.msg.Nl_BE.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Belgian Dutch IBM-850 |
| OpenGL.msg.No_NO package includes the following fileset(s); | |
| OpenGL.msg.No_NO.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Norwegian IBM-850 |
| OpenGL.msg.Sv_SE package includes the following fileset(s); | |
| OpenGL.msg.Sv_SE.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Swedish IBM-850 |
| OpenGL.msg.de_DE package includes the following fileset(s); | |
| OpenGL.msg.de_DE.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - German |
| OpenGL.msg.en_US package includes the following fileset(s); | |
| OpenGL.msg.en_US.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - U.S. English |
| OpenGL.msg.es_ES package includes the following fileset(s); | |
| OpenGL.msg.es_ES.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Spanish |
| OpenGL.msg.fr_FR package includes the following fileset(s); | |
| OpenGL.msg.fr_FR.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - French |
| OpenGL.msg.it_IT package includes the following fileset(s); | |
| OpenGL.msg.it_IT.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Italian |
| OpenGL.msg.ja_JP package includes the following fileset(s); | |
| OpenGL.msg.ja_JP.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Japanese IBM-eucJP |
| OpenGL.msg.ko_KR package includes the following fileset(s); | |
| OpenGL.msg.ko_KR.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Korean |
| OpenGL.msg.nl_BE package includes the following fileset(s); | |
| OpenGL.msg.nl_BE.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Belgian Dutch |
| OpenGL.msg.no_NO package includes the following fileset(s); | |

| Package | Description |
|---|---|
| OpenGL.msg.no_NO.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Norwegian |
| OpenGL.msg.sv_SE package includes the following fileset(s); | |
| OpenGL.msg.sv_SE.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Swedish |
| OpenGL.msg.zh_TW package includes the following fileset(s); | |
| OpenGL.msg.zh_TW.GL32.rte.base | 4.1.1.0 GL Base Runtime Environment Messages - Traditional Chinese |
| PEX_PHIGS.PEX.adt package includes the following fileset(s); | |
| PEX_PHIGS.PEX.adt.pexlib.clients | 4.1.0.0 PEX PEXlib Application Development Toolkit Sample Clients |
| PEX_PHIGS.PEX.adt.pexlib.include | 4.1.3.0 PEX PEXlib Application Development Toolkit Include Files |
| PEX_PHIGS.PEX.adt.pexlib.util | 4.1.0.0 PEX PEXlib Application Development Toolkit Utilities |
| PEX_PHIGS.PEX.adt.si_phigs.clients | 4.1.0.0 PEX SI-PHIGS Application Development Toolkit Clients |
| PEX_PHIGS.PEX.adt.si_phigs.include | 4.1.0.0 PEX SI-PHIGS Application Development Toolkit Include Files |
| PEX_PHIGS.PEX.adt.si_phigs.lib | 4.1.3.0 PEX SI-PHIGS Application Development Toolkit Library |
| PEX_PHIGS.PEX.adt.si_phigs.man | 4.1.0.0 PEX SI-PHIGS Application Development Toolkit Man Pages |
| PEX_PHIGS.PEX.adt.tools | 4.1.3.0 PEX Application Development Toolkit Tools |
| PEX_PHIGS.PEX.rte package includes the following fileset(s); | |
| PEX_PHIGS.PEX.rte.base | 4.1.3.0 PEX Base Runtime Environment |
| PEX_PHIGS.PEX.rte.soft | 4.1.3.0 PEX Soft Runtime Environment |
| PEX_PHIGS.dev package includes the following fileset(s); | |
| PEX_PHIGS.dev.buc.00004002 | 4.1.3.0 PEX/graPHIGS GXT500 Device Dependent Software |
| PEX_PHIGS.dev.mca.8ee3 | 4.1.3.0 PEX/graPHIGS GT4 Device Dependent Software |
| PEX_PHIGS.dev.mca.8fbc | 4.1.3.0 PEX/graPHIGS GXT1000 Device Dependent Software |
| PEX_PHIGS.dev.mca.8ffd | 4.1.3.0 PEX/graPHIGS GTO Device Dependent Software |
| PEX_PHIGS.graPHIGS.adt package includes the following fileset(s); | |
| PEX_PHIGS.graPHIGS.adt.clients | 4.1.3.0 graPHIGS Application Development Toolkit Clients |
| PEX_PHIGS.graPHIGS.adt.gks | 4.1.3.0 graPHIGS Application Development Toolkit GKS Library |
| PEX_PHIGS.graPHIGS.adt.include | 4.1.3.0 graPHIGS Application Development Toolkit Include Files |
| PEX_PHIGS.graPHIGS.adt.samples | 4.1.3.0 graPHIGS Application Development Toolkit Samples |
| PEX_PHIGS.graPHIGS.adt.tutor | 4.1.3.0 graPHIGS Application Development Toolkit Tutorial |
| PEX_PHIGS.graPHIGS.fnt package includes the following fileset(s); | |
| PEX_PHIGS.graPHIGS.fnt.JP | 4.1.0.0 graPHIGS Kanji (Japanese) Fonts |
| PEX_PHIGS.graPHIGS.fnt.KR | 4.1.0.0 graPHIGS Hangul (Korean) Fonts |
| PEX_PHIGS.graPHIGS.fnt.SC_EUC | 4.1.3.0 graPHIGS Simplified Chinese Font, EUC based |
| PEX_PHIGS.graPHIGS.fnt.TW | 4.1.0.0 graPHIGS Traditional Chinese Fonts |
| PEX_PHIGS.graPHIGS.fnt.uni | 4.1.0.0 graPHIGS Unicode Fonts |
| PEX_PHIGS.graPHIGS.rte package includes the following fileset(s); | |
| PEX_PHIGS.graPHIGS.rte.6098 | 4.1.3.0 graPHIGS 6098 Support |
| PEX_PHIGS.graPHIGS.rte.base | 4.1.3.0 graPHIGS Base Runtime Environment |
| PEX_PHIGS.graPHIGS.rte.pipe | 4.1.3.0 graPHIGS Pipeline Runtime Environment |
| PEX_PHIGS.graPHIGS.rte.plot | 4.1.3.0 graPHIGS IBM/CALCOMP/VERSATEC Plotter Support |
| PEX_PHIGS.graPHIGS.rte.rnuc | 4.1.3.0 graPHIGS Remote Nucleus Support |
| PEX_PHIGS.graPHIGS.rte.soft | 4.1.3.0 graPHIGS Soft Runtime Environment |
| PEX_PHIGS.info.en_US package includes the following fileset(s); | |
| PEX_PHIGS.info.en_US.PEX | 4.1.3.0 PEX Programming Guide - U.S. English |
| PEX_PHIGS.info.en_US.graPHIGS | 4.1.3.0 graPHIGS Programming Guide - U.S. English |

| Package | Description |
|---|---|
| PEX_PHIGS.msg.De_DE package includes the following fileset(s); | |
| PEX_PHIGS.msg.De_DE.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - German IBM-850 |
| PEX_PHIGS.msg.De_DE.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - German IBM-850 |
| PEX_PHIGS.msg.En_US package includes the following fileset(s); | |
| PEX_PHIGS.msg.En_US.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - U.S. English IBM-850 |
| PEX_PHIGS.msg.En_US.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - U.S. English IBM-850 |
| PEX_PHIGS.msg.Es_ES package includes the following fileset(s); | |
| PEX_PHIGS.msg.Es_ES.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Spanish IBM-850 |
| PEX_PHIGS.msg.Es_ES.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Spanish IBM-850 |
| PEX_PHIGS.msg.Fr_FR package includes the following fileset(s); | |
| PEX_PHIGS.msg.Fr_FR.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - French IBM-850 |
| PEX_PHIGS.msg.Fr_FR.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - French IBM-850 |
| PEX_PHIGS.msg.It_IT package includes the following fileset(s); | |
| PEX_PHIGS.msg.It_IT.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Italian IBM-850 |
| PEX_PHIGS.msg.It_IT.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Italian IBM-850 |
| PEX_PHIGS.msg.Ja_JP package includes the following fileset(s); | |
| PEX_PHIGS.msg.Ja_JP.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Japanese |
| PEX_PHIGS.msg.Ja_JP.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Japanese |
| PEX_PHIGS.msg.Nl_BE package includes the following fileset(s); | |
| PEX_PHIGS.msg.Nl_BE.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Belgian Dutch IBM-850 |
| PEX_PHIGS.msg.Nl_BE.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Belgian Dutch IBM-850 |
| PEX_PHIGS.msg.No_NO package includes the following fileset(s); | |
| PEX_PHIGS.msg.No_NO.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Norwegian IBM-850 |
| PEX_PHIGS.msg.No_NO.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Norwegian IBM-850 |
| PEX_PHIGS.msg.Sv_SE package includes the following fileset(s); | |
| PEX_PHIGS.msg.Sv_SE.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Swedish IBM-850 |
| PEX_PHIGS.msg.Sv_SE.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Swedish IBM-850 |
| PEX_PHIGS.msg.de_DE package includes the following fileset(s); | |
| PEX_PHIGS.msg.de_DE.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - German |
| PEX_PHIGS.msg.de_DE.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - German |
| PEX_PHIGS.msg.en_US package includes the following fileset(s); | |
| PEX_PHIGS.msg.en_US.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - U.S. English |
| PEX_PHIGS.msg.en_US.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - U.S. English |
| PEX_PHIGS.msg.es_ES package includes the following fileset(s); | |
| PEX_PHIGS.msg.es_ES.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Spanish |
| PEX_PHIGS.msg.es_ES.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Spanish |
| PEX_PHIGS.msg.fr_FR package includes the following fileset(s); | |
| PEX_PHIGS.msg.fr_FR.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - French |
| PEX_PHIGS.msg.fr_FR.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - French |
| PEX_PHIGS.msg.it_IT package includes the following fileset(s); | |
| PEX_PHIGS.msg.it_IT.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Italian |
| PEX_PHIGS.msg.it_IT.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Italian |
| PEX_PHIGS.msg.ja_JP package includes the following fileset(s); | |
| PEX_PHIGS.msg.ja_JP.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Japanese IBM-eucJP |

| Package | Description |
|---|---|
| PEX_PHIGS.msg.ja_JP.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Japanese IBM-eucJP |
| PEX_PHIGS.msg.ko_KR package includes the following fileset(s); | |
| PEX_PHIGS.msg.ko_KR.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Korean |
| PEX_PHIGS.msg.ko_KR.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Korean |
| PEX_PHIGS.msg.nl_BE package includes the following fileset(s); | |
| PEX_PHIGS.msg.nl_BE.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Belgian Dutch |
| PEX_PHIGS.msg.nl_BE.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Belgian Dutch |
| PEX_PHIGS.msg.no_NO package includes the following fileset(s); | |
| PEX_PHIGS.msg.no_NO.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Norwegian |
| PEX_PHIGS.msg.no_NO.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Norwegian |
| PEX_PHIGS.msg.sv_SE package includes the following fileset(s); | |
| PEX_PHIGS.msg.sv_SE.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Swedish |
| PEX_PHIGS.msg.sv_SE.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Swedish |
| PEX_PHIGS.msg.zh_TW package includes the following fileset(s); | |
| PEX_PHIGS.msg.zh_TW.PEX.adt.si_phigs.lib | 4.1.1.0 PEX SI-PHIGS Library Messages - Traditional Chinese |
| PEX_PHIGS.msg.zh_TW.graPHIGS.rte.6098 | 4.1.1.0 graPHIGS 6098 Support Messages - Traditional Chinese |
| PEX_PHIGS.rte package includes the following fileset(s); | |
| PEX_PHIGS.rte.soft | 4.1.3.0 PEX_PHIGS Soft Runtime Environment |
| Soft5080 package includes the following fileset(s); | |
| Soft5080.Dt | 1.1.1.0 Soft5080 Common Desktop Environment |
| Soft5080.base | 1.1.1.0 Soft5080 Base Runtime Environment |
| Soft5080.fconv | 1.1.1.0 Soft5080 Kanji Font Converter Runtime Environment |
| Soft5080.gateway | 1.1.1.0 Soft5080 Gateway Runtime Environment |
| Soft5080.ppc | 1.1.1.0 Soft5080 Runtime Environment - PowerPC |
| Soft5080.pwr | 1.1.1.0 Soft5080 Runtime Environment - Power |
| Soft5080.samples | 1.1.1.0 Soft5080 Resource File Samples |
| Soft5080.fnt package includes the following fileset(s); | |
| Soft5080.fnt.JP | 1.1.1.0 Soft5080 Kanji(Japanese) Vector Font |
| Soft5080.msg.Ja_JP package includes the following fileset(s); | |
| Soft5080.msg.Ja_JP | 1.1.1.0 Soft5080 Message - Ja_JP |
| Soft5080.msg.en_US package includes the following fileset(s); | |
| Soft5080.msg.en_US | 1.1.1.0 Soft5080 Message - en_US |
| SoftWindows package includes the following fileset(s); | |
| SoftWindows.local | 1.2.0.0 SoftWindows extra fonts, keyboards and localization |
| SoftWindows.obj | 1.2.0.0 SoftWindows Executable and Configuration Files |
| SoftWindows.winfiles | 1.2.0.0 Additional Windows 3.1 Files |
| UMS package includes the following fileset(s); | |
| UMS.demo | 2.1.2.0 AIX Ultimedia Services Demo |
| UMS.objects | 2.1.2.0 AIX Ultimedia Services |
| UMS.samples | 2.1.2.0 AIX Ultimedia Services Samples |
| UMS.speech | 2.1.2.0 AIX Ultimedia Services Speech Recognition |
| UMS.video_ext | 2.1.2.0 AIX Ultimedia Services Video Extensions |
| UMS.info.en_US package includes the following fileset(s); | |
| UMS.info.en_US.user_gd | 4.1.3.0 Ultimedia InfoExplorer Database - U.S. English |

| Package | Description |
|---|---|
| UMS.loc package includes the following fileset(s); | |
| UMS.loc.De_DE.objects | 2.1.2.0 Ultimedia Services Locales - German |
| UMS.loc.En_US.objects | 2.1.2.0 Ultimedia Services Locales - English |
| UMS.loc.Es_ES.objects | 2.1.2.0 Ultimedia Services Locales - Spanish IBM-850 |
| UMS.loc.Fr_FR.objects | 2.1.2.0 Ultimedia Services Locales - French |
| UMS.loc.It_IT.objects | 2.1.2.0 Ultimedia Services Locales - Italian-850 |
| UMS.loc.Ja_JP.objects | 2.1.2.0 Ultimedia Services Locales - Japanese |
| UMS.loc.Nl_BE.objects | 2.1.2.0 Ultimedia Services Locales - Belgian Dutch IBM-850 |
| UMS.loc.No_NO.objects | 2.1.2.0 Ultimedia Services Locales - Norwegian IBM-850 |
| UMS.loc.Sv_SE.objects | 2.1.2.0 Ultimedia Services Locales - Swedish IBM-850 |
| UMS.loc.de_DE.objects | 2.1.2.0 Ultimedia Services Locales - German |
| UMS.loc.en_US.objects | 2.1.2.0 Ultimedia Services Locales - U.S. English |
| UMS.loc.es_ES.objects | 2.1.2.0 Ultimedia Services Locales - Spanish |
| UMS.loc.fr_FR.objects | 2.1.2.0 Ultimedia Services Locales - French |
| UMS.loc.it_IT.objects | 2.1.2.0 Ultimedia Services Locales - Italian |
| UMS.loc.ja_JP.objects | 2.1.2.0 Ultimedia Services Locales - Japanese IBM-eucJP |
| UMS.loc.ko_KR.objects | 2.1.2.0 Ultimedia Services Locales - Korean |
| UMS.loc.nl_BE.objects | 2.1.2.0 Ultimedia Services Locales - Belgian Dutch |
| UMS.loc.no_NO.objects | 2.1.2.0 Ultimedia Services Locales - Norwegian |
| UMS.loc.sv_SE.objects | 2.1.2.0 Ultimedia Services Locales - Swedish |
| UMS.loc.zh_TW.objects | 2.1.2.0 Ultimedia Services Locales - Traditional Chinese |
| UMS.msg.De_DE package includes the following fileset(s); | |
| UMS.msg.De_DE.objects | 2.1.2.0 AIX Ultimedia Services Messages - German IBM-850 |
| UMS.msg.En_US package includes the following fileset(s); | |
| UMS.msg.En_US.objects | 2.1.2.0 AIX Ultimedia Services Messages - U.S. English IBM-850 |
| UMS.msg.Es_ES package includes the following fileset(s); | |
| UMS.msg.Es_ES.objects | 2.1.2.0 AIX Ultimedia Services Messages - Spanish IBM-850 |
| UMS.msg.Fr_FR package includes the following fileset(s); | |
| UMS.msg.Fr_FR.objects | 2.1.2.0 AIX Ultimedia Services Messages - French IBM-850 |
| UMS.msg.It_IT package includes the following fileset(s); | |
| UMS.msg.It_IT.objects | 2.1.2.0 AIX Ultimedia Services Messages - Italian IBM-850 |
| UMS.msg.Ja_JP package includes the following fileset(s); | |
| UMS.msg.Ja_JP.objects | 2.1.2.0 AIX Ultimedia Services Messages - Japanese |
| UMS.msg.Nl_BE package includes the following fileset(s); | |
| UMS.msg.Nl_BE.objects | 2.1.2.0 AIX Ultimedia Services Messages - Belgian Dutch IBM-850 |
| UMS.msg.No_NO package includes the following fileset(s); | |
| UMS.msg.No_NO.objects | 2.1.2.0 AIX Ultimedia Services Messages - Norwegian IBM-850 |
| UMS.msg.Sv_SE package includes the following fileset(s); | |
| UMS.msg.Sv_SE.objects | 2.1.2.0 AIX Ultimedia Services Messages - Swedish IBM-850 |
| UMS.msg.de_DE package includes the following fileset(s); | |
| UMS.msg.de_DE.objects | 2.1.2.0 AIX Ultimedia Services Messages - German |
| UMS.msg.en_US package includes the following fileset(s); | |
| UMS.msg.en_US.objects | 2.1.2.0 AIX Ultimedia Services Messages - U.S. English |
| UMS.msg.es_ES package includes the following fileset(s); | |

| Package | Description |
|---|---|
| UMS.msg.es_ES.objects | 2.1.2.0 AIX Ultimedia Services Messages - Spanish |
| UMS.msg.fr_FR package includes the following fileset(s); | |
| UMS.msg.fr_FR.objects | 2.1.2.0 AIX Ultimedia Services Messages - French |
| UMS.msg.it_IT package includes the following fileset(s); | |
| UMS.msg.it_IT.objects | 2.1.2.0 AIX Ultimedia Services Messages - Italian |
| UMS.msg.ja_JP package includes the following fileset(s); | |
| UMS.msg.ja_JP.objects | 2.1.2.0 AIX Ultimedia Services Messages - Japanese IBM-eucJP |
| UMS.msg.ko_KR package includes the following fileset(s); | |
| UMS.msg.ko_KR.objects | 2.1.2.0 AIX Ultimedia Services Messages - Korean |
| UMS.msg.nl_BE package includes the following fileset(s); | |
| UMS.msg.nl_BE.objects | 2.1.2.0 AIX Ultimedia Services Messages - Belgian Dutch |
| UMS.msg.no_NO package includes the following fileset(s); | |
| UMS.msg.no_NO.objects | 2.1.2.0 AIX Ultimedia Services Messages - Norwegian |
| UMS.msg.sv_SE package includes the following fileset(s); | |
| UMS.msg.sv_SE.objects | 2.1.2.0 AIX Ultimedia Services Messages - Swedish |
| UMS.msg.zh_TW package includes the following fileset(s); | |
| UMS.msg.zh_TW.objects | 2.1.2.0 AIX Ultimedia Services Messages - Traditional Chinese |
| Wabi package includes the following fileset(s); | |
| Wabi.Dt | 2.0.0.0 AIX Desktop Integration Files for Wabi |
| Wabi.fnt | 2.0.0.0 Wabi Font Files |
| Wabi.loc.Da_DK | 2.0.0.0 Wabi Locale Files - Danish IBM-850 |
| Wabi.loc.De_CH | 2.0.0.0 Wabi Locale Files - Swiss German IBM-850 |
| Wabi.loc.De_DE | 2.0.0.0 Wabi Locale Files - German IBM-850 |
| Wabi.loc.En_UK | 2.0.0.0 Wabi Locale Files - U.K. English IBM-850 |
| Wabi.loc.Es_ES | 2.0.0.0 Wabi Locale Files - Spanish IBM-850 |
| Wabi.loc.Fi_FI | 2.0.0.0 Wabi Locale Files - Finish IBM-850 |
| Wabi.loc.Fr_BE | 2.0.0.0 Wabi Locale Files - Belgian French IBM-850 |
| Wabi.loc.Fr_CH | 2.0.0.0 Wabi Locale Files - Swiss French IBM-850 |
| Wabi.loc.Fr_FR | 2.0.0.0 Wabi Locale Files - French IBM-850 |
| Wabi.loc.It_IT | 2.0.0.0 Wabi Locale Files - Itailan IBM-850 |
| Wabi.loc.Nl_NL | 2.0.0.0 Wabi Locale Files - Netherlands Dutch IBM-850 |
| Wabi.loc.No_NO | 2.0.0.0 Wabi Locale Files - Norwegian IBM-850 |
| Wabi.loc.Pt_PT | 2.0.0.0 Wabi Locale Files - Protuguese IBM-850 |
| Wabi.loc.Sv_SV | 2.0.0.0 Wabi Locale Files - Swedish IBM-850 |
| Wabi.loc.en_US | 2.0.0.0 Wabi Locale Files - U.S. English |
| Wabi.man.en_US | 2.0.0.0 Wabi Man Pages - U.S. English |
| Wabi.printers | 2.0.0.0 Wabi Printer Support Files |
| Wabi.rte | 2.0.0.0 Wabi Runtime Environment |
| Wabi.win | 2.0.0.0 Wabi Windows Integration Files |
| Wabi.info.en_US package includes the following fileset(s); | |
| Wabi.info.en_US.usr_gd | 4.1.3.0 Wabi Users Guides - U.S. English |
| X11.Dt package includes the following fileset(s); | |
| X11.Dt.ToolTalk | 4.1.3.0 AIX CDE ToolTalk Support |
| X11.Dt.adt | 4.1.3.0 AIX CDE Application Developers' Toolkit |

| Package | Description |
|---|---|
| X11.Dt.bitmaps | 4.1.3.0 AIX CDE Bitmaps |
| X11.Dt.compat | 4.1.3.0 AIX CDE Compatibility |
| X11.Dt.helpinfo | 4.1.3.0 AIX CDE Help Files and Volumes |
| X11.Dt.helpmin | 4.1.3.0 AIX CDE Minimum Help Files |
| X11.Dt.helprun | 4.1.3.0 AIX CDE Runtime Help |
| X11.Dt.lib | 4.1.3.0 AIX CDE Runtime Libraries |
| X11.Dt.rte | 4.1.3.0 AIX Common Desktop Environment (CDE) 1.0 |
| X11.Dt.xdt2cde | 4.1.3.0 AIX CDE Migration Tool |
| X11.adt package includes the following fileset(s); | |
| X11.adt.bitmaps | 4.1.0.0 AIXwindows Application Development Toolkit Bitmap Files |
| X11.adt.ext | 4.1.3.0 AIXwindows Application Development Toolkit for X Extensions |
| X11.adt.imake | 4.1.3.0 AIXwindows Application Development Toolkit imake |
| X11.adt.include | 4.1.3.0 AIXwindows Application Development Toolkit Include Files |
| X11.adt.lib | 4.1.1.0 AIXwindows Application Development Toolkit Libraries |
| X11.adt.motif | 4.1.3.0 AIXwindows Application Development Toolkit Motif |
| X11.apps package includes the following fileset(s); | |
| X11.apps.aixterm | 4.1.3.0 AIXwindows aixterm Application |
| X11.apps.clients | 4.1.3.0 AIXwindows Client Applications |
| X11.apps.config | 4.1.3.0 AIXwindows Configuration Applications |
| X11.apps.custom | 4.1.3.0 AIXwindows Customizing Tool |
| X11.apps.ims | 4.1.1.0 AIXwindows Input Method Server |
| X11.apps.msmit | 4.1.3.0 AIXwindows msmit Application |
| X11.apps.pcmcia | 4.1.3.0 AIXwindows PCMCIA GUI Utility |
| X11.apps.pm | 4.1.3.0 AIXwindows Power Management GUI Utility |
| X11.apps.rte | 4.1.3.0 AIXwindows Runtime Configuration Applications |
| X11.apps.util | 4.1.0.0 AIXwindows Utility Applications |
| X11.apps.xdm | 4.1.3.0 AIXwindows xdm Application |
| X11.apps.msmit | 4.1.3.0 AIXwindows msmit Application |
| X11.apps.pcmcia | 4.1.3.0 AIXwindows PCMCIA GUI Utility |
| X11.apps.pm | 4.1.3.0 AIXwindows Power Management GUI Utility |
| X11.apps.xterm | 4.1.3.0 AIXwindows xterm Application |
| X11.base package includes the following fileset(s); | |
| X11.base.common | 4.1.0.0 AIXwindows Runtime Common Directories |
| X11.base.lib | 4.1.3.0 AIXwindows Runtime Libraries |
| X11.base.rte | 4.1.3.0 AIXwindows Runtime Environment |
| X11.base.smt | 4.1.3.0 AIXwindows Runtime Shared Memory Transport |
| X11.compat package includes the following fileset(s); | |
| X11.compat.fnt.oldX | 4.1.0.0 AIXwindows Ancient X Consortium Fonts Compatibility |
| X11.compat.fnt.pc | 4.1.3.0 AIXwindows PC850 Fonts Compatibility |
| X11.compat.lib.Motif10 | 4.1.0.0 AIXwindows Motif 1.0 Libraries Compatibility |
| X11.compat.lib.Motif114 | 4.1.0.0 AIXwindows Motif 1.1.4 Libraries Compatibility |
| X11.compat.lib.X11R3 | 4.1.0.0 AIXwindows X11R3 Libraries Compatibility |
| X11.compat.lib.X11R4 | 4.1.0.0 AIXwindows X11R4 Libraries Compatibility |
| X11.compat.samples.util | 4.1.0.0 AIXwindows Sample Utilities Compatibility |

| Package | Description |
|---|---|
| X11.fnt package includes the following fileset(s); | |
| X11.fnt.Gr_Cyr_T1 | 4.1.0.0 AIXwindows Greek-Cyrillic Type1 Fonts |
| X11.fnt.coreX | 4.1.0.0 AIXwindows X Consortium Fonts |
| X11.fnt.defaultFonts | 4.1.2.0 AIXwindows Default Fonts |
| X11.fnt.fontServer | 4.1.3.0 AIXwindows Font Server |
| X11.fnt.ibm1046 | 4.1.0.0 AIXwindows Arabic Fonts |
| X11.fnt.ibm1046_T1 | 4.1.0.0 AIXwindows Arabic Type1 Fonts |
| X11.fnt.iso1 | 4.1.3.0 AIXwindows Latin 1 Fonts |
| X11.fnt.iso2 | 4.1.0.0 AIXwindows Latin 2 Fonts |
| X11.fnt.iso3 | 4.1.0.0 AIXwindows Latin 3 Fonts |
| X11.fnt.iso4 | 4.1.0.0 AIXwindows Latin 4 Fonts |
| X11.fnt.iso5 | 4.1.0.0 AIXwindows Cyrillic Fonts |
| X11.fnt.iso7 | 4.1.0.0 AIXwindows Greek Fonts |
| X11.fnt.iso8 | 4.1.3.0 AIXwindows Hebrew Fonts |
| X11.fnt.iso8_T1 | 4.1.0.0 AIXwindows Hebrew Type1 Fonts |
| X11.fnt.iso9 | 4.1.2.0 AIXwindows Turkish Fonts |
| X11.fnt.iso_T1 | 4.1.0.0 AIXwindows Latin Type1 Fonts |
| X11.fnt.ucs.cjk | 4.1.3.0 AIXwindows Unicode CJK Fonts |
| X11.fnt.util | 4.1.3.0 AIXwindows Font Utilities |
| X11.info package includes the following fileset(s); | |
| X11.info.rte | 4.1.3.0 AIXwindows InfoExplorer Runtime Environment |
| X11.info.en_US package includes the following fileset(s); | |
| X11.info.en_US.Dt | 4.1.3.0 AIXwindows Desktop Guide - U.S. English |
| X11.info.en_US.prog_gds | 4.1.3.0 AIXwindows Programming Guides - U.S. English |
| X11.info.en_US.tech_ref | 4.1.3.0 AIXwindows Technical Reference - U.S. English |
| X11.info.en_US.x_st_mgr.manage_gd | 4.1.3.0 Xstation Manager Administrators Guide - U.S. English |
| X11.loc package includes the following fileset(s); | |
| X11.loc.Ar_AA.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Arabic IBM-850 |
| X11.loc.Ar_AA.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Arabic IBM-850 |
| X11.loc.Ar_AA.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Arabic IBM-850 |
| X11.loc.Ca_ES.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Catalan IBM-850 |
| X11.loc.Ca_ES.base.lib | 4.1.3.0 AIXwindows Client Locale Configuration - Catalan IBM-850 |
| X11.loc.Da_DK.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Danish IBM-850 |
| X11.loc.Da_DK.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Danish IBM-850 |
| X11.loc.De_CH.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Swiss German IBM-850 |
| X11.loc.De_CH.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Swiss German IBM-850 |
| X11.loc.De_CH.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Swiss German IBM-850 |
| X11.loc.De_DE.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - German IBM-850 |
| X11.loc.De_DE.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - German IBM-850 |
| X11.loc.De_DE.base.rte | 4.1.0.0 AIXwindows Locale Configuration - German IBM-850 |
| X11.loc.En_GB.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - U.K. English IBM-850 |
| X11.loc.En_GB.base.rte | 4.1.0.0 AIXwindows Locale Configuration - U.K. English IBM-850 |
| X11.loc.En_US.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - U.S. English IBM-850 |
| X11.loc.En_US.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - U.S. English IBM-850 |

