IBM

Transition from PSSP to Cluster Systems Management (CSM)

Transition tools overview

Detailed how-to procedures for HPC software stack

Multiple transition scenarios

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International Technical Support Organization

Transition from PSSP to Cluster Systems Management (CSM)

August 2004

SG24-6967-00

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

First Edition (August 2004)

This edition applies to Cluster Systems Management (CSM) Version 1, Release 3, Modification 3, and Parallel Systems Support Programs (PSSP) Version 3, Release 5.

Contents

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Preface

This IBM® Redbook covers the process of converting a PSSP cluster to a CSM cluster. It examines the different tools, utilities, documentation and other resources available to help the system administrator move a system from PSSP to CSM. It also examines the different paths a customer can take to achieve this transition and illustrates these different paths with step-by-step transition scenarios of actual clustered systems. This redbook also makes recommendations about which procedures are most suitable to different types of customer environments (high performance technical computing, server consolidation, business intelligence, etc.) and points out the relative advantages and disadvantages of the different procedures, tools, and methods. Customers will use the working knowledge presented in this book to help plan and accomplish the transition of their own clustered systems from PSSP to CSM.

Are you using GPFS? This transition redbook covers a number of GPFS transitions methods, each with its own recommendations, GPFS cluster types, advantages versus disadvantages, and step-by-step scenarios. This redbook also demonstrates a method of moving GPFS storage between two clusters, which could be used during hardware transition or upgrades.

The team that wrote this redbook

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

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1

Introduction

This chapter includes the following sections:

1.1 Summary of PSSP

Parallel System Support Programs (PSSP) is the mature clustering product for AIX 5L™ on IBM @server® pSeries hardware. Originally developed for IBM's RS/6000 Scalable POWER™ parallel systems (RS/6000 SP) and for the high speed network interconnects, the SP switches, PSSP provides support for the older frame-based node hardware technology and for the modern pSeries products such as the POWER4™-class machines. The central management point of the cluster is known as the Control Workstation (CWS). PSSP clusters are based around the concept of nodes and frames. This is a legacy of the RS/6000 SP systems, since they were originally designed for the RS/6000 SP clusters, as the nodes are physically hosted in frames. The CWS is a central point of control for maintaining, managing and monitoring the frames and nodes.

Representing a mature product based on a decade of development, PSSP provides a suite of powerful management functions:

- **Configuration:** PSSP uses a central database known as the System Data Repository (SDR). This holds configuration information about the cluster, from environment settings to the configuration of the nodes themselves. For example, node type, network adaptors and IP configuration, disk information and software installation information are all held centrally within the SDR. PSSP discovers the hardware in the cluster, administrators then populate the SDR and define node specifics prior to an install or upgrade. The SDR is stored centrally on the CWS and can be referenced from the nodes.
- **Installation:** The CWS acts as a boot/install server (BIS) for the nodes; if your cluster is large, other nodes can also be used as BIS. It uses the Network Install Manager (NIM) to manage the install of base OS (AIX) and PSSP filesets. This provides the ability to perform installs on multiple nodes simultaneously. The required node configuration information (such as IP addresses, hostname and software level) is held within the SDR and used during the install by PSSP. Managing different levels of AIX and PSSP is supported within a cluster. CWS must be at the highest combination of AIX and PSSP you will use within your cluster.
- **Security:** PSSP supports the use of either Kerberos V4 or V5. The CWS can be an authentication server for Kerberos within the cluster. Kerberos is used to enforce security within the cluster; it provides security of the remote commands such as **rsh**, **rcp** and **dsh**. In a PSSP system, there are at least two levels of security: AIX and PSSP. Kerberos provides PSSP with a method to authenticate network connections within the cluster.
- **User administration:** PSSP allows you to optionally manage user accounts centrally from the CWS using the SP user management facility. You can centrally add, remove or manage users within the cluster directly from the CWS. PSSP uses file collections to ensure password, group, home directory

and environment consistency within the cluster. Groups of files and directories can be defined into collections on the CWS. These collections can then be “pulled” by the nodes from the CWS on a regular schedule. PSSP can use the AIX automount daemon to automatically mount filesystems from the CWS to the nodes. This is how user’s home directories are mounted from the CWS. Optionally, Network Information Service (NIS) can be used to manage users within the cluster.

