IBM Parallel System Support Programs for AIX
Read This First
Version 3 Release 1

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Contents

Read This First

Thank you for your order. The material you have received is listed on the enclosed Packing List. Please review the Packing List to ensure you have received all items listed.

Please review the following publications prior to installing your SP system.

- *IBM RS/6000 SP: Planning, Volume 2, Control Workstation and Software Environment.*
- *IBM Parallel System Support Programs: Administrative Guide*
- *IBM Parallel System Support Programs: Installation and Migration Guide*

The most current information is available as READMEs, and is on the respective tape as indicated.

Also included in this order is the most current recommended corrective service for this product. Please review the service README file for details on the installation of service. View the softcopy service README files the same way you would view the softcopy README for the product tape(s) (Instructions are included later in this document).

Included in this Memo to Licensees are:

- Summary of Enhancements
- Additional Resource Information
- **PSSP Compatibility, Limitations, Restrictions & Prerequisites**
- IBM Parallel System Support Programs for AIX packaging
- Viewing the softcopy README documents from tape
- AIX 4.3.2 Minimal Image
- List of Program Materials

Summary of Enhancements

PSSP V3.1 is a new version of Parallel System Support Programs that can run on SP Systems, including the new POWER3 SMP Nodes, and RS/6000 Enterprise Servers that are attached to SP Systems. It offers significant new functions for parallel applications, security, usability and availability, as well as repackaging of features and the inclusion of the IBM Recoverable Virtual Shared Disk product. PSSP V3.1 supports AIX 4.3.2.

The RS/6000 Enterprise Server models S70 and S70 Advanced servers with PSSP V3.1 installed can now be attached to the SP. The S70 can run in either a switched or switchless environment. Attachment of the S70 to the SP Switch requires a new switch adapter.

New functional enhancements include:

- Support for up to four User Space tasks per node, enabling MPI applications to exploit SMP nodes and servers for significant performance improvements.

- Providing a more highly available environment by:

  - Booting from an external disk for microchannel nodes

  - Mirrored root volume groups for preventing a single disk from becoming a single point of failure

  - Alternate root volume groups to provide booting of a single node with different versions of software

- Improved and consistent graphical user interfaces.

- National Language Support for the graphical user interface.

- Re-packaging of PSSP to include formerly priced functions such as HACWS, Performance Toolbox Parallel Extensions, and Recoverable Virtual Shared Disk. The job management functions of the Resource Manager have been consolidated into LoadLeveler.

- For existing Tivoli customers, a facility to forward Event Manager Events to the Tivoli Enterprise Console.

- New SP Resource Center providing one simple interface for all softcopy SP documentation and information resources.

New security enhancements include:

- Use of AIX 4.3.2 authenticated remote commands.

Additional Resource Information

RS/6000 SP Resource Center

The SP Resource Center provides one simple interface for all softcopy documentation and information resources. It consists of HTML, Java, and Javascript files and runs in a web browser. The SP Resource Center provides access to a variety of information including publications, READMEs, Redbooks, Whitepapers, SP product information, as well as up-to-date service information. The SP Resource Center contains links to documents that are locally installed, or if a document is not installed, the link points to the document on the IBM World Wide Web site.

The latest version of the RS/6000 SP Resource Center may be downloaded from:

```
http://www.rs6000.ibm.com/support/sp/resctr.html
```

For security information, please refer to the RS/6000 SP Security Support web page located at:

```
http://www.rs6000.ibm.com/support/sp/security/
```

The security information will be included in an update of the SP Resource Center as a PTF in the future.

To preview or browse recently published RS/6000 SP documents for Parallel System Support Programs, visit our web page at:

```
http://www.rs6000.ibm.com/resource/aix_resource/sp_books/pssp/index.html
```

PSSP Compatibility, Limitations, Restrictions & Pre-requisites

Please refer to the README files within Parallel System Support Programs for AIX (PSSP for AIX) software for any restrictions or advisories as well as any required service before you begin to install your SP system.

Additional Restrictions and Considerations

Recoverable Virtual Shared Disk Restriction

- It is HIGHLY recommended that customers who use the Recoverable Virtual Shared Disk function install PTF1 service for the Virtual Shared Disk install image immdeiately after initial install or migration to the PSSP V3.1 level of Virtual Shared Disk.

Installation Considerations

- Nodes running the PSSP V2.2 or PSSP V2.3 level with boot install servers running at the PSSP V3.1 level will encounter a customization problem without the proper APAR applied:

    - Apply APAR IX81696 to nodes running PSSP V2.2 prior to customizing those nodes from a boot install server at the PSSP V3.1 level.

    - Apply APAR IX81710 to nodes running PSSP V2.3 prior to customizing those nodes from a boot install server at the PSSP V3.1 level.

SMP Node Considerations

- For Symmetric Multiprocessor (SMP) nodes there is the possibility that a processor may be configured off-line due to hardware errors. If this occurs, the node can still boot with a remaining processor, but the normal PSSP mechanisms don't report that a processor is off-line to an administrator. If you wish to be notified if this occurs, you can set up SP Problem Management to inform you that fewer than expected processors are on-line. To do this issue the **pmandef** command whose handle name is "processorsOffline" in the **/usr/lpp/ssp/install/bin/pmandefaults** file. Then you will receive mail on the control workstation when a node boots and there are fewer processors on-line than expected. The "processorsOffline" event can also be monitored by SP Perspectives by registering for the event definition. To do this, select the "Load Defaults" action in the Event Perspective. See the RS/6000 SP PSSP Administration Guide for more information about SP Problem Management and SP Perspectives.

SP-Attached Server Restrictions/Considerations

- **REQUIRED MICROCODE UPDATE**

    All S70 and S70 Advanced servers and stand-alone machines must be upgraded with microcode 19981111, when available. This microcode will fix an S70 processor problem. Your IBM Service Representative will be contacting you about this mandatory microcode uplift.

- PSSP V3.1 PTF1 set is required for installation of SP-Attached servers.

- After installing your SP-Attached Server ensure that your **s1_tty** is login enabled on your server. If this tty is disabled then your hardmon **s1term** will not function.

    1. See which tty is defined to Serial Port S1:

```
 # lsdev -Cc tty
tty0 Available 01-S1-00-00 Asynchronous Terminal
tty1 Available 01-S2-00-00 Asynchronous Terminal
```

In this example tty0 is defined for the S1 Serial Port which is connected to our **s1term** through hardmon.