| Package | Description |
|---|---|
| X11.loc.En_US.base.rte | 4.1.0.0 AIXwindows Locale Configuration - U.S. English IBM-850 |
| X11.loc.Es_ES.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Spanish IBM-850 |
| X11.loc.Es_ES.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Spanish IBM-850 |
| X11.loc.Es_ES.base.rte | 4.1.1.0 AIXwindows Locale Configuration - Spanish IBM-850 |
| X11.loc.Fi_FI.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Finnish IBM-850 |
| X11.loc.Fi_FI.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Finish IBM-850 |
| X11.loc.Fr_BE.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Belgian French IBM-850 |
| X11.loc.Fr_BE.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Belgian French IBM-850 |
| X11.loc.Fr_BE.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Belgian French IBM-850 |
| X11.loc.Fr_CA.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Canadian French IBM-850 |
| X11.loc.Fr_CA.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Canadian French IBM-850 |
| X11.loc.Fr_CA.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Canadian French IBM-850 |
| X11.loc.Fr_CH.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Swiss French IBM-850 |
| X11.loc.Fr_CH.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Swiss French IBM-850 |
| X11.loc.Fr_CH.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Swiss French IBM-850 |
| X11.loc.Fr_FR.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - French IBM-850 |
| X11.loc.Fr_FR.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - French IBM-850 |
| X11.loc.Fr_FR.base.rte | 4.1.0.0 AIXwindows Locale Configuration - French IBM-850 |
| X11.loc.Is_IS.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Icelandic IBM-850 |
| X11.loc.Is_IS.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Icelandic IBM-850 |
| X11.loc.It_IT.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Italian IBM-850 |
| X11.loc.It_IT.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Italian IBM-850 |
| X11.loc.It_IT.base.rte | 4.1.1.0 AIXwindows Locale Configuration - Italian IBM-850 |
| X11.loc.Iw_IL.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Hebrew IBM-850 |
| X11.loc.Iw_IL.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Hebrew IBM-850 |
| X11.loc.Iw_IL.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Hebrew IBM-850 |
| X11.loc.Ja_JP.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Japanese |
| X11.loc.Ja_JP.base.lib | 4.1.3.0 AIXwindows Client Locale Configuration - Japanese |
| X11.loc.Ja_JP.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Japanese |
| X11.loc.Ja_JP.info.rte | 4.1.1.0 AIXwindows InfoExplorer Locale Configuration - Japanese |
| X11.loc.Nl_BE.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Belgian Dutch IBM-850 |
| X11.loc.Nl_BE.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Belgian Dutch IBM-850 |
| X11.loc.Nl_BE.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Belgian Dutch IBM-850 |
| X11.loc.Nl_NL.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Netherlands Dutch IBM-850 |
| X11.loc.Nl_NL.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Netherlands Dutch IBM-850 |
| X11.loc.Nl_NL.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Netherlands Dutch IBM-850 |
| X11.loc.No_NO.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Norwegian IBM-850 |
| X11.loc.No_NO.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Norwegian IBM-850 |
| X11.loc.No_NO.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Norwegian IBM-850 |
| X11.loc.Pt_PT.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Portuguese IBM-850 |
| X11.loc.Pt_PT.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Portuguese IBM-850 |
| X11.loc.Sv_SE.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Swedish IBM-850 |
| X11.loc.Sv_SE.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Swedish IBM-850 |
| X11.loc.Sv_SE.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Swedish IBM-850 |

| Package | Description |
|---|---|
| X11.loc.ZH_CN.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - S. Chinese (UTF) |
| X11.loc.ZH_CN.base.lib | 4.1.3.0 AIXwindows Locale Configuration - Simplified Chinese (UTF) |
| X11.loc.ZH_CN.base.rte | 4.1.3.0 AIXwindows Locale Configuration - S. Chinese (UTF) |
| X11.loc.ar_AA.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Arabic |
| X11.loc.ar_AA.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Arabic |
| X11.loc.ar_AA.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Arabic |
| X11.loc.bg_BG.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Bulgarian |
| X11.loc.bg_BG.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Bulgarian |
| X11.loc.ca_ES.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Catalan |
| X11.loc.ca_ES.base.lib | 4.1.3.0 AIXwindows Client Locale Configuration - Catalan |
| X11.loc.cs_CZ.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Czech |
| X11.loc.cs_CZ.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Czech |
| X11.loc.da_DK.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Danish |
| X11.loc.da_DK.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Danish |
| X11.loc.de_CH.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Swiss German |
| X11.loc.de_CH.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Swiss German |
| X11.loc.de_CH.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Swiss German |
| X11.loc.de_DE.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - German |
| X11.loc.de_DE.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - German |
| X11.loc.de_DE.base.rte | 4.1.0.0 AIXwindows Locale Configuration - German |
| X11.loc.el_GR.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Greek |
| X11.loc.el_GR.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Greek |
| X11.loc.en_GB.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - U.K. English |
| X11.loc.en_GB.base.rte | 4.1.0.0 AIXwindows Locale Configuration - U.K. English |
| X11.loc.en_US.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - U.S. English |
| X11.loc.en_US.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - U.S. English |
| X11.loc.en_US.base.rte | 4.1.0.0 AIXwindows Locale Configuration - U.S. English |
| X11.loc.es_ES.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Spanish |
| X11.loc.es_ES.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Spanish |
| X11.loc.es_ES.base.rte | 4.1.1.0 AIXwindows Locale Configuration - Spanish |
| X11.loc.fi_FI.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Finnish |
| X11.loc.fi_FI.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Finish |
| X11.loc.fr_BE.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Belgian French |
| X11.loc.fr_BE.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Belgian French |
| X11.loc.fr_BE.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Belgian French |
| X11.loc.fr_CA.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Canadian French |
| X11.loc.fr_CA.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Canadian French |
| X11.loc.fr_CA.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Canadian French |
| X11.loc.fr_CH.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Swiss French |
| X11.loc.fr_CH.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Swiss French |
| X11.loc.fr_CH.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Swiss French |
| X11.loc.fr_FR.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - French |
| X11.loc.fr_FR.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - French |
| X11.loc.fr_FR.base.rte | 4.1.1.0 AIXwindows Locale Configuration - French |

| Package | Description |
|---|---|
| X11.loc.hr_HR.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Croatian |
| X11.loc.hr_HR.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Croatian |
| X11.loc.hu_HU.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Hungarian |
| X11.loc.hu_HU.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Hungarian |
| X11.loc.is_IS.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Icelandic |
| X11.loc.is_IS.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Icelandic |
| X11.loc.it_IT.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Italian |
| X11.loc.it_IT.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Italian |
| X11.loc.it_IT.base.rte | 4.1.1.0 AIXwindows Locale Configuration - Italian |
| X11.loc.iw_IL.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Hebrew |
| X11.loc.iw_IL.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Hebrew |
| X11.loc.iw_IL.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Hebrew |
| X11.loc.ja_JP.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Japanese IBM-eucJP |
| X11.loc.ja_JP.base.lib | 4.1.3.0 AIXwindows Client Locale Configuration - Japanese IBM-eucJP |
| X11.loc.ja_JP.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Japanese IBM-eucJP |
| X11.loc.ja_JP.info.rte | 4.1.1.0 AIXwindows InfoExplorer Locale Configuration - Japanese IBM-eucJP |
| X11.loc.ko_KR.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Korean |
| X11.loc.ko_KR.base.lib | 4.1.3.0 AIXwindows Client Locale Configuration - Korean |
| X11.loc.ko_KR.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Korean |
| X11.loc.mk_MK.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Macedonian |
| X11.loc.mk_MK.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Macedonian |
| X11.loc.nl_BE.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Belgian Dutch |
| X11.loc.nl_BE.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Belgian Dutch |
| X11.loc.nl_BE.base.rte | 4.1.1.0 AIXwindows Locale Configuration - Belgian Dutch |
| X11.loc.nl_NL.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Netherlands Dutch |
| X11.loc.nl_NL.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Netherlands Dutch |
| X11.loc.nl_NL.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Netherlands Dutch |
| X11.loc.no_NO.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Norwegian |
| X11.loc.no_NO.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Norwegian |
| X11.loc.no_NO.base.rte | 4.1.1.0 AIXwindows Locale Configuration - Norwegian |
| X11.loc.sv_SE.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Swedish |
| X11.loc.pl_PL.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Polish |
| X11.loc.pl_PL.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Polish |
| X11.loc.pt_BR.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Portuguese (Brazil) |
| X11.loc.pt_BR.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Portuguese (Brazil) |
| X11.loc.pt_PT.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Portuguese |
| X11.loc.pt_PT.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Portuguese |
| X11.loc.ro_RO.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Romanian |
| X11.loc.ro_RO.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Romanian |
| X11.loc.ru_RU.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Russian |
| X11.loc.ru_RU.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Russian |
| X11.loc.sh_SP.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Serbian Latin |
| X11.loc.sh_SP.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Serbian Latin |
| X11.loc.sk_SK.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Slovak |

| Package | Description |
|---|---|
| X11.loc.sk_SK.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Slovak |
| X11.loc.sl_SI.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Slovene |
| X11.loc.sl_SI.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Slovene |
| X11.loc.sr_SP.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Serbian Cyrillic |
| X11.loc.sr_SP.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Serbian Cyrillic |
| X11.loc.sv_SE.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Swedish |
| X11.loc.sv_SE.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Swedish |
| X11.loc.tr_TR.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Turkish |
| X11.loc.tr_TR.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Turkish |
| X11.loc.zh_CN.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - S. Chinese (EUC) |
| X11.loc.zh_CN.base.lib | 4.1.3.0 AIXwindows Client Locale Configuration - S. Chinese (EUC) |
| X11.loc.zh_CN.base.rte | 4.1.3.0 AIXwindows Locale Configuration - S. Chinese (EUC) |
| X11.loc.zh_TW.Dt.rte | 4.1.3.0 AIX CDE Locale Configuration - Traditional Chinese |
| X11.loc.zh_TW.base.lib | 4.1.1.0 AIXwindows Client Locale Configuration - Traditional Chinese |
| X11.loc.zh_TW.base.rte | 4.1.0.0 AIXwindows Locale Configuration - Traditional Chinese |
| X11.man.en_US package includes the following fileset(s); | |
| X11.man.en_US.Dt.adt | 4.1.3.0 AIX CDE Toolkit Man Pages - U.S. English |
| X11.man.en_US.Dt.rte | 4.1.1.0 AIX CDE Man Pages - U.S. English |
| X11.motif package includes the following fileset(s); | |
| X11.motif.lib | 4.1.3.0 AIXwindows Motif Libraries |
| X11.motif.mwm | 4.1.3.0 AIXwindows Motif Window Manager |
| X11.msg.De_DE package includes the following fileset(s); | |
| X11.msg.De_DE.Dt.rte | 4.1.3.0 AIX CDE Messages - German IBM-850 |
| X11.msg.De_DE.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - German IBM-850 |
| X11.msg.De_DE.adt.imake | 4.1.1.0 AIXwindows imake Messages - German IBM-850 |
| X11.msg.De_DE.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - German IBM-850 |
| X11.msg.De_DE.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - German IBM-850 |
| X11.msg.De_DE.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - German IBM-850 |
| X11.msg.De_DE.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - German IBM-850 |
| X11.msg.De_DE.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - German IBM-850 |
| X11.msg.De_DE.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - German IBM-850 |
| X11.msg.De_DE.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - German IBM-850 |
| X11.msg.De_DE.base.common | 4.1.1.0 AIXwindows Common Messages - German IBM-850 |
| X11.msg.De_DE.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - German IBM-850 |
| X11.msg.De_DE.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - German IBM-850 |
| X11.msg.De_DE.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - German IBM-850 |
| X11.msg.De_DE.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - German IBM-850 |
| X11.msg.De_DE.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - German IBM-850 |
| X11.msg.De_DE.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - German IBM-850 |
| X11.msg.De_DE.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - German IBM-850 |
| X11.msg.De_DE.x_st_mgr.rte | 4.1.1.0 Xstation Manager - German IBM-850 |
| X11.msg.En_US package includes the following fileset(s); | |
| X11.msg.En_US.Dt.rte | 4.1.3.0 AIX CDE Messages - U.S. English IBM-850 |
| X11.msg.En_US.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - U.S. English IBM-850 |

| Package | Description |
|---|---|
| X11.msg.En_US.adt.imake | 4.1.1.0 AIXwindows imake Messages - U.S. English IBM-850 |
| X11.msg.En_US.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - U.S. English IBM-850 |
| X11.msg.En_US.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - U.S. English IBM-850 |
| X11.msg.En_US.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - U.S. English IBM-850 |
| X11.msg.En_US.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - U.S. English IBM-850 |
| X11.msg.En_US.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - U.S. English IBM-850 |
| X11.msg.En_US.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - U.S. English IBM-850 |
| X11.msg.En_US.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - U.S. English IBM-850 |
| X11.msg.En_US.base.common | 4.1.1.0 AIXwindows Common Messages - U.S. English IBM-850 |
| X11.msg.En_US.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - U.S. English IBM-850 |
| X11.msg.En_US.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - U.S. English IBM-850 |
| X11.msg.En_US.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - U.S. English IBM-850 |
| X11.msg.En_US.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - U.S. English IBM-850 |
| X11.msg.En_US.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - U.S. English IBM-850 |
| X11.msg.En_US.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - U.S. English IBM-850 |
| X11.msg.En_US.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - U.S. English IBM-850 |
| X11.msg.En_US.x_st_mgr.rte | 4.1.1.0 Xstation Manager - U.S. English IBM-850 |
| X11.msg.Es_ES package includes the following fileset(s); | |
| X11.msg.Es_ES.Dt.rte | 4.1.3.0 AIX CDE Messages - Spanish IBM-850 |
| X11.msg.Es_ES.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Spanish IBM-850 |
| X11.msg.Es_ES.adt.imake | 4.1.1.0 AIXwindows imake Messages - Spanish IBM-850 |
| X11.msg.Es_ES.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Spanish IBM-850 |
| X11.msg.Es_ES.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Spanish IBM-850 |
| X11.msg.Es_ES.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Spanish IBM-850 |
| X11.msg.Es_ES.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Spanish IBM-850 |
| X11.msg.Es_ES.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Spanish IBM-850 |
| X11.msg.Es_ES.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Spanish IBM-850 |
| X11.msg.Es_ES.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Spanish IBM-850 |
| X11.msg.Es_ES.base.common | 4.1.1.0 AIXwindows Common Messages - Spanish IBM-850 |
| X11.msg.Es_ES.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Spanish IBM-850 |
| X11.msg.Es_ES.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Spanish IBM-850 |
| X11.msg.Es_ES.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Spanish IBM-850 |
| X11.msg.Es_ES.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Spanish IBM-850 |
| X11.msg.Es_ES.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Spanish IBM-850 |
| X11.msg.Es_ES.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Spanish IBM-850 |
| X11.msg.Es_ES.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Spanish IBM-850 |
| X11.msg.Es_ES.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Spanish IBM-850 |
| X11.msg.Fr_FR package includes the following fileset(s); | |
| X11.msg.Fr_FR.Dt.rte | 4.1.3.0 AIX CDE Messages - French IBM-850 |
| X11.msg.Fr_FR.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - French IBM-850 |
| X11.msg.Fr_FR.adt.imake | 4.1.1.0 AIXwindows imake Messages - French IBM-850 |
| X11.msg.Fr_FR.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - French IBM-850 |
| X11.msg.Fr_FR.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - French IBM-850 |

| Package | Description |
|---|---|
| X11.msg.Fr_FR.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - French IBM-850 |
| X11.msg.Fr_FR.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - French IBM-850 |
| X11.msg.Fr_FR.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - French IBM-850 |
| X11.msg.Fr_FR.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - French IBM-850 |
| X11.msg.Fr_FR.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - French IBM-850 |
| X11.msg.Fr_FR.base.common | 4.1.1.0 AIXwindows Common Messages - French IBM-850 |
| X11.msg.Fr_FR.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - French IBM-850 |
| X11.msg.Fr_FR.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - French IBM-850 |
| X11.msg.Fr_FR.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - French IBM-850 |
| X11.msg.Fr_FR.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - French IBM-850 |
| X11.msg.Fr_FR.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - French IBM-850 |
| X11.msg.Fr_FR.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - French IBM-850 |
| X11.msg.Fr_FR.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - French IBM-850 |
| X11.msg.Fr_FR.x_st_mgr.rte | 4.1.1.0 Xstation Manager - French IBM-850 |
| X11.msg.It_IT package includes the following fileset(s); | |
| X11.msg.It_IT.Dt.rte | 4.1.3.0 AIX CDE Messages - Italian IBM-850 |
| X11.msg.It_IT.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Italian IBM-850 |
| X11.msg.It_IT.adt.imake | 4.1.1.0 AIXwindows imake Messages - Italian IBM-850 |
| X11.msg.It_IT.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Italian IBM-850 |
| X11.msg.It_IT.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Italian IBM-850 |
| X11.msg.It_IT.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Italian IBM-850 |
| X11.msg.It_IT.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Italian IBM-850 |
| X11.msg.It_IT.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Italian IBM-850 |
| X11.msg.It_IT.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Italian IBM-850 |
| X11.msg.It_IT.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Italian IBM-850 |
| X11.msg.It_IT.base.common | 4.1.1.0 AIXwindows Common Messages - Italian IBM-850 |
| X11.msg.It_IT.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Italian IBM-850 |
| X11.msg.It_IT.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Italian IBM-850 |
| X11.msg.It_IT.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Italian IBM-850 |
| X11.msg.It_IT.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Italian IBM-850 |
| X11.msg.It_IT.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Italian IBM-850 |
| X11.msg.It_IT.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Italian IBM-850 |
| X11.msg.It_IT.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Italian IBM-850 |
| X11.msg.It_IT.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Italian IBM-850 |
| X11.msg.Ja_JP package includes the following fileset(s); | |
| X11.msg.Ja_JP.Dt.rte | 4.1.3.0 AIX CDE Messages - Japanese |
| X11.msg.Ja_JP.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Japanese |
| X11.msg.Ja_JP.adt.imake | 4.1.1.0 AIXwindows imake Messages - Japanese |
| X11.msg.Ja_JP.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Japanese |
| X11.msg.Ja_JP.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Japanese |
| X11.msg.Ja_JP.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Japanese |
| X11.msg.Ja_JP.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Japanese |
| X11.msg.Ja_JP.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Japanese |
| X11.msg.Ja_JP.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Japanese |

| Package | Description |
|---|---|
| X11.msg.Ja_JP.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Japanese |
| X11.msg.Ja_JP.base.common | 4.1.1.0 AIXwindows Common Messages - Japanese |
| X11.msg.Ja_JP.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Japanese |
| X11.msg.Ja_JP.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Japanese |
| X11.msg.Ja_JP.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Japanese |
| X11.msg.Ja_JP.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Japanese |
| X11.msg.Ja_JP.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Japanese |
| X11.msg.Ja_JP.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Japanese |
| X11.msg.Ja_JP.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Japanese |
| X11.msg.Ja_JP.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Japanese |
| X11.msg.Nl_BE package includes the following fileset(s); | |
| X11.msg.Nl_BE.Dt.rte | 4.1.3.0 AIX CDE Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.adt.imake | 4.1.1.0 AIXwindows imake Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.base.common | 4.1.1.0 AIXwindows Common Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Belgian Dutch IBM-850 |
| X11.msg.Nl_BE.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Belgian Dutch IBM-850 |
| X11.msg.No_NO package includes the following fileset(s); | |
| X11.msg.No_NO.Dt.rte | 4.1.3.0 AIX CDE Messages - Norwegian IBM-850 |
| X11.msg.No_NO.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Norwegian IBM-850 |
| X11.msg.No_NO.adt.imake | 4.1.1.0 AIXwindows imake Messages - Norwegian IBM-850 |
| X11.msg.No_NO.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Norwegian IBM-850 |
| X11.msg.No_NO.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Norwegian IBM-850 |
| X11.msg.No_NO.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Norwegian IBM-850 |
| X11.msg.No_NO.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Norwegian IBM-850 |
| X11.msg.No_NO.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Norwegian IBM-850 |
| X11.msg.No_NO.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Norwegian IBM-850 |
| X11.msg.No_NO.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Norwegian IBM-850 |
| X11.msg.No_NO.base.common | 4.1.1.0 AIXwindows Common Messages - Norwegian IBM-850 |

| Package | Description |
|---|---|
| X11.msg.No_NO.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Norwegian IBM-850 |
| X11.msg.No_NO.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Norwegian IBM-850 |
| X11.msg.No_NO.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Norwegian IBM-850 |
| X11.msg.No_NO.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Norwegian IBM-850 |
| X11.msg.No_NO.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Norwegian IBM-850 |
| X11.msg.No_NO.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Norwegian IBM-850 |
| X11.msg.No_NO.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Norwegian IBM-850 |
| X11.msg.No_NO.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Norwegian IBM-850 |
| X11.msg.Sv_SE package includes the following fileset(s); | |
| X11.msg.Sv_SE.Dt.rte | 4.1.3.0 AIX CDE Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.adt.imake | 4.1.1.0 AIXwindows imake Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.base.common | 4.1.1.0 AIXwindows Common Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Swedish IBM-850 |
| X11.msg.Sv_SE.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Swedish IBM-850 |
| X11.msg.de_DE package includes the following fileset(s); | |
| X11.msg.de_DE.Dt.rte | 4.1.3.0 AIX CDE Messages - German |
| X11.msg.de_DE.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - German |
| X11.msg.de_DE.adt.imake | 4.1.1.0 AIXwindows imake Messages - German |
| X11.msg.de_DE.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - German |
| X11.msg.de_DE.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - German |
| X11.msg.de_DE.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - German |
| X11.msg.de_DE.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - German |
| X11.msg.de_DE.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - German |
| X11.msg.de_DE.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - German |
| X11.msg.de_DE.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - German |
| X11.msg.de_DE.base.common | 4.1.1.0 AIXwindows Common Messages - German |
| X11.msg.de_DE.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - German |
| X11.msg.de_DE.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - German |
| X11.msg.de_DE.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - German |
| X11.msg.de_DE.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - German |

| Package | Description |
|---|---|
| X11.msg.de_DE.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - German |
| X11.msg.de_DE.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - German |
| X11.msg.de_DE.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - German |
| X11.msg.de_DE.x_st_mgr.rte | 4.1.1.0 Xstation Manager - German |
| X11.msg.en_US package includes the following fileset(s); | |
| X11.msg.en_US.Dt.rte | 4.1.3.0 AIX CDE Messages - U.S. English |
| X11.msg.en_US.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - U.S. English |
| X11.msg.en_US.adt.imake | 4.1.1.0 AIXwindows imake Messages - U.S. English |
| X11.msg.en_US.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - U.S. English |
| X11.msg.en_US.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - U.S. English |
| X11.msg.en_US.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - U.S. English |
| X11.msg.en_US.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - U.S. English |
| X11.msg.en_US.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - U.S. English |
| X11.msg.en_US.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - U.S. English |
| X11.msg.en_US.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - U.S. English |
| X11.msg.en_US.base.common | 4.1.1.0 AIXwindows Common Messages - U.S. English |
| X11.msg.en_US.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - U.S. English |
| X11.msg.en_US.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - U.S. English |
| X11.msg.en_US.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - U.S. English |
| X11.msg.en_US.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - U.S. English |
| X11.msg.en_US.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - U.S. English |
| X11.msg.en_US.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - U.S. English |
| X11.msg.en_US.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - U.S. English |
| X11.msg.en_US.x_st_mgr.rte | 4.1.1.0 Xstation Manager - U.S. English |
| X11.msg.es_ES package includes the following fileset(s); | |
| X11.msg.es_ES.Dt.rte | 4.1.3.0 AIX CDE Messages - Spanish |
| X11.msg.es_ES.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Spanish |
| X11.msg.es_ES.adt.imake | 4.1.1.0 AIXwindows imake Messages - Spanish |
| X11.msg.es_ES.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Spanish |
| X11.msg.es_ES.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Spanish |
| X11.msg.es_ES.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Spanish |
| X11.msg.es_ES.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Spanish |
| X11.msg.es_ES.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Spanish |
| X11.msg.es_ES.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Spanish |
| X11.msg.es_ES.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Spanish |
| X11.msg.es_ES.base.common | 4.1.1.0 AIXwindows Common Messages - Spanish |
| X11.msg.es_ES.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Spanish |
| X11.msg.es_ES.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Spanish |
| X11.msg.es_ES.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Spanish |
| X11.msg.es_ES.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Spanish |
| X11.msg.es_ES.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Spanish |
| X11.msg.es_ES.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Spanish |
| X11.msg.es_ES.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Spanish |
| X11.msg.es_ES.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Spanish |

| Package | Description |
|---|---|
| X11.msg.fr_FR package includes the following fileset(s); | |
| X11.msg.fr_FR.Dt.rte | 4.1.3.0 AIX CDE Messages - French |
| X11.msg.fr_FR.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - French |
| X11.msg.fr_FR.adt.imake | 4.1.1.0 AIXwindows imake Messages - French |
| X11.msg.fr_FR.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - French |
| X11.msg.fr_FR.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - French |
| X11.msg.fr_FR.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - French |
| X11.msg.fr_FR.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - French |
| X11.msg.fr_FR.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - French |
| X11.msg.fr_FR.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - French |
| X11.msg.fr_FR.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - French |
| X11.msg.fr_FR.base.common | 4.1.1.0 AIXwindows Common Messages - French |
| X11.msg.fr_FR.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - French |
| X11.msg.fr_FR.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - French |
| X11.msg.fr_FR.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - French |
| X11.msg.fr_FR.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - French |
| X11.msg.fr_FR.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - French |
| X11.msg.fr_FR.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - French |
| X11.msg.fr_FR.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - French |
| X11.msg.fr_FR.x_st_mgr.rte | 4.1.1.0 Xstation Manager - French |
| X11.msg.it_IT package includes the following fileset(s); | |
| X11.msg.it_IT.Dt.rte | 4.1.3.0 AIX CDE Messages - Italian |
| X11.msg.it_IT.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Italian |
| X11.msg.it_IT.adt.imake | 4.1.1.0 AIXwindows imake Messages - Italian |
| X11.msg.it_IT.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Italian |
| X11.msg.it_IT.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Italian |
| X11.msg.it_IT.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Italian |
| X11.msg.it_IT.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Italian |
| X11.msg.it_IT.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Italian |
| X11.msg.it_IT.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Italian |
| X11.msg.it_IT.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Italian |
| X11.msg.it_IT.base.common | 4.1.1.0 AIXwindows Common Messages - Italian |
| X11.msg.it_IT.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Italian |
| X11.msg.it_IT.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Italian |
| X11.msg.it_IT.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Italian |
| X11.msg.it_IT.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Italian |
| X11.msg.it_IT.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Italian |
| X11.msg.it_IT.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Italian |
| X11.msg.it_IT.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Italian |
| X11.msg.it_IT.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Italian |
| X11.msg.ja_JP package includes the following fileset(s); | |
| X11.msg.ja_JP.Dt.rte | 4.1.3.0 AIX CDE Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.adt.imake | 4.1.1.0 AIXwindows imake Messages - Japanese IBM-eucJP |

| Package | Description |
|---|---|
| X11.msg.ja_JP.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.base.common | 4.1.1.0 AIXwindows Common Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Japanese IBM-eucJP |
| X11.msg.ja_JP.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Japanese IBM-eucJP |
| X11.msg.ko_KR package includes the following fileset(s); | |
| X11.msg.ko_KR.Dt.rte | 4.1.3.0 AIX CDE Messages - Korean |
| X11.msg.ko_KR.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Korean |
| X11.msg.ko_KR.adt.imake | 4.1.1.0 AIXwindows imake Messages - Korean |
| X11.msg.ko_KR.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Korean |
| X11.msg.ko_KR.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Korean |
| X11.msg.ko_KR.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Korean |
| X11.msg.ko_KR.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Korean |
| X11.msg.ko_KR.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Korean |
| X11.msg.ko_KR.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Korean |
| X11.msg.ko_KR.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Korean |
| X11.msg.ko_KR.base.common | 4.1.1.0 AIXwindows Common Messages - Korean |
| X11.msg.ko_KR.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Korean |
| X11.msg.ko_KR.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Korean |
| X11.msg.ko_KR.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Korean |
| X11.msg.ko_KR.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Korean |
| X11.msg.ko_KR.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Korean |
| X11.msg.ko_KR.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Korean |
| X11.msg.ko_KR.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Korean |
| X11.msg.ko_KR.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Korean |
| X11.msg.nl_BE package includes the following fileset(s); | |
| X11.msg.nl_BE.Dt.rte | 4.1.3.0 AIX CDE Messages - Belgian Dutch |
| X11.msg.nl_BE.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Belgian Dutch |
| X11.msg.nl_BE.adt.imake | 4.1.1.0 AIXwindows imake Messages - Belgian Dutch |
| X11.msg.nl_BE.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Belgian Dutch |
| X11.msg.nl_BE.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Belgian Dutch |
| X11.msg.nl_BE.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Belgian Dutch |

| Package | Description |
|---|---|
| X11.msg.nl_BE.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Belgian Dutch |
| X11.msg.nl_BE.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Belgian Dutch |
| X11.msg.nl_BE.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Belgian Dutch |
| X11.msg.nl_BE.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Belgian Dutch |
| X11.msg.nl_BE.base.common | 4.1.1.0 AIXwindows Common Messages - Belgian Dutch |
| X11.msg.nl_BE.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Belgian Dutch |
| X11.msg.nl_BE.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Belgian Dutch |
| X11.msg.nl_BE.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Belgian Dutch |
| X11.msg.nl_BE.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Belgian Dutch |
| X11.msg.nl_BE.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Belgian Dutch |
| X11.msg.nl_BE.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Belgian Dutch |
| X11.msg.nl_BE.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Belgian Dutch |
| X11.msg.nl_BE.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Belgian Dutch |
| X11.msg.no_NO package includes the following fileset(s); | |
| X11.msg.no_NO.Dt.rte | 4.1.3.0 AIX CDE Messages - Norwegian |
| X11.msg.no_NO.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Norwegian |
| X11.msg.no_NO.adt.imake | 4.1.1.0 AIXwindows imake Messages - Norwegian |
| X11.msg.no_NO.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Norwegian |
| X11.msg.no_NO.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Norwegian |
| X11.msg.no_NO.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Norwegian |
| X11.msg.no_NO.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Norwegian |
| X11.msg.no_NO.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Norwegian |
| X11.msg.no_NO.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Norwegian |
| X11.msg.no_NO.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Norwegian |
| X11.msg.no_NO.base.common | 4.1.1.0 AIXwindows Common Messages - Norwegian |
| X11.msg.no_NO.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Norwegian |
| X11.msg.no_NO.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Norwegian |
| X11.msg.no_NO.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Norwegian |
| X11.msg.no_NO.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Norwegian |
| X11.msg.no_NO.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Norwegian |
| X11.msg.no_NO.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Norwegian |
| X11.msg.no_NO.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Norwegian |
| X11.msg.no_NO.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Norwegian |
| X11.msg.sv_SE package includes the following fileset(s); | |
| X11.msg.sv_SE.Dt.rte | 4.1.3.0 AIX CDE Messages - Swedish |
| X11.msg.sv_SE.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Swedish |
| X11.msg.sv_SE.adt.imake | 4.1.1.0 AIXwindows imake Messages - Swedish |
| X11.msg.sv_SE.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Swedish |
| X11.msg.sv_SE.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Swedish |
| X11.msg.sv_SE.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Swedish |
| X11.msg.sv_SE.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Swedish |
| X11.msg.sv_SE.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Swedish |
| X11.msg.sv_SE.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Swedish |
| X11.msg.sv_SE.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Swedish |