- **Scalability:** Out-of-the-box PSSP can scale up to 128 nodes (and higher via a special bid). PSSP over the years added support outside the range of RS/6000 SP nodes. Clustering of “SP-attached” servers is supported for certain pSeries servers. Allowing them to be physically and logically attached to a PSSP cluster provides the management benefits of PSSP. So a PSSP cluster can be made up of SP and non-SP pSeries servers. The SP switch is an optional product supported and managed by PSSP, which provides a high speed, full-duplex point-to-point network interconnect between nodes. The SP High Availability CWS (HACWS) option uses the High Availability Cluster Multi-Processing for RS/6000 (HACMP) program product to cluster two CWS together. This option provides automated detection and recovery against a CWS failure.
- **Monitoring:** The Event Management (EM) application and the companion Problem Management subsystem (PMAN) provide a distributed framework for monitoring, problem determination, alerting and solving. These offer the ability to collate data from the cluster and act on defined conditions. For example, system and error logs can be monitored along with other defined system resources like filesystems. Logical conditions can be defined and action taken, should the condition trigger. PSSP also ships with a T/EC adaptor which allows integration with the TME® 10 Enterprise Console.

Note: For a complete list of hardware and software supported by PSSP, please refer to *PSSP for AIX V3.5 Read This First*, GI10-0641.

1.2 Summary of CSM

Cluster Systems Management (CSM) is the product developed as the successor to PSSP. It is built on technology derived from the abundant technology of PSSP. CSM 1.3.3 is the current version and ships with transition tools to aid the transition from PSSP. The Management Server (MS) is the central management point of the CSM cluster and has a strong relationship with AIX V5.2. Currently AIX V5.2 and V5.1 are supported for AIX managed nodes. Unlike PSSP, CSM is also available for Linux. Both Linux and AIX nodes are manageable from an AIX MS. Both types are managed using the same commands. CSM also makes use of some open source software.

Although CSM is the successor to PSSP, there are a number of differences:

- **Configuration:** CSM has no repository like the SDR in PSSP, but stores configuration data in a directory. For example, node name, OS name, OS version, CSM version, and network adapters are contained in configuration data. IP addresses are not contained in configuration data because node management is performed based on the host name. CSM does not need a full SDR-like function because of its use of RSCT, which has its own System Register (SR). It is necessary to carry out a name resolution using the /etc/hosts file or DNS.
- **Installation:** The CSM management server (MS) manages the install of AIX and CSM software in a manner similar to PSSP. NIM is used for the installation of AIX like PSSP, but CSM does not wrap around NIM like PSSP does with `setup_server`. Since NIM is not configured by CSM, it is necessary to manually configure the MS as a NIM master. Since you are using NIM itself, and not a wrapper, this is actually an advantage because more flexible installations can be performed. CSM provides a deinstallation tool for un-managing nodes from a cluster and, unlike PSSP, removing CSM from the MS itself.
- **Security:** In CSM, Cluster Security Services (CtSec), the security mechanism of the new RSCT, is adopted. Since previous versions of RSCT did not have that layer of security, PSSP used Kerberos. CSM 1.3.3 supports Kerberos 5 for remote command authentication. Moreover, it is not necessary to set up security at the time of installation, as it is automatically set up at the time a node is added to a cluster.
- **User administration:** Currently, CSM has no centralized cluster user management function like PSSP. However, considering the complicated processing for every user/group to unify user name, user ID and group ID within a cluster, centralized user management functions are desired. Configuration File Management (CFM) is similar to file collection in PSSP and can be used to distribute user-related files within a cluster. It is required for the user name, user ID and group ID to be in agreement within a cluster also for CFM. When you have Linux and AIX nodes in a cluster, you need to set up separate node groups because the directory structure differs between the two.
- **Scalability:** Currently, the CSM management server can manage a maximum of 128 nodes (operating system images) or higher via a special bid. Special hardware is not required when adding a node to a cluster, although your pSeries box must be capable of running AIX 5L. If a node has a hardware control point, it is possible to carry out power control from the management server. SP switches are not supported in CSM.
- **Monitoring:** In CSM, a resource can be monitored using Resource Monitoring and Control (RMC), which is one of the RSCT components. RMC

collects the information about the state of a resource using Resource Manager (RM), which is an interface with a resource. RM is also a component of RSCT. Under resource monitoring, a “condition” is first set up using the state of a resource. Next, the action which should be taken when the “condition” is filled is defined as a “response,” and resource monitoring is started.

Note: Both AIX and Linux nodes can be managed in a Cluster 1600 (where the management server runs AIX 5L). However, we only focus on the management of AIX nodes. If you need more information about Linux nodes, please refer to Chapter 2 of the *CSM for AIX 5L: Administration Guide,* SA22-7918.

1.3 Summary of PSSP to CSM transition

The PSSP to CSM transition may be implemented in a number of different ways, depending on the customer’s environment. There are several transition types we have attempted in our test scenarios. These scenarios are discussed in more detail in Chapter 2 of the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989 and our own Chapter 3, “Process steps for transition” on page 37. A collection of transition tools is provided to perform the PSSP to CSM transition.