2. Enable login on that tty for example:

```
 # chdev -l tty0 -a login=enable
```

After an IPL you may have LEDs displayed through hardmon even though the SP-Attached Server has a blank operator panel. Those LEDs can be ignored.

You will have hardmon **s1term** performance degradation if the SAMI rs-232 cable is not connected to the operator panel.

- Ensure, when specifying "starting switch port number" through spframe or smit, that this number corresponds to a valid and unused switch node number in your SP system.

- Always use hardmon as your interface to your SP-Attached Server's operator panel. If for some reason you need to use the operator panel do the following:

  1. On your control workstation issue

     ```
     stopsrc -s hardmon
     ```

  2. Disconnect the rs-232 cable from your operator panel on the SP-Attached Server.

  3. On your control workstation issue:

     ```
     startsrc -s hardmon
     ```

  4. Once you have completed using the operator panel connect the rs-232 cable to your operator panel on the SP-Attached Server. Once the cable has been reconnected normal hardmon function for your SP-Attached Server will resume.

- If your existing RS/6000 S70 is running an IPV6 network you must disable the network connection before attaching it to your SP System.

Mirroring considerations

- For those who have previously mirrored the root volume group *(rootvg)* on pre-PSSP V3.1 nodes or on S70 systems they now intend to attach to the SP System, care must be taken to enter the information regarding the mirroring into the SDR **prior** to either migrating a node to PSSP 3.1 or attaching an S70. Failure to enter the information regarding the *rootvg* mirroring of existing systems will result in the volume group being **unmirrored** during migration to PSSP V3.1 or an S70 attached to a PSSP V3.1 system.

Mirroring the Root Volume Group

- One way to significantly increase the availability of an SPN SP system is to set up redundant copies of the operating system on different physical disks using the AIX disk mirroring feature. Mirroring the root volume group means that there will be multiple copies of the operating system image available to a workstation or node. Mirrored system images are distributed so that a node can remain in operation even after one of the mirrored units fails.

- When installing a node, you have a choice of how many copies of the root volume group you would like. AIX allows one (the original), two (the original plus one), or three (the original plus two) copies of a volume group. It is highly recommended that the root volume group be mirrored for a total of at least two copies. PSSP-3.1 provides commands to facilitate mirroring. See "Appendix B" of the PSSP Administration Guide for information on how to mirror a root volume group.

- In order to mirror the root volume group you must have at least one additional disk for each copy of AIX. IBM, in its desire to provide its customers with a highly reliable system, has begun to deliver 332 MHz SMP nodes and the new Power3 SMP nodes with disk pairs as a standard feature. You are encouraged to use this extra disk to mirror your root volume group when installing your system.

Configuration Management Considerations

- To stop configuration manager errors from occurring in the future, if you do not have a graphics adapter in your SP, you should run the following:

```
rmdev -dl gxme0
rmdev -dl rcm0
rmdev -dl lft0 (if it exists)
/usr/lib/instl/sm_inst installp_cmd -u -f'devices.graphics.com'  '-g'
```

This should take care of the problem.

Security Considerations

- If you wish to use Kerberos 5 authentication, you must perform the following steps prior to enabling the authentication method (Step 34 in the PSSP Installation & Migration Guide):

    – Install and configure DCE authentication on the CWS and all nodes in the partition.

    – Create a **.k5login** file containing DCE principals for the CWS and all nodes in the partition.

    – To enable root **rcmd** access, set the KRB5CCNAME environment variable to point to the DCE credentials file. For example:

    ```
    export KRB5CCNAME=FILE:/opt/dcelocal/var/security/creds/dcecred_ffffffff
    ```

    – Set the Selected Authentication Methods (Step 34 in the PSSP Installation & Migration Guide) to contain **k5**.

    For more information on DCE configuration, see "Distributed Computing Environment for AIX, version 2.2, Quick Beginnings" (SC23-4188-00).

- When the AIX authenticated remote commands are enabled for Kerberos 5 authentication, be aware that a problem may be encountered when the DCE security server is in a different subnet than any part of the SP. Examples of this are:

    – a multi-partitioned SP system where Kerberos 5 enabled partitions are in different subnets

    – the DCE security server is on a system external to the SP and the system is off of the SP's subnet

    – multiple subnets exist within the SP, the DCE security server is on the CWS, but the CWS is not directly connected to all of the subnets.

The following error message received as a result of remote command processing indicates the problem may have occurred:

```
kerberos: Couldn't get credentials for the server:
Cannot contact any KDC for requested realm.
```

Note: The problem is only encountered with AIX remote command processing and only when the Kerberos V5 authentication method is enabled on the client and server hosts (which requires that AIX DCE V2.2 or later is installed and configured on the client and server hosts for Kerberos V5 support).

The problem relates to address information in the **/etc/krb5.conf file**. **/etc/krb5.conf** is automatically generated by DCE and is used by the AIX remote commands for Kerberos V5 authentication.

Should you encounter this problem, please refer to the RS/6000 SP Security Support web page located at:

```
http://www.rs6000.ibm.com/support/sp/security/
```

or contact IBM Service for help on resolving this problem.

AIX Considerations

Note: When using a *mksysb*, any AIX corrective service (PTFs) applied to that *mksysb* must also be placed in the lppsource directory and the Shared Product Object Tree (SPOT) must be updated. The AIX corrective service applied to the minimal images is listed under the "Software Requirements" section in this document.

In order to update the SPOT, perform the following steps on the control workstation and all of the boot/install servers:

– Deallocate the SPOT from all clients using the **unallnimres** command.

– On the control workstation only, copy the install images for PTFs to the lppsource directory that corresponds to the appropriate SPOT. For example, copy the PTFs into /spdata/sys1/install/aix421/lppsource.

– For Boot Install Server (BIS) nodes, it is necessary to add the BIS hostname to the /.rhosts file on the control workstation.

– Issue **inutoc** in the lppsource directory.

– Issue **nim -o check -F <lppsourceName>**

– Issue **smit nim_res_op**

– Select the appropriate SPOT.

– Select the "update_all" function.

– Hit <F4> in the "Source of Install Images" field and select the appropriate lppsource.

– Hit enter twice to initiate the update

– After the update completes, run **setup_server** to reallocate the SPOT to the necessary clients.

Note: The following APAR is included in the minimal image and must be installed on both the control workstation and the nodes.

– AIX 4.3.2 - **REQUIRED**

```
AIX 4.3.2 Updates REQUIRED for PSSP - IX83445
```

General corrections for all PSSP 3.1 documents

- The level of AIX supported is AIX 4.3.2.