| Package | Description |
|---|---|
| X11.msg.sv_SE.base.common | 4.1.1.0 AIXwindows Common Messages - Swedish |
| X11.msg.sv_SE.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Swedish |
| X11.msg.sv_SE.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Swedish |
| X11.msg.sv_SE.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Swedish |
| X11.msg.sv_SE.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Swedish |
| X11.msg.sv_SE.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Swedish |
| X11.msg.sv_SE.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Swedish |
| X11.msg.sv_SE.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Swedish |
| X11.msg.sv_SE.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Swedish |
| X11.msg.zh_TW package includes the following fileset(s); | |
| X11.msg.zh_TW.Dt.rte | 4.1.3.0 AIX CDE Messages - Traditional Chinese |
| X11.msg.zh_TW.adt.ext | 4.1.1.0 AIXwindows X Extensions Messages - Traditional Chinese |
| X11.msg.zh_TW.adt.imake | 4.1.1.0 AIXwindows imake Messages - Traditional Chinese |
| X11.msg.zh_TW.apps.aixterm | 4.1.1.0 AIXwindows aixterm Messages - Traditional Chinese |
| X11.msg.zh_TW.apps.clients | 4.1.1.0 AIXwindows Client Application Messages - Traditional Chinese |
| X11.msg.zh_TW.apps.config | 4.1.1.0 AIXwindows Config Applications Messages - Traditional Chinese |
| X11.msg.zh_TW.apps.custom | 4.1.1.0 AIXwindows Customizing Tool Messages - Traditional Chinese |
| X11.msg.zh_TW.apps.ims | 4.1.1.0 AIXwindows Input Method Server Messages - Traditional Chinese |
| X11.msg.zh_TW.apps.rte | 4.1.1.0 AIXwindows Runtime Config Messages - Traditional Chinese |
| X11.msg.zh_TW.apps.xdm | 4.1.1.0 AIXwindows xdm Messages - Traditional Chinese |
| X11.msg.zh_TW.base.common | 4.1.1.0 AIXwindows Common Messages - Traditional Chinese |
| X11.msg.zh_TW.base.rte | 4.1.1.0 AIXwindows Runtime Environment Messages - Traditional Chinese |
| X11.msg.zh_TW.fnt.fontServer | 4.1.1.0 AIXwindows Font Server Messages - Traditional Chinese |
| X11.msg.zh_TW.fnt.util | 4.1.1.0 AIXwindows Font Utilities Messages - Traditional Chinese |
| X11.msg.zh_TW.info.rte | 4.1.1.0 AIXwindows InfoExplorer Runtime Messages - Traditional Chinese |
| X11.msg.zh_TW.motif.lib | 4.1.1.0 AIXwindows Motif Libraries Messages - Traditional Chinese |
| X11.msg.zh_TW.motif.mwm | 4.1.1.0 AIXwindows Motif Window Manager Messages - Traditional Chinese |
| X11.msg.zh_TW.vsm.rte | 4.1.1.0 Visual System Mgmt. Helps & Messages - Traditional Chinese |
| X11.msg.zh_TW.x_st_mgr.rte | 4.1.1.0 Xstation Manager - Traditional Chinese |
| X11.samples package includes the following fileset(s); | |
| X11.samples.apps.aixclients | 4.1.3.0 AIXwindows Sample AIX Clients Source |
| X11.samples.apps.clients | 4.1.3.0 AIXwindows Sample X Consortium Clients Binary/Source |
| X11.samples.apps.demos | 4.1.0.0 AIXwindows Sample X Consortium Demos Source |
| X11.samples.apps.motifdemos | 4.1.0.0 AIXwindows Sample Motif Demos Source |
| X11.samples.common | 4.1.0.0 AIXwindows Imakefile Structure for Samples |
| X11.samples.doc | 4.1.0.0 AIXwindows Sample Documents Source |
| X11.samples.ext | 4.1.3.0 AIXwindows Sample X Extensions Source |
| X11.samples.fnt.util | 4.1.0.0 AIXwindows Sample Font Server Utilities Source |
| X11.samples.im | 4.1.0.0 AIXwindows Sample Input Methods Source |
| X11.samples.lib.Core | 4.1.1.0 AIXwindows Sample X Consortium Core Libraries Binary/Source |
| X11.samples.rgb | 4.1.0.0 AIXwindows Sample Color Database Source |
| X11.vsm package includes the following fileset(s); | |
| X11.vsm.helps | 4.1.3.0 Visual System Management Default Help Messages |
| X11.vsm.icons | 4.1.3.0 Visual System Management Icons |

| Package | Description |
|---|---|
| X11.vsm.rte | 4.1.3.0 Visual System Management Runtime Environment |
| X11.x_st_mgr package includes the following fileset(s); | |
| X11.x_st_mgr.compat | 4.1.0.0 Xstation Manager Compatability |
| X11.x_st_mgr.rte | 4.1.3.0 Xstation Manager Runtime Enviroment |
| afs package includes the following fileset(s); | |
| afs.rte | 3.3.1.0 AFS client |
| blkmux package includes the following fileset(s); | |
| blkmux | 4.1.3.0 S/370 Block Multiplexer Support |
| bos package includes the following fileset(s); | |
| bos.rte | 4.1.3.0 Base Operating System Runtime |
| bos.rte.ILS | 4.1.3.0 International Language Support |
| bos.rte.SRC | 4.1.3.0 System Resource Controller |
| bos.rte.aio | 4.1.3.0 Asynchronous I/O Extension |
| bos.rte.archive | 4.1.3.0 Archive Commands |
| bos.rte.bind_cmds | 4.1.3.0 Binder and Loader Commands |
| bos.rte.boot | 4.1.3.0 Boot Commands |
| bos.rte.bosinst | 4.1.3.0 Base OS Install Commands |
| bos.rte.commands | 4.1.3.0 Commands |
| bos.rte.compare | 4.1.3.0 File Compare Commands |
| bos.rte.control | 4.1.3.0 System Control Commands |
| bos.rte.cron | 4.1.3.0 Batch Operations |
| bos.rte.date | 4.1.3.0 Date Control Commands |
| bos.rte.devices | 4.1.3.0 Base Device Drivers |
| bos.rte.devices_msg | 4.1.3.0 Device Driver Messages |
| bos.rte.diag | 4.1.3.0 Diagnostics |
| bos.rte.edit | 4.1.3.0 Editors |
| bos.rte.filesystem | 4.1.3.0 Filesystem Administration |
| bos.rte.iconv | 4.1.3.0 Language Converters |
| bos.rte.ifor_ls | 4.1.3.0 iFOR/LS Libraries |
| bos.rte.install | 4.1.3.0 LPP Install Commands |
| bos.rte.libc | 4.1.3.0 libc Library |
| bos.rte.libcfg | 4.1.3.0 libcfg Library |
| bos.rte.libcur | 4.1.3.0 libcurses Library |
| bos.rte.libpthreads | 4.1.3.0 libpthreads Library |
| bos.rte.libs | 4.1.3.0 libs Library |
| bos.rte.loc | 4.1.3.0 Base Locale Support |
| bos.rte.lvm | 4.1.3.0 Logical Volume Manager |
| bos.rte.man | 4.1.3.0 Man Commands |
| bos.rte.methods | 4.1.3.0 Device Config Methods |
| bos.rte.misc_cmds | 4.1.3.0 Miscellaneous Commands |
| bos.rte.odm | 4.1.3.0 Object Data Manager |
| bos.rte.printers | 4.1.3.0 Front End Printer Support |
| bos.rte.security | 4.1.3.0 Base Security Function |
| bos.rte.serv_aid | 4.1.3.0 Error Log Service Aids |

| Package | Description |
|---|---|
| bos.rte.shell | 4.1.3.0 Shells (bsh, ksh, csh) |
| bos.rte.tty | 4.1.3.0 Base TTY Support and Commands |
| bos.INed package includes the following fileset(s); | |
| bos.INed | 4.1.3.0 INed Editor |
| bos.acct package includes the following fileset(s); | |
| bos.acct | 4.1.3.0 Accounting Services |
| bos.adt package includes the following fileset(s); | |
| bos.adt.base | 4.1.3.0 Base Application Development Toolkit |
| bos.adt.data | 4.1.0.0 Base Application Development Toolkit Data |
| bos.adt.debug | 4.1.3.0 Base Application Development Debuggers |
| bos.adt.graphics | 4.1.3.0 Base Application Development Graphics Include Files |
| bos.adt.include | 4.1.3.0 Base Application Development Include Files |
| bos.adt.lib | 4.1.3.0 Base Application Development Libraries |
| bos.adt.libm | 4.1.3.0 Base Application Development Math Library |
| bos.adt.prof | 4.1.3.0 Base Profiling Support |
| bos.adt.prt_tools | 4.1.0.0 Printer Support Development Toolkit |
| bos.adt.samples | 4.1.3.0 Base Operating System Samples |
| bos.adt.sccs | 4.1.3.0 SCCS Application Development Toolkit |
| bos.adt.syscalls | 4.1.3.0 System Calls Application Development Toolkit |
| bos.adt.utils | 4.1.3.0 Base Application Development Utilities - lex and yacc |
| bos.compat package includes the following fileset(s); | |
| bos.compat.NetInstl | 4.1.0.0 AIX 3.2 Network Installation Tools |
| bos.compat.cmds | 4.1.3.0 AIX 4.1 Compatibility Commands |
| bos.compat.imk | 4.1.0.0 Base System Locale 3.1 Compatibility Links |
| bos.compat.lan | 4.1.3.0 LAN COMIO Compatibility Software |
| bos.compat.libs | 4.1.1.0 AIX 3.2 Compatibility Libraries |
| bos.compat.links | 4.1.0.0 AIX 3.2 to 4.1 Compatibility Links |
| bos.compat.msg | 4.1.0.0 AIX 3.1 Message Compatibility Links |
| bos.compat.net | 4.1.1.0 AIX 3.2 TCP/IP Compatability Commands |
| bos.compat.termcap | 4.1.1.0 AIX 3.2 Termcap Source and Library |
| bos.compat.termcap.data | 4.1.3.0 AIX 3.2 Termcap Source Data |
| bos.data package includes the following fileset(s); | |
| bos.data | 4.1.0.0 Base Operating System Data |
| bos.diag package includes the following fileset(s); | |
| bos.diag.rte | 4.1.3.0 Hardware Diagnostics |
| bos.dlc package includes the following fileset(s); | |
| bos.dlc.8023 | 4.1.3.0 IEEE Ethernet (802.3) Data Link Control |
| bos.dlc.com | 4.1.3.0 Common Data Link Control files |
| bos.dlc.com_enet | 4.1.0.0 Common Ethernet Data Link files |
| bos.dlc.ether | 4.1.3.0 Standard Ethernet Data Link Control |
| bos.dlc.fddi | 4.1.3.0 FDDI Data Link Control |
| bos.dlc.qllc | 4.1.3.0 X.25 QLLC Data Link Control |
| bos.dlc.sdlc | 4.1.3.0 SDLC Data Link Control |
| bos.dlc.token | 4.1.3.0 Token-Ring Data Link Control |

| Package | Description |
|---|---|
| bos.dosutil package includes the following fileset(s); | |
| bos.dosutil | 4.1.3.0 DOS Utilities |
| bos.games package includes the following fileset(s); | |
| bos.games | 4.1.1.0 Games |
| bos.iconv package includes the following fileset(s); | |
| bos.iconv.ar_AA | 4.1.0.0 EBCDIC and ASCII Language Converters - Arabic |
| bos.iconv.com | 4.1.3.0 Common Language to Language Converters |
| bos.iconv.da_DK | 4.1.0.0 EBCDIC and ASCII Language Converters - Danish |
| bos.iconv.de_DE | 4.1.0.0 EBCDIC and ASCII Language Converters - German |
| bos.iconv.el_GR | 4.1.0.0 EBCDIC and ASCII Language Converters - Greek |
| bos.iconv.en_GB | 4.1.0.0 EBCDIC and ASCII Language Converters - U.K. English |
| bos.iconv.es_ES | 4.1.0.0 EBCDIC and ASCII Language Converters - Spanish |
| bos.iconv.fr_FR | 4.1.0.0 EBCDIC and ASCII Language Converters - French |
| bos.iconv.is_IS | 4.1.0.0 EBCDIC and ASCII Language Converters - Icelandic |
| bos.iconv.iso2 | 4.1.0.0 EBCDIC and ASCII Language Converters - Latin 2 Countries |
| bos.iconv.iso5 | 4.1.0.0 EBCDIC and ASCII Language Converters - Cyrillic Countries |
| bos.iconv.it_IT | 4.1.0.0 EBCDIC and ASCII Language Converters - Italian |
| bos.iconv.iw_IL | 4.1.0.0 EBCDIC and ASCII Language Converters - Hebrew |
| bos.iconv.ja_JP | 4.1.3.0 EBCDIC and ASCII Language Converters - Japanese |
| bos.iconv.ko_KR | 4.1.0.0 EBCDIC and ASCII Language Converters - Korean |
| bos.iconv.tr_TR | 4.1.0.0 EBCDIC and ASCII Language Converters - Turkish |
| bos.iconv.ucs.ZH_CN | 4.1.3.0 Unicode Converters for Simplified Chinese |
| bos.iconv.ucs.com | 4.1.3.0 Unicode Base Converters for AIX Code Sets/Fonts |
| bos.iconv.ucs.ebcdic | 4.1.0.0 Unicode Converters for EBCDIC Code Sets |
| bos.iconv.ucs.pc | 4.1.0.0 Unicode Converters for Additional PC Code Sets |
| bos.iconv.zh_CN | 4.1.3.0 EBCDIC and ASCII Language Converters - Simplified Chinese |
| bos.iconv.zh_TW | 4.1.3.0 EBCDIC and ASCII Language Converters - Traditional Chinese |
| bos.ifor_ls package includes the following fileset(s); | |
| bos.ifor_ls.client | 4.1.3.0 iFOR/LS License System Client Utilities |
| bos.ifor_ls.server | 4.1.3.0 iFOR/LS License System Server |
| bos.info.en_US package includes the following fileset(s); | |
| bos.info.en_US.adapters_gd_ref | 4.1.3.0 Adapters Database - U.S. English |
| bos.info.en_US.aix_tech_ref | 4.1.3.0 AIX Technical Reference Database - U.S. English |
| bos.info.en_US.assemb_ref | 4.1.3.0 Assembler Database - U.S. English |
| bos.info.en_US.cmds_ref | 4.1.3.0 Commands Database - U.S. English |
| bos.info.en_US.files_ref | 4.1.3.0 Files Database - U.S. English |
| bos.info.en_US.info_help | 4.1.3.0 Help for InfoExplorer - U.S. English |
| bos.info.en_US.keybd_tech_ref | 4.1.3.0 Keyboard Technical Reference Database - U.S. English |
| bos.info.en_US.manage_gds | 4.1.3.0 AIX System Management Guides Database - U.S. English |
| bos.info.en_US.nav | 4.1.3.0 Navigation Database - U.S. English |
| bos.info.en_US.probsolv_gds | 4.1.3.0 AIX Problem Solving Guides Database - U.S. English |
| bos.info.en_US.prog_gds | 4.1.3.0 AIX Programming Guides - U.S. English |
| bos.info.en_US.smit_help | 4.1.3.0 Help for SMIT - U.S. English |
| bos.info.en_US.update | 4.1.3.0 Update Database - U.S. English |

| Package | Description |
|---|---|
| bos.info.en_US.user_gds | 4.1.3.0 AIX User Guides - U.S. English |
| bos.info.rte package includes the following fileset(s); | |
| bos.info.rte | 4.1.3.0 Base System InfoExplorer |
| bos.loc.adt package includes the following fileset(s); | |
| bos.loc.adt.iconv | 4.1.3.0 Language Converter Development Toolkit |
| bos.loc.adt.imk | 4.1.3.0 Keymap Development Toolkit |
| bos.loc.adt.locale | 4.1.3.0 Locale Development Toolkit |
| bos.loc.adt.unicode | 4.1.3.0 Developers Toolkit for Unicode |
| bos.loc.com package includes the following fileset(s); | |
| bos.loc.com.AR | 4.1.0.0 Common Locale Support - Arabic |
| bos.loc.com.EE | 4.1.0.0 Common Locale Support - Eastern Europe |
| bos.loc.com.IW | 4.1.0.0 Common Locale Support - Hebrew |
| bos.loc.com.JP | 4.1.3.0 Common Locale Support - Japanese |
| bos.loc.com.bidi | 4.1.1.0 Common Locale Support - Bidirectional Languages |
| bos.loc.fnt package includes the following fileset(s); | |
| bos.loc.fnt.iso1 | 4.1.0.0 Optional Fonts - Latin 1 |
| bos.loc.fnt.iso7 | 4.1.0.0 Optional Fonts - Greek |
| bos.loc.fnt.iso9 | 4.1.0.0 Optional Fonts - Turkish |
| bos.loc.iso package includes the following fileset(s); | |
| bos.loc.iso.ar_AA | 4.1.0.0 Base System Locale ISO Code Set - Arabic |
| bos.loc.iso.bg_BG | 4.1.0.0 Base System Locale ISO Code Set - Bulgarian |
| bos.loc.iso.ca_ES | 4.1.3.0 Base System Locale ISO Code Set - Catalan |
| bos.loc.iso.cs_CZ | 4.1.0.0 Base System Locale ISO Code Set - Czech |
| bos.loc.iso.da_DK | 4.1.1.0 Base System Locale ISO Code Set - Danish |
| bos.loc.iso.de_CH | 4.1.0.0 Base System Locale ISO Code Set - Swiss German |
| bos.loc.iso.de_DE | 4.1.0.0 Base System Locale ISO Code Set - German |
| bos.loc.iso.el_GR | 4.1.0.0 Base System Locale ISO Code Set - Greek |
| bos.loc.iso.en_GB | 4.1.0.0 Base System Locale ISO Code Set - U.K. English |
| bos.loc.iso.en_US | 4.1.0.0 Base System Locale ISO Code Set - U.S. English |
| bos.loc.iso.es_ES | 4.1.3.0 Base System Locale ISO Code Set - Spanish |
| bos.loc.iso.fi_FI | 4.1.0.0 Base System Locale ISO Code Set - Finish |
| bos.loc.iso.fr_BE | 4.1.0.0 Base System Locale ISO Code Set - Belgian French |
| bos.loc.iso.fr_CA | 4.1.0.0 Base System Locale ISO Code Set - Canadian French |
| bos.loc.iso.fr_CH | 4.1.0.0 Base System Locale ISO Code Set - Swiss French |
| bos.loc.iso.fr_FR | 4.1.0.0 Base System Locale ISO Code Set - French |
| bos.loc.iso.hr_HR | 4.1.0.0 Base System Locale ISO Code Set - Croatian |
| bos.loc.iso.hu_HU | 4.1.0.0 Base System Locale ISO Code Set - Hungarian |
| bos.loc.iso.is_IS | 4.1.1.0 Base System Locale ISO Code Set - Icelandic |
| bos.loc.iso.it_IT | 4.1.0.0 Base System Locale ISO Code Set - Italian |
| bos.loc.iso.iw_IL | 4.1.1.0 Base System Locale ISO Code Set - Hebrew |
| bos.loc.iso.ja_JP | 4.1.3.0 Base System Locale ISO Code Set - Japanese |
| bos.loc.iso.ko_KR | 4.1.3.0 Base System Locale ISO Code Set - Korean |
| bos.loc.iso.mk_MK | 4.1.0.0 Base System Locale ISO Code Set - Macedonian |
| bos.loc.iso.nl_BE | 4.1.0.0 Base System Locale ISO Code Set - Belgian Dutch |

| Package | Description |
|---|---|
| bos.loc.iso.nl_NL | 4.1.1.0 Base System Locale ISO Code Set - Netherlands Dutch |
| bos.loc.iso.no_NO | 4.1.0.0 Base System Locale ISO Code Set - Norwegian |
| bos.loc.iso.pl_PL | 4.1.0.0 Base System Locale ISO Code Set - Polish |
| bos.loc.iso.pt_BR | 4.1.1.0 Base System Locale ISO Code Set - Portuguese (Brazil) |
| bos.loc.iso.pt_PT | 4.1.0.0 Base System Locale ISO Code Set - Portuguese |
| bos.loc.iso.ro_RO | 4.1.0.0 Base System Locale ISO Code Set - Romanian |
| bos.loc.iso.ru_RU | 4.1.0.0 Base System Locale ISO Code Set - Russian |
| bos.loc.iso.sh_SP | 4.1.0.0 Base System Locale ISO Code Set - Serbian Latin |
| bos.loc.iso.sk_SK | 4.1.0.0 Base System Locale ISO Code Set - Slovak |
| bos.loc.iso.sl_SI | 4.1.0.0 Base System Locale ISO Code Set - Slovene |
| bos.loc.iso.sr_SP | 4.1.0.0 Base System Locale ISO Code Set - Serbian Cyrillic |
| bos.loc.iso.sv_SE | 4.1.0.0 Base System Locale ISO Code Set - Swedish |
| bos.loc.iso.tr_TR | 4.1.0.0 Base System Locale ISO Code Set - Turkish |
| bos.loc.iso.zh_CN | 4.1.3.0 Base System Locale ISO Code Set - Simplified Chinese |
| bos.loc.iso.zh_TW | 4.1.3.0 Base System Locale ISO Code Set - Taiwan |
| bos.loc.pc package includes the following fileset(s); | |
| bos.loc.pc.Ja_JP | 4.1.3.0 Base System Locale PC Code Set - Japanese |
| bos.loc.pc_compat package includes the following fileset(s); | |
| bos.loc.pc_compat.Ar_AA | 4.1.0.0 Base System Locale PC Code Set - Arabic |
| bos.loc.pc_compat.Ca_ES | 4.1.3.0 Base System Locale PC Code Set - Catalan |
| bos.loc.pc_compat.Da_DK | 4.1.1.0 Base System Locale PC Code Set - Danish |
| bos.loc.pc_compat.De_CH | 4.1.0.0 Base System Locale PC Code Set - Swiss German |
| bos.loc.pc_compat.De_DE | 4.1.0.0 Base System Locale PC Code Set - German |
| bos.loc.pc_compat.En_GB | 4.1.0.0 Base System Locale PC Code Set - U.K. English |
| bos.loc.pc_compat.En_US | 4.1.0.0 Base System Locale PC Code Set - U.S. English |
| bos.loc.pc_compat.Es_ES | 4.1.3.0 Base System Locale PC Code Set - Spanish |
| bos.loc.pc_compat.Fi_FI | 4.1.0.0 Base System Locale PC Code Set - Finish |
| bos.loc.pc_compat.Fr_BE | 4.1.0.0 Base System Locale PC Code Set - Belgian French |
| bos.loc.pc_compat.Fr_CA | 4.1.0.0 Base System Locale PC Code Set - Canadian French |
| bos.loc.pc_compat.Fr_CH | 4.1.0.0 Base System Locale PC Code Set - Swiss French |
| bos.loc.pc_compat.Fr_FR | 4.1.0.0 Base System Locale PC Code Set - French |
| bos.loc.pc_compat.Is_IS | 4.1.1.0 Base System Locale PC Code Set - Icelandic |
| bos.loc.pc_compat.It_IT | 4.1.0.0 Base System Locale PC Code Set - Italian |
| bos.loc.pc_compat.Iw_IL | 4.1.1.0 Base System Locale PC Code Set - Hebrew |
| bos.loc.pc_compat.Nl_BE | 4.1.1.0 Base System Locale PC Code Set - Belgian Dutch |
| bos.loc.pc_compat.Nl_NL | 4.1.1.0 Base System Locale PC Code Set - Netherlands Dutch |
| bos.loc.pc_compat.No_NO | 4.1.0.0 Base System Locale PC Code Set - Norwegian |
| bos.loc.pc_compat.Pt_PT | 4.1.0.0 Base System Locale PC Code Set - Portuguese |
| bos.loc.pc_compat.Sv_SE | 4.1.0.0 Base System Locale PC Code Set - Swedish |
| bos.loc.pc_compat.com | 4.1.0.0 Common Locale Support - PC Code Set |
| bos.loc.pc_compat.fnt | 4.1.0.0 Base System Locale PC Compatibility Fonts |
| bos.loc.utf package includes the following fileset(s); | |
| bos.loc.utf.ZH_CN | 4.1.3.0 Base System Locale UTF Code Set - Simplified Chinese |
| bos.lrn package includes the following fileset(s); | |

| Package | Description |
|---|---|
| bos.lrn | 4.1.3.0 Learning Basic Operating System Commands |
| bos.lrn.data | 4.1.0.0 Learning Basic Operating System Data |
| bos.mh package includes the following fileset(s); | |
| bos.mh | 4.1.3.0 Mail Handler |
| bos.msg.De_DE package includes the following fileset(s); | |
| bos.msg.De_DE.INed | 4.1.1.0 INed Editor Messages - German IBM-850 |
| bos.msg.De_DE.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - German IBM-850 |
| bos.msg.De_DE.net.tcp.client | 4.1.1.0 TCP/IP Messages - German IBM-850 |
| bos.msg.De_DE.rte | 4.1.1.0 Base Operating System Runtime Messages - German IBM-850 |
| bos.msg.De_DE.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - German IBM-850 |
| bos.msg.De_DE.txt.tfs | 4.1.1.0 Text Formatting Services Messages - German IBM-850 |
| bos.msg.En_US package includes the following fileset(s); | |
| bos.msg.En_US.INed | 4.1.1.0 INed Editor Messages - U.S. English IBM-850 |
| bos.msg.En_US.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - U.S. English IBM-850 |
| bos.msg.En_US.net.tcp.client | 4.1.1.0 TCP/IP Messages - U.S. English IBM-850 |
| bos.msg.En_US.rte | 4.1.1.0 Base Operating System Runtime Messages - U.S. English IBM-850 |
| bos.msg.En_US.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - U.S. English IBM-850 |
| bos.msg.En_US.txt.tfs | 4.1.1.0 Text Formatting Services Messages - U.S. English IBM-850 |
| bos.msg.Es_ES package includes the following fileset(s); | |
| bos.msg.Es_ES.INed | 4.1.1.0 INed Editor Messages - Spanish IBM-850 |
| bos.msg.Es_ES.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Spanish IBM-850 |
| bos.msg.Es_ES.net.tcp.client | 4.1.1.0 TCP/IP Messages - Spanish IBM-850 |
| bos.msg.Es_ES.rte | 4.1.1.0 Base Operating System Runtime Messages - Spanish IBM-850 |
| bos.msg.Es_ES.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Spanish IBM-850 |
| bos.msg.Es_ES.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Spanish IBM-850 |
| bos.msg.Fr_FR package includes the following fileset(s); | |
| bos.msg.Fr_FR.INed | 4.1.1.0 INed Editor Messages - French IBM-850 |
| bos.msg.Fr_FR.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - French IBM-850 |
| bos.msg.Fr_FR.net.tcp.client | 4.1.1.0 TCP/IP Messages - French IBM-850 |
| bos.msg.Fr_FR.rte | 4.1.1.0 Base Operating System Runtime Messages - French IBM-850 |
| bos.msg.Fr_FR.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - French IBM-850 |
| bos.msg.Fr_FR.txt.tfs | 4.1.1.0 Text Formatting Services Messages - French IBM-850 |
| bos.msg.It_IT package includes the following fileset(s); | |
| bos.msg.It_IT.INed | 4.1.1.0 INed Editor Messages - Italian IBM-850 |
| bos.msg.It_IT.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Italian IBM-850 |
| bos.msg.It_IT.net.tcp.client | 4.1.1.0 TCP/IP Messages - Italian IBM-850 |
| bos.msg.It_IT.rte | 4.1.1.0 Base Operating System Runtime Messages - Italian IBM-850 |
| bos.msg.It_IT.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Italian IBM-850 |
| bos.msg.It_IT.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Italian IBM-850 |
| bos.msg.Ja_JP package includes the following fileset(s); | |
| bos.msg.Ja_JP.INed | 4.1.1.0 INed Editor Messages - Japanese |
| bos.msg.Ja_JP.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Japanese |
| bos.msg.Ja_JP.net.tcp.client | 4.1.1.0 TCP/IP Messages - Japanese |
| bos.msg.Ja_JP.rte | 4.1.1.0 Base Operating System Runtime Messages - Japanese |

| Package | Description |
|---|---|
| bos.msg.Ja_JP.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Japanese |
| bos.msg.Ja_JP.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Japanese |
| bos.msg.Nl_BE package includes the following fileset(s); | |
| bos.msg.Nl_BE.INed | 4.1.1.0 INed Editor Messages - Belgian Dutch IBM-850 |
| bos.msg.Nl_BE.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Belgian Dutch IBM-850 |
| bos.msg.Nl_BE.net.tcp.client | 4.1.1.0 TCP/IP Messages - Belgian Dutch IBM-850 |
| bos.msg.Nl_BE.rte | 4.1.1.0 Base Operating System Runtime Messages - Belgian Dutch IBM-850 |
| bos.msg.Nl_BE.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Belgian Dutch IBM-850 |
| bos.msg.Nl_BE.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Belgian Dutch IBM-850 |
| bos.msg.No_NO package includes the following fileset(s); | |
| bos.msg.No_NO.INed | 4.1.1.0 INed Editor Messages - Norwegian IBM-850 |
| bos.msg.No_NO.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Norwegian IBM-850 |
| bos.msg.No_NO.net.tcp.client | 4.1.1.0 TCP/IP Messages - Norwegian IBM-850 |
| bos.msg.No_NO.rte | 4.1.1.0 Base Operating System Runtime Messages - Norwegian IBM-850 |
| bos.msg.No_NO.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Norwegian IBM-850 |
| bos.msg.No_NO.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Norwegian IBM-850 |
| bos.msg.Sv_SE package includes the following fileset(s); | |
| bos.msg.Sv_SE.INed | 4.1.1.0 INed Editor Messages - Swedish IBM-850 |
| bos.msg.Sv_SE.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Swedish IBM-850 |
| bos.msg.Sv_SE.net.tcp.client | 4.1.1.0 TCP/IP Messages - Swedish IBM-850 |
| bos.msg.Sv_SE.rte | 4.1.3.0 Base Operating System Runtime Messages - Swedish IBM-850 |
| bos.msg.Sv_SE.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Swedish IBM-850 |
| bos.msg.Sv_SE.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Swedish IBM-850 |
| bos.msg.de_DE package includes the following fileset(s); | |
| bos.msg.de_DE.INed | 4.1.1.0 INed Editor Messages - German |
| bos.msg.de_DE.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - German |
| bos.msg.de_DE.net.tcp.client | 4.1.1.0 TCP/IP Messages - German |
| bos.msg.de_DE.rte | 4.1.1.0 Base Operating System Runtime Messages - German |
| bos.msg.de_DE.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - German |
| bos.msg.de_DE.txt.tfs | 4.1.1.0 Text Formatting Services Messages - German |
| bos.msg.en_US package includes the following fileset(s); | |
| bos.msg.en_US.INed | 4.1.1.0 INed Editor Messages - U.S. English |
| bos.msg.en_US.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - U.S. English |
| bos.msg.en_US.net.tcp.client | 4.1.1.0 TCP/IP Messages - U.S. English |
| bos.msg.en_US.rte | 4.1.1.0 Base Operating System Runtime Messages - U.S. English |
| bos.msg.en_US.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - U.S. English |
| bos.msg.en_US.txt.tfs | 4.1.1.0 Text Formatting Services Messages - U.S. English |
| bos.msg.es_ES package includes the following fileset(s); | |
| bos.msg.es_ES.INed | 4.1.1.0 INed Editor Messages - Spanish |
| bos.msg.es_ES.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Spanish |
| bos.msg.es_ES.net.tcp.client | 4.1.1.0 TCP/IP Messages - Spanish |
| bos.msg.es_ES.rte | 4.1.1.0 Base Operating System Runtime Messages - Spanish |
| bos.msg.es_ES.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Spanish |
| bos.msg.es_ES.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Spanish |