1.3.1 Transition types

The following are the transition types covered in this redbook:

- All-at-once transition

  An existing system is transitioned from PSSP to CSM using the existing hardware of the production system. In this transition, the customer stops production on the PSSP cluster, removes the PSSP software and installs the CSM software on all nodes; the CWS becomes the management server and starts the CSM cluster. This transition requires a longer outage.

- All-at-once-alternate-disk transition

  This is an extension of the previous transition type, if you have the available storage on your nodes and CWS. The *alt_disk_install* function can be used to clone your rootvg onto another disk. This provides the ability to boot on one disk and upgrade to CSM, leaving the other clone of rootvg intact running PSSP. This allows comparison of the cluster environments and a practical backout method. Ability to use this method will depend on the configuration of your logical volumes, volume groups and available storage.

- Frame-at-a-time transition

  This transition allows the customer to move one or more nodes at a time. The customer configures a CSM cluster alongside the PSSP cluster. The customer is required to set up a new CSM management server (on new hardware), remove one or more nodes from the PSSP cluster, and add them to the CSM cluster until all nodes are moved to the CSM cluster. This transition is suitable for customers who cannot afford to stop their production system all at once. However, a restriction exists here: the nodes in the "hardware control boundary" have to move all at once. For example, all nodes in a given SP frame need to be moved together. So it is more "frame" than "node" at a time.

- New-hardware transition

  The system moves from PSSP to CSM using a new set of hardware. The existing PSSP cluster is kept running in production while a new CSM cluster is configured. Once the CSM cluster is set up, production workload is moved over to the CSM cluster.

Table 1-1 Transition types

Transition type	**Positive**	**Negative**
All-at-once	- Cheaper solution	- Higher risk than "new hardware" type - Longer outage
All-at-once-alternate-disk	- Cheaper solution - Fall back to PSSP cluster any time	- Higher risk than "new hardware" type - Configuration dependant
Frame-at-a-time	- Total transition can be staggered over time	- Can be more complex
New-hardware	- Minimal outage - Parallel operation - Easier backout	- Potentially expensive

1.3.2 Transition tools

Transition tools assist customers with performing the PSSP to CSM transition. At a high level, these tools capture the existing PSSP cluster information, create stanza files needed to configure the PSSP nodes into CSM nodes. They also aid in removing the PSSP software on the nodes and the CWS. These tools are:

- PSSP cluster analysis tool: **mkpssprpt**

  mkpssprpt runs on the CWS and analyzes the PSSP configuration in the existing PSSP cluster. It generates a report which specifies the PSSP configuration.

- PSSP node analysis tool: **mknoderpt**

  mknoderpt is initiated from the CWS and runs on the individual nodes of the PSSP cluster. It captures the node-specific information and file collections information in the PSSP cluster.

- PSSP cluster configuration recording tool: **mkcfgutils**

  mkcfgutils, running on the CWS, gathers the PSSP data configuration and generates the stanza files needed for the CSM cluster configuration.

- PSSP removal tools: **rmpsspnode** and **rmpssp**

  These tools are run on both the PSSP cluster nodes and the CWS. They are used to de-install and remove the PSSP software from the cluster; prior to removal, the tools perform prerequisite checks to ensure the cluster is in a suitable state. **rmpsspnode**, running on the CWS, invokes a remote shell to remove the PSSP from the nodes and **rmpssp** is used to remove the PSSP from the CWS.

- File collections to CFM conversion tool: **cfgcfmutil**

  cfgcfmutil is run on the CSM management server. With the help of the stanza files generated by **mkcfgutil**, it configures the files that are in the PSSP file collection to be used in the CSM management server's CFM file distribution.

1.4 Scope of this redbook

This book covers a set of scenarios related to the transition from a Cluster 1600 managed by PSSP to a Cluster 1600 managed by CSM 1.3.3. A suite of transition tools have been provided to facilitate this move. The transition tools and their functions are summarized in 1.3.2, "Transition tools" on page 6. We look at the transition in three different ways to try to reflect potential customer situations. The three types of transition that have been included by the developers of the transition tools are described in 1.3.1, "Transition types" on page 5.

1.4.1 What we cover

The following topics are covered in this publication:

- Planning considerations
  It would be impossible for us to describe and cover every recorded or known type of customer cluster implementation. So as a compromise, we highlight some areas which need consideration with the hope that this will lead you into other specific areas.
- Reasons to transition
  We discuss what drivers exist for transitioning to CSM and what other considerations may affect your own time scales.
- Using the suite of tools
  We document the use of the tools and how they aid you in transitioning your system with minimal problems. We give pointers on what to look out for and the steps we used to perform the transition.
- Transition of legacy software and hardware
  For several different reasons, many customers are not running the latest software versions or do not have the latest hardware. CSM does not support all software and hardware, so additional planning for transition and evaluation of the PSSP system may be required.
- Transition of Hardware Management Console (HMC)-managed hardware
  Hardware such as a p690, which requires an HMC, adds another variable to the transition process. We test a transition with a p690 cluster to investigate this scenario.
- Lost functionality in CSM compared to PSSP
  Many of the tools in PSSP that appeared as the software has evolved are not available in the current version of CSM. For a comparison between PSSP and CSM, please refer to *CSM Guide for the PSSP System Administrator,* SG24-6953.