- Topology Services Limitation

  Although current documentation lists 250 as the upper limit for frame numbers, the code has been changed to enforce an upper limit of 128. The code change results from a topology services limit on node number.

Corrections to the PSSP Planning Guide, Volume 2

- In Chapter 2 under "Supported Control Workstations" there is an addition of the RS/6000 7026 Model H50 as a supported control workstation. Notes 3 and 4 apply to the use of the H50 as a control workstation.

- In Chapter 2 and Appendix C, "SP Planning - Worksheet 4" should list **Frames** as follows:

      500 (short):
      1500 (short):
      550 (tall):
      1550 (tall):

- In Chapter 3 under "Understanding the SP Networks", the following should be after the words "SP Ethernet":

  SP-Ethernet is the name of the LAN that connects all SP nodes to the control workstation. For each node, ensure that the SDR reliable_hostname attribute is identical to the default host name returned by the host command for its SP Ethernet IP addresses. For example, if the en0 IP address of a node is 129.40.133.75, and 'host 129.40.133.75' gives the default host name of k65n11.ppd.pok.ibm.com, then it also should be the host name given as the reliable_hostname attribute in the SDR. The PSSP components use this connection as the SP administrative network for installs and other SP functions.

  In order for PSSP installation to function, you must connect the SP-Ethernet to the ethernet adapter in the SP node's lowest hardware slot of all the ethernet adapters on that node. When a node is network booted, it will select the lowest ethernet adapter from which it will perform the install. This ethernet adapter must be on the same subnet of an ethernet adapter on the node's Boot/Install server. In node's which have one, the integrated ethernet adapter is always the lowest ethernet adapter. Be sure to maintain this relationship when adding ethernet adapters to a node.

Corrections to the Migration and Install Guide

- Throughout the book the words "Manage/Control Hardware" icon should be "Hardware Perspectives" icon.

- Chapter 2: Installing and Configuring a New RS/6000 SP System

  – Step 16. Copy the PSSP Images

  The following install images should be added to the list to copy:

```
ssp.vsdgui
   Contains the SP Virtual Shared Disk Perspective
ssp.loc
   Contains the non-english locale information for the SP Perspectives
   Launch Pad, SP Hardware Perspective, and SP Event Perspective
ssp.msg
   Contains the non-english messages for the SP Perspectives Launch Pad,
   SP Hardware Perspective, and SP Event Perspective
ssp.help
   Contains the non-english online help for the SP Perspectives
ssp.top.loc
   Contains the non-english locale info for the SP System Partitioning
   Aid
ssp.top.msg
   Contains the non-english messages for the SP System Partitioning Aid
ssp.ptpegui.loc
   Contains the non-english locale info for the SP Performance Monitor
   Perspective
ssp.ptpegui.msg
   Contains the non-english messages for the SP Performance Monitor
   Perspective
ssp.vsdgui.loc
   Contains the non-english locale information the SP Virtual Shared
   Disk Perspective
ssp.vsdgui.msg
   Contains the non-english messages for the SP Virtual Shared Disk
   Perspective
```

– Step 16.2 Update for Image Table of Contents(.toc)

When bffcreate completes. rename ssp.usr.3.1.0.0, rsct.clients.usr.3.1.0.0, rsct.basic.usr.3.1.0.0 in **/spdata/sys1/install/pssplpp/PSSP-3.1**.

Enter the following:

```
cd  /spdata/sys1/install/pssplpp/PSSP-3.1
mv  ssp.usr.3.1.0.0  pssp.installp
mv  rsct.basic.usr.3.1.0.0  rsct.basic
mv  rsct.clients.usr.3.1.0.0  rsct.clients
```

– Step 18: Install PSSP on the Control Workstation

- Refer to the PSSP Planning Guide volume 2, pages 55-57 for new NLS filesets.

- Installing NLS filesets for SP Perspectives (New section)

English versions of SP Perspectives messages, locale information, and online help are always installed when SP Perspectives is installed. However, messages and locale information for your own language are also automatically installed.

Messages, locale information and online help are provided in the following languages for SP Perspectives:

```
Ja_JP  Japanese
ja_JP  Japanese IBM-eucJP
ko_KR  Korean
zh_CN  Simplified Chinese EUC
zh_TW  Traditional Chinese
Zh_TW  Traditional Chinese big-5
```

When you install SP Perspectives, messages and locale information will automatically be installed for your language. This language is determined by the language that was selected when your AIX system was originally installed.

The SP Perspectives online help is not automatically installed for your language. During installation of PSSP, you must select the help fileset to install for your language. If you select "all" when installing PSSP, the online help will be installed for all languages.

If you originally installed your AIX system with one language, and want to install Perspectives messages and locales for a different language, you must modify the following two files:

- In **/var/adm/ras/bosinst.data**, make sure the CULTURAL_CONVENTION and the MESSAGES variables are set to your language.

- In **/etc/environment**, make sure LANG is set to your language.

– Step 24: Enter Frame Information

The syntax of the spframe command when issued for SP-Attached Servers requires the -p SAMI option. For example:

```
spframe -r yes -p SAMI -n 14 -s /dev/tty3 5 1 /dev/tty4
```

Also when performing this step use the -s option to specify which tty is connected to your **s1_term**. If you are using SMIT use the help key to clarify which ttys map to the SAMI interface and the **s1_term**.

– Step 34: Enable Selected Authentication Methods

In order for PSSP installation to function, you must enable **k5** or **std** in this step. If you enable **k5**, you will need to configure the DCE environment before continuing.

– Step 39. Set Up Nodes to be installed

In the box under "If using: SMIT" the second step reads:

```
SELECT   Change Volume Group Information
  - The Boot/Install Server Information window appears
```

This should read:

```
SELECT   Change Volume Group Information
  - The Change Volume Group Information window appears
```

– Do not perform the following step:

- Step 56: Verify the SP-Attached Server Switch Connection (Optional)

- Chapter 4: Migrating to the Latest Level of PSSP

Migrating the Control Workstation to PSSP 3.1

– Step 11: Copy the PSSP Images for PSSP 3.1

The RS/6000 SP package consists of several file sets which must be copied into the /spdata/sys1/install/pssplpp/PSSP-3.1 directory using the bffcreate command. Once copied, the pssp and rsct filesets must be renamed with a creation of the .toc following.

```
>
bffcreate -qvX -t /spdata/sys1/install/pssplpp/PSSP-3.1 -d /dev/rmt0 all
cd /spdata/sys1/install/pssplpp/PSSP-3.1
mv  ssp.usr.3.1.0.0  pssp.installp
mv  rsct.basic.usr.3.1.0.0  rsct.basic
mv  rsct.clients.usr.3.1.0.0  rsct.clients
inutoc .
```

- Step 22 substep 3A, 3C: The full path name is required for the **haemctrl** command - **/usr/sbin/rsct/bin/haemctrl**.