| Package | Description |
|---|---|
| bos.msg.fr_FR package includes the following fileset(s); | |
| bos.msg.fr_FR.INed | 4.1.1.0 INed Editor Messages - French |
| bos.msg.fr_FR.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - French |
| bos.msg.fr_FR.net.tcp.client | 4.1.1.0 TCP/IP Messages - French |
| bos.msg.fr_FR.rte | 4.1.1.0 Base Operating System Runtime Messages - French |
| bos.msg.fr_FR.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - French |
| bos.msg.fr_FR.txt.tfs | 4.1.1.0 Text Formatting Services Messages - French |
| bos.msg.it_IT package includes the following fileset(s); | |
| bos.msg.it_IT.INed | 4.1.1.0 INed Editor Messages - Italian |
| bos.msg.it_IT.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Italian |
| bos.msg.it_IT.net.tcp.client | 4.1.1.0 TCP/IP Messages - Italian |
| bos.msg.it_IT.rte | 4.1.1.0 Base Operating System Runtime Messages - Italian |
| bos.msg.it_IT.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Italian |
| bos.msg.it_IT.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Italian |
| bos.msg.ja_JP package includes the following fileset(s); | |
| bos.msg.ja_JP.INed | 4.1.1.0 INed Editor Messages - Japanese IBM-eucJP |
| bos.msg.ja_JP.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Japanese IBM-eucJP |
| bos.msg.ja_JP.net.tcp.client | 4.1.1.0 TCP/IP Messages - Japanese IBM-eucJP |
| bos.msg.ja_JP.rte | 4.1.1.0 Base Operating System Runtime Messages - Japanese IBM-eucJP |
| bos.msg.ja_JP.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Japanese IBM-eucJP |
| bos.msg.ja_JP.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Japanese IBM-eucJP |
| bos.msg.ko_KR package includes the following fileset(s); | |
| bos.msg.ko_KR.INed | 4.1.1.0 INed Editor Messages - Korean |
| bos.msg.ko_KR.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Korean |
| bos.msg.ko_KR.net.tcp.client | 4.1.1.0 TCP/IP Messages - Korean |
| bos.msg.ko_KR.rte | 4.1.1.0 Base Operating System Runtime Messages - Korean |
| bos.msg.ko_KR.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Korean |
| bos.msg.ko_KR.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Korean |
| bos.msg.nl_BE package includes the following fileset(s); | |
| bos.msg.nl_BE.INed | 4.1.1.0 INed Editor Messages - Belgian Dutch |
| bos.msg.nl_BE.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Belgian Dutch |
| bos.msg.nl_BE.net.tcp.client | 4.1.1.0 TCP/IP Messages - Belgian Dutch |
| bos.msg.nl_BE.rte | 4.1.1.0 Base Operating System Runtime Messages - Belgian Dutch |
| bos.msg.nl_BE.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Belgian Dutch |
| bos.msg.nl_BE.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Belgian Dutch |
| bos.msg.no_NO package includes the following fileset(s); | |
| bos.msg.no_NO.INed | 4.1.1.0 INed Editor Messages - Norwegian |
| bos.msg.no_NO.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Norwegian |
| bos.msg.no_NO.net.tcp.client | 4.1.1.0 TCP/IP Messages - Norwegian |
| bos.msg.no_NO.rte | 4.1.1.0 Base Operating System Runtime Messages - Norwegian |
| bos.msg.no_NO.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Norwegian |
| bos.msg.no_NO.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Norwegian |
| bos.msg.sv_SE package includes the following fileset(s); | |
| bos.msg.sv_SE.INed | 4.1.1.0 INed Editor Messages - Swedish |

| Package | Description |
|---|---|
| bos.msg.sv_SE.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Swedish |
| bos.msg.sv_SE.net.tcp.client | 4.1.1.0 TCP/IP Messages - Swedish |
| bos.msg.sv_SE.rte | 4.1.3.0 Base Operating System Runtime Messages - Swedish |
| bos.msg.sv_SE.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Swedish |
| bos.msg.sv_SE.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Swedish |
| bos.msg.zh_TW package includes the following fileset(s); | |
| bos.msg.zh_TW.INed | 4.1.1.0 INed Editor Messages - Traditional Chinese |
| bos.msg.zh_TW.diag.rte | 4.1.1.0 Hardware Diagnostics Messages - Traditional Chinese |
| bos.msg.zh_TW.net.tcp.client | 4.1.1.0 TCP/IP Messages - Traditional Chinese |
| bos.msg.zh_TW.rte | 4.1.1.0 Base Operating System Runtime Messages - Traditional Chinese |
| bos.msg.zh_TW.rte.mp | 4.1.1.0 Base Operating System MP Runtime Msgs - Traditional Chinese |
| bos.msg.zh_TW.txt.tfs | 4.1.1.0 Text Formatting Services Messages - Traditional Chinese |
| bos.net package includes the following fileset(s); | |
| bos.net.ate | 4.1.3.0 Asynchronous Terminal Emulator |
| bos.net.ncs | 4.1.3.0 Network Computing System 1.5.1 |
| bos.net.nfs.adt | 4.1.2.0 Network File System Development Toolkit |
| bos.net.nfs.client | 4.1.3.0 Network File System Client |
| bos.net.nfs.server | 4.1.0.0 Network File System Server |
| bos.net.nis.client | 4.1.3.0 Network Information Service Client |
| bos.net.nis.server | 4.1.3.0 Network Information Service Server |
| bos.net.tcp.adt | 4.1.0.0 TCP/IP Application Toolkit |
| bos.net.tcp.client | 4.1.3.0 TCP/IP Client Support |
| bos.net.tcp.server | 4.1.3.0 TCP/IP Server |
| bos.net.tcp.smit | 4.1.3.0 TCP/IP SMIT Support |
| bos.net.uucp | 4.1.3.0 Unix to Unix Copy Program |
| bos.pci package includes the following fileset(s); | |
| bos.pci | 4.1.1.0 AIX DOS Server for use with AIX Access for DOS Users |
| bos.perf package includes the following fileset(s); | |
| bos.perf.diag_tool | 4.1.3.0 Performance Diagnostic Tool |
| bos.perf.pmr | 4.1.0.0 Performance PMR Data Collection Tool |
| bos.powermgt package includes the following fileset(s); | |
| bos.powermgt.rte | 4.1.3.0 Power Management Runtime Software |
| bos.rcs package includes the following fileset(s); | |
| bos.rcs | 4.1.3.0 Remote Customer Support and Services |
| bos.rte.mp package includes the following fileset(s); | |
| bos.rte.mp | 4.1.3.0 Base Operating System Multiprocessor Runtime |
| bos.rte.up package includes the following fileset(s); | |
| bos.rte.up | 4.1.3.0 Base Operating System Uniprocessor Runtime |
| bos.som package includes the following fileset(s); | |
| bos.som.comp | 4.1.3.0 SOM Compiler |
| bos.som.dsom | 4.1.3.0 Distributed SOM Framework (DSOM) |
| bos.som.rte | 4.1.3.0 SOM Run-time Kernel and Interface Repository Framework |
| bos.som.util | 4.1.3.0 SOMobjects Utility Classes |
| bos.sysmgt package includes the following fileset(s); | |

| Package | Description |
|---|---|
| bos.sysmgt.loginlic | 4.1.1.0 License Management |
| bos.sysmgt.nim.client | 4.1.3.0 Network Install Manager - Client Tools |
| bos.sysmgt.nim.master | 4.1.3.0 Network Install Manager - Master Tools |
| bos.sysmgt.nim.spot | 4.1.3.0 Network Install Manager - SPOT |
| bos.sysmgt.quota | 4.1.3.0 Filesystem Quota Commands |
| bos.sysmgt.serv_aid | 4.1.3.0 Software Error Logging and Dump Service Aids |
| bos.sysmgt.smit | 4.1.3.0 System Management Interface Tool (SMIT) |
| bos.sysmgt.sysbr | 4.1.3.0 System Backup and BOS Install Utilities |
| bos.sysmgt.trace | 4.1.3.0 Software Trace Service Aids |
| bos.sysmgt.smit.softlic package includes the following fileset(s); | |
| bos.sysmgt.smit.softlic | 4.1.3.0 Software License Support |
| bos.terminfo package includes the following fileset(s); | |
| bos.terminfo.adds.data | 4.1.0.0 ADDS Terminal Definitions |
| bos.terminfo.annarbor.data | 4.1.0.0 Annarbor Terminal Definitions |
| bos.terminfo.ansi.data | 4.1.0.0 Amer National Stds Institute Terminal Defs |
| bos.terminfo.att.data | 4.1.0.0 AT&T Terminal Definitions |
| bos.terminfo.beehive.data | 4.1.0.0 Beehive Terminal Definitions |
| bos.terminfo.bull.data | 4.1.3.0 Bull Terminal Definitions |
| bos.terminfo.cdc.data | 4.1.0.0 Control Data Corp. Terminal Definitions |
| bos.terminfo.colorscan.data | 4.1.0.0 Datamedia Colorscan Terminal Definitions |
| bos.terminfo.com.data | 4.1.0.0 Common Terminal Definitions |
| bos.terminfo.datamedia.data | 4.1.0.0 Datamedia Terminal Definitions |
| bos.terminfo.dec.data | 4.1.3.0 Digital Equipment Corp. Terminal Definitions |
| bos.terminfo.diablo.data | 4.1.0.0 Generic Daisy Wheel Terminal Definitions |
| bos.terminfo.falco.data | 4.1.0.0 Falco Terminal Definitions |
| bos.terminfo.fortune.data | 4.1.0.0 Fortune Terminal Definitions |
| bos.terminfo.general.data | 4.1.0.0 General Terminal Corp. Term Definitions |
| bos.terminfo.hardcopy.data | 4.1.0.0 Hard Copy Terminals Definitions |
| bos.terminfo.hazeltine.data | 4.1.0.0 Hazeltine Terminal Definitions |
| bos.terminfo.hds.data | 4.1.0.0 Human Designed Systems Terminal Definitions |
| bos.terminfo.heath.data | 4.1.0.0 Heathkit and Zenith Terminal Definitions |
| bos.terminfo.homebrew.data | 4.1.0.0 Home-made Terminal Definitions |
| bos.terminfo.hp.data | 4.1.0.0 Hewlett-Packard Terminal Definitions |
| bos.terminfo.ibm.data | 4.1.3.0 IBM Terminal Definitions |
| bos.terminfo.lsi.data | 4.1.0.0 Lear Siegler Terminal Definitions |
| bos.terminfo.microterm.data | 4.1.0.0 Microterm Terminal Definitions |
| bos.terminfo.misc.data | 4.1.0.0 Miscellaneous Terminal Definitions |
| bos.terminfo.pc.data | 4.1.0.0 Personal Computer Terminal Definitions |
| bos.terminfo.pci.data | 4.1.0.0 DOS Server Terminal Definitions |
| bos.terminfo.perkinelmer.data | 4.1.0.0 Perkin Elmer Terminal Definitions |
| bos.terminfo.pmcons.data | 4.1.0.0 PMAX Console Terminal Definitions |
| bos.terminfo.print.data | 4.1.0.0 Generic Line Printer Terminal Definitions |
| bos.terminfo.rte | 4.1.3.0 Run-time Environment for AIX Terminals |
| bos.terminfo.special.data | 4.1.1.0 Special Generic Terminal Definitions |

| Package | Description |
|---|---|
| bos.terminfo.sperry.data | 4.1.0.0 Sperry Terminal Definitions |
| bos.terminfo.tektronix.data | 4.1.0.0 Tektronix Terminal Definitions |
| bos.terminfo.teleray.data | 4.1.0.0 Teleray Terminal Definitions |
| bos.terminfo.televideo.data | 4.1.0.0 Televideo Terminal Definitions |
| bos.terminfo.ti.data | 4.1.0.0 Texas Instruments Terminal Definitions |
| bos.terminfo.tymshare.data | 4.1.0.0 Tymshare Terminal Definitions |
| bos.terminfo.visual.data | 4.1.0.0 Visual Terminal Definitions |
| bos.terminfo.wyse.data | 4.1.0.0 Wyse Terminal Definitions |
| bos.txt package includes the following fileset(s); | |
| bos.txt.bib | 4.1.1.0 Bibliography Support |
| bos.txt.bib.data | 4.1.0.0 Bibliography Support Data |
| bos.txt.hplj.fnt | 4.1.0.0 Fonts for Hewlett Packard Laser Jet Printers |
| bos.txt.ibm3812.fnt | 4.1.0.0 Fonts for IBM 3812 Printer |
| bos.txt.ibm3816.fnt | 4.1.0.0 Fonts for IBM 3816 Printer |
| bos.txt.spell | 4.1.1.0 Writer's Tools Commands |
| bos.txt.spell.data | 4.1.0.0 Writer's Tools Data |
| bos.txt.tfs | 4.1.3.0 Text Formatting Services Commands |
| bos.txt.tfs.data | 4.1.0.0 Text Formatting Services Data |
| bos.txt.ts | 4.1.0.0 TranScript Tools |
| bos.txt.xpv.dps | 4.1.1.0 Troff Postscript Xpreviewer |
| bos.txt.xpv.rte | 4.1.3.0 Troff Xpreviewer |
| cics.base package includes the following fileset(s); | |
| cics.base.adt | 2.1.0.0 CICS Base Development System |
| cics.base.rte | 2.1.0.0 CICS Base Runtime |
| cics.books package includes the following fileset(s); | |
| cics.books.agdoc | 2.1.0.0 CICS Administration Guide |
| cics.books.apgdoc | 2.1.0.0 CICS Application Programming Guide |
| cics.books.aprdoc | 2.1.0.0 CICS Application Programming Reference |
| cics.books.ardoc | 2.1.0.0 CICS Administration Reference |
| cics.books.cspdoc | 2.1.0.0 CICS Family - Client/Server Programming |
| cics.books.ecdoc | 2.1.0.0 Encina for CICS |
| cics.books.igdoc | 2.1.0.0 CICS Intercommunications Guide |
| cics.books.ipcdoc | 2.1.0.0 CICS Family - InterProduct Communications |
| cics.books.mcdoc | 2.1.0.0 CICS Messages and Codes |
| cics.books.pdgdoc | 2.1.0.0 CICS Problem Determination Guide |
| cics.books.pigdoc | 2.1.0.0 CICS Planning and Installation Guide |
| cics.client package includes the following fileset(s); | |
| cics.client.adt | 2.1.0.0 CICS Client Development System |
| cics.client.rte | 2.1.0.0 CICS Client Runtime |
| cics.info.en_US package includes the following fileset(s); | |
| cics.info.en_US | 2.1.0.0 CICS Hyperverse - en_US |
| cics.msg.Ja_JP package includes the following fileset(s); | |
| cics.msg.Ja_JP.base | 2.1.0.0 CICS Messages - Ja_JP |
| cics.msg.en_US package includes the following fileset(s); | |

| Package | Description |
|---|---|
| cics.msg.en_US.base | 2.1.0.0 CICS Messages - en_US |
| cics.msg.ja_JP package includes the following fileset(s); | |
| cics.msg.ja_JP.base | 2.1.0.0 CICS Messages - ja_JP |
| cics.msg.ko_KR package includes the following fileset(s); | |
| cics.msg.ko_KR.base | 2.1.0.0 CICS Messages - ko_KR |
| cics.msg.zh_CN package includes the following fileset(s); | |
| cics.msg.zh_CN.base | 2.1.0.0 CICS Messages - zh_CN |
| cics.server package includes the following fileset(s); | |
| cics.server.adt | 2.1.0.0 CICS Server Development System |
| cics.server.adt.ivp | 2.1.0.0 CICS Server Development System IVPs |
| cics.server.rte | 2.1.0.0 CICS Server Runtime |
| cics.server.rte.ivp | 2.1.0.0 CICS Server Runtime IVPs |
| cluster package includes the following fileset(s); | |
| cluster.client | 4.1.0.0 HACMP for AIX |
| cluster.server | 4.1.0.0 HACMP for AIX |
| dce.cdmf package includes the following fileset(s); | |
| dce.cdmf.rte | 2.1.95.619 DCE User Data Masking |
| dce.cds package includes the following fileset(s); | |
| dce.cds.rte | 2.1.95.619 DCE Cell Directory Services |
| dce.dfsnfs package includes the following fileset(s); | |
| dce.dfsnfs.rte | 2.1.95.619 DCE NFS to DFS Authenticating Gateway |
| dce.edfs package includes the following fileset(s); | |
| dce.edfs.rte | 2.1.95.619 DCE Enhanced DFS |
| dce.priv package includes the following fileset(s); | |
| dce.priv.rte | 2.1.95.619 DCE Privacy Level Protection Feature |
| dce.security package includes the following fileset(s); | |
| dce.security.rte | 2.1.95.619 DCE Security Services |
| dce.tools package includes the following fileset(s); | |
| dce.tools.admin.rte | 2.1.95.619 DCE Administration Tools |
| dce.tools.appdev.adt | 2.1.95.619 DCE Application Development Tools |
| devices.base package includes the following fileset(s); | |
| devices.base.com | 4.1.3.0 Common Base System Device Software |
| devices.base.rte | 4.1.3.0 Uniprocessor Base System Device Software |
| devices.buc.00004001 package includes the following fileset(s); | |
| devices.buc.00004001.X11 | 4.1.3.0 AIXwindows GXT100 Graphics Adapter Software |
| devices.buc.00004001.X11.com | 4.1.0.0 AIXwindows GXT100 Graphics Adapter Common Software |
| devices.buc.00004001.com | 4.1.3.0 GXT100 Graphics Adapter Family Common Software |
| devices.buc.00004001.diag | 4.1.3.0 GXT100 Graphics Adapter Diagnostics |
| devices.buc.00004001.rte | 4.1.0.0 GXT100 Graphics Adapter Software |
| devices.buc.00004002 package includes the following fileset(s); | |
| devices.buc.00004002.X11 | 4.1.3.0 AIXwindows GXT500 Graphics Adapter Software |
| devices.buc.00004002.diag | 4.1.3.0 GXT500 Graphics Adapter Diagnostics |
| devices.buc.00004002.rte | 4.1.3.0 GXT500 Graphics Adapter Software |
| devices.buc.00004005 package includes the following fileset(s); | |

| Package | Description |
|---|---|
| devices.buc.00004005.X11 | 4.1.0.0 AIXwindows GXT150 Graphics Adapter Software |
| devices.buc.00004005.diag | 4.1.0.0 GXT150 Graphics Adapter Diagnostics |
| devices.buc.00004005.rte | 4.1.0.0 GXT150 Graphics Adapter Software |
| devices.buc.00004006 package includes the following fileset(s); | |
| devices.buc.00004006.X11 | 4.1.0.0 AIXwindows GXT150L Graphics Adapter Software |
| devices.buc.00004006.diag | 4.1.0.0 GXT150L Graphics Adapter Diagnostics |
| devices.buc.00004006.rte | 4.1.0.0 GXT150L Graphics Adapter Software |
| devices.buc.00004007 package includes the following fileset(s); | |
| devices.buc.00004007.X11 | 4.1.0.0 AIXwindows GXT155L Graphics Adapter Software |
| devices.buc.00004007.diag | 4.1.0.0 GXT155L Graphics Adapter Diagnostics |
| devices.buc.00004007.rte | 4.1.0.0 GXT155L Graphics Adapter Software |
| devices.graphics package includes the following fileset(s); | |
| devices.graphics.com | 4.1.3.0 Graphics Adapter Common Software |
| devices.graphics.voo | 4.1.3.0 Graphics Adapter VOO and Stereo Software |
| devices.ide.cdrom package includes the following fileset(s); | |
| devices.ide.cdrom.rte | 4.1.3.0 IDE CDROM Device Software |
| devices.ide.disk package includes the following fileset(s); | |
| devices.ide.disk.rte | 4.1.3.0 IDE Disk Device Software |
| devices.isa.IBM0010 package includes the following fileset(s); | |
| devices.isa.IBM0010.rte | 4.1.3.0 IBM ISA Ethernet Adapter Software (IBM0010) |
| devices.isa.PNP80CC package includes the following fileset(s); | |
| devices.isa.PNP80CC.rte | 4.1.3.0 IBM 16/4 PowerPC Token-Ring Adapter (isa-PNP80CC) Software |
| devices.isa.c1x package includes the following fileset(s); | |
| devices.isa.c1x.diag | 4.1.3.0 X.25 CoProcessor/1 Adapter Diagnostics |
| devices.isa.c1x.rte | 4.1.3.0 X.25 CoProcessor/1 Adapter Software |
| devices.isa.cxia package includes the following fileset(s); | |
| devices.isa.cxia.diag | 4.1.3.0 RISC PC ISA Async 8 Port Adapter Diagnostics |
| devices.isa.cxia.rte | 4.1.3.0 ISA 8-Port Asynchronous Adapter Software |
| devices.isa.cxia.ucode | 4.1.3.0 ISA 8-Port Asynchronous Adapter Microcode |
| devices.isa.ethernet package includes the following fileset(s); | |
| devices.isa.ethernet.rte | 4.1.3.0 IBM ISA Ethernet Adapter Software |
| devices.isa.pcmcia package includes the following fileset(s); | |
| devices.isa.pcmcia.rte | 4.1.3.0 PCMCIA Bus Adapter Software |
| devices.isa.sio package includes the following fileset(s); | |
| (dee6vices.isa.sio.rte | 4.1.3.0 RISC PC Standard I/O Software |
| devices.isa.tokenring package includes the following fileset(s); | |
| devices.isa.tokenring.rte | 4.1.3.0 IBM 16/4 PowerPC Token-Ring Adapter (isa) Software |
| devices.isa_sio.IBM0005.IBM8301 package includes the following fileset(s); | |
| devices.isa_sio.IBM0005.IBM8301.rte | 4.1.3.0 ISA Power Management Controller Software |
| devices.isa_sio.IBM000E package includes the following fileset(s); | |
| devices.isa_sio.IBM000E.rte | 4.1.2.0 AIX Ultimedia Services RISC PC Audio Device (CS4231) |
| devices.isa_sio.IBM000E.NA package includes the following fileset(s); | |
| devices.isa_sio.IBM000E.NA | 4.1.3.0 Empty Fileset for UMS LPP Audio Dev. Support |
| devices.isa_sio.IBM0012.NA package includes the following fileset(s); | |

| Package | Description |
|---|---|
| devices.isa_sio.IBM0012.NA | 4.1.3.0 Empty Fileset for Optional CS4232 Gameport |
| devices.isa_sio.IBM0013.NA package includes the following fileset(s); | |
| devices.isa_sio.IBM0013.NA | 4.1.3.0 Empty Fileset for Optional CS4232 MIDI Support |
| devices.isa_sio.IBM0017 package includes the following fileset(s); | |
| devices.isa_sio.IBM0017.rte | 4.1.2.0 AIX Ultimedia Services RISC PC Audio Device (CS4232) |
| devices.isa_sio.IBM0017.NA package includes the following fileset(s); | |
| devices.isa_sio.IBM0017.NA | 4.1.3.0 Empty Fileset for UMS LPP Audio Dev. Support |
| devices.isa_sio.IBM001C package includes the following fileset(s); | |
| devices.isa_sio.IBM001C.rte | 4.1.3.0 RISC PC EPP Parallel Port Adapter Software (IBM001C) |
| devices.isa_sio.IBM001D.NA package includes the following fileset(s); | |
| devices.isa_sio.IBM001D.NA | 4.1.3.0 Empty Fileset for Optional Yamaha Audio Support |
| devices.isa_sio.PNP0303 package includes the following fileset(s); | |
| devices.isa_sio.PNP0303.diag | 4.1.3.0 ISA Keyboard Diagnostics (PNP0303) |
| devices.isa_sio.PNP0303.rte | 4.1.3.0 ISA Keyboard Software (PNP0303) |
| devices.isa_sio.PNP0400 package includes the following fileset(s); | |
| devices.isa_sio.PNP0400.diag | 4.1.3.0 RISC PC Standard Parallel Port Adapter Diagnostics (PNP0400) |
| devices.isa_sio.PNP0400.rte | 4.1.3.0 RISC PC Standard Parallel Port Adapter Software (PNP0400) |
| devices.isa_sio.PNP0401 package includes the following fileset(s); | |
| devices.isa_sio.PNP0401.diag | 4.1.3.0 RISC PC ECP Parallel Port Adapter Diagnostics (PNP0401) |
| devices.isa_sio.PNP0401.rte | 4.1.3.0 RISC PC ECP Parallel Port Adapter Software (PNP0401) |
| devices.isa_sio.PNP0501 package includes the following fileset(s); | |
| devices.isa_sio.PNP0501.diag | 4.1.3.0 RISC PC Standard Serial Adapter Diagnostics (PNP0501) |
| devices.isa_sio.PNP0501.rte | 4.1.3.0 RISC PC Standard Serial Adapter Software (PNP0501) |
| devices.isa_sio.PNP0600 package includes the following fileset(s); | |
| devices.isa_sio.PNP0600.com | 4.1.3.0 Common IDE Device Software |
| devices.isa_sio.PNP0600.rte | 4.1.3.0 IDE Adapter Device Software |
| devices.isa_sio.PNP0700 package includes the following fileset(s); | |
| devices.isa_sio.PNP0700.diag | 4.1.3.0 RISC PC Diskette Adapter Diagnostics (PNP0700) |
| devices.isa_sio.PNP0700.rte | 4.1.3.0 RISC PC Diskette Adapter Software (PNP0700) |
| devices.isa_sio.PNP0E00 package includes the following fileset(s); | |
| devices.isa_sio.PNP0E00.rte | 4.1.3.0 PCMCIA Bus Software (PNP0E00) |
| devices.isa_sio.PNP0F03 package includes the following fileset(s); | |
| devices.isa_sio.PNP0F03.diag | 4.1.3.0 ISA Mouse Diagnostics (PNP0F03) |
| devices.isa_sio.PNP0F03.rte | 4.1.3.0 ISA Mouse Software (PNP0F03) |
| devices.isa_sio.baud package includes the following fileset(s); | |
| devices.isa_sio.baud.rte | 4.1.2.0 AIX Ultimedia Services New RISC PC Audio Device |
| devices.isa_sio.baud.NA package includes the following fileset(s); | |
| devices.isa_sio.baud.NA | 4.1.3.0 Empty Fileset for UMS LPP Audio Dev. Support |
| devices.isa_sio.fda package includes the following fileset(s); | |
| devices.isa_sio.fda.diag | 4.1.3.0 RISC PC Diskette Adapter Diagnostics |
| devices.isa_sio.fda.rte | 4.1.3.0 RISC PC Diskette Adapter Software |
| devices.isa_sio.km package includes the following fileset(s); | |
| devices.isa_sio.km.diag | 4.1.3.0 ISA Keyboard & Mouse Diagnostics |
| devices.isa_sio.km.rte | 4.1.3.0 ISA Keyboard & Mouse Software |

| Package | Description |
|---|---|
| devices.isa_sio.ppa package includes the following fileset(s); | |
| devices.isa_sio.ppa.diag | 4.1.3.0 RISC PC Parallel Printer Adapter Diagnostics |
| devices.isa_sio.ppa.rte | 4.1.3.0 RISC PC Parallel Printer Adapter Software |
| devices.isa_sio.sa package includes the following fileset(s); | |
| devices.isa_sio.sa.diag | 4.1.3.0 RISC PC Standard Serial Adapter Diagnostics |
| devices.isa_sio.sa.rte | 4.1.3.0 RISC PC Standard Serial Adapter Software |
| devices.mca.8787 package includes the following fileset(s); | |
| devices.mca.8787.diag | 4.1.3.0 5085/86/88 Attachment Adapter Diagnostics |
| devices.mca.8787.rte | 4.1.3.0 5085/86/88 Attachment Adapter Software |
| devices.mca.8787.ucode | 4.1.3.0 5085/86/88 Attachment Adapter Microcode |
| devices.mca.8d77 package includes the following fileset(s); | |
| devices.mca.8d77.com | 4.1.3.0 Common SCSI I/O Controller Software |
| devices.mca.8d77.diag | 4.1.0.0 8-bit SCSI I/O Controller Diagnostics |
| devices.mca.8d77.rte | 4.1.3.0 8-bit SCSI I/O Controller Software |
| devices.mca.8d77.ucode | 4.1.3.0 8-bit SCSI I/O Controller Microcode |
| devices.mca.8ee3 package includes the following fileset(s); | |
| devices.mca.8ee3.X11 | 4.1.3.0 AIXwindows Gt3/Gt4 Graphics Adapter Software |
| devices.mca.8ee3.diag | 4.1.3.0 Gt3/Gt4 Graphics Adapter Diagnostics |
| devices.mca.8ee3.rte | 4.1.3.0 Gt3/Gt4 Graphics Adapter Software |
| devices.mca.8ee3.ucode | 4.1.3.0 Gt3/Gt4 Graphics Adapter Microcode |
| devices.mca.8ee4 package includes the following fileset(s); | |
| devices.mca.8ee4.X11 | 4.1.3.0 AIXwindows Color Graphics Display Adapter Software |
| devices.mca.8ee4.diag | 4.1.0.0 Color Graphics Display Adapter Diagnostics |
| devices.mca.8ee4.rte | 4.1.1.0 Color Graphics Display Adapter Software |
| devices.mca.8ee5 package includes the following fileset(s); | |
| devices.mca.8ee5.X11 | 4.1.0.0 AIXwindows Grayscale Graphics Display Adapter Software |
| devices.mca.8ee5.diag | 4.1.0.0 Grayscale Graphics Display Adapter Diagnostics |
| devices.mca.8ee5.rte | 4.1.0.0 Grayscale Graphics Display Adapter Software |
| devices.mca.8ef2 package includes the following fileset(s); | |
| devices.mca.8ef2.com | 4.1.3.0 Common Integrated Ethernet Software |
| devices.mca.8ef2.diag | 4.1.2.0 Integrated Ethernet Adapter (8ef2) Diagnostics |
| devices.mca.8ef2.diag.com | 4.1.3.0 Common Integrated Ethernet Diagnostics |
| devices.mca.8ef2.rte | 4.1.0.0 Integrated Ethernet Adapter (8ef2) Software |
| devices.mca.8ef3 package includes the following fileset(s); | |
| devices.mca.8ef3.diag | 4.1.1.0 Integrated Ethernet Adapter (8ef3) Diagnostics |
| devices.mca.8ef3.rte | 4.1.0.0 Integrated Ethernet Adapter (8ef3) Software |
| devices.mca.8ef4 package includes the following fileset(s); | |
| devices.mca.8ef4.com | 4.1.3.0 Common FDDI Software |
| devices.mca.8ef4.diag | 4.1.3.0 FDDI Adapter (8ef4) Diagnostics |
| devices.mca.8ef4.rte | 4.1.3.0 FDDI Adapter (8ef4) Software |
| devices.mca.8ef4.ucode | 4.1.3.0 FDDI Adapter (8ef4) Microcode |
| devices.mca.8ef5 package includes the following fileset(s); | |
| devices.mca.8ef5.com | 4.1.3.0 Common Ethernet Software |
| devices.mca.8ef5.diag | 4.1.3.0 Ethernet High-Performance LAN Adapter (8ef5) Diagnostics |

| Package | Description |
|---|---|
| devices.mca.8ef5.rte | 4.1.3.0 Ethernet High-Performance LAN Adapter (8ef5) Software |
| devices.mca.8efc package includes the following fileset(s); | |
| devices.mca.8efc.com | 4.1.3.0 Common 16-bit SCSI I/O Controller Software |
| devices.mca.8efc.diag | 4.1.3.0 16-bit SCSI I/O Controller Diagnostics |
| devices.mca.8efc.rte | 4.1.3.0 16-bit SCSI I/O Controller Software |
| devices.mca.8f70 package includes the following fileset(s); | |
| devices.mca.8f70.diag | 4.1.3.0 Portmaster Adapter/A Diagnostics |
| devices.mca.8f70.mpqp | 4.1.3.0 4-Port Selectable Portmaster Adapter/A (MPQP) Software |
| devices.mca.8f70.rte | 4.1.3.0 Portmaster Adapter/A Software |
| devices.mca.8f78 package includes the following fileset(s); | |
| devices.mca.8f78.diag | 4.1.3.0 Serial Linked Disk Adapter/Controller/DASD Diagnostics |
| devices.mca.8f78.rte | 4.1.3.0 Serial Linked Disk Adapter/Controller/DAMD Software |
| devices.mca.8f78.ucode | 4.1.0.0 Serial Linked Disk Adapter/Controller/DASD Microcode |
| devices.mca.8f96 package includes the following fileset(s); | |
| devices.mca.8f96.rte | 4.1.2.0 AIX Ultimedia Services Video I/O Adapter |
| devices.mca.8f97 package includes the following fileset(s); | |
| devices.mca.8f97.com | 4.1.3.0 Common SSA Adapter (8f97) Software |
| devices.mca.8f97.diag | 4.1.3.0 SSA Adapter (8f97) Diagnostics |
| devices.mca.8f97.rte | 4.1.3.0 SSA Adapter (8f97) Software |
| devices.mca.8f98 package includes the following fileset(s); | |
| devices.mca.8f98.diag | 4.1.0.0 Integrated Ethernet Adapter (8f98) Diagnostics |
| devices.mca.8f98.rte | 4.1.0.0 Integrated Ethernet Adapter (8f98) Software |
| devices.mca.8f9a package includes the following fileset(s); | |
| devices.mca.8f9a.X11 | 4.1.3.0 AIXwindows GXT150M Graphics Adapter Software |
| devices.mca.8f9a.diag | 4.1.3.0 GXT150M Graphics Adapter Diagnostics |
| devices.mca.8f9a.rte | 4.1.3.0 GXT150M Graphics Adapter Software |
| devices.mca.8f9a.ucode | 4.1.2.0 GXT150M Graphics Adapter Microcode |
| devices.mca.8fa2 package includes the following fileset(s); | |
| devices.mca.8fa2.diag | 4.1.3.0 Token Ring High-Performance Adapter (8fa2) Diagnostics |
| devices.mca.8fa2.rte | 4.1.3.0 Token Ring High-Performance Adapter (8fa2) Software |
| devices.mca.8fba package includes the following fileset(s); | |
| devices.mca.8fba.com | 4.1.3.0 Common NCR53C7XX SCSI Software |
| devices.mca.8fba.diag | 4.1.0.0 Standard NCR53C720 SCSI Diagnostics |
| devices.mca.8fba.rte | 4.1.3.0 Standard NCR53C720 SCSI Software |
| devices.mca.8fbc package includes the following fileset(s); | |
| devices.mca.8fbc.X11 | 4.1.3.0 AIXwindows GXT1000 Graphics Adapter Software |
| devices.mca.8fbc.diag | 4.1.3.0 GXT1000 Graphics Adapter Diagnostics |
| devices.mca.8fbc.rte | 4.1.3.0 GXT1000 Graphics Adapter Software |
| devices.mca.8fbc.ucode | 4.1.3.0 GXT1000 Graphics Adapter Microcode |
| devices.mca.8fc8 package includes the following fileset(s); | |
| devices.mca.8fc8.com | 4.1.3.0 Common Token Ring Software |
| devices.mca.8fc8.diag | 4.1.3.0 Token Ring High-Performance Adapter (8fc8) Diagnostics |
| devices.mca.8fc8.rte | 4.1.3.0 Token Ring High-Performance Adapter (8fc8) Software |
| devices.mca.8fc8.ucode | 4.1.0.0 Token Ring High-Performance Adapter (8fc8) Microcode |

| Package | Description |
|---|---|
| devices.mca.8ff4 package includes the following fileset(s); | |
| devices.mca.8ff4.diag | 4.1.0.0 Standard NCR53C700 SCSI Diagnostics |
| devices.mca.8ff4.rte | 4.1.3.0 Standard NCR53C700 SCSI Software |
| devices.mca.8ffd package includes the following fileset(s); | |
| devices.mca.8ffd.X11 | 4.1.3.0 AIXwindows GTO Graphics Adapter Software |
| devices.mca.8ffd.diag | 4.1.3.0 High Speed 3D Graphics Adapter Diagnostics |
| devices.mca.8ffd.rte | 4.1.3.0 High Speed 3D Graphics Adapter Software |
| devices.mca.8ffd.ucode | 4.1.3.0 High Speed 3D Graphics Adapter Microcode |
| devices.mca.dee6 package includes the following fileset(s); | |
| (dee6vices.mca.dee6.rte | 4.1.0.0 Standard I/O (dee6) Adapter Software |
| devices.mca.deff package includes the following fileset(s); | |
| devices.mca.deff.diag | 4.1.3.0 Multiprotocol Adapter/A (MP/A) Diagnostics Support |
| devices.mca.deff.rte | 4.1.3.0 Multiprotocol Adapter/A (MP/A) Configuration Support |
| devices.mca.deff.sdlc | 4.1.3.0 Multiprotocol Adapter/A (MP/A) SDLC Device Driver |
| devices.mca.df5f package includes the following fileset(s); | |
| devices.mca.df5f.com | 4.1.1.0 Standard I/O Adapter Common Software |
| devices.mca.df5f.rte | 4.1.0.0 Standard I/O (df5f) Adapter Software |
| devices.mca.df9f package includes the following fileset(s); | |
| devices.mca.df9f.com | 4.1.3.0 Common Direct Attached Disk Software |
| devices.mca.df9f.diag | 4.1.1.0 Direct Attached Disk Diagnostics |
| devices.mca.df9f.rte | 4.1.2.0 Direct Attached Disk Software |
| devices.mca.dfe5 package includes the following fileset(s); | |
| devices.mca.dfe5.rte | 4.1.2.0 AIX Ultimedia Services RISC Audio Device |
| devices.mca.e1ff package includes the following fileset(s); | |
| devices.mca.e1ff.diag | 4.1.0.0 3270 Connection Adapter Diagnostics |
| devices.mca.e1ff.rte | 4.1.3.0 3270 Connection Adapter Software |
| devices.mca.edd0 package includes the following fileset(s); | |
| devices.mca.edd0.com | 4.1.3.0 Common Async Adapter Support |
| devices.mca.edd0.diag | 4.1.0.0 8-Port Asynchronous Adapter EIA-232 Diagnostics |
| devices.mca.edd0.rte | 4.1.3.0 8-Port Asynchronous Adapter EIA-232 Software |
| devices.mca.edd1 package includes the following fileset(s); | |
| devices.mca.edd1.diag | 4.1.0.0 8-Port Asynchronous Adapter EIA-422 Diagnostics |
| devices.mca.edd1.rte | 4.1.3.0 8-Port Asynchronous Adapter EIA-422 Software |
| devices.mca.edd2 package includes the following fileset(s); | |
| devices.mca.edd2.diag | 4.1.0.0 8-Port Asynchronous Adapter MIL-STD 188 Diagnostics |
| devices.mca.edd2.rte | 4.1.3.0 8-Port Asynchronous Adapter MIL-STD 188 Software |
| devices.mca.edd3 package includes the following fileset(s); | |
| devices.mca.edd3.diag | 4.1.0.0 16-Port Asynchronous Adapter EIA-422 Diagnostics |
| devices.mca.edd3.rte | 4.1.3.0 16-Port Asynchronous Adapter EIA-422 Software |
| devices.mca.edd5 package includes the following fileset(s); | |
| devices.mca.edd5.X11 | 4.1.3.0 AIXwindows Graphics Input Adapter Software |
| devices.mca.edd5.com | 4.1.3.0 Dials/Lighted Program Function Keyboard |
| devices.mca.edd5.diag | 4.1.3.0 Graphics Input Adapter and Device Diagnostics |
| devices.mca.edd5.rte | 4.1.1.0 Graphics Input Adapter Software |

| Package | Description |
|---|---|
| devices.mca.edd6 package includes the following fileset(s); | |
| devices.mca.edd6.diag | 4.1.0.0 16-Port Asynchronous Adapter EIA-232 Diagnostics |
| devices.mca.edd6.rte | 4.1.3.0 16-Port Asynchronous Adapter EIA-232 Software |
| devices.mca.efc6 package includes the following fileset(s); | |
| devices.mca.efc6.X11 | 4.1.3.0 AIXwindows BBLMCA Graphics Adapter Software |
| devices.mca.efc6.diag | 4.1.0.0 BBLMCA Graphics Adapter Diagnostics |
| devices.mca.efc6.rte | 4.1.0.0 BBLMCA Graphics Adapter Software |
| devices.mca.eff0 package includes the following fileset(s); | |
| devices.mca.eff0.diag | 4.1.0.0 X.25 CoProcessor/2 or Multiport/2 Adapter Diagnostics |
| devices.mca.eff0.rte | 4.1.1.0 X.25 CoProcessor/2 or Multiport/2 Adapter Software |
| devices.mca.f6f8 package includes the following fileset(s); | |
| devices.mca.f6f8.diag | 4.1.3.0 MCA Keyboard & Mouse Adapter (f6f8) Diagnostics |
| devices.mca.f6f8.rte | 4.1.3.0 MCA Keyboard & Mouse Adapter (f6f8) Software |
| devices.mca.f6fe package includes the following fileset(s); | |
| devices.mca.f6fe.rte | 4.1.0.0 Standard I/O (f6fe) Adapter Software |
| devices.mca.fe92 package includes the following fileset(s); | |
| devices.mca.fe92.diag | 4.1.3.0 Block Multiplexer Channel Adapter Diagnostics |
| devices.mca.fe92.rte | 4.1.3.0 Block Multiplexer Channel Adapter Software |
| devices.mca.fe92.ucode | 4.1.1.0 Block Multiplexer Channel Adapter Microcode |
| devices.mca.fed9 package includes the following fileset(s); | |
| devices.mca.fed9.rte | 4.1.0.0 Standard I/O (fed9) Adapter Software |
| devices.mca.ffe1 package includes the following fileset(s); | |
| devices.mca.ffe1.diag | 4.1.0.0 128-Port Asynchronous Adapter Diagnostics |
| devices.mca.ffe1.rte | 4.1.3.0 128-Port Asynchronous Adapter Software |
| devices.mca.ffe1.ucode | 4.1.0.0 128-Port Asynchronous Adapter Microcode |
| devices.msg.De_DE package includes the following fileset(s); | |
| devices.msg.De_DE.base.com | 4.1.1.0 Base System Device Software Messages - German IBM-850 |
| devices.msg.De_DE.diag.rte | 4.1.1.0 Device Diagnostics Messages - German IBM-850 |
| devices.msg.De_DE.rspc.base.com | 4.1.1.0 RISC PC Software Messages - German IBM-850 |
| devices.msg.De_DE.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - German IBM-850 |
| devices.msg.En_US package includes the following fileset(s); | |
| devices.msg.En_US.base.com | 4.1.1.0 Base System Device Software Messages - U.S. English IBM-850 |
| devices.msg.En_US.diag.rte | 4.1.1.0 Device Diagnostics Messages - U.S. English IBM-850 |
| devices.msg.En_US.rspc.base.com | 4.1.1.0 RISC PC Software Messages - U.S. English IBM-850 |
| devices.msg.En_US.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - U.S. English IBM-850 |
| devices.msg.Es_ES package includes the following fileset(s); | |
| devices.msg.Es_ES.base.com | 4.1.1.0 Base System Device Software Messages - Spanish IBM-850 |
| devices.msg.Es_ES.diag.rte | 4.1.1.0 Device Diagnostics Messages - Spanish IBM-850 |
| devices.msg.Es_ES.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Spanish IBM-850 |
| devices.msg.Es_ES.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Spanish IBM-850 |
| devices.msg.Fr_FR package includes the following fileset(s); | |
| devices.msg.Fr_FR.base.com | 4.1.1.0 Base System Device Software Messages - French IBM-850 |
| devices.msg.Fr_FR.diag.rte | 4.1.1.0 Device Diagnostics Messages - French IBM-850 |
| devices.msg.Fr_FR.rspc.base.com | 4.1.1.0 RISC PC Software Messages - French IBM-850 |

| Package | Description |
|---|---|
| devices.msg.Fr_FR.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - French IBM-850 |
| devices.msg.It_IT package includes the following fileset(s); | |
| devices.msg.It_IT.base.com | 4.1.1.0 Base System Device Software Messages - Italian IBM-850 |
| devices.msg.It_IT.diag.rte | 4.1.1.0 Device Diagnostics Messages - Italian IBM-850 |
| devices.msg.It_IT.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Italian IBM-850 |
| devices.msg.It_IT.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Italian IBM-850 |
| devices.msg.Ja_JP package includes the following fileset(s); | |
| devices.msg.Ja_JP.base.com | 4.1.1.0 Base System Device Software Messages - Japanese |
| devices.msg.Ja_JP.diag.rte | 4.1.1.0 Device Diagnostics Messages - Japanese |
| devices.msg.Ja_JP.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Japanese |
| devices.msg.Ja_JP.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Japanese |
| devices.msg.Nl_BE package includes the following fileset(s); | |
| devices.msg.Nl_BE.base.com | 4.1.1.0 Base System Device Software Messages - Belgian Dutch IBM-850 |
| devices.msg.Nl_BE.diag.rte | 4.1.1.0 Device Diagnostics Messages - Belgian Dutch IBM-850 |
| devices.msg.Nl_BE.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Belgian Dutch IBM-850 |
| devices.msg.Nl_BE.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Belgian Dutch IBM-850 |
| devices.msg.No_NO package includes the following fileset(s); | |
| devices.msg.No_NO.base.com | 4.1.1.0 Base System Device Software Messages - Norwegian IBM-850 |
| devices.msg.No_NO.diag.rte | 4.1.1.0 Device Diagnostics Messages - Norwegian IBM-850 |
| devices.msg.No_NO.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Norwegian IBM-850 |
| devices.msg.No_NO.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Norwegian IBM-850 |
| devices.msg.Sv_SE package includes the following fileset(s); | |
| devices.msg.Sv_SE.base.com | 4.1.1.0 Base System Device Software Messages - Swedish IBM-850 |
| devices.msg.Sv_SE.diag.rte | 4.1.1.0 Device Diagnostics Messages - Swedish IBM-850 |
| devices.msg.Sv_SE.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Swedish IBM-850 |
| devices.msg.Sv_SE.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Swedish IBM-850 |
| devices.msg.de_DE package includes the following fileset(s); | |
| devices.msg.de_DE.base.com | 4.1.1.0 Base System Device Software Messages - German |
| devices.msg.de_DE.diag.rte | 4.1.1.0 Device Diagnostics Messages - German |
| devices.msg.de_DE.rspc.base.com | 4.1.1.0 RISC PC Software Messages - German |
| devices.msg.de_DE.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - German |
| devices.msg.en_US package includes the following fileset(s); | |
| devices.msg.en_US.base.com | 4.1.1.0 Base System Device Software Messages - U.S. English |
| devices.msg.en_US.diag.rte | 4.1.1.0 Device Diagnostics Messages - U.S. English |
| devices.msg.en_US.rspc.base.com | 4.1.1.0 RISC PC Software Messages - U.S. English |
| devices.msg.en_US.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - U.S. English |
| devices.msg.es_ES package includes the following fileset(s); | |
| devices.msg.es_ES.base.com | 4.1.1.0 Base System Device Software Messages - Spanish |
| devices.msg.es_ES.diag.rte | 4.1.1.0 Device Diagnostics Messages - Spanish |
| devices.msg.es_ES.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Spanish |
| devices.msg.es_ES.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Spanish |
| devices.msg.fr_FR package includes the following fileset(s); | |
| devices.msg.fr_FR.base.com | 4.1.1.0 Base System Device Software Messages - French |
| devices.msg.fr_FR.diag.rte | 4.1.1.0 Device Diagnostics Messages - French |

| Package | Description |
|---|---|
| devices.msg.fr_FR.rspc.base.com | 4.1.1.0 RISC PC Software Messages - French |
| devices.msg.fr_FR.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - French |
| devices.msg.it_IT package includes the following fileset(s); | |
| devices.msg.it_IT.base.com | 4.1.1.0 Base System Device Software Messages - Italian |
| devices.msg.it_IT.diag.rte | 4.1.1.0 Device Diagnostics Messages - Italian |
| devices.msg.it_IT.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Italian |
| devices.msg.it_IT.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Italian |
| devices.msg.ja_JP package includes the following fileset(s); | |
| devices.msg.ja_JP.base.com | 4.1.1.0 Base System Device Software Messages - Japanese IBM-eucJP |
| devices.msg.ja_JP.diag.rte | 4.1.1.0 Device Diagnostics Messages - Japanese IBM-eucJP |
| devices.msg.ja_JP.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Japanese IBM-eucJP |
| devices.msg.ja_JP.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Japanese IBM-eucJP |
| devices.msg.ko_KR package includes the following fileset(s); | |
| devices.msg.ko_KR.base.com | 4.1.1.0 Base System Device Software Messages - Korean |
| devices.msg.ko_KR.diag.rte | 4.1.1.0 Device Diagnostics Messages - Korean |
| devices.msg.ko_KR.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Korean |
| devices.msg.ko_KR.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Korean |
| devices.msg.nl_BE package includes the following fileset(s); | |
| devices.msg.nl_BE.base.com | 4.1.1.0 Base System Device Software Messages - Belgian Dutch |
| devices.msg.nl_BE.diag.rte | 4.1.1.0 Device Diagnostics Messages - Belgian Dutch |
| devices.msg.nl_BE.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Belgian Dutch |
| devices.msg.nl_BE.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Belgian Dutch |
| devices.msg.no_NO package includes the following fileset(s); | |
| devices.msg.no_NO.base.com | 4.1.1.0 Base System Device Software Messages - Norwegian |
| devices.msg.no_NO.diag.rte | 4.1.1.0 Device Diagnostics Messages - Norwegian |
| devices.msg.no_NO.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Norwegian |
| devices.msg.no_NO.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Norwegian |
| devices.msg.sv_SE package includes the following fileset(s); | |
| devices.msg.sv_SE.base.com | 4.1.1.0 Base System Device Software Messages - Swedish |
| devices.msg.sv_SE.diag.rte | 4.1.1.0 Device Diagnostics Messages - Swedish |
| devices.msg.sv_SE.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Swedish |
| devices.msg.sv_SE.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Swedish |
| devices.msg.zh_TW package includes the following fileset(s); | |
| devices.msg.zh_TW.base.com | 4.1.1.0 Base System Device Software Messages - Traditional Chinese |
| devices.msg.zh_TW.diag.rte | 4.1.1.0 Device Diagnostics Messages - Traditional Chinese |
| devices.msg.zh_TW.rspc.base.com | 4.1.1.0 RISC PC Software Messages - Traditional Chinese |
| devices.msg.zh_TW.sys.mca.rte | 4.1.1.0 Micro Channel Bus Software Messages - Traditional Chinese |
| devices.pci.00100100 package includes the following fileset(s); | |
| devices.pci.00100100.rte | 4.1.3.0 Standard NCR53C810 SCSI Software |
| devices.pci.00100300 package includes the following fileset(s); | |
| devices.pci.00100300.diag | 4.1.3.0 PCI 16-bit SCSI I/O Controller Diagnostics |
| devices.pci.00100300.rte | 4.1.3.0 PCI 16-bit SCSI I/O Controller Software |
| devices.pci.0e100091 package includes the following fileset(s); | |
| devices.pci.0e100091.X11 | 4.1.3.0 AIXwindows S15/H10 Graphics Adapter Software |

| Package | Description |
|---|---|
| devices.pci.0e100091.diag | 4.1.3.0 S15/H10 Graphics Adapter Diagnostics |
| devices.pci.0e100091.rte | 4.1.3.0 H10/S15 Graphics Adapter Software |
| devices.pci.14101300 package includes the following fileset(s); | |
| devices.pci.14101300.X11 | 4.1.3.0 AIXwindows S10 Graphics Adapter Software |
| devices.pci.14101300.rte | 4.1.3.0 S10 Graphics Adapter Software |
| devices.pci.14101800 package includes the following fileset(s); | |
| devices.pci.14101800.diag | 4.1.3.0 PCI Tokenring Adapter Diagnostic |
| devices.pci.14101800.rte | 4.1.3.0 IBM PCI Tokenring Adapter Software |
| devices.pci.14101b00 package includes the following fileset(s); | |
| devices.pci.14101b00.X11 | 4.1.3.0 AIXwindows GXT150P Graphics Adapter Software |
| devices.pci.14101b00.rte | 4.1.3.0 GXT150P Graphics Adapter Software |
| devices.pci.14101c00 package includes the following fileset(s); | |
| devices.pci.14101c00.rte | 4.1.3.0 Power Management Controller Software |
| devices.pci.1c104ac2 package includes the following fileset(s); | |
| devices.pci.1c104ac2.X11 | 4.1.3.0 AIXwindows G10 Graphics Adapter Software |
| devices.pci.1c104ac2.rte | 4.1.3.0 G10 Graphics Adapter Software |
| devices.pci.22100020 package includes the following fileset(s); | |
| devices.pci.22100020.diag | 4.1.3.0 PCI Ethernet Adapter Diagnostics |
| devices.pci.22100020.rte | 4.1.3.0 IBM PCI Ethernet Adapter Software |
| devices.pci.3353b088 package includes the following fileset(s); | |
| devices.pci.3353b088.X11 | 4.1.3.0 AIXwindows E10 Graphics Adapter Software |
| devices.pci.3353b088.rte | 4.1.3.0 E10 Graphics Adapter Software |
| devices.pci.3353c088 package includes the following fileset(s); | |
| devices.pci.3353c088.X11 | 4.1.0.0 AIXwindows E15 Graphics Adapter Software 0 |
| devices.pci.3353c088.X11.com | 4.1.3.0 AIXwindows E15 Graphics Adapter Family Common Software |
| devices.pci.3353c088.com | 4.1.3.0 E15 Graphics Adapter Family Common Software |
| devices.pci.3353c088.rte | 4.1.3.0 E15 Graphics Adapter Software 0 |
| devices.pci.3353c188 package includes the following fileset(s); | |
| devices.pci.3353c188.X11 | 4.1.0.0 AIXwindows E15 Graphics Adapter Software 1 |
| devices.pci.3353c188.rte | 4.1.3.0 E15 Graphics Adapter Software 1 |
| devices.pci.3353c288 package includes the following fileset(s); | |
| devices.pci.3353c288.X11 | 4.1.0.0 AIXwindows E15 Graphics Adapter Software 2 |
| devices.pci.3353c288.rte | 4.1.3.0 E15 Graphics Adapter Software 2 |
| devices.pci.3353c388 package includes the following fileset(s); | |
| devices.pci.3353c388.X11 | 4.1.0.0 AIXwindows E15 Graphics Adapter Software 3 |
| devices.pci.3353c388.rte | 4.1.3.0 E15 Graphics Adapter Software 3 |
| devices.pci.86808404 package includes the following fileset(s); | |
| devices.pci.86808404.com | 4.1.3.0 Common ISA Bus Software |
| devices.pci.86808404.rte | 4.1.3.0 ISA Bus Software |
| devices.pci.PNP0A00 package includes the following fileset(s); | |
| devices.pci.PNP0A00.rte | 4.1.3.0 ISA Bus Bridge Software (PNP0A00) |
| devices.pci.PNP0A03 package includes the following fileset(s); | |
| devices.pci.PNP0A03.rte | 4.1.3.0 PCI Bus Bridge Software |
| devices.pci.ed101073 package includes the following fileset(s); | |

| Package | Description |
|---|---|
| devices.pci.ed101073.rte | 4.1.3.0 G10 Graphics with Motion Video Adapter Software |
| devices.pcmcia.a4000200 package includes the following fileset(s); | |
| devices.pcmcia.a4000200.rte | 4.1.3.0 IBM PCMCIA Ethernet Card Software |
| devices.pcmcia.a4001d00 package includes the following fileset(s); | |
| devices.pcmcia.a4001d00.rte | 4.1.3.0 IBM PCMCIA High Speed Fax Modem Card Software |
| devices.pcmcia.a4001e00 package includes the following fileset(s); | |
| devices.pcmcia.a4001e00.rte | 4.1.3.0 IBM PCMCIA Tokenring Card Software |
| devices.pcmcia.ethernet package includes the following fileset(s); | |
| devices.pcmcia.ethernet.com | 4.1.3.0 Common PCMCIA Ethernet Card Software |
| devices.pcmcia.serial package includes the following fileset(s); | |
| devices.pcmcia.serial.com | 4.1.3.0 Common PCMCIA Serial Port Software |
| devices.pcmcia.tokenring package includes the following fileset(s); | |
| devices.pcmcia.tokenring.com | 4.1.3.0 Common PCMCIA Tokenring Card Software |
| devices.rs6ksmp.base package includes the following fileset(s); | |
| devices.rs6ksmp.base.rte | 4.1.3.0 Multiprocessor Base System Device Software |
| devices.rspc.base package includes the following fileset(s); | |
| devices.rspc.base.com | 4.1.3.0 RISC PC Common Base System Device Software |
| devices.rspc.base.diag | 4.1.3.0 RISC PC Base System Device Diagnostics |
| devices.rspc.base.rte | 4.1.3.0 RISC PC Base System Device Software |
| devices.scsi.disk package includes the following fileset(s); | |
| devices.scsi.disk.diag.com | 4.1.3.0 Common Disk Diagnostic Service Aid |
| devices.scsi.disk.diag.rte | 4.1.3.0 SCSI CD_ROM, Disk Device Diagnostics |
| devices.scsi.disk.rspc | 4.1.3.0 RISC PC SCSI CD-ROM, Disk, Read/Write Optical Device Software |
| devices.scsi.disk.rte | 4.1.3.0 SCSI CD-ROM, Disk, Read/Write Optical Device Software |
| devices.scsi.scarray package includes the following fileset(s); | |
| devices.scsi.scarray.diag | 4.1.3.0 RAIDiant Array DA Device Diagnostics |
| devices.scsi.scarray.rte | 4.1.3.0 7135 RAIDiant Array DA Device Software Support |
| devices.scsi.tape package includes the following fileset(s); | |
| devices.scsi.tape.diag | 4.1.3.0 SCSI Tape Device Diagnostics |
| devices.scsi.tape.rspc | 4.1.3.0 RISC PC SCSI Tape Device Software |
| devices.scsi.tape.rte | 4.1.3.0 SCSI Tape Device Software |
| devices.scsi.tm package includes the following fileset(s); | |
| devices.scsi.tm.rte | 4.1.3.0 SCSI Target Mode Software |
| devices.serial.gio package includes the following fileset(s); | |
| devices.serial.gio.X11 | 4.1.0.0 AIXwindows Serial Graphics Input Adapter Software |
| devices.serial.gio.diag | 4.1.0.0 Serial Graphics Input Adapter and Device Diagnostics |
| devices.serial.gio.rte | 4.1.3.0 Serial Graphics Input Adapter Software |
| devices.serial.sb1 package includes the following fileset(s); | |
| devices.serial.sb1.X11 | 4.1.0.0 AIXwindows 6094-030 Spaceball 3-D Input Device Software |
| devices.serial.tablet1 package includes the following fileset(s); | |
| devices.serial.tablet1.X11 | 4.1.3.0 AIXwindows Serial Tablet Input Device Software |
| devices.sio.fda package includes the following fileset(s); | |
| devices.sio.fda.com | 4.1.3.0 Common Diskette Device Software |
| devices.sio.fda.diag | 4.1.2.0 Diskette Adapter and Device Diagnostics |

| Package | Description |
|---|---|
| devices.sio.fda.rte | 4.1.3.0 Diskette Adapter Software |
| devices.sio.ktma package includes the following fileset(s); | |
| devices.sio.ktma.com | 4.1.3.0 Common Keyboard Tablet & Mouse Device and Adapter Software |
| devices.sio.ktma.diag | 4.1.3.0 Keyboard Tablet & Mouse Device and Adapter Diagnostics |
| devices.sio.ktma.rte | 4.1.3.0 Keyboard Tablet & Mouse Device and Adapter Software |
| devices.sio.ppa package includes the following fileset(s); | |
| devices.sio.ppa.com | 4.1.1.0 Common Parallel Printer Adapter Software |
| devices.sio.ppa.diag | 4.1.3.0 Parallel Printer Adapter Diagnostics |
| devices.sio.ppa.rte | 4.1.3.0 Parallel Printer Adapter Software |
| devices.sio.sa package includes the following fileset(s); | |
| devices.sio.sa.diag | 4.1.3.0 Built-in Serial Adapter Diagnostics |
| devices.sio.sa.rte | 4.1.3.0 Built-in Serial Adapter Software |
| devices.ssa.disk package includes the following fileset(s); | |
| devices.ssa.disk.rte | 4.1.3.0 SSA DASD Software |
| devices.sys.PNP0A03 package includes the following fileset(s); | |
| devices.sys.PNP0A03.rte | 4.1.3.0 PCI Bus Software (PNP0A03) |
| devices.sys.mca package includes the following fileset(s); | |
| devices.sys.mca.rte | 4.1.3.0 Micro Channel Bus Software |
| devices.sys.pci package includes the following fileset(s); | |
| devices.sys.pci.rte | 4.1.3.0 PCI Bus Software |
| devices.sys.sga package includes the following fileset(s); | |
| devices.sys.sga.X11 | 4.1.3.0 AIXwindows Gt1 Graphics Adapter Software |
| devices.sys.sga.diag | 4.1.0.0 Gt1 Graphics Adapter Diagnostics |
| devices.sys.sga.rte | 4.1.1.0 Gt1 Graphics Adapter Software |
| devices.sys.sgabus package includes the following fileset(s); | |
| devices.sys.sgabus.rte | 4.1.1.0 Special Graphics Slot Software |
| devices.sys.slc package includes the following fileset(s); | |
| devices.sys.slc.diag | 4.1.1.0 Serial Optical Link Diagnostics |
| devices.sys.slc.rte | 4.1.3.0 Serial Optical Link Software |
| devices.sys.wga package includes the following fileset(s); | |
| devices.sys.wga.X11 | 4.1.3.0 AIXwindows Gt1x Graphics Adapter Software |
| devices.sys.wga.diag | 4.1.0.0 Gt1x Graphics Adapter Diagnostics |
| devices.sys.wga.rte | 4.1.3.0 Gt1x Graphics Adapter Software |
| devices.tty package includes the following fileset(s); | |
| devices.tty.rte | 4.1.3.0 TTY Device Driver Support Software |
| dps package includes the following fileset(s); | |
| dps.copyright | 4.1.2.0 Display PostScript Copyright |
| dps.fnt | 4.1.2.0 Display PostScript Fonts |
| dps.rte | 4.1.3.0 Display PostScript Runtime Environment |
| dps.samples | 4.1.2.0 Display PostScript Sample Programs |
| dsmit package includes the following fileset(s); | |
| dsmit.aix | 2.2.0.0 Distributed SMIT - AIX Client |
| dsmit.aix_3_2.data | 2.2.0.0 Distributed SMIT - AIX 3.2 Client |
| dsmit.com | 2.2.0.0 Distributed SMIT - Common files for Server and AIX Client |