- Chapter 5: Reconfiguring the RS/6000 SP System

  Adding a Frame or SP-Attached Server

  - Step 6: Enter Frame Information

    The syntax of the spframe command when issued for SP-Attached Servers requires the -p SAMI option. For example:

    ```
    spframe -r yes -p SAMI -n 14 -s /dev/tty3 5 1 /dev/tty4
    ```

    Deleting a Frame, Node, or SP-Attached Server

    - When deleting a frame with an SP switch in a single frame environment you must quiesce the switch with the **Equiesce** command before deleting the frame.

    Also when performing this step use the -s option to specify which tty is connected to your **s1_term**. If you are using SMIT use the help key to clarify which ttys map to the SAMI interface and the **s1_term**.

Software Requirements

Note: To run the new POWER3 SMP Nodes with PSSP V3.1 PTF Set # 4, APAR # IX85457, must be installed prior to installation of any of these new nodes.

- AIX 4.3.2 (5765-C34), or later, (Please check with your IBM representative for AIX 4.3.2 service updates.) on the control workstation and nodes.

- At least one concurrent use license of C for AIX compiler or C++ compiler installed on the SP complex, which includes the control workstation. It should be the version supported by the operating system on the nodes. For compatibility with PSSP V3.1, currently available versions include:

  - AIX 4.3.2

      C for AIX, V4.3, or later (04L0677 & 04L0678)
      C and C++ Compilers V3.6, or later (04L3535 & 04L3536).
      Visual Age C++ Professional for AIX V4.0, or later

    Note: PSSP V3.1 does not support IBM Visualage C++ Professional for AIX, Version 4.0 incremental compiler and C++ runtime library Version 4.0. It does support the batch IBM C and C++ Version 3.6.4 compilers and the Version 3.6.4 C++ runtime libraries that are also included in Visualage C++ 4.0.

    Compilers are necessary for service of PSSP Also, without the compiler, dump diagnosis tools like **crash** will not function fully. At least a one-user license must be obtained, but if you intend to do C development work, you will have to decide how many users you wish supported at a given time.

If you are doing C or C++ development work, the runtime libraries on the nodes must be equal to or later than the level used to compile any of the nodes. See the announcements on the compilers for details on compatibility.

- The LAPI function, which is within PSSP, requires Parallel Environment V2.4. If this optional function is not used, Parallel Environment is not required.

The license for PSSP V3.1, which includes the HACWS, IBM Recoverable Virtual Shared Disk, and Performance Toolbox Parallel optional filesets, is included in the SP hardware price. However, PSSP must be separately ordered.

The HACMP Enhanced Scalability feature of HACMP 4.3, or later, (5765-D28) is supported on PSSP V3.1. Refer to HACMP software announcements for more detailed information.

IBM Performance Toolbox Parallel Extensions (PTPE) (Separate optional fileset of PSSP, V3.1):

- Performance Toolbox for AIX, V2.2 (5765-654)

  – Agent Component installed on each node that you want to monitor

  – Performance Manager on at least one node or workstation in the network for monitoring

HACWS (Separate optional fileset of PSSP, V3.1):

- On both of the control workstations:

  – PSSP V3.1 (5765-D51)

  – Any level of AIX that is supported with PSSP V3.1.

  – Any level of HACMP that is supported with the level of AIX that you are using. Refer to the appropriate HACMP documentation to determine what levels of HACMP are supported with the level of AIX you are using.

    The HACMP Enhanced Scalability feature is supported by HACWS.

    Note: Please make sure you have the latest appropriate service levels of HACMP, HA Enhanced Scalability, and PSSP V3.1.

IBM Virtual Shared Disk and IBM Recoverable Virtual Shared Disk (Separate optional filesets of PSSP, V3.1):

- On both the control workstation and the nodes:

  – PSSP V3.1 (5765-D51)

  – Any level of AIX that is supported with PSSP V3.1.

Service

The URL address of the RS/6000 SP service and support information is located on the Internet at the following URL:

```
http://www.rs6000.ibm.com/support/sp/
```

This page contains all the service bulletins and flashes as well as PTF and APAR reports for all current releases of PSSP, LoadLeveler, Parallel Environment, and NetTAPE.

Compatibility

- Because the SP system and PSSP use IBM RS/6000 POWER2, PowerPC, POWER architecture, and AIX 4.3.2, programs written for the RS/6000 Systems will run on properly configured SP processor nodes without recompilation. In some cases, improved performance can be achieved by recompiling with the latest versions of the IBM XL Fortran compilers to further exploit the POWER2 and PowerPC technology.

- PSSP V3.1 is a functional enhancement of PSSP V2.4. PSSP V2.4 can still be ordered.

- When running with PSSP V3.1, the following products must be at the levels specified, or later:

  - LoadLeveler (5765-D61) V2R1
  - Parallel Environment for AIX V2R4 (5765-543).
  - Parallel ESSL for AIX V2R1M1 (5765-C41)
  - General Parallel File System (5765-B95) V1R1, or V1R2
  - HACMP V4R3, or later (5765-D28), Enhanced Scalability feature.
  - CLI/OS. V2R2 (5648-129)

  Refer to the *IBM RS/6000 SP: Planning, Volume 2, Control Workstation and Software Environment* (Form Number GA22-7281) for a matrix of supported combinations of SP licensed programs for compatibility statements on nodes running on different levels of AIX and PSSP.

Limitations

- PSSP V3.1 does not support Internet Protocol, V6 networks (IP V6) on either the control workstation or the nodes.

  Note: If you are attaching an existing Enterprise Server, and that server is connected to an IP V6 network, you will need to remove the server from the network before making the SP attachment.

- PSSP V3.1 does not exploit the 64 bit architecture of AIX 4.3.2.

- An SP System does not support C2 evaluation.

- An SP System with more than one control workstation requires special procedures to maintain hardware control for control workstation fail-over. For details contact your IBM representative.

Migration and Coexistence

- The following service must be applied to your existing SP system prior to migrating your control workstation to PSSP 3.1. Coexistence also requires this service.

  The minimum service level for PSSP 2.2 support is PTF set 20 which consists of the following PTFs:

```
PSSP PTFs by component        Pre-Req PTF        Curr PTF
  ssp.authent                                    2.2.0.5
  ssp.basic                                      2.2.0.15
  ssp.clients                                    2.2.0.13
  ssp.csd.cmi                                    2.2.0.0
  ssp.csd.hsd                                    2.2.0.8
  ssp.csd.vsd                                    2.2.0.13
  ssp.csd.gui                                    2.2.0.2
  ssp.csdsysctl                                  2.2.0.4
  ssp.css                                        2.2.0.15
  ssp.docs                                       2.2.0.7
  ssp.gui                                        2.2.0.10
  ssp.ha                                         2.2.0.12
  ssp.hacws                                      2.2.0.2
  ssp.jm                                         2.2.0.3
  ssp.public                                     2.2.0.1
  ssp.pman                                       2.2.0.5
  ssp.sysctl                                     2.2.0.4
  ssp.sysman                                     2.2.0.11
  ssp.top                                        2.2.0.0
```

The minimum service level for PSSP 2.3 support is PTF set 12. To determine which ptf filesets are installed on your PSSP 2.3 system, use the command **lslpp -h ssp.***. The necessary ptf filesets and their corresponding release levels are listed below:

```
PSSP PTFs by Comp      File Set Level    Perf Toolbox      File Set Level
  ssp.authent              2.3.0.4       ptpe.docs            1.1.0.1
  ssp.basic                2.3.0.10      ptpe.gui             1.1.0.4
  ssp.clients              2.3.0.6       ptpe.program         1.1.0.5
  ssp.csd.cmi              2.3.0.2
  ssp.csd.gui              2.3.0.1
  ssp.csd.hsd              2.3.0.3
  ssp.csd.sysctl           2.3.0.2
  ssp.csd.vsd              2.3.0.10
  ssp.css                  2.3.0.10
  ssp.docs                 2.3.0.7
  ssp.gui                  2.3.0.5
  ssp.ha                   2.3.0.10
  ssp.hacws                2.3.0.2
  ssp.jm                   2.3.0.2
  ssp.perlpkg              2.3.0.1
  ssp.pman                 2.3.0.4
  ssp.public               2.3.0.1
  ssp.spmgr                2.3.0.1
  ssp.st                   2.3.0.3
  ssp.sysctl               2.3.0.5
  ssp.sysman               2.3.0.8
  ssp.top                  2.3.0.2
  ssp.top.gui              2.3.0.1
  ssp.topsvcs              2.3.0.9
```

The minimum service level for PSSP 2.4 support is PTF set 5. To determine which ptf filesets are installed on your PSSP 2.4 system, use the command **lslpp -h ssp.***. The necessary ptf filesets and their corresponding release levels are listed below:

```
PSSP PTFs by component      Service level
  ssp.authent                 2.4.0.1
  ssp.basic                   2.4.0.4
  ssp.clients                 2.4.0.3
  ssp.csd.hsd                 2.4.0.1
  ssp.csd.sysctl              2.4.0.2
  ssp.csd.vsd                 2.4.0.3
  ssp.css                     2.4.0.3
  ssp.docs                    2.4.0.2
  ssp.gui                     2.4.0.2
  ssp.ha                      2.4.0.3
  ssp.pman                    2.4.0.2
  ssp.st                      2.4.0.1
  ssp.sysman                  2.4.0.1
  ssp.top                     2.4.0.1
  ssp.topsvcs                 2.4.0.3
  ssp.ucode                   2.4.0.1
```

IBM Parallel System Support Programs for AIX Packaging

The RS/6000 SP system software includes the IBM Parallel System Support Programs for AIX (PSSP), a comprehensive suite of applications for the installation, operation, management, and administration of the RS/6000 SP system. PSSP provides a single point of control for administrative tasks and helps increase productivity by letting administrators view, monitor, and control system operation.

Packaging information is located in the *IBM Parallel System Support Programs for AIX: Installation and Migration Guide*

Other IBM Products

A large number of system and application software products developed by IBM can be run on the SP system. For example:

- IBM LoadLeveler
  - Distributed, network-wide job management
- IBM Parallel Environment for AIX
  - Parallel application development and execution
  - Message passing parallel task communications
- IBM General Parallel File System for AIX (GPFS)
  - Data file system for parallel access to large files
- ADSM/6000
  - System and user data management
- PTX/6000
  - Performance monitoring
- NetView for AIX
  - Enterprise network management
- Trouble Ticket for AIX
  - Problem management
- PSF/6000
  - Printing support
- Job Scheduler for AIX
  - Schedules production batch workload in a distributed AIX environment

Independent Software Vendor Products

There is an aggressive program in place to enable and encourage independent software vendors to enable and port their applications to the RS/6000 SP system.

Viewing softcopy of the README documents

To view a softcopy of any READMEs from the IBM Software Manufacturing Solutions (ISMS) media:

- View the components on the media with one of these commands:

```
installp -l -d /dev/rmt0.1  (for tape)
installp -l -d /cdrom       (for CD ROM)
```

Find the desired component name.

- View a softcopy of any README from the ISMS tape or CD ROM with the following command. Please note it may take several minutes to display each file.

```
installp -i -d /dev/rmt0.1  ssp           (PSSP install options)
installp -i -d /dev/rmt0.1  rsct.basic    (RS/6000 Cluster Technology options)
installp -i -d /dev/rmt0.1  rsct.clients  (RS/6000 Cluster Technology options)
installp -i -d /dev/rmt0.1  ssp.ptpegui   (spperfmon perspective)
installp -i -d /dev/rmt0.1  ssp.vsd       (IBM Virtual Shared Disk)
installp -i -d /dev/rmt0.1  spimg         (separate tape)

installp -i -d /cdrom  ssp           (PSSP install options)
installp -i -d /cdrom  rsct.basic    (RS/6000 Cluster Technology options)
installp -i -d /cdrom  rsct.clients  (RS/6000 Cluster Technology options)
installp -i -d /cdrom  ssp.ptpegui   (spperfmon perspective)
installp -i -d /cdrom  ssp.vsd       (IBM Virtual Shared Disk)
installp -i -d /cdrom  spimg         (separate tape)
```

- After installation, the READMEs can be found in the following directories:

```
/usr/lpp/ssp/README
/usr/sbin/rsct/README
/usr/lpp/ssp.hacws/README
/usr/lpp/csd/README
/usr/lpp/ptpe/README
/usr/lpp/spimg/README
```

AIX System Minimal mksysb Image and Required AIX PTFs

AIX 4.3.2 Image Content
##

The following fix is required and is included in the minimal **mksysb** image for AIX 4.3.2.