| Package | Description |
|---|---|
| dsmit.hp.data | 2.2.0.0 Distributed SMIT - HP Client |
| dsmit.mserver | 2.2.0.0 Motif Distributed SMIT - AIX 4.1 |
| dsmit.server | 2.2.0.0 Distributed System Management Server |
| dsmit.server.data | 2.2.0.0 Distributed System Management Server Data |
| dsmit.sol.data | 2.2.0.0 Distributed SMIT - Solaris Client |
| dsmit.sun.data | 2.2.0.0 Distributed SMIT - SUN Client |
| dsmit.msg.De_DE package includes the following fileset(s); | |
| dsmit.msg.De_DE.hp | 2.2.0.0 Distributed SMIT HP Client Messages - German (IBM-850) |
| dsmit.msg.De_DE.server | 2.2.0.0 Distributed SMIT Server Messages - German (IBM-850) |
| dsmit.msg.De_DE.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - German (IBM-850) |
| dsmit.msg.De_DE.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - German (IBM-850) |
| dsmit.msg.En_US package includes the following fileset(s); | |
| dsmit.msg.En_US.hp | 2.2.0.0 Distributed SMIT HP Client Messages - U.S. English (IBM-850) |
| dsmit.msg.En_US.server | 2.2.0.0 Distributed SMIT Server Messages - U.S. English (IBM-850) |
| dsmit.msg.En_US.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - U.S. English (IBM-850) |
| dsmit.msg.En_US.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - U.S. English (IBM-850) |
| dsmit.msg.Es_ES package includes the following fileset(s); | |
| dsmit.msg.Es_ES.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Spanish (IBM-850) |
| dsmit.msg.Es_ES.server | 2.2.0.0 Distributed SMIT Server Messages - Spanish (IBM-850) |
| dsmit.msg.Es_ES.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Spanish (IBM-850) |
| dsmit.msg.Es_ES.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Spanish (IBM-850) |
| dsmit.msg.Fr_FR package includes the following fileset(s); | |
| dsmit.msg.Fr_FR.hp | 2.2.0.0 Distributed SMIT HP Client Messages - French (IBM-850) |
| dsmit.msg.Fr_FR.server | 2.2.0.0 Distributed SMIT Server Messages - French (IBM-850) |
| dsmit.msg.Fr_FR.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - French (IBM-850) |
| dsmit.msg.Fr_FR.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - French (IBM-850) |
| dsmit.msg.Ja_JP package includes the following fileset(s); | |
| dsmit.msg.Ja_JP.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Japanese |
| dsmit.msg.Ja_JP.server | 2.2.0.0 Distributed SMIT Server Messages - Japanese |
| dsmit.msg.Ja_JP.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Japanese |
| dsmit.msg.Ja_JP.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Japanese |
| dsmit.msg.Nl_BE package includes the following fileset(s); | |
| dsmit.msg.Nl_BE.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Belgian Dutch (IBM-850) |
| dsmit.msg.Nl_BE.server | 2.2.0.0 Distributed SMIT Server Messages - Belgian Dutch (IBM-850) |
| dsmit.msg.Nl_BE.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Belgian Dutch (IBM-850) |
| dsmit.msg.Nl_BE.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Belgian Dutch (IBM-850) |
| dsmit.msg.Sv_SE package includes the following fileset(s); | |
| dsmit.msg.Sv_SE.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Swedish (IBM-850) |
| dsmit.msg.Sv_SE.server | 2.2.0.0 Distributed SMIT Server Messages - Swedish (IBM-850) |
| dsmit.msg.Sv_SE.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Swedish (IBM-850) |
| dsmit.msg.Sv_SE.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Swedish (IBM-850) |
| dsmit.msg.de_DE package includes the following fileset(s); | |
| dsmit.msg.de_DE.hp | 2.2.0.0 Distributed SMIT HP Client Messages - German |
| dsmit.msg.de_DE.server | 2.2.0.0 Distributed SMIT Server Messages - German |

| Package | Description |
|---|---|
| dsmit.msg.de_DE.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - German |
| dsmit.msg.de_DE.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - German |
| dsmit.msg.en_US package includes the following fileset(s); | |
| dsmit.msg.en_US.hp | 2.2.0.0 Distributed SMIT HP Client Messages - U.S. English |
| dsmit.msg.en_US.server | 2.2.0.0 Distributed SMIT Server Messages - U.S. English |
| dsmit.msg.en_US.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - U.S. English |
| dsmit.msg.en_US.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - U.S. English |
| dsmit.msg.es_ES package includes the following fileset(s); | |
| dsmit.msg.es_ES.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Spanish |
| dsmit.msg.es_ES.server | 2.2.0.0 Distributed SMIT Server Messages - Spanish |
| dsmit.msg.es_ES.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Spanish |
| dsmit.msg.es_ES.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Spanish |
| dsmit.msg.fr_FR package includes the following fileset(s); | |
| dsmit.msg.fr_FR.hp | 2.2.0.0 Distributed SMIT HP Client Messages - French |
| dsmit.msg.fr_FR.server | 2.2.0.0 Distributed SMIT Server Messages - French |
| dsmit.msg.fr_FR.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - French |
| dsmit.msg.fr_FR.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - French |
| dsmit.msg.ja_JP package includes the following fileset(s); | |
| dsmit.msg.ja_JP.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Japanese (IBM-eucJP) |
| dsmit.msg.ja_JP.server | 2.2.0.0 Distributed SMIT Server Messages - Japanese (IBM-eucJP) |
| dsmit.msg.ja_JP.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Japanese (IBM-eucJP) |
| dsmit.msg.ja_JP.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Japanese (IBM-eucJP) |
| dsmit.msg.ko_KR package includes the following fileset(s); | |
| dsmit.msg.ko_KR.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Korean |
| dsmit.msg.ko_KR.server | 2.2.0.0 Distributed SMIT Server Messages - Korean |
| dsmit.msg.ko_KR.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Korean |
| dsmit.msg.ko_KR.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Korean |
| dsmit.msg.nl_BE package includes the following fileset(s); | |
| dsmit.msg.nl_BE.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Belgian Dutch |
| dsmit.msg.nl_BE.server | 2.2.0.0 Distributed SMIT Server Messages - Belgian Dutch |
| dsmit.msg.nl_BE.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Belgian Dutch |
| dsmit.msg.nl_BE.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Belgian Dutch |
| dsmit.msg.sv_SE package includes the following fileset(s); | |
| dsmit.msg.sv_SE.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Swedish |
| dsmit.msg.sv_SE.server | 2.2.0.0 Distributed SMIT Server Messages - Swedish |
| dsmit.msg.sv_SE.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Swedish |
| dsmit.msg.sv_SE.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Swedish |
| dsmit.msg.zh_TW package includes the following fileset(s); | |
| dsmit.msg.zh_TW.hp | 2.2.0.0 Distributed SMIT HP Client Messages - Traditional Chinese |
| dsmit.msg.zh_TW.server | 2.2.0.0 Distributed SMIT Server Messages - Traditional Chinese |
| dsmit.msg.zh_TW.sol | 2.2.0.0 Distributed SMIT Solaris Client Messages - Traditional Chinese |
| dsmit.msg.zh_TW.sun | 2.2.0.0 Distributed SMIT SUN Client Messages - Traditional Chinese |
| dtext package includes the following fileset(s); | |
| dtext.brwsr | 2.3.0.0 DynaText Browser |

| Package | Description |
|---|---|
| encina.monitor package includes the following fileset(s); | |
| encina.monitor.rqs | 2.1.0.0 Encina Recoverable Queuing Service (950522) |
| encina.monitor.tpm | 2.1.0.0 Encina Transaction Processing Monitor (950522) |
| encina.msg.en_US package includes the following fileset(s); | |
| encina.msg.en_US.client | 2.1.0.0 Encina Client Messages (950522) |
| encina.msg.en_US.monitor.rqs | 2.1.0.0 Encina Recoverable Queuing Service Messages (950522) |
| encina.msg.en_US.monitor.tpm | 2.1.0.0 Encina Transaction Processing Monitor Messages (950522) |
| encina.msg.en_US.ppcexec | 2.1.0.0 Encina PPC Executive Messages (950522) |
| encina.msg.en_US.ppcgate | 2.1.0.0 Encina PPC Gateway Messages (950522) |
| encina.msg.en_US.server | 2.1.0.0 Encina Server Messages (950522) |
| encina.msg.en_US.sfs | 2.1.0.0 Encina Structured File Server Messages (950522) |
| essl package includes the following fileset(s); | |
| essl.common.rte | 2.2.2.0 ESSL Common Commands and Libraries |
| essl.rs1.rte | 2.2.2.0 ESSL RS/1 Architecture Specific Commands and Libraries |
| essl.rs2.rte | 2.2.2.0 ESSL RS/2 Architecture Specific Commands and Libraries |
| essl.book.en_US package includes the following fileset(s); | |
| essl.book.en_US | 2.2.2.0 ESSL Online Documentation - BookManager |
| essl.info.en_US package includes the following fileset(s); | |
| essl.info.en_US | 2.2.2.0 ESSL Online Documentation - InfoExplorer |
| essl.ps.en_US package includes the following fileset(s); | |
| essl.ps.en_US | 2.2.2.0 ESSL Online Documentation - PostScript |
| fsf package includes the following fileset(s); | |
| fsf.com | 1.2.2.0 FSF Kernel Communication Module |
| fsf.daemon | 1.2.2.0 FSF Daemon Module |
| fsf.doc | 1.2.2.0 FSF Documentation |
| fsf.lib | 1.2.2.0 FSF Daemon Interface Library |
| fsf.mfs | 1.2.2.0 FSF Filesystem Module |
| fsf.smit | 1.2.2.0 FSF SMIT Screens and Scripts |
| fsf.sys | 1.2.2.0 FSF Include files |
| fsf.utilities | 1.2.2.0 FSF Utilities |
| gw package includes the following fileset(s); | |
| gw.rte | 2.2.0.0 SNA Gateway |
| gw.ubp package includes the following fileset(s); | |
| gw.ubp.unlimited | 1.1.0.0 SNA Gateway/6000 Unlimited User Enablement Key |
| hcon package includes the following fileset(s); | |
| hcon.Dt.apps | 2.1.0.0 3270 Host Connection Program Desk Top Application |
| hcon.Dt.icons | 2.1.0.0 3270 Host Connection Program Desk Top Icon |
| hcon.X11 | 2.1.1.0 3270 Host Connection Program for AIXWindows |
| hcon.adt | 2.1.1.0 3270 Host Connection Program Application Development Toolkit |
| hcon.prod | 2.1.1.0 3270 Host Connection Program Productivity Files |
| hcon.rte | 2.1.1.0 3270 Host Connection Program |
| hcon.util | 2.1.1.0 3270 Host Connection Program Utility Programs |
| hcon.info.en_US package includes the following fileset(s); | |
| hcon.info.en_US.hcongd | 4.1.3.0 Host Connection Programming Guide - U.S. English |

| Package | Description |
|---|---|
| hcon.loc package includes the following fileset(s); | |
| hcon.loc.Ja_JP.X11 | 2.1.0.0 3270 Host Connection Program app-default file - Japan Japanese |
| hcon.loc.en_US.X11 | 2.1.0.0 3270 Host Connection Program app-default file - U.S. - English |
| hcon.loc.ja_JP.X11 | 2.1.0.0 3270 Host Connection Program app-default file - Japan Japanese |
| hcon.loc.ko_KR.X11 | 2.1.0.0 3270 Host Connection Program app-default file - Korea Korean |
| hcon.loc.zh_TW.X11 | 2.1.0.0 3270 Host Connection Program app-default file - Taiwan Chinese |
| hcon.msg.De_DE package includes the following fileset(s); | |
| hcon.msg.De_DE | 2.1.0.0 3270 Host Connection Program Messages - German IBM-850 |
| hcon.msg.En_US package includes the following fileset(s); | |
| hcon.msg.En_US | 2.1.0.0 3270 Host Connection Program Messages - U.S. English IBM-850 |
| hcon.msg.Es_ES package includes the following fileset(s); | |
| hcon.msg.Es_ES | 2.1.0.0 3270 Host Connection Program Messages - Spanish IBM-850 |
| hcon.msg.Fr_FR package includes the following fileset(s); | |
| hcon.msg.Fr_FR | 2.1.0.0 3270 Host Connection Program Messages - French IBM-850 |
| hcon.msg.It_IT package includes the following fileset(s); | |
| hcon.msg.It_IT | 2.1.0.0 3270 Host Connection Program Messages - Italian IBM-850 |
| hcon.msg.Ja_JP package includes the following fileset(s); | |
| hcon.msg.Ja_JP | 2.1.0.0 3270 Host Connection Program Messages - Japanese |
| hcon.msg.Nl_BE package includes the following fileset(s); | |
| hcon.msg.Nl_BE | 2.1.0.0 3270 Host Connection Program Messages - Belgian Dutch IBM-850 |
| hcon.msg.Sv_SE package includes the following fileset(s); | |
| hcon.msg.Sv_SE | 2.1.0.0 3270 Host Connection Program Messages - Swedish IBM-850 |
| hcon.msg.de_DE package includes the following fileset(s); | |
| hcon.msg.de_DE | 2.1.0.0 3270 Host Connection Program Messages - German |
| hcon.msg.en_US package includes the following fileset(s); | |
| hcon.msg.en_US | 2.1.0.0 3270 Host Connection Program Messages - U.S. English |
| hcon.msg.es_ES package includes the following fileset(s); | |
| hcon.msg.es_ES | 2.1.0.0 3270 Host Connection Program Messages - Spanish |
| hcon.msg.fr_FR package includes the following fileset(s); | |
| hcon.msg.fr_FR | 2.1.0.0 3270 Host Connection Program Messages - French |
| hcon.msg.it_IT package includes the following fileset(s); | |
| hcon.msg.it_IT | 2.1.0.0 3270 Host Connection Program Messages - Italian |
| hcon.msg.ja_JP package includes the following fileset(s); | |
| hcon.msg.ja_JP | 2.1.0.0 3270 Host Connection Program Messages - Japanese IBM-eucJP |
| hcon.msg.ko_KR package includes the following fileset(s); | |
| hcon.msg.ko_KR | 2.1.0.0 3270 Host Connection Program Messages - Korean |
| hcon.msg.nl_BE package includes the following fileset(s); | |
| hcon.msg.nl_BE | 2.1.0.0 3270 Host Connection Program Messages - Belgian Dutch |
| hcon.msg.sv_SE package includes the following fileset(s); | |
| hcon.msg.sv_SE | 2.1.0.0 3270 Host Connection Program Messages - Swedish |
| hcon.msg.zh_TW package includes the following fileset(s); | |
| hcon.msg.zh_TW | 2.1.0.0 3270 Host Connection Program Messages - Traditional Chinese |
| hcon.terminfo package includes the following fileset(s); | |
| hcon.terminfo.bull.data | 2.1.0.0 3270 Host Connection Program Terminal Definition - BULL |

| Package | Description |
|---|---|
| hcon.terminfo.dec.data | 2.1.1.0 3270 Host Connection Program Terminal Definition - DEC |
| hcon.terminfo.ibm.data | 2.1.0.0 3270 Host Connection Program Terminal Definition - IBM |
| hcon.terminfo.wyse.data | 2.1.0.0 3270 Host Connection Program Terminal Definition - WYSE |
| icraft package includes the following fileset(s); | |
| icraft.JP.rte | 2.1.0.0 InfoCrafter Database Creation Package - Japanese |
| icraft.rte | 2.1.1.0 InfoCrafter Database Creation Package |
| icraft.info.en_US package includes the following fileset(s); | |
| icraft.info.en_US.user_gd_ref | 4.1.3.0 InfoCrafter Users Guide - U.S. English |
| icraft.msg.En_US package includes the following fileset(s); | |
| icraft.msg.En_US | 2.1.1.0 InfoCrafter Database Creation Package Messages - U.S. English |
| icraft.msg.Ja_JP package includes the following fileset(s); | |
| icraft.msg.Ja_JP | 2.1.1.0 InfoCrafter Database Creation Package Messages - Japanese |
| icraft.msg.en_US package includes the following fileset(s); | |
| icraft.msg.en_US | 2.1.1.0 InfoCrafter Database Creation Package Messages - U.S. English |
| icraft.msg.ja_JP package includes the following fileset(s); | |
| icraft.msg.ja_JP | 2.1.1.0 InfoCrafter Database Creation Package Messages - Japanese |
| infoxl package includes the following fileset(s); | |
| infoxl | 4.1.1.0 InfoExplorer License Extension to read InfoCrafter databases |
| internet_server package includes the following fileset(s); | |
| internet_server.admin | 4.1.3.0 IBM Internet Connection Server Administration |
| internet_server.doc | 4.1.3.0 IBM Internet Connection Server Documentation |
| internet_server.httpd | 4.1.3.0 IBM Internet Connection Server |
| ipfx package includes the following fileset(s); | |
| ipfx.msg.Da_DK.rte | 2.1.0.0 Danish IBM-850 message and grammer files |
| ipfx.msg.De_DE.rte | 2.1.0.0 German IBM-850 message and grammer files |
| ipfx.msg.En_GB.rte | 2.1.0.0 Great Britain IBM-850 message and grammer files |
| ipfx.msg.En_US.rte | 2.1.0.0 English IBM-850 message and grammer files |
| ipfx.msg.Es_ES.rte | 2.1.0.0 Spanish IBM-850 message and grammer files |
| ipfx.msg.Fi_FI.rte | 2.1.0.0 Finnish IBM-850 message and grammer files |
| ipfx.msg.Fr_FR.rte | 2.1.0.0 French IBM-850 message and grammer files |
| ipfx.msg.It_IT.rte | 2.1.0.0 Italian IBM-850 message and grammer files |
| ipfx.msg.Ja_JP.rte | 2.1.0.0 Japanese IBM-932 message and grammer files |
| ipfx.msg.Nl_NL.rte | 2.1.0.0 Dutch IBM-850 message and grammer files |
| ipfx.msg.No_NO.rte | 2.1.0.0 Norwegian IBM-850 message and grammer files |
| ipfx.msg.Pt_PT.rte | 2.1.0.0 Portuguese IBM-850 message and grammer files |
| ipfx.msg.Sv_SE.rte | 2.1.0.0 Swedish IBM-850 message and grammer files |
| ipfx.msg.da_DK.rte | 2.1.0.0 Danish ISO8859-1 message and grammer files |
| ipfx.msg.de_DE.rte | 2.1.0.0 German ISO8859-1 message and grammer files |
| ipfx.msg.en_GB.rte | 2.1.0.0 Great Britain ISO8859-1 message and grammer files |
| ipfx.msg.en_US.rte | 2.1.0.0 English ISO8859-1 message and grammer files |
| ipfx.msg.es_ES.rte | 2.1.0.0 Spanish ISO8859-1 message and grammer files |
| ipfx.msg.fi_FI.rte | 2.1.0.0 Finnish ISO8859-1 message and grammer files |
| ipfx.msg.fr_FR.rte | 2.1.0.0 French ISO8859-1 message and grammer files |
| ipfx.msg.it_IT.rte | 2.1.0.0 Italian ISO8859-1 message and grammer files |

| Package | Description |
|---|---|
| ipfx.msg.ja_JP.rte | 2.1.0.0 Japanese EUC message and grammer files |
| ipfx.msg.nl_NL.rte | 2.1.0.0 Dutch ISO8859-1 message and grammer files |
| ipfx.msg.no_NO.rte | 2.1.0.0 Norwegian ISO8859-1 message and grammer files |
| ipfx.msg.pt_PT.rte | 2.1.0.0 Portuguese ISO8859-1 message and grammer files |
| ipfx.msg.sv_SE.rte | 2.1.0.0 Swedish ISO8859-1 message and grammer files |
| ipfx.rte | 2.1.0.0 IBM Information Presentation Facility/6000 |
| ipx package includes the following fileset(s); | |
| ipx.api | 4.1.1.0 IPX and SPX Application Programming Interface |
| ipx.rte | 4.1.3.0 IPX and SPX Protocol Stacks |
| netbios package includes the following fileset(s); | |
| netbios.api | 2.1.0.0 NetBIOS Application Programming Interface |
| netbios.rte | 2.1.0.0 NetBIOS Protocol Stack |
| netware package includes the following fileset(s); | |
| netware.client | 4.1.0.0 Netware Workstation Client Utilities |
| netware.fs | 4.1.0.0 Netware Basic File System |
| netware.server | 4.1.0.0 Netware Server Code v3.11b |
| perfagent package includes the following fileset(s); | |
| perfagent.server | 2.1.3.0 Performance Agent Daemons & Utilities |
| perfagent.tools | 2.1.3.0 Performance Analysis and Control Commands |
| perfagent.info.en_US package includes the following fileset(s); | |
| perfagent.info.en_US.usr_gds | 4.1.3.0 Performance User and Reference Guides - U.S. English |
| perfmgr package includes the following fileset(s); | |
| perfmgr | 2.1.3.0 Performance Manager |
| pkg_gd package includes the following fileset(s); | |
| pkg_gd | 4.1.3.0 Package Installation Database for Current Media |
| printers package includes the following fileset(s); | |
| printers.bull1015.com | 4.1.1.0 BULL Common Generic for HP-pcl5 and HP-pgl2 Emulations |
| printers.bull1015.rte | 4.1.0.0 Bull Compuprint PageMaster 1015 |
| printers.bull1021.rte | 4.1.0.0 Bull Compuprint PageMaster 1021 |
| printers.bull1025.rte | 4.1.1.0 Bull Compuprint PageMaster 1025 |
| printers.bull1070.rte | 4.1.1.0 Bull Compuprint PageMaster 1070 |
| printers.bull1625.rte | 4.1.0.0 Bull Compuprint PageMaster 1625 |
| printers.bull200.rte | 4.1.0.0 Bull Compuprint PageMaster 200 |
| printers.bull201.rte | 4.1.0.0 Bull Compuprint PageMaster 201 |
| printers.bull411.rte | 4.1.0.0 Bull Compuprint PageMaster 411 |
| printers.bull413.rte | 4.1.0.0 Bull Compuprint PageMaster 413 |
| printers.bull422.rte | 4.1.0.0 Bull Compuprint PageMaster 422 |
| printers.bull451.rte | 4.1.0.0 Bull Compuprint 4/51 |
| printers.bull454.rte | 4.1.0.0 Bull Compuprint 4/54 |
| printers.bull721.rte | 4.1.0.0 Bull Compuprint PageMaster 721 |
| printers.bull815.rte | 4.1.0.0 Bull Compuprint PageMaster 815 |
| printers.bull825.rte | 4.1.0.0 Bull Compuprint PageMaster 825 |
| printers.bull9142.rte | 4.1.0.0 Bull Compuprint 914 |
| printers.bull9148.rte | 4.1.0.0 Bull Compuprint 914 N |

| Package | Description |
|---|---|
| printers.bull922.com | 4.1.1.0 BULL Common Generic epson predef file |
| printers.bull922.rte | 4.1.0.0 Bull Compuprint PageMaster 922 |
| printers.bull923.rte | 4.1.0.0 Bull Compuprint PageMaster 923 |
| printers.bull924.rte | 4.1.0.0 Bull Compuprint PageMaster 924 |
| printers.bull924N.rte | 4.1.0.0 Bull Compuprint PageMaster 924 N |
| printers.bull956.rte | 4.1.1.0 Bull Compuprint 956 |
| printers.bull970.com | 4.1.2.0 Common Bull 970/1070 fonts |
| printers.bull970.rte | 4.1.2.0 Bull Compuprint PageMaster 970 |
| printers.bullpr88-vfu.rte | 4.1.1.0 Bull PR-88 VFU Handling |
| printers.bullpr88.rte | 4.1.0.0 Bull PR-88 |
| printers.bullpr90.rte | 4.1.1.0 Bull PR-90 |
| printers.canlbp-A404PS.rte | 4.1.0.0 Canon Laser Shot LBP-A404PS/Lite |
| printers.canlbp-B406G.rte | 4.1.0.0 Canon Laser Shot LBP-B406G |
| printers.canlbp.rte | 4.1.0.0 Canon Laser Shot LBP-B406/S/D,A404 |
| printers.dp2000.rte | 4.1.0.0 Dataproducts BP2000 Line Printer |
| printers.dp2665.rte | 4.1.0.0 Dataproducts LZR 2665 Laser Printer |
| printers.epsonLQ1600K_CN.rte | 4.1.3.0 Epson LQ1600K Chinese (Simplified) Data Stream |
| printers.hpJetDirect.attach | 4.1.3.0 Hewlett-Packard JetDirect Network Printer Attachment |
| printers.hplj-2.rte | 4.1.0.0 Hewlett-Packard LaserJet II |
| printers.hplj-2p_CN.rte | 4.1.3.0 Hewlett Packard LaserJet IIp Chinese (Simplified) Data Stm |
| printers.hplj-3.rte | 4.1.0.0 Hewlett-Packard LaserJet III |
| printers.hplj-3si.rte | 4.1.0.0 Hewlett-Packard LaserJet IIISi |
| printers.hplj-4+.rte | 4.1.3.0 Hewlett-Packard LaserJet 4 Plus |
| printers.hplj-4.rte | 4.1.0.0 Hewlett-Packard LaserJet 4 |
| printers.hplj-4si.rte | 4.1.3.0 Hewlett-Packard LaserJet 4si |
| printers.hplj-4v.rte | 4.1.3.0 Hewlett-Packard LaserJet 4V |
| printers.hplj-c.rte | 4.1.3.0 Hewlett-Packard LaserJet Color |
| printers.ibm2380-2.rte | 4.1.0.0 IBM 2380 Plus printer (Model 2) |
| printers.ibm2380.rte | 4.1.0.0 IBM 2380 Personal Printer II |
| printers.ibm2381-2.rte | 4.1.0.0 IBM 2381 Plus printer (Model 2) |
| printers.ibm2381.rte | 4.1.0.0 IBM 2381 Personal Printer II |
| printers.ibm2390-2.rte | 4.1.0.0 IBM 2390 Plus printer (Model 2) |
| printers.ibm2390.rte | 4.1.0.0 IBM 2390 Personal Printer II |
| printers.ibm2391-2.rte | 4.1.0.0 IBM 2391 Plus printer (Model 2) |
| printers.ibm2391.rte | 4.1.0.0 IBM 2391 Personal Printer II |
| printers.ibm3112.rte | 4.1.3.0 IBM 3112 Page Printer |
| printers.ibm3116.rte | 4.1.3.0 IBM 3116 Page Printer |
| printers.ibm3812-2.rte | 4.1.0.0 IBM 3812 Model 2 Page Printer |
| printers.ibm3816.rte | 4.1.0.0 IBM 3816 Page Printer |
| printers.ibm4019.rte | 4.1.0.0 IBM 4019 LaserPrinter |
| printers.ibm4019_AR.rte | 4.1.1.0 IBM 4019 LaserPrinter Arabic Printer Fonts |
| printers.ibm4019_JP.rte | 4.1.0.0 IBM 4019 LaserPrinter Japanese Data Stream |
| printers.ibm4019_KR.rte | 4.1.0.0 IBM 4019 LaserPrinter Korean Data Stream |
| printers.ibm4029.rte | 4.1.0.0 IBM 4029 LaserPrinter |

| Package | Description |
|---|---|
| printers.ibm4029_JP.rte | 4.1.0.0 IBM 4029 LaserPrinter Japanese Data Stream |
| printers.ibm4037.rte | 4.1.0.0 IBM 4037 LP printer |
| printers.ibm4039.rte | 4.1.0.0 IBM 4039 LaserPrinter |
| printers.ibm4070.rte | 4.1.0.0 IBM 4070 IJ Printer |
| printers.ibm4072.rte | 4.1.0.0 IBM 4072 ExecJet |
| printers.ibm4076.rte | 4.1.0.0 IBM 4076 IJ printer |
| printers.ibm4079.rte | 4.1.0.0 IBM 4079 Color Jetprinter PS |
| printers.ibm4201-2.rte | 4.1.0.0 IBM 4201 Model 2 Proprinter II |
| printers.ibm4201-3.rte | 4.1.0.0 IBM 4201 Model 3 Proprinter III |
| printers.ibm4202-2.rte | 4.1.0.0 IBM 4202 Model 2 Proprinter II XL |
| printers.ibm4202-3.rte | 4.1.0.0 IBM 4202 Model 3 Proprinter III XL |
| printers.ibm4207-2.rte | 4.1.0.0 IBM 4207 Model 2 Proprinter X24E |
| printers.ibm4208-2.rte | 4.1.0.0 IBM 4208 Model 2 Proprinter XL24E |
| printers.ibm4208-502.rte | 4.1.0.0 IBM 4208 Model 502 Proprinter XL24EK |
| printers.ibm4212.rte | 4.1.0.0 IBM 4212 Proprinter 24P |
| printers.ibm4216-31.rte | 4.1.0.0 IBM 4216 Personal Page Printer, Model 013 |
| printers.ibm4216-510.rte | 4.1.0.0 IBM 4216 Model 510 |
| printers.ibm4224.rte | 4.1.0.0 IBM 4224 Printer, Models 301, 302, 3C2, 3E3 |
| printers.ibm4226.rte | 4.1.0.0 IBM 4226 Printer |
| printers.ibm4234.rte | 4.1.0.0 IBM 4234 Dot Band Printer, Model 013 |
| printers.ibm4234_AR.rte | 4.1.1.0 IBM 4234 Dot Band Printer, Model 13 Ariabic Printer Fonts |
| printers.ibm5202.rte | 4.1.0.0 IBM 5202 Quietwriter III |
| printers.ibm5204.rte | 4.1.0.0 IBM 5204 Quickwriter |
| printers.ibm5327.rte | 4.1.0.0 IBM 5327 Model 011 |
| printers.ibm5572.rte | 4.1.0.0 IBM 5572 Model B02 |
| printers.ibm5573.rte | 4.1.0.0 IBM 5573 Model H02 |
| printers.ibm5575.com | 4.1.0.0 IBM 5575 Model B02/F02 Device Driver |
| printers.ibm5575_JP.rte | 4.1.0.0 IBM 5575 Model B02/F02 Japanese Data Stream |
| printers.ibm5575_KR.rte | 4.1.0.0 IBM 5575 Model B02/F02 Korean Data Stream |
| printers.ibm5575_TW.rte | 4.1.0.0 IBM 5575 Model B02/F02 Traditional Chinese Data Stream |
| printers.ibm5577.com | 4.1.0.0 IBM 5577 Model B02/F02/H02/G02/FU2/J02/K02 Device Driver |
| printers.ibm5577_JP.rte | 4.1.0.0 IBM 5577 Model B02/F02/H02/G02/FU2/J02/K02 Japan Data Stream |
| printers.ibm5577_KR.rte | 4.1.0.0 IBM 5577 Model B02/F02/H02/G02/FU2 Korean Data Stream |
| printers.ibm5577_TW.rte | 4.1.0.0 IBM 5577 Model B02/F02/H02/G02/FU2 Traditional Chinese Data Stream |
| printers.ibm5579.rte | 4.1.0.0 IBM 5579 Model H02/K02 |
| printers.ibm5584.rte | 4.1.0.0 IBM 5584 Model G02/H02 |
| printers.ibm5585.com | 4.1.0.0 IBM 5585 Model H01 Device Driver |
| printers.ibm5585_JP.rte | 4.1.0.0 IBM 5585 Model H01 Japanese Data Stream |
| printers.ibm5585_TW.rte | 4.1.0.0 IBM 5585 Model H01 Traditional Chinese Data Stream |
| printers.ibm5587.rte | 4.1.0.0 IBM 5587 Model G01 |
| printers.ibm5587H.rte | 4.1.0.0 IBM 5587 Model H01 |
| printers.ibm5589.rte | 4.1.0.0 IBM 5589 Model H01 |
| printers.ibm6180.rte | 4.1.0.0 IBM 6180 Color Plotter |