##

If you do not use this minimal **mksysb** image, the fixes must be applied to your AIX 4.3.2 operating system prior to creating your **mksysb** image which you will use to install your nodes. Whichever image you use you must update your SPOT and lppsource directory with these fixes according to the instructions listed in "AIX Considerations" under "Additional Restrictions" in this document.

```
   AIX 4.3.2 Updates Required for PSSP - IX83445

 Fileset                     Level  State  Description
 -------------------------------------------------------------------------------
 bos.acct                    4.3.2.1   C    Accounting Services
 bos.adt.base                4.3.2.0   C    Base Application Development
                                            Toolkit
 bos.adt.debug               4.3.2.1   C    Base Application Development
                                            Debuggers
 bos.adt.include             4.3.2.2   C    Base Application Development
                                            Include Files
 bos.adt.lib                 4.3.2.0   C    Base Application Development
                                            Libraries
 bos.adt.libm                4.3.2.0   C    Base Application Development
                                            Math Library
 bos.adt.syscalls            4.3.2.0   C    System Calls Application
                                            Development Toolkit
 bos.diag.com                4.3.2.0   C    Common Hardware Diagnostics
 bos.diag.rte                4.3.2.1   C    Hardware Diagnostics
 bos.diag.util               4.3.2.0   C    Hardware Diagnostics Utilities
 bos.docregister.com         4.3.2.0   C    Docregister Common
 bos.help.msg.en_US.com      4.3.2.0   C    WebSM/SMIT Context Helps - U.S.
                                            English
 bos.help.msg.en_US.smit     4.3.2.0   C    SMIT Context Helps - U.S.
                                            English
 bos.html.en_US.topnav.navigate
                             4.3.2.0   C    Top Level Navigation - U. S.
                                            English
 bos.iconv.com               4.3.2.1   C    Common Language to Language
                                            Converters
 bos.iconv.ucs.com           4.3.2.0   C    Unicode Base Converters for AIX
                                            Code Sets/Fonts
 bos.loc.iso.en_US           4.3.2.0   C    Base System Locale ISO Code Set
                                            - U.S. English
 bos.mp                      4.3.2.2   C    Base Operating System
                                            Multiprocessor Runtime
 bos.msg.en_US.diag.rte      4.3.2.0   C    Hardware Diagnostics Messages -
                                            U.S. English
```

```
bos.msg.en_US.docregister.com
                                4.3.1.0    C    Docregister Common Messages -
                                                U.S. English
bos.msg.en_US.mp                 4.3.0.0    C    Base Operating System MP
                                                Messages - U.S. English
bos.msg.en_US.net.tcp.client
                                4.3.2.0    C    TCP/IP Messages - U.S. English
bos.msg.en_US.rte                4.3.2.0    C    Base Operating System Runtime
                                                Msgs - U.S. English
bos.msg.en_US.txt.tfs            4.3.1.0    C    Text Formatting Services
                                                Messages - U.S. English
bos.net.ncs                      4.3.2.0    C    Network Computing System 1.5.1
bos.net.nfs.client               4.3.2.3    C    Network File System Client
bos.net.tcp.client               4.3.2.2    C    TCP/IP Client Support
bos.net.tcp.server               4.3.2.2    C    TCP/IP Server
bos.net.tcp.smit                 4.3.2.0    C    TCP/IP SMIT Support
bos.rte                          4.3.2.1    C    Base Operating System Runtime
bos.rte.Dt                       4.3.0.0    C    Desktop Integrator
bos.rte.ILS                      4.3.2.0    C    International Language Support
bos.rte.SRC                      4.3.2.0    C    System Resource Controller
bos.rte.X11                      4.3.0.0    C    AIXwindows Device Support
bos.rte.aio                      4.3.2.1    C    Asynchronous I/O Extension
bos.rte.archive                  4.3.2.0    C    Archive Commands
bos.rte.bind_cmds                4.3.2.1    C    Binder and Loader Commands
bos.rte.boot                     4.3.2.0    C    Boot Commands
bos.rte.bosinst                  4.3.2.0    C    Base OS Install Commands
bos.rte.commands                 4.3.2.0    C    Commands
bos.rte.compare                  4.3.2.0    C    File Compare Commands
bos.rte.console                  4.3.2.0    C    Console
bos.rte.control                  4.3.2.1    C    System Control Commands
bos.rte.cron                     4.3.2.0    C    Batch Operations
bos.rte.date                     4.3.2.0    C    Date Control Commands
bos.rte.devices                  4.3.2.0    C    Base Device Drivers
bos.rte.devices_msg              4.3.2.0    C    Device Driver Messages
bos.rte.diag                     4.3.2.0    C    Diagnostics
bos.rte.edit                     4.3.2.0    C    Editors
bos.rte.filesystem               4.3.2.0    C    Filesystem Administration
bos.rte.iconv                    4.3.2.2    C    Language Converters
bos.rte.ifor_ls                  4.3.2.0    C    iFOR/LS Libraries
bos.rte.im                       4.3.2.0    C    Input Methods
bos.rte.install                  4.3.2.1    C    LPP Install Commands
bos.rte.jfscomp                  4.3.1.0    C    JFS Compression
bos.rte.libc                     4.3.2.2    C    libc Library
bos.rte.libcfg                   4.3.2.0    C    libcfg Library
bos.rte.libcur                   4.3.2.0    C    libcurses Library
bos.rte.libdbm                   4.3.2.0    C    libdbm Library
bos.rte.libnetsvc                4.3.0.0    C    Network Services Libraries
bos.rte.libpthreads              4.3.2.0    C    pthreads Library
```

```
bos.rte.libqb            4.3.2.0   C   libqb Library
bos.rte.libs             4.3.0.0   C   libs Library
bos.rte.loc              4.3.2.1   C   Base Locale Support
bos.rte.lvm              4.3.2.2   C   Logical Volume Manager
bos.rte.man              4.3.2.0   C   Man Commands
bos.rte.methods          4.3.2.0   C   Device Config Methods
bos.rte.misc_cmds        4.3.2.0   C   Miscellaneous Commands
bos.rte.net              4.3.2.0   C   Network
bos.rte.odm              4.3.2.1   C   Object Data Manager
bos.rte.printers         4.3.2.0   C   Front End Printer Support
bos.rte.security         4.3.2.0   C   Base Security Function
bos.rte.serv_aid         4.3.2.3   C   Error Log Service Aids
bos.rte.shell            4.3.2.1   C   Shells (bsh, ksh, csh)
bos.rte.streams          4.3.2.0   C   Streams Libraries
bos.rte.tty              4.3.2.2   C   Base TTY Support and Commands
bos.sysmgt.loginlic      4.3.2.0   C   License Management
bos.sysmgt.nim.client    4.3.2.0   C   Network Install Manager - Client
                                       Tools
bos.sysmgt.serv_aid      4.3.2.0   C   Software Error Logging and Dump
                                       Service Aids
bos.sysmgt.smit          4.3.2.1   C   System Management Interface Tool
                                       (SMIT)
bos.sysmgt.sysbr         4.3.2.2   C   System Backup and BOS Install
                                       Utilities
bos.sysmgt.trace         4.3.2.0   C   Software Trace Service Aids
bos.terminfo.com.data    4.3.0.0   C   Common Terminal Definitions
bos.terminfo.dec.data    4.3.0.0   C   Digital Equipment Corp. Terminal
                                       Definitions
bos.terminfo.ibm.data    4.3.2.1   C   IBM Terminal Definitions
bos.terminfo.pc.data     4.3.2.0   C   Personal Computer Terminal
                                       Definitions
bos.terminfo.rte         4.3.2.0   C   Run-time Environment for AIX
                                       Terminals
bos.txt.spell            4.3.2.0   C   Writer's Tools Commands
bos.txt.spell.data       4.3.0.0   C   Writer's Tools Data
bos.txt.tfs              4.3.2.0   C   Text Formatting Services
                                       Commands
bos.txt.tfs.data         4.3.2.0   C   Text Formatting Services Data
bos.up                   4.3.2.2   C   Base Operating System
                                       Uniprocessor Runtime
devices.base.diag        4.3.2.0   C   Base System Diagnostics
devices.base.rte         4.3.2.0   C   RISC System 6000 Base Device
                                       Software
devices.chrp.base.diag   4.3.2.1   C   RISC CHRP Base System Device
                                       Diagnostics
devices.chrp.base.rte    4.3.2.1   C   RISC PC Base System Device
                                       Software (CHRP)
devices.chrp.pci.rte     4.3.2.0   C   PCI Bus Software (CHRP)
```

```
devices.common.IBM.ARTIC.diag
                            4.3.2.0   C    Common ARTIC Diagnostics
devices.common.IBM.async.diag
                            4.3.2.1   C    Common Serial Adapter
                                           Diagnostics
devices.common.IBM.disk.rte
                            4.3.2.0   C    Common IBM Disk Software
devices.common.IBM.ethernet.rte
                            4.3.2.0   C    Common Ethernet Software
devices.common.IBM.fda.diag
                            4.3.2.0   C    Common Diskette Adapter and
                                           Device Diagnostics
devices.common.IBM.fda.rte
                            4.3.2.0   C    Common Diskette Device Software
devices.common.IBM.ktm_std.diag
                            4.3.0.0   C    Common Keyboard, Mouse, and
                                           Tablet Device Diagnostics
devices.common.IBM.ktm_std.rte
                            4.3.2.0   C    Common Keyboard, Tablet, and
                                           Mouse Software
devices.common.IBM.modemcfg.data
                            4.3.1.0   C    Sample Service Processor Modem
                                           Configuration Files
devices.common.IBM.ppa.diag
                            4.3.2.1   C    Common Parallel Printer Adapter
                                           Diagnostics
devices.common.IBM.ppa.rte
                            4.3.2.0   C    Common Parallel Printer Adapter
                                           Software
devices.common.IBM.scsi.rte
                            4.3.2.0   C    Common SCSI I/O Controller
                                           Software
devices.common.IBM.tokenring.rte
                            4.3.2.0   C    Common Token Ring Software
devices.common.base.diag    4.3.2.0   C    Common Base System Diagnostics
devices.common.rspcbase.rte
                            4.3.2.0   C    RISC PC Common Base System
                                           Device Software
devices.graphics.com        4.3.2.0   C    Graphics Adapter Common Software
devices.mca.8d77.diag       4.3.2.0   C    8-bit SCSI I/O Controller
                                           Diagnostics
devices.mca.8d77.rte        4.3.2.0   C    8-bit SCSI I/O Controller
                                           Software
devices.mca.8d77.ucode      4.3.0.0   C    8-bit SCSI I/O Controller
                                           Microcode
devices.mca.8ee4.X11        4.3.2.0   C    AIXwindows Color Graphics
                                           Display Adapter Software
```