| Package | Description |
|---|---|
| printers.ibm6182.rte | 4.1.0.0 IBM 6182 Auto Feed Color Plotter |
| printers.ibm6184.rte | 4.1.0.0 IBM 6184 Color Plotter |
| printers.ibm6185-1.rte | 4.1.0.0 IBM 6185-1 Color Plotter |
| printers.ibm6185-2.rte | 4.1.0.0 IBM 6185-2 Color Plotter |
| printers.ibm6186.rte | 4.1.0.0 IBM 6186 Color Plotter |
| printers.ibm6252.rte | 4.1.0.0 IBM 6252 Impactwriter |
| printers.ibm6262.rte | 4.1.0.0 IBM 6262 Printer |
| printers.ibm7372.rte | 4.1.0.0 IBM 7372 Color Plotter |
| printers.lex4039+.rte | 4.1.3.0 Lexmark 4039 plus LaserPrinter |
| printers.lex4047.rte | 4.1.3.0 Lexmark ValueWriter 600 |
| printers.lex4049.rte | 4.1.3.0 Lexmark Optra LaserPrinter |
| printers.lex4076-2c.rte | 4.1.3.0 Lexmark ExecJet IIc |
| printers.lex4079+.rte | 4.1.3.0 Lexmark 4079 Color Jetprinter Plus |
| printers.oki801ps.rte | 4.1.0.0 OKI Microline 801PS, 801PS-F, 801PSII/-F, 800PSIILT |
| printers.p9012.rte | 4.1.0.0 Printronix P9012 Line Printer |
| printers.qms100.rte | 4.1.0.0 QMS ColorScript 100, Model 20 |
| printers.starAR2463_CN.rte | 4.1.3.0 Star AR2463 Chinese (Simplified) Data Stream |
| printers.ti2115.rte | 4.1.0.0 Texas Instruments OmniLaser 2115 Page Printer |
| printers.msg.De_DE package includes the following fileset(s); | |
| printers.msg.De_DE.rte | 4.1.1.0 Printer Backend Messages - German IBM-850 |
| printers.msg.En_US package includes the following fileset(s); | |
| printers.msg.En_US.rte | 4.1.1.0 Printer Backend Messages - U.S. English IBM-850 |
| printers.msg.Es_ES package includes the following fileset(s); | |
| printers.msg.Es_ES.rte | 4.1.1.0 Printer Backend Messages - Spanish IBM-850 |
| printers.msg.Fr_FR package includes the following fileset(s); | |
| printers.msg.Fr_FR.rte | 4.1.1.0 Printer Backend Messages - French IBM-850 |
| printers.msg.It_IT package includes the following fileset(s); | |
| printers.msg.It_IT.rte | 4.1.1.0 Printer Backend Messages - Italian IBM-850 |
| printers.msg.Ja_JP package includes the following fileset(s); | |
| printers.msg.Ja_JP.rte | 4.1.1.0 Printer Backend Messages - Japanese |
| printers.msg.Nl_BE package includes the following fileset(s); | |
| printers.msg.Nl_BE.rte | 4.1.1.0 Printer Backend Messages - Belgian Dutch IBM-850 |
| printers.msg.No_NO package includes the following fileset(s); | |
| printers.msg.No_NO.rte | 4.1.1.0 Printer Backend Messages - Norwegian IBM-850 |
| printers.msg.Sv_SE package includes the following fileset(s); | |
| printers.msg.Sv_SE.rte | 4.1.1.0 Printer Backend Messages - Swedish IBM-850 |
| printers.msg.de_DE package includes the following fileset(s); | |
| printers.msg.de_DE.rte | 4.1.1.0 Printer Backend Messages - German |
| printers.msg.en_US package includes the following fileset(s); | |
| printers.msg.en_US.rte | 4.1.1.0 Printer Backend Messages - U.S. English |
| printers.msg.es_ES package includes the following fileset(s); | |
| printers.msg.es_ES.rte | 4.1.1.0 Printer Backend Messages - Spanish |
| printers.msg.fr_FR package includes the following fileset(s); | |
| printers.msg.fr_FR.rte | 4.1.1.0 Printer Backend Messages - French |

| Package | Description |
|---|---|
| printers.msg.it_IT package includes the following fileset(s); | |
| printers.msg.it_IT.rte | 4.1.1.0 Printer Backend Messages - Italian |
| printers.msg.ja_JP package includes the following fileset(s); | |
| printers.msg.ja_JP.rte | 4.1.1.0 Printer Backend Messages - Japanese IBM-eucJP |
| printers.msg.ko_KR package includes the following fileset(s); | |
| printers.msg.ko_KR.rte | 4.1.1.0 Printer Backend Messages - Korean |
| printers.msg.nl_BE package includes the following fileset(s); | |
| printers.msg.nl_BE.rte | 4.1.1.0 Printer Backend Messages - Belgian Dutch |
| printers.msg.no_NO package includes the following fileset(s); | |
| printers.msg.no_NO.rte | 4.1.1.0 Printer Backend Messages - Norwegian |
| printers.msg.sv_SE package includes the following fileset(s); | |
| printers.msg.sv_SE.rte | 4.1.1.0 Printer Backend Messages - Swedish |
| printers.msg.zh_TW package includes the following fileset(s); | |
| printers.msg.zh_TW.rte | 4.1.1.0 Printer Backend Messages - Traditional Chinese |
| printers.rte package includes the following fileset(s); | |
| printers.rte | 4.1.3.0 Printer Backend |
| sde.Dt package includes the following fileset(s); | |
| sde.Dt.cbl | 1.3.0.0 SDE COBOL Common Desktop Environment |
| sde.Dt.com | 1.3.0.0 SDE Common Desktop Environment |
| sde.Dt.pli | 1.3.0.0 SDE PL/I Common Desktop Environment |
| sde.Dt.xlC | 1.3.0.0 SDE CSet++ Common Desktop Environment |
| sde.Dt.xlf | 1.3.0.0 SDE XL Fortran Common Desktop Environment |
| sde.loc.Ja_JP package includes the following fileset(s); | |
| sde.loc.Ja_JP.tools.base | 1.3.0.0 SDE Ja_JP Configuration |
| sde.loc.Ja_JP.tools.lpex | 1.3.0.0 SDE LPEX Ja_JP Configuration |
| sde.loc.ja_JP package includes the following fileset(s); | |
| sde.loc.ja_JP.tools.base | 1.3.0.0 SDE ja_JP Configuration |
| sde.loc.ja_JP.tools.lpex | 1.3.0.0 SDE LPEX ja_JP Configuration |
| sde.msg.Ja_JP package includes the following fileset(s); | |
| sde.msg.Ja_JP.tools.base | 1.3.0.0 SDE Ja_JP Message Catalogs |
| sde.msg.Ja_JP.tools.build | 1.3.0.0 SDE Program Builder Ja_JP Message Catalogs |
| sde.msg.Ja_JP.tools.lpex | 1.3.0.0 SDE LPEX Editor Ja_JP Message Catalogs |
| sde.msg.ja_JP package includes the following fileset(s); | |
| sde.msg.ja_JP.tools.base | 1.3.0.0 SDE ja_JP Message Catalogs |
| sde.msg.ja_JP.tools.build | 1.3.0.0 SDE Program Builder ja_JP Message Catalogs |
| sde.msg.ja_JP.tools.lpex | 1.3.0.0 SDE LPEX Editor ja_JP Message Catalogs |
| sde.tools package includes the following fileset(s); | |
| sde.tools.base | 1.3.0.0 Software Development Environment (SDE) Tools Base |
| sde.tools.build | 1.3.0.0 SDE Program Builder |
| sde.tools.lpex | 1.3.0.0 SDE Live Parsing Editor (LPEX) |
| sna package includes the following fileset(s); | |
| sna.lu0 | 2.2.0.0 Logical Unit 0 (LU0) |
| sna.rte | 2.2.0.0 SNA Server Base (LU1, LU2, LU3, LU6.2) |
| sna.books package includes the following fileset(s); | |

| Package | Description |
|---|---|
| sna.books.adoc | 2.2.0.0 APPC Application Suite for AIX User's Guide |
| sna.books.cmdoc | 2.2.0.0 SNA Server/6000 Command Reference |
| sna.books.crdoc | 2.2.0.0 SNA Server/6000 Configuration Reference |
| sna.books.dgdoc | 2.2.0.0 SNA Server/6000 Diagnosis Guide and Messages |
| sna.books.gwdoc | 2.2.0.0 SNA Gateway/6000 User's Guide |
| sna.books.tpdoc | 2.2.0.0 SNA Server/6000 TP Reference |
| sna.books.usdoc | 2.2.0.0 SNA Server/6000 User's Guide |
| sna.msg.en_US package includes the following fileset(s); | |
| sna.msg.en_US.rte | 2.2.0.0 SNA Base Messages - en_US |
| sna.msg.ja_JP package includes the following fileset(s); | |
| sna.msg.ja_JP.rte | 2.2.0.0 SNA Base Messages - ja_JP |
| sna.snapi package includes the following fileset(s); | |
| sna.snapi | 2.2.0.0 SNA Server/6000 SNAPI TP development tool |
| sna.toolkit package includes the following fileset(s); | |
| sna.toolkit.3270 | 2.2.0.0 APPC 3270 Emulator |
| sna.toolkit.aftp | 2.2.0.0 APPC File Transfer Applications |
| sna.toolkit.aname | 2.2.0.0 APPC/APPN Name Server |
| sna.toolkit.basic | 2.2.0.0 Basic APPC Connectivity Applications |
| sna.toolkit.misc | 2.2.0.0 Miscellaneous APPC Applications |
| sna.toolkit.rte | 2.2.0.0 APPC Application Suite Common Routines |
| sna.xsna package includes the following fileset(s); | |
| sna.xsna | 2.2.0.0 X-windows Management Tool for SNA Server/6000 |
| sx25 package includes the following fileset(s); | |
| sx25.comio | 1.1.1.0 AIXlink/X.25 COMIO Compatibility Support and Applications |
| sx25.npi | 1.1.1.0 AIXlink/X.25 NPI and DLPI Support |
| sx25.pad | 1.1.1.0 AIXlink/X.25 Triple-X Packet Assembler/Disassembler (PAD) |
| sx25.rte | 1.1.1.0 AIXlink/X.25 Runtime Environment |
| sx25.server | 1.1.1.0 AIXlink/X.25 Server Support |
| sx25.tcpip | 1.1.1.0 AIXlink/X.25 TCP/IP Support |
| sx25.adt package includes the following fileset(s); | |
| sx25.adt.comio | 1.1.0.0 AIXlink/X.25 Application Development Toolkit - COMIO Support |
| sx25.adt.npi | 1.1.1.0 AIXlink/X.25 Application Development Toolkit - NPI/DLPI |
| sx25.adt.rte | 1.1.0.0 AIXlink/X.25 Application Development Toolkit - Runtime Env. |
| sx25.info.en_US package includes the following fileset(s); | |
| sx25.info.en_US.usr_gd | 4.1.3.0 X.25 User Guides - U.S. English |
| sx25.msg.De_DE package includes the following fileset(s); | |
| sx25.msg.De_DE.rte | 1.1.0.0 AIXlink/X.25 Messages - German IBM-850 |
| sx25.msg.En_US package includes the following fileset(s); | |
| sx25.msg.En_US.rte | 1.1.0.0 AIXlink/X.25 Messages - U.S. English IBM-850 |
| sx25.msg.Es_ES package includes the following fileset(s); | |
| sx25.msg.Es_ES.rte | 1.1.0.0 AIXlink/X.25 Messages - Spanish IBM-850 |
| sx25.msg.Fr_FR package includes the following fileset(s); | |
| sx25.msg.Fr_FR.rte | 1.1.0.0 AIXlink/X.25 Messages - French IBM-850 |
| sx25.msg.It_IT package includes the following fileset(s); | |

| Package | Description |
|---|---|
| sx25.msg.It_IT.rte | 1.1.0.0 AIXlink/X.25 Messages - Italian IBM-850 |
| sx25.msg.Ja_JP package includes the following fileset(s); | |
| sx25.msg.Ja_JP.rte | 1.1.0.0 AIXlink/X.25 Messages - Japanese |
| sx25.msg.Nl_BE package includes the following fileset(s); | |
| sx25.msg.Nl_BE.rte | 1.1.0.0 AIXlink/X.25 Messages - Belgian Dutch IBM-850 |
| sx25.msg.de_DE package includes the following fileset(s); | |
| sx25.msg.de_DE.rte | 1.1.0.0 AIXlink/X.25 Messages - German |
| sx25.msg.en_US package includes the following fileset(s); | |
| sx25.msg.en_US.rte | 1.1.0.0 AIXlink/X.25 Messages - U.S. English |
| sx25.msg.es_ES package includes the following fileset(s); | |
| sx25.msg.es_ES.rte | 1.1.0.0 AIXlink/X.25 Messages - Spanish |
| sx25.msg.fr_FR package includes the following fileset(s); | |
| sx25.msg.fr_FR.rte | 1.1.0.0 AIXlink/X.25 Messages - French |
| sx25.msg.it_IT package includes the following fileset(s); | |
| sx25.msg.it_IT.rte | 1.1.0.0 AIXlink/X.25 Messages - Italian |
| sx25.msg.ja_JP package includes the following fileset(s); | |
| sx25.msg.ja_JP.rte | 1.1.0.0 AIXlink/X.25 Messages - Japanese IBM-eucJP |
| sx25.msg.ko_KR package includes the following fileset(s); | |
| sx25.msg.ko_KR.rte | 1.1.0.0 AIXlink/X.25 Messages - Korean |
| sx25.msg.nl_BE package includes the following fileset(s); | |
| sx25.msg.nl_BE.rte | 1.1.0.0 AIXlink/X.25 Messages - Belgian Dutch |
| sx25.msg.zh_TW package includes the following fileset(s); | |
| sx25.msg.zh_TW.rte | 1.1.0.0 AIXlink/X.25 Messages - Traditional Chinese |
| uimx package includes the following fileset(s); | |
| uimx.contrib | 2.8.0.0 UIM/X Example Software |
| uimx.libux | 2.8.0.0 UIM/X UX Convenience Library Source Code |
| uimx.rte | 2.8.1.0 UIM/X Runtime |
| uimx.msg.En_US package includes the following fileset(s); | |
| uimx.msg.En_US.rte | 2.8.0.0 UIM/X Messages - U.S. English IBM-850 |
| uimx.msg.Ja_JP package includes the following fileset(s); | |
| uimx.msg.Ja_JP.rte | 2.8.0.0 UIM/X Messages - Japanese |
| uimx.msg.en_US package includes the following fileset(s); | |
| uimx.msg.en_US.rte | 2.8.0.0 UIM/X Messages - U.S. English |
| uimx.msg.ja_JP package includes the following fileset(s); | |
| uimx.msg.ja_JP.rte | 2.8.0.0 UIM/X Messages - Japanese IBM-eucJP |
| uimx.msg.ko_KR package includes the following fileset(s); | |
| uimx.msg.ko_KR.rte | 2.8.0.0 UIM/X Messages - Korean |
| uimx.msg.zh_TW package includes the following fileset(s); | |
| uimx.msg.zh_TW.rte | 2.8.0.0 UIM/X Messages - Traditional Chinese |
| xlC.C package includes the following fileset(s); | |
| xlC.C | 3.1.1.0 C for AIX Compiler |
| xlC.C.data | 3.1.1.0 C for AIX Manual Pages |
| xlC.C++ package includes the following fileset(s); | |
| xlC.C++.ascl.lib | 3.1.1.0 C Set ++ Application Support Class Library |

| Package | Description |
|---|---|
| xlC.C++.browser | 3.1.1.0 C Set ++ for AIX Browser |
| xlC.C++.cmp | 3.1.1.0 C Set ++ for AIX Compiler |
| xlC.C++.cmp.data | 3.1.1.0 C Set ++ for AIX Manual Pages |
| xlC.C++.collect.lib | 3.1.1.0 C Set ++ Collection Class Library |
| xlC.C++.collect.samples | 3.1.1.0 C Set ++ Collection Classes Sample Programs |
| xlC.C++.collect.tutorial | 3.1.1.0 C Set ++ Collection Classes Tutorials |
| xlC.C++.heapview | 3.1.1.0 C Set ++ for AIX Heapview Debugger |
| xlC.C++.iclui.lib | 3.1.1.0 C Set ++ Graphical User Interface Class Library |
| xlC.C++.iclui.samples | 3.1.1.0 C++ Graphical User Interface Class Library Samples |
| xlC.C++.include | 3.1.1.0 C Set ++ for AIX Compiler Include Files |
| xlC.C++.lib | 3.1.1.0 C Set ++ for AIX Compiler Libraries |
| xlC.C++.tcov | 3.1.1.0 C Set ++ for AIX Test Coverage Tool |
| xlC.C++.tutorial | 3.1.1.0 C Set ++ Tutorial |
| xlC.C.readme.ibm package includes the following fileset(s); | |
| xlC.C.readme.ibm | 3.1.1.0 C and C Set ++ for AIX iFOR/LS Information |
| xlC.cpp package includes the following fileset(s); | |
| xlC.cpp | 3.1.1.0 C for AIX Preprocessor |
| xlC.info.en_US.C package includes the following fileset(s); | |
| xlC.info.en_US.C | 3.1.1.0 C for AIX Programming Information en_US |
| xlC.info.en_US.C++ package includes the following fileset(s); | |
| xlC.info.en_US.C++ | 3.1.1.0 C Set ++ for AIX Programming Information en_US |
| xlC.ipf.en_US.C++ package includes the following fileset(s); | |
| xlC.ipf.en_US.C++.iclui | 3.1.1.0 C++ GUI Class Library Reference Manual |
| xlC.loc.en_US.C++ package includes the following fileset(s); | |
| xlC.loc.en_US.C++.iclui | 3.1.1.0 C++ GUI Class Library en_US application defaults |
| xlC.msg.De_DE package includes the following fileset(s); | |
| xlC.msg.De_DE.rte | 3.1.1.0 C Set ++ for AIX Application Runtime Messages De_DE |
| xlC.msg.Ja_JP package includes the following fileset(s); | |
| xlC.msg.Ja_JP.C | 3.1.1.0 C for AIX Compiler Messages Ja_JP |
| xlC.msg.Ja_JP.C++ | 3.1.1.0 C Set ++ for AIX Compiler Messages Ja_JP |
| xlC.msg.Ja_JP.cpp | 3.1.1.0 C for AIX Preprocessor Messages Ja_JP |
| xlC.msg.Ja_JP.rte | 3.1.1.0 C Set ++ for AIX Application Runtime Messages Ja_JP |
| xlC.msg.de_DE package includes the following fileset(s); | |
| xlC.msg.de_DE.rte | 3.1.1.0 C Set ++ for AIX Application Runtime Messages de_DE |
| xlC.msg.en_US package includes the following fileset(s); | |
| xlC.msg.en_US.C | 3.1.1.0 C for AIX Compiler Messages en_US |
| xlC.msg.en_US.C++ | 3.1.1.0 C Set ++ for AIX Compiler Messages en_US |
| xlC.msg.en_US.cpp | 3.1.1.0 C for AIX Preprocessor Messages en_US |
| xlC.msg.en_US.rte | 3.1.1.0 C Set ++ for AIX Application Runtime Messages en_US |
| xlC.msg.ja_JP package includes the following fileset(s); | |
| xlC.msg.ja_JP.C | 3.1.1.0 C for AIX Compiler Messages ja_JP |
| xlC.msg.ja_JP.C++ | 3.1.1.0 C Set ++ for AIX Compiler Messages ja_JP |
| xlC.msg.ja_JP.cpp | 3.1.1.0 C for AIX Preprocessor Messages ja_JP |
| xlC.msg.ja_JP.rte | 3.1.1.0 C Set ++ for AIX Application Runtime Messages ja_JP |

| Package | Description |
|---|---|
| xlC.ps.en_US.C package includes the following fileset(s); | |
| xlC.ps.en_US.C | 3.1.1.0 C for AIX Documentation (Postscript) en_US |
| xlC.ps.en_US.C++ package includes the following fileset(s); | |
| xlC.ps.en_US.C++ | 3.1.1.0 C Set ++ for AIX Documentation (Postscript) en_US |
| xlC.rte package includes the following fileset(s); | |
| xlC.rte | 3.1.1.0 C Set ++ for AIX Application Runtime |
| xldb package includes the following fileset(s); | |
| xldb | 1.1.1.0 XLDB Graphical Debugger for Fortran, C, and C++ |
| xlfrte package includes the following fileset(s); | |
| xlfrte | 3.2.0.0 XL Fortran Runtime Environment for AIX |
| xlfrte | 3.2.0.2 XLF Runtime for AIX |
| xlfrte.msg.en_US package includes the following fileset(s); | |
| xlfrte.msg.en_US | 3.2.0.0 XL Fortran Runtime Environment Messages for AIX - en_US |

*Table 48 (Page 1 of 2). PSSP 2.2 File Sets*

# PSSP 2.2 File Sets - Worksheet 13

| File sets for PSSP Image: ssp | | |
|---|---|---|
| **Select**[1] | **File Set** | **Description** |
| | ssp.clients | SP authenticated client commands |
| | ssp.basic | SP system support package |
| | ssp.sysman | Optional system management programs |
| | ssp.css | SP Communication subsystem package (only if the switch is installed) |
| | ssp.jm | SP job manager package |
| | ssp.public | Public code compressed tar files |
| | ssp.gui | SP system monitor graphical user interface and Perspectives |
| | ssp.docs | SP man page and InfoExplorer files |
| | ssp.sysctl | SP sysctl package |
| | ssp.authent | SP authentication server |
| | ssp.top | SP system partition support |
| | ssp.top.gui | SP system partition support graphical user interface |
| | ssp.st | Low level application programming interface for loading, unloading, and querying the job switch resource table |
| | ssp.ha | Availability subsystems which include heartbeat, group services, and event management |
| | ssp.perlpkg | Perl4 and Perl5 |
| | ssp.pman | Problem management |
| **File sets for PSSP Image: ssp.mte** | | |
| | ssp.mte | Magnetic tape extensions |
| **File sets for PSSP Image: spimg** | | |
| | spimg | |
| **File sets for PSSP Image: ssp.csd** | | |
| | ssp.csd.vsd | IBM Virtual Shared Disk package |
| | ssp.csd.cmi | SP centralized management interface package for IBM Virtual Shared Disk |
| | ssp.csd.hsd | IBM Virtual Shared Disk data striping package |
| | ssp.csd.sysctl | Useability improvement |
| | ssp.csd.gui | Graphical user interface |
| **File sets for PSSP Image: ssp.hacws** | | |
| | ssp.hacws | High Availability Control Workstation Support |
| **File sets for PSSP Image: ptpe** | | |
| | ptpe.program | Program for PTPE |
| | ptpe.gui | Graphical user inteface for PTPE |

| Table 48 (Page 2 of 2). PSSP 2.2 File Sets | | |
|---|---|---|
| | ptpe.docs | Man pages and InfoExplorer files for PTPE |

**Note:**
[1]Check off √ if you want this file set.

*Table 49. Control Workstation Image Worksheet*

# Worksheet 14a

# SP Control Workstation Image

| | |
|---|---|
| **Control Workstation Name** | _____ |
| **Model** | _____ |
| **Install rootvg on disk** | _____ |
| **Disk Space** | _____ |
| **Memory Size** | _____ |

| **Hardware Options and Adapters** | |
|---|---|
| **Type** | **Quantity** |
| ATM | |
| Ethernet | |
| FDDI | |
| Token Ring: Speed _____MB | |
| Multiport Serial Adapters | |
| 8 mm tape drive | |
| CD-ROM | |

| **IBM Licensed Products** |
|---|
| AIX |
| PSSP |
| LoadLeveler |
| X-Windows |
| |
| |

| **Other Applications** |
|---|
| |
| |

*Table 50. Time Zones*

# Worksheet 14b

# Select a Time Zone

| Select using a √ | Time Zone | Select using a √ | Time Zone | Description |
|---|---|---|---|---|
| | (CUT0) | | (CUT0GDT) | Coordinated Universal Time (CUT) |
| | (GMT0) | | (GMT0BST) | United Kingdom (CUT) |
| | (AZOREST1) | | (AZOREST1AZOREDT) | Azores; Cape Verde (CUT -1) |
| | (FALKST2) | | (FALKST2FALKDT) | Falkland Islands (CUT -2) |
| | (GRNLNDST3) | | (GRNLNDST3GRNLNDDT) | Greenland; East Brazil (CUT -3) |
| | (AST4) | | (AST4ADT) | Central Brazil (CUT -4) |
| | (EST5) | | (EST5EDT) | Eastern U.S.; Colombia (CUT -5) |
| | (CST6) | | (CST6CDT) | Central U.S.; Honduras (CUT -6) |
| | (MST7) | | (MST7MDT) | Mountain U.S. (CUT -7) |
| | (PST8) | | (PST8PDT) | Pacific U.S.; Yukon (CUT -8) |
| | (AST9) | | (AST9ADT) | Alaska (CUT -9) |
| | (HST10) | | (HST10HDT) | Hawaii; Aleutian (CUT-10) |
| | (BST11) | | (BST11BDT) | Bering Straits (CUT-11) |
| | (NZST-12) | | (NZST-12NZDT) | New Zealand (CUT+12) |
| | (MET-11M) | | (MET-11METDT) | Solomon Islands (CUT+11) |
| | (EET-10E) | | (EET-10EETDT) | Eastern Australia (CUT+10) |
| | (JST-9) | | (JST-9JDT) | Japan (CUT +9) |
| | (KORST-9) | | (KORST-9KORDT) | Korea (CUT +9) |
| | (WAUST-8) | | (WAUST-8WAUDT) | Western Australia (CUT +8) |
| | (TAIST-8) | | (TAIST-8TAIDT) | Taiwan (CUT +8) |
| | (THAIST-7) | | (THAIST-7THAIDT) | Thailand (CUT +7) |
| | (TASHST-6) | | (TASHST-6TASHDT) | Tashkent; Central Asia (CUT +6) |
| | (PAKST-5) | | (PAKST-5PAKDT) | Pakistan (CUT +5) |
| | (WST-4) | | (WST-4WDT) | Gorki; Central Asia; Oman (CUT +4) |
| | (MEST-3) | | (MEST-3MEDT) | Turkey (CUT +3) |
| | (SAUST-3) | | (SAUST-3SAUDT) | Saudi Arabia (CUT +3) |
| | (WET-2) | | (WET-2WET) | Finland (CUT +2) |
| | (USAST-2) | | (USAST-2USADT) | South Africa (CUT +2) |
| | (NFT-1) | | (NFT-1DFT) | Norway; France (CUT +1) |

*Table 51. Control Workstation Network Worksheet*

# SP Control Workstation Network - Worksheet 15

**Name** _____ **Date** _____

**System Name** _____ **Control Workstation Name** _____

| Frame Hardware Control Connections (RS-232) | | | | Control Workstation Network Connections [b] | | | |
|---|---|---|---|---|---|---|---|
| **Frame Number** | **Serial Port for RS-232 Control Line[a]** | **tty Device** | | **Adapter** | **Hostname** | **IP Address** | **Netmask** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

*Table 52. Site Environment Worksheet*

# SP Site Environment - Worksheet 16

**Name** _____ **Date** _____

**System Name** _____ **Control Workstation Name** _____

| SMIT Dialog Field Name [a] | Site Attribute [b] | Default Value | Your Choice |
|---|---|---|---|
| Default Network Install Image | install_image | bos.obj.ssp.41 | |
| Remove Install Image After Installs | remove_image | false | |
| NTP Installation | ntp_config | consensus | |
| NTP Server Hostname | ntp_server | | |
| NTP Version | ntp_version | 3 | |
| Amd Configuration | amd_config | true | |
| Print Management Configuration | print_config | false | |
| Print System Secure Mode Login Name | print_id | | |
| User Administration Interface | usermgmt_config | true | |
| Password File Server Hostname | passwd_file_loc | control workstation hostname | |
| Password File Location | passwd_file | /etc/passwd | |
| Home Directory Server Hostname | homedir_server | control workstation hostname | |
| Home Directory Path | homedir_path | /home/<control workstation> | |
| File Collection Management | filecoll_config | true | |
| Home Collection Daemon uid | supman_uid | 102 | |
| Home Collection Port | supfilesrv_port | 8431 | |
| SP Accounting Enabled | spacct_enable | false | |
| SP Accounting Active Node Threshold | spacct_node | 80 | |
| SP Exclusive Use Accounting Enabled | spacct_exclusive_enable | false | |
| Accounting Master | acct_master | 0 | |

**a.** This is the name that appears on the SMIT dialog. **b.** This is the attribute name to use on the **spsitenv** command.

*Table 53. PSSP Or Other Kerberos Authentication Servers*

| Authentication - Worksheets 17 | | | | |
|---|---|---|---|---|
| **Primary Server** | **Hostname (long)** | **Default realm** | **Control workstation** | **SP Authentication?** |
| | | | | |
| **Secondary Servers** | | | | |
| | | | | |
| | | | | |
| **Client Systems** | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**hostname** Fully qualified hostname. For example, `kgn.east.abc.com`

**default realm** Domain portion of hostname in upper case. For example, `EAST.ABC.COM`

**control workstation?**

`y` This workstation is the SP control workstation for the system being installed.

`n` This workstation is *not* the SP control workstation for the system being installed.

Any of the secondary servers or client systems could be control workstations for other SP systems, but enter `y` only for this system's control workstation.

**SP2 Authentication**

`y` This workstation will run an SP authentication server.

`n` This workstation has a different MIT Kerberos 4 server installed.