devices.mca.8ee4.diag	4.3.2.0	C	Color Graphics Display Adapter Diagnostics
devices.mca.8ee4.rte	4.3.2.0	C	Color Graphics Display Adapter Software
devices.mca.8ef5.diag	4.3.2.0	C	Ethernet High-Performance LAN Adapter (8ef5) Diagnostics
devices.mca.8ef5.rte	4.3.2.0	C	Ethernet High-Performance LAN Adapter (8ef5) Software
devices.mca.8f70.diag	4.3.2.0	C	Portmaster Adapter/A Diagnostics
devices.mca.8fc8.diag	4.3.2.0	C	Token Ring High-Performance Adapter (8fc8) Diagnostics
devices.mca.8fc8.rte	4.3.2.0	C	Token Ring High-Performance Adapter (8fc8) Software
devices.mca.8fc8.ucode	4.3.0.0	C	Token Ring High-Performance Adapter (8fc8) Microcode
devices.mca.df5f.com	4.3.2.0	C	Standard I/O Adapter Common Software
devices.mca.df5f.rte	4.3.0.0	C	Standard I/O (df5f) Adapter Software
devices.mca.edd0.com	4.3.2.0	C	Common Async Adapter Support
devices.mca.eff0.diag	4.3.0.0	C	X.25 CoProcessor/2 or Multiport/2 Adapter Diagnostics
devices.mca.eff0.rte	4.3.2.0	C	X.25 CoProcessor/2 or Multiport/2 Adapter Software
devices.msg.en_US.base.com			
	4.3.2.0	C	Base System Device Software Msgs - U.S. English
devices.msg.en_US.diag.rte			
	4.3.2.0	C	Device Diagnostics Messages - U.S. English
devices.msg.en_US.rspc.base.com			
	4.3.2.0	C	RISC PC Software Messages - U.S. English
devices.msg.en_US.sys.mca.rte			
	4.3.2.0	C	Micro Channel Bus Software Messages - U.S. English
devices.rs6ksmp.base.rte	4.3.2.1	C	Multiprocessor Base System Device Software
devices.rspc.base.diag	4.3.2.0	C	RISC PC Base System Device Diagnostics
devices.rspc.base.rte	4.3.2.0	C	RISC PC Base System Device Software
devices.scsi.disk.diag.com			
	4.3.2.0	C	Common Disk Diagnostic Service Aid
devices.scsi.disk.diag.rte			
	4.3.2.0	C	SCSI CD_ROM, Disk Device Diagnostics

```
devices.scsi.disk.rspc    4.3.0.0    C    RISC PC SCSI CD-ROM, Disk,
                                          Read/Write Optical Software
devices.scsi.disk.rte     4.3.2.0    C    SCSI CD-ROM, Disk, Read/Write
                                          Optical Device Software
devices.scsi.tape.diag    4.3.2.0    C    SCSI Tape Device Diagnostics
devices.scsi.tape.rspc    4.3.0.0    C    RISC PC SCSI Tape Device
                                          Software
devices.scsi.tape.rte     4.3.2.0    C    SCSI Tape Device Software
devices.sio.fda.diag      4.3.2.0    C    Diskette Adapter and Device
                                          Diagnostics
devices.sio.fda.rte       4.3.2.0    C    Diskette Adapter Software
devices.sio.ktma.diag     4.3.2.0    C    Keyboard Tablet & Mouse Device
                                          and Adapter Diagnostics
devices.sio.ktma.rte      4.3.2.0    C    Keyboard Tablet & Mouse Device
                                          and Adapter Software
devices.sio.ppa.diag      4.3.1.0    C    Parallel Printer Adapter
                                          Diagnostics
devices.sio.ppa.rte       4.3.2.0    C    Parallel Printer Adapter
                                          Software
devices.sio.sa.diag       4.3.0.0    C    Built-in Serial Adapter
                                          Diagnostics
devices.sio.sa.rte        4.3.2.0    C    Built-in Serial Adapter Software
devices.sys.mca.rte       4.3.2.0    C    Micro Channel Bus Software
devices.sys.pci.rte       4.3.2.0    C    PCI Bus Software
devices.sys.slc.diag      4.3.2.0    C    Serial Optical Link Diagnostics
devices.sys.slc.rte       4.3.2.0    C    Serial Optical Link Software
devices.tty.rte           4.3.2.0    C    TTY Device Driver Support
                                          Software
ifor_ls.base.cli          4.3.2.0    C    License Use Management Runtime
                                          Code
ifor_ls.client.base       4.3.1.0    C    License Use Management Client
                                          Runtime
ifor_ls.client.gui        4.3.1.0    C    License Use Management Client
                                          GUI
ifor_ls.msg.en_US.base.cli
                          4.3.2.0    C    LUM Runtime Code Messages - U.S.
                                          English
perfagent.tools           2.2.32.1   C    Local Performance Analysis &
                                          Control Commands
printers.msg.en_US.rte    4.3.1.1    C    Printer Backend Messages - U.S.
                                          English
printers.rte              4.3.2.1    C    Printer Backend
xlC.cpp                   4.3.0.1    C    C for AIX Preprocessor
xlC.msg.en_US.cpp         4.3.0.1    C    C for AIX Preprocessor Messages
                                          en_US
xlC.msg.en_US.rte         3.6.4.0    C    C Set ++ for AIX Application
                                          Runtime Messages en_US
xlC.rte                   3.6.4.0    C    C Set ++ for AIX Application
                                          Runtime
```

Customizations: The /(root) filesystem has been increased to 8MB.

The /var filesystem should be increased to 50MB.

Default number of licensed users was set to >64

Default maximum number of processes allowed per user was set to 256

Restrictions/Considerations: You should clean out /tmp after the image is installed, so there is maximum working space.

Note: AIX X-Windows has been removed (to reduce the image size) from the spimg in this release.

After you have installed your nodes, you should increase the dump space on each node to at least 32 MB. This is the minimum dump space required for the minimal image pre-installed on each SP node and supplied in the "spimg" installp image. If you are using a larger image, more dump space may be required. You may cause the dump space on a node to be increased during installation by specifying the extendlv command in the script.cust script. If script.cust is run multiple times (i.e. customization of nodes) then all statements will also be run multiple times. Refer to the sample script.cust in /usr/lpp/ssp/samples.

List of Program Materials

The Program Material consists of the following materials.

- Basic machine readable material, either 8mm tape, 4-mm tape, or CD ROM.

```
External Label ID     Feature Number   Distribution Medium
-------------------   --------------   -----------------------
Para Sys Supt Pgm         5801         8-mm tape cartridge
SP AIX Min Image          5801         8-mm tape cartridge
Cumulative service
   for PSSP               5801         8-mm tape cartridge

Para Sys Supt Pgm         5800         4-mm tape cartridge
SP AIX Min Image          5800         4-mm tape cartridge

Para Sys Supt Pgm         5803         CD ROM - 2 volumes
SP AIX Min Image          5803

SP Resource Center        5802         CD ROM
```

Note: This is the first time PSSP is translated into National Language Versions. The specify codes for the translated languages are as follows: English - 2924, Japanese - 2962, Korean - 2986, and Traditional Chinese - 2987.

- Documentation

```
        Title                                                 Order Number
 ------------------------------------------------------   ------------
IBM RS/6000 SP:
    Planning, Volume 2, Control Workstation and Software
    Environment                                              GA22-7281
IBM Parallel System Support Programs for AIX:
    Administration Guide                                     SA22-7348
IBM Parallel System Support Programs for AIX:
    Installation and Migration Guide                         GA22-7347
IBM Parallel System Support Programs for AIX:
    Diagnosis Guide                                          GA22-7350
IBM Parallel System Support Programs for AIX:
    Messages Reference                                       GA22-7352
IBM Parallel System Support Programs for AIX:
    Command and Technical Reference                          SA22-7351
RS/6000 Cluster Technology:
    Event Management Programming Guide and Reference         SA22-7354
RS/6000 Cluster Technology:
    Group Services Programming Guide and Reference           SA22-7355
IBM Parallel System Support Programs for AIX:
    Managing Shared Disks:                                   SA22-7349
IBM Parallel System Support Programs for AIX:
    Performance Monitoring Guide and Reference               SA22-7353
```