This option is not applicable to client systems. You must install **ssp.authent** on all workstations for which you enter **y**.

| Table 54. Local Realm Information, PSSP Authentication Server | | |
|---|---|---|
| **Local realm name** | | **Master password** |
| **Administrative principal** | **.admin** | Password |
| **other principals** | **name** | **password** |
| | **name** | **password** |
| | **name** | **password** |
| | **name** | **password** |
| | **name** | **password** |
| | **name** | **password** |
| | **name** | **password** |
| | **name** | **password** |

| Table 55. AFS Authentication Servers | |
|---|---|
| **administrative principal** | |
| **Password** | |
| **Directory containing CellServDB, ThisCell files** | |
| **Directory containing kas command** | |

**local realm** The name of your local realm.

If blank, the local realm is the default realm you entered for the primary server.

**administrative principal** The name you will use as the primary administrator of the authentication database.

**password** The master password of the primary authentication server using SP authentication. Once you have written this password on the chart, be sure to keep the chart in a secure environment.

# Glossary of Terms and Abbreviations

This glossary includes terms and definitions from:

- The *IBM Dictionary of Computing*, New York: McGraw-Hill, 1994.
- The *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies can be purchased from the American National Standards Institute, 1430 Broadway, New York, New York 10018. Definitions are identified by the symbol (A) after the definition.
- The *ANSI/EIA Standard - 440A: Fiber Optic Terminology*, copyright 1989 by the Electronics Industries Association (EIA). Copies can be purchased from the Electronic Industries Association, 2001 Pennsylvania Avenue N.W., Washington, D.C. 20006. Definitions are identified by the symbol (E) after the definition.
- The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). Definitions of published parts of this vocabulary are identified by the symbol (I) after the definition; definitions taken from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1 are identified by the symbol (T) after the definition, indicating that final agreement has not yet been reached among the participating National Bodies of SC1.

The following cross-references are used in this glossary:

**Contrast with.** This refers to a term that has an opposed or substantively different meaning.

**See.** This refers the reader to multiple-word terms in which this term appears.

**See also.** This refers the reader to terms that have a related, but not synonymous, meaning.

**Synonym for.** This indicates that the term has the same meaning as a preferred term, which is defined in the glossary.

This section contains some of the terms that are commonly used in the SP publications.

IBM is grateful to the American National Standards Institute (ANSI) for permission to reprint its definitions from the American National Standard *Vocabulary for Information Processing* (Copyright 1970 by American National Standards Institute, Incorporated), which was prepared by Subcommittee X3K5 on Terminology and Glossary of the American National Standards Committee X3. ANSI definitions are preceded by an asterisk (*).

Other definitions in this glossary are taken from *IBM Vocabulary for Data Processing, Telecommunications, and Office Systems* (SC20-1699) and *IBM DATABASE 2 Application Programming Guide for TSO Users* (SC26-4081).

© Copyright IBM Corp. 1996

# A

**address**. A character or group of characters that identifies a register, a device, a particular part of storage, or some other data source or destination.

**AFS**. A distributed file system that provides authentication services as part of its file system creation.

**AIX**. Abbreviation for Advanced Interactive Executive, IBM's licensed version of the UNIX operating system. AIX is particularly suited to support technical computing applications, including high function graphics and floating point computations.

**Amd**. Berkeley Software Distribution automount daemon.

**API**. Application Programming Interface. A set of programming functions and routines that provide access between the Application layer of the OSI seven-layer model and applications that want to use the network. It is a software interface.

**application**. The use to which a data processing system is put; for example, a payroll application, an airline reservation application.

**application data**. The data that is produced or used by an application program.

**ARP**. Address Resolution Protocol.

**ATM**. Asynchronous Transfer Mode. (See *TURBOWAYS 100 ATM Adapter*.)

**authentication**. The process of validating the identity of a user or server.

**authorization**. The process of obtaining permission to perform specific actions.

# B

**batch processing**. * (1) The processing of data or the accomplishment of jobs accumulated in advance in such a manner that each accumulation thus formed is processed or accomplished in the same run. * (2) The processing of data accumulating over a period of time. * (3) Loosely, the execution of computer programs serially. (4) Computer programs executed in the background.

**BMCA**. Block Multiplexer Channel Adapter. The block multiplexer channel connection allows the RISC System/6000 to communicate directly with a host System/370 or System/390; the host operating system views the system unit as a control unit.

# C

**call home function**. The ability of a system to call the IBM support center and open a PMR to have a repair scheduled.

**charge feature**. An optional feature for either software or hardware for which there is a charge.

**CLI**. Command Line Interface.

**client**. * (1) A function that requests services from a server and makes them available to the user. * (2) A term used in an environment to identify a machine that uses the resources of the network.

**Client Input/Output Sockets (CLIO/S)**. An IBM software package that enables high-speed data and tape access between SP systems, AIX systems, and ES/9000 mainframes.

**CLIO/S**. Client Input/Output Sockets.

**CMI**. Centralized Management Interface provides a series of SMIT menus and dialogues used for defining and querying the SP system configuration.

**connectionless**. A communication process that takes place without first establishing a connection.

**connectionless network**. A network in which the sending logical node must have the address of the receiving logical node before information interchange can begin. The packet is routed through nodes in the network based on the destination address in the packet. The originating source does not receive an acknowledgment that the packet was received at the destination.

**control workstation**. A single point of control allowing the administrator or operator to monitor and manage the SP system using the IBM AIX Parallel System Support Programs.

# D

**daemon**. A process, not associated with a particular user, that performs system-wide functions such as administration and control of networks, execution of time-dependent activities, line printer spooling and so forth.

**DASD**. Direct Access Storage Device. Storage for input/output data.

**DCE**. Distributed Computing Environment.

**DFS**. distributed file system. A subset of the IBM Distributed Computing Environment.

**DNS**. Domain Name Service. A hierarchical name service which maps high level machine names to IP addresses.

# E

**Error Notification Object**. An object in the SDR that is matched with an error log entry. When an error log entry occurs that matches the Notification Object, a user-specified action is taken.

**ESCON**. Enterprise Systems Connection. The ESCON channel connection allows the RISC System/6000 to communicate directly with a host System/390; the host operating system views the system unit as a control unit.

**Ethernet**. (1) Ethernet is the standard hardware for TCP/IP local area networks in the UNIX marketplace. It is a 10-megabit per second baseband type LAN that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by collision detection (CSMA/CD). (2) A passive coaxial cable whose interconnections contain devices or components, or both, that are all active. It uses CSMA/CD technology to provide a best-effort delivery system.

**Ethernet network**. A baseband LAN with a bus topology in which messages are broadcast on a coaxial cabling using the carrier sense multiple access/collision detection (CSMA/CD) transmission method.

**event**. An action that takes place in the operation of the system software.

**expect**. Programmed dialogue with interactive programs.

# F

**Failover**. Also called fallover, the sequence of events when a primary or server machine fails and a secondary or backup machine assumes the primary workload. This is a disruptive failure with a short recovery time.

**fall back**. Also called fall back, the sequence of events when a primary or server machine takes back control of its workload from a secondary or backup machine.

**FDDI**. Fiber Distributed Data Interface.

**Fiber Distributed Data Interface (FDDI)**. An American National Standards Institute (ANSI) standard for 100-megabit-per-second LAN using optical fiber cables. An FDDI local area network (LAN) can be up to 100 km (62 miles) and can include up to 500 system units. There can be up to 2 km (1.24 miles) between system units and/or concentrators.

**File Transfer Protocol (FTP)**. The Internet protocol (and program) used to transfer files between hosts. It is an application layer protocol in TCP/IP that uses TELNET and TCP protocols to transfer bulk-data files between machines or hosts.

**file**. * A set of related records treated as a unit, for example, in stock control, a file could consist of a set of invoices.

**file server**. A centrally located computer that acts as a storehouse of data and applications for numerous users of a local area network.

**foreign host**. Any host on the network other than the local host.

**FTP**. File transfer protocol.

# G

**gateway**. An intelligent electronic device interconnecting dissimilar networks and providing protocol conversion for network compatibility. A gateway provides transparent access to dissimilar networks for nodes on either network. It operates at the session presentation and application layers.

# H

**HACMP/6000**. AIX High Availability Cluster Multi-Processing/6000.

**HACWS**. High Availability Control Workstation function, based on HACMP/6000, provides for a backup control workstation for the SP system.

**help key**. In the SP graphical interface, the key that gives you access to the SP graphical interface help facility.

**High Availability Cluster Multi-Processing/6000**. An IBM facility to cluster nodes or components to provide high availability by eliminating single points of failure.

**High Performance Switch**. An IBM multi-stage packet switch for high-performance communication between processor nodes.

**HiPPI**. High Performance Parallel Interface. RISC System/6000 units can attach to a HiPPI network as defined by the ANSI specifications. The HiPPI channel supports burst rates of 100 Mbps over dual simplex

cables; connections can be up to 25 km in length as defined by the standard and can be extended using third-party HiPPI switches and fiber optic extenders.

**home directory**. The directory associated with an individual user.

**host**. A computer connected to a network, and providing an access method to that network. A host provides end-user services.

**HSD**. The data striping device for the IBM Virtual Shared Disk. The device driver lets application programs stripe data across physical disks in multiple &vsds., thus reducing I/O bottlenecks and hot spots.

# I

**Internet**. A specific inter-network consisting of large national backbone networks such as APARANET, MILNET, and NSFnet, and a myriad of regional and campus networks all over the world. The network uses the TCP/IP protocol suite.

**Intermediate Switch Board**. Switches mounted in the High Performance Switch expansion frame.

**IP address**. A 32-bit address assigned to devices or hosts in an IP internet that maps to a physical address. The IP address is composed of a network and host portion.

**Internet Protocol (IP)**. (1) A protocol that routes data through a network or interconnected networks. IP acts as an interface between the higher logical layers and the physical network. This protocol, however, does not provide error recovery, flow control, or guarantee the reliability of the physical network. IP is a connectionless protocol. (2) A protocol used to route data from its source to it destination in an Internet environment.

**ISB**. Intermediate Switch Board.

# K

**Kerberos**. A service for authenticating users in a network environment.

**kernel**. The core portion of the UNIX operating system which controls the resources of the CPU and allocates them to the users. The kernel is memory-resident, is said to run in “kernel mode” and is protected from user tampering by the hardware.

# L

**LAN**. (1) Acronym for Local Area Network, a data network located on the user's premises in which serial transmission is used for direct data communication among data stations. (2) Physical network technology that transfers data a high speed over short distances. (3) A network in which a set of devices is connected to another for communication and that can be connected to a larger network.

**local host**. The computer to which a user's terminal is directly connected.

**log database**. A persistent storage location for the logged information.

**log event**. The recording of an event.

**log event type**. A particular kind of log event that has a hierarchy associated with it.

**logging**. The writing of information to persistent storage for subsequent analysis by humans or programs.

# M

**mask**. To use a pattern of characters to control retention or elimination of portions of another pattern of characters.

**menu**. A display of a list of available functions for selection by the user.

**Motif**. The graphical user interface for OSF, incorporating the X Window System. Also called OSF/Motif.

**MTBF**. Mean time between failure. This is a measure of reliability.

**MTTR**. Mean time to repair. This is a measure of serviceability.

# N

**naive application**. An application with no knowledge of a server that fails over to another server. Client to server retry methods are used to reconnect.

**network**. An interconnected group of nodes, lines, and terminals. A network provides the ability to transmit data to and receive data from other systems and users.

**NFS**. Network File System. NFS allows different systems (UNIX or non-UNIX), different architectures, or vendors connected to the same network, to access

remote files in a LAN environment as though they were local files.

**NIM**. Network Installation Management is provided with AIX 4.1 to install AIX on the nodes.

**NIM client**. An AIX system installed and managed by a NIM master. NIM supports three types of clients:

- Standalone
- Diskless
- Dataless

**NIM master**. An AIX system that can install one or more NIM clients. An AIX system must be defined as a NIM master before defining any NIM clients on that system. A NIM master managers the configuration database containing the information for the NIM clients.

**NIM object**. A representation of information about the NIM environment. NIM stores this information as objects in the NIM database. The types of objects are:

- Network
- Machine
- Resource

**NIS**. Network Information System.

**node**. In a network, the point where one or more functional units interconnect transmission lines. A computer location defined in a network.

**Node Switch Board**. Switches mounted in frames that contain nodes.

**NSB**. Node Switch Board.

**NTP**. Network Time Protocol.

# P

**parallel environment**. A system environment where message passing or SP resource manager services are used by they application.

**Parallel Environment**. A licensed IBM program used for message passing applications on the SP or RISC System/6000 platforms.

**parallel processing**. A multiprocessor architecture which allows processes to be allocated to tightly coupled multiple processors in a cooperative processing environment, allowing concurrent execution of tasks.

**parameter**. * (1) A variable that is given a constant value for a specified application and that may denote the application. * (2) An item in a menu for which the operator specifies a value or for which the system provides a value when the menu is interpreted. * (3) A name in a procedure that is used to refer to an argument that is passed to the procedure. * (4) A particular piece of information that a system or application program needs to process a request.

**partition**. See system partition.

**Perl**. Practical Extraction and Report Language.

**pipe**. A UNIX utility allowing the output of one command to be the input of another. Represented by the | symbol. It is also referred to as filtering output.

**port**. (1) An end point for communication between devices, generally referring to physical connection. (2) A 16-bit number identifying a particular TCP or UDP resource within a given TCP/IP node.

**process**. * (1) A unique, finite course of events defined by its purpose or by its effect, achieved under defined conditions. * (2) Any operation or combination of operations on data. * (3) A function being performed or waiting to be performed. * (4) A program in operation. For example, a daemon is a system process that is always running on the system.

**protocol**. A set of semantic and syntactic rules that defines the behavior of functional units in achieving communication.

**PMR**. Problem Management Report.

**Problem Management Report**. The number in the IBM support mechanism that represents a service incident with a customer.

**Primary node or machine**. (1) A device that runs a workload and has a standby device ready to assume the primary workload if that primary node fails or is taken out of service. (2) A node on the High Performance Switch that initializes, provides diagnosis and recovery services, and performs other operations to the switch network. (3) In IBM Virtual Shared Disk function, the node at which the logical volume is actually local and that acts as server node to I/O requests from other nodes.

# R

**RAID**. Redundant array of independent disks.

**remote host**. *See foreign host*.

**RISC**. Reduced Instruction Set Computing (RISC), the technology for today's high performance personal computers and workstations, was invented in 1975. Uses a small simplified set of frequently used instructions for rapid execution.

**rlogin (remote LOGIN)**. A service offered by Berkeley UNIX systems that allows authorized users of one

machine to connect to other UNIX systems across a network and interact as if their terminals were connected directly. The rlogin software passes information about the user's environment (for example, terminal type) to the remote machine.

**RPC**. Acronym for Remote Procedure Call, a facility that a client uses to have a server execute a procedure call. This facility is composed of a library of procedures plus an XDR.

**RSH**. A variant of RLOGIN command that invokes a command interpreter on a remote UNIX machine and passes the command line arguments to the command interpreter, skipping the LOGIN step completely. See also *rlogin*.

# S

**SCSI**. Small Computer System Interface.

**server**. (1) A function that provides services for users. A machine may run client and server processes at the same time. (2) A machine that provides resources to the network. It provides a network service, such as disk storage and file transfer, or a program that uses such a service. (3) A device, program, or code module on a network dedicated to providing a specific service to a network. (4) On a LAN, a data station that provides facilities to other data stations. Examples are file server, print server, and mail server.

**Small Computer System Interface (SCSI)**. An input and output bus that provides a standard interface for the attachment of various direct access storage devices (DASD) and tape drives to the RISC System/6000.

**shell**. The shell is the primary user interface for the UNIX operating system. It serves as command language interpreter, programming language, and allows foreground and background processing. There are three different implementations of the shell concept: Bourne, C and Korn.

**Small Computer Systems Interface Adapter (SCSI Adapter)**. An adapter that supports the attachment of various direct-access storage devices (DASD) and tape drives to the RISC System/6000.

**SMIT**. The System Management Interface Toolkit is a set of menu driven utilities for AIX that provides functions such as transaction login, shell script creation, automatic updates of object database, and so forth.

**SNMP**. Simple Network Management Protocol. (1) An IP network management protocol that is used to monitor attached networks and routers. (2) A TCP/IP-based protocol for exchanging network management information and outlining the structure for communications among network devices.

**socket**. (1) An abstraction used by Berkeley UNIX that allows an application to access TCP/IP protocol functions. (2) An IP address and port number pairing. (3) In TCP/IP, the Internet address of the host computer on which the application runs, and the port number it uses. A TCP/IP application is identified by its socket.

**SP Switch**. Newest version of the IBM High Performance Switch.

**standby node or machine**. A device that waits for a failure of a primary node in order to assume the identity of the primary node. The standby machine then runs the primary's workload until the primary is back in service.

**subnet**. Shortened form of subnetwork.

**subnet mask**. A bit template that identifies to the TCP/IP protocol code the bits of the host address that are to be used for routing for specific subnetworks.

**subnetwork**. Any group of nodes that have a set of common characteristics, such as the same network ID.

**SUP**. Software Update Protocol.

**Sysctl**. Secure System Command Execution Tool. An authenticated client/server system for running commands remotely and in parallel.

**System Administrator**. The user who is responsible for setting up, modifying, and maintaining the SP system.

**subsystem**. A software component that is not usually associated with a user command. It is usually a daemon process. A subsystem will perform work or provide services on behalf of a user request or operating system request.

**syslog**. A BSD logging system used to collect and manage other subsystem's logging data.

**system partition**. A group of nodes that act as a logical SP system. All nodes attached to the same switch chip must be in the same system partition.

# T

**tar**. Tape ARchive, is a standard UNIX data archive utility for storing data on tape media.

**Tcl**. Tool Command Language.

**TclX**. Tool Command Language Extended.

**TCP**. Acronym for Transmission Control Protocol, a stream communication protocol that includes error recovery and flow control.

**TCP/IP**. Acronym for Transmission Control Protocol/Internet Protocol, a suite of protocols designed to allow communication between networks regardless of the technologies implemented in each network. TCP provides a reliable host-to-host protocol between hosts in packet-switched communications networks and in interconnected systems of such networks. It assumes that the underlying protocol is the Internet Protocol.

**Telnet**. Terminal Emulation Protocol, a TCP/IP application protocol that allows interactive access to foreign hosts.

**Tk**. Tcl-based Tool Kit for X Windows.

**TMPCP**. Tape Management Program Control Point.

**token-ring**. (1) Network technology that controls media access by passing a token (special packet or frame) between media-attached machines. (2) A network with a ring topology that passes tokens from one attaching device (node) to another. (3) The IBM Token-Ring LAN connection allows the RISC System/6000 system unit to participate in a LAN adhering to the IEEE 802.5 Token-Passing Ring standard or the ECMA standard 89 for Token-Ring, baseband LANs.

**transaction**. An exchange between the user and the system. Each activity the system performs for the user is considered a transaction.

**transceiver (transmitter-receiver)**. A physical device that connects a host interface to a local area network, such as Ethernet. Ethernet transceivers contain electronics that apply signals to the cable and sense collisions.

**transfer**. To send data from one place and to receive the data at another place. Synonymous with move.

**transmission**. * The sending of data from one place for reception elsewhere.

**TURBOWAYS 100 ATM Adapter**. An IBM high-performance, high-function intelligent adapter that provides dedicated 100 Mbps ATM (asynchronous transfer mode) connection for high-performance servers and workstations.

# U

**UDP**. User Datagram Protocol.

**Uninteruptable Power Supply (UPS)**. A UPS can supply electricity to a device to keep it running when main power is interrupted or is unreliable.

**User Datagram Protocol (UDP)**. (1) In TCP/IP, a packet-level protocol built directly on the Internet Protocol layer. UDP is used for application-to-application programs between TCP/IP host systems. (2) A transport protocol in the Internet suite of protocols that provides unreliable, connectionless datagram service. (3) The Internet Protocol that enables an application programmer on one machine or process to send a datagram to an application program on another machine or process.

**UNIX operating system**. An operating system developed by Bell Laboratories that features multiprogramming in a multiuser environment. The UNIX operating system was originally developed for use on minicomputers, but has been adapted for mainframes and microcomputers. **Note:** The AIX operating system is IBM's implementation of the UNIX operating system.

**user**. Anyone who requires the services of a computing system.

**user ID**. A nonnegative integer, contained in an object of type *uid_t*, that is used to uniquely identify a system user.

# V

**Virtual Shared Disk**. The function that allows application programs executing at different nodes of a system partition to access a raw logical volume as if it were local at each of the nodes. In actuality, the logical volume is local at only one of the nodes, the server node.

# W

**workstation**. * (1) A configuration of input/output equipment at which an operator works. * (2) A terminal or microcomputer, usually one that is connected to a mainframe or to a network, at which a user can perform applications.

# X

**X Window System.**. A graphical user interface product.

# Index

## Special Characters

/usr clients 162
  migration 162

## Numerics

604 high node 5

## A

ABC Corporation, used in examples 9
accounting choices 68
acct_master 68
adapters 41
adapters supported on AIX 3.2.5 and AIX 4.1.3
  worksheet 228
adapters, network connectivity 6
AFS
  authentication servers, choosing 128
AIX 6
AIX 4.1, new function 21
AIX components list worksheet 234
AIX level selection 21
application planning worksheet 216
applications, preliminary list 16
authentication
  administrative principals 121
  AFS servers, choosing 128
  choosing a configuration 121
  configurations 121
  creating configuration files 126
  deciding on realms 125
  planning checklists 127
  principals of 119
  selecting options to install 127
  servers 75
  setting up configurations 121
  SP authentication services 119
  worksheet 311
automount daemon (Amd) 63
availability requirements 30

## B

backup control workstation 94
boot/install server 69, 152
boot/install server for AIX 3.2.5 109

## C

choosing a switch
  High Performance Switch, benefits 15
choosing a switch *(continued)*
  SP Switch, benefits 15
Client Input Output/Sockets (CLIO/S) 17, 144
combining the space requirements 77
commands
  dsh 131
configuration planning 59
connectivity adapters, network 6
connectivity, network 25
control workstation 6
  configuration decisions 94
  description 6
  disk mirroring 94
  failure scenario 93
  function with High Availability Control
    Workstation 93
  hardware requirements 49
  maintenance with High Availability Control
    Workstation 93
  minimum hardware requirements 52
  planning for 89
  planning for a backup 94
  planning for High Availability Control
    Workstation 93
  planning site environment 59
  reliability 94
  requirements 48
  single point of failure 91
  worksheet 307
control workstation network workstation 307
control workstation system images worksheet 307
control workstation worksheet 56, 308

## D

data access across system partitions 102, 108
decisions to make 9
default (persistent) system partitions 101
defining the system 9
directory structure, system partitions 116
disk mirroring 94
disk space
  installation image requirements 76
  lppsource 76
  system programs 27
  users' home directories 27
disk storage 27

## E

EMEA Service Planning 135

© Copyright IBM Corp. 1996

environment variable
SP_NAME 109
error messages, finding and using 133
estimate the installation image requirements 76
ethernet 79
event management 23
expansion frames 5, 82, 85, 152, 153
external disk storage needs worksheet 218
external disk storage worksheet 29
external LAN 80

## F

fault tolerance definition 89
filecoll-config 67
finding and using error messages 133
frame
expansion frames 5, 85
frame description 5
frame numbers 84
frame supervisor changes 95
future expansion, network install server 73

## G

group services 23
coexistence 24

## H

HACWS 30
hard disk choices for nodes 75
hardware configuration by node worksheet 223
hardware overview 4
hardware requirements
control workstation 49, 52
help
getting from IBM 134
High Availability Control Workstation
control workstation maintenance 93
description 30
failure scenario with High Availability Control Workstation 93
minimum requirements 53
new function 30
no loss of control workstation function 93
ordering 90
planning 93
resource manager limitation 95
system stability 93
time services considerations 61
worksheet 94
High Availability Control Workstation changes to the control workstation
frame supervisor changes 95
high availability definition 89
high performance switch 5, 15, 80, 225
worksheet 225
home directory server planning 75
homedir_path 65
homedir_server 65

## I

IBM C for AIX, V3, requirement 17
IBM LoadLeveler 17
IBM parallel system support programs for AIX (PSSP) 7
IBM Program Products worksheet 217
IBM Recoverable Virtual Shared Disk 19, 137
IBM Virtual Shared Disk 137
IBM, getting help from 134
installation image requirements 76
installation worksheets
network install image choices 60
time service choices 61
installation, planning for 59
installp image requirements 77
installp images
space requirements 77
IP address assignments to nodes 82
IP addresses 79, 80, 109
IP over the high performance switch 80

## K

kernel-to-kernel interface 137

## L

large scale configurations, network install server 73
listing your applications 16
LoadLeveler 142
location of customer data 74
lppsource
disk space requirements 76

## M

management of system partitions 108
manual pages for public code xvii
messages, finding and using 133
Micro Channel adapters, not yet supported 21
migration
/usr clients 162
planning 159
minimum requirements, High Availability Control Workstation 53
Motif 89
multiple frame systems, network install server 71
multiple production environments 102

# N


NetTape 144
network connectivity 25
network connectivity adapters 6
network install image choices 60
network install image choices, worksheet 60
network install server planning
  future expansion 73
  large scale configurations 73
  multiple frame systems 71
  single frame systems 69
network planning 78
network time protocol (NTP) 61
networking considerations for partitioning 109
new function
  High Availability Control Workstation 30
  system partitions 30
new support
  system partitions 22
node
  604 high nodes 34
  determinging how many nodes needed 32
  node configuration worksheet 40
  node grouping 22
  node hard disk choices 75
  node layout worksheet instructions 36
  node numbering 82, 85
  node slot 111
  thin nodes 34
  wide nodes 34
node layout worksheet for one frame 220
node layout worksheet for two frames 221
nodes, processor 4
nodes, thin 4
nodes, wide 5
non-disruptive management 102
numbering nodes 82
numbering switch nodes 82


# O


ordering the High Availability Control Workstation 90
other installp image requirements 77
overall system view of a High Availability Control Workstation 89
overview
  hardware 4
  software 6


# P


parallel computing 14
Parallel Engineering and Scientific Subroutine Library 18
Parallel Environment for AIX 17, 140
Parallel I/O File System 144
Parallel I/O File System for AIX 18
parallel libraries 18
Parallel Optimization Subroutine Library 18
Parallel System Support Programs for AIX (PSSP), IBM 7
partitions
  benefits 102
  change management 102
  data access 108
  default system partition 101
  description 101
  multiple production environments 102
  networking considerations 109
  single point of control 108
  switchless systems 106
  System Partitioning Aid 107
  understanding the switch board 104
passwd_file 65
Performance Monitor (PTPE) 141
Perspectives 22
planning
  for High Availability Control Workstation 93
  for installation and configuration 59
  IBM planning services 3
  migration 159
  network 78
  partitions 108
  questions to ask 9
  server 69
  site environment 59
planning for security 119
power independence 94
preloaded SP or default version 10
print management choices 64
problem management 22
problem management record (PMR) 135
problem resolution 135
  EMEA Service Planning 135
  Service Director/6000 135
processor nodes 4
programs, related IBM 17
PSSP 7
PSSP 1.2 and 2.1 components list worksheet 305
PSSP 2.2, new function 22
PSSP print subsystem 64
PVMe 144
PVMe for AIX 18


# Q


Question
  1. Do you want a preloaded SP or the default version? 10
  1. what are you going to use your SP for? 14

Question *(continued)*
2. what related IBM program products do you need? 17
3. what levels of AIX do you need? 21
4. what type of network connectivity do you need? 25
5. what are your disk storage requirements? 27
6. what are your reliability and availability requirements? 30
7. how many nodes do you need? 32
8. defining your system images 45
9. what do you need for your control workstation? 48
questions for planning decisions 9

# R

reference rate of customer data 74
related program products 17
related programs
Client Input Output/Sockets (CLIO/S) 17
IBM LoadLeveler 17
IBM Recoverable Virtual Shared Disk 19
Parallel Engineering and Scientific Subroutine Library 18
Parallel Environment for AIX 17
Parallel I/O File System for AIX 18
parallel libraries 18
Parallel Optimization Subroutine Library 18
PVMe for AIX 18
x3270 19
reliability requirements 30
requirements
availability 30
control workstation requirements 48
IBM C for AIX, V3 17
reliability 30
resource manager 95
High Availability Control Workstation limitation 95

# S

SDR and system partitions 109
security
planning 119
selecting IBM program products 19
sending problem data to IBM 134
server planning 69
server planning, home directory 75
servers, authentication 75
Service Director/6000 135
single frame systems, network install server 69
single point of control with system partitions 108
single point of failure 91
site environment choices 60, 61, 63, 64, 65, 67, 68
site environment planning 59
site environment worksheet 308
slot numbers 82
SMIT 59
SMP (high) node 33
software migration 159
software overview 6
SP Ethernet 79
SP specific logs 133
table 133
SP Switch 15, 16
SP system planning worksheet 219
SP_NAME environment variable 109
spacct_actnode_thresh 68
spacct_enable 68
spacct_exclusive_enable 68
space requirements
installp images 77
spchuser command 65
home attribute 65
SPIMG worksheet 229
spmkuser command 65
home attribute 65
spsitenv 59
supfiesrv_port 67
supman_uid 67
switch node numbering 82, 86
switch numbers 84
switch port numbering 86
switch, high performance 5, 15
switches 15
high performance switch 15
SP Switch 15
switchless systems 106
system partitions partition 106
system definition 9
system file management choices 67
system images 45, 48
system logs 132
table 132
system partitions 30
benefits 102
boot/install server requirements 69
boot/install servers for AIX 3.2.5 109
change management 102
data access 102, 108
default (persistent) system partitions 101
directory structure 116
management of a system 108
multiple production environments 102
new function 30
overview 101
switchless systems 106
the SDR 109
system stability, High Availability Control Workstation 93

## T

thin node 32
thin nodes 4
time service choices 61
time services considerations and High Availability Control Workstation 61
trademarks vii
tuning considerations 69

## U

understanding accounting 68
understanding node hard disk choices 75
understanding user account management choices 65
unterruptable power supply 94
user account management choices 65
user directory mounting choices 63
usermgmt-config 65
uses for an SP 14
uses for system partitions 102

## V

VSD
  kernel-to-kernel interface 137

## W

wide node 5, 32
worksheet
  completing for High Availability Control Workstation 94
  external disk storage 29
worksheet entries
  Amd choices 63
  Amd choices, worksheet 63
worksheets
  adapters supported on AIX 3.2.5 and AIX 4.1.3 228
  AIX components list 234
  application planning 216
  authentication 311
  authentication planning 129
  control workstation network 307
  control workstation system images 307
  copying 9
  external disk storage needs 218
  hardware configuration by node 223
  High Performance Switch Configuration 225
  IBM Program Products 217
  node layout for one frame 220
  node layout for two frames 221
  node layout instructions 36
  PSSP 1.2 and 2.1 components list 305
  site environment 308
  SP Control Workstation Worksheet 56, 308
  SP Node Configuration Worksheet 40
worksheets *(continued)*
  SP system planning 219
  SPIMG 229
workstation, control 6

## X

X-Windows 89
x3270 19