1.4.2 What we do not cover

- How to use PSSP
  This is a redbook to detail the transition of a PSSP-managed cluster to a CSM-managed cluster, so we assume that you have a good understanding of PSSP. If you are familiar with PSSP but need an update about the new features in the latest PSSP release, please refer to *IBM (e)server Cluster 1600 Managed by PSSP 3.5: What's New,* SG24-6617.
- How to use CSM
  As with the previous point, we assume that you have a good understanding of CSM. If you are not familiar with CSM aside from the product manuals, you may find useful information on the *CSM Guide for the PSSP System*

Administrator, SG24-6953 and in *An Introduction to CSM 1.3 for AIX 5L,* SG24-6859. We strongly recommend you encourage your system administrators attend the CSM education classes.

- How to administer AIX
  Again we assume the reader has a good working understanding of AIX and its relationship with both PSSP and CSM. We expect a solid grounding in NIM and RSCT.
- Instructions on how to migrate to AIX 5.2
  Although we highlight the theory of such a migration using NIM, we do not cover all the issues associated with such an AIX release migration. Such an upgrade should be investigated in addition to a PSSP to CSM transition. Please refer to *AIX Version 4.3 to 5L Migration Guide*, SG24-6924 and chapter 6 of the *AIX 5L V 5.2 Installation Guide and Reference,* SC23-4389 for more information.
- Linux nodes under CSM
  CSM 1.3.3 supports certain node types running Linux. As there is no comparable feature in PSSP, we do not discuss this in any detail. For more information on Linux support on CSM, please refer to chapter 1 of the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919 for supported hardware and software configurations.
- OpenSSH
  Both PSSP and CSM provide support for using SSH for remote command execution. However we do not explore how this may affect a Cluster 1600 transition. For more information on SSH use with CSM, please refer to *An Introduction to Security in a CSM 1.3 for AIX 5L Environment,* SG24-6873.

1.5 Chapter summaries

The following sections provide a brief description of the contents of each chapter:

- Chapter 1, “Introduction” on page 1 - This chapter briefly describes both PSSP and CSM and the mechanism for transitioning from PSSP to CSM. We also cover the scope of this redbook.
- Chapter 2, “Planning and considerations” on page 13 - This chapter establishes the motivation for transitioning from PSSP to CSM and introduces the tools for assisting in the transition. We discuss the hardware and software requirements you may have which could force a PSSP to CSM transition. We discuss contingency plans to be used to restore the original PSSP system in case problems are encountered during transition.
- Chapter 3, “Process steps for transition” on page 37 - This chapter includes detailed steps which are introduced in Chapter 2, “Planning and

considerations" on page 13. They track the progress of each of the PSSP to CSM transitions performed on a number of different test scenarios. The chapter also includes a description of the systems used for each test transition.

- Chapter 4, "Implications of transition" on page 93 (transition of additional functions) - This chapter discusses features and functions within a Cluster 1600 managed by PSSP. Migration of these clusters is discussed in relation to transitioning from PSSP to CSM. In transitioning to CSM, you may gain new functionality, but lose others.
- Chapter 5, "High Performance Computing (HPC) recommendations" on page 121 - This chapter discusses the HPC software stack, with reference to transition. We discuss the additional required considerations and detail some example transitions.
- Appendix A, "How to configure monitoring in CSM from pman subscriptions" on page 133 - This appendix is an extension of the examples in Chapter 4, "Implications of transition" on page 93.
- Appendix B, "Hints and tips" on page 139 - As we proceeded through our testing, we realized that there were hints which simplified or aided the transition process. Although these are included within the test descriptions, we have also collected tips in this appendix.
- Appendix C, "Transition tools sample outputs" on page 145 - This appendix includes scripts we have found helpful in addition to the transition tools. This appendix also covers any problematic situations we have discovered while using the transition tools.
- Appendix D, "Additional GPFS/VSD sample scenarios" on page 233 - This appendix covers a few more transitions where the HPC is involved.

1.6 Additional resources

For additional information and reference materials, refer to:

- *IBM @server Cluster 1600 Managed by PSSP 3.5: What's New,* SG24-6617
- *PSSP Installation and Migration Guide,* GA22-7347
- *PSSP Administration Guide,* SA22-7348
- *CSM Guide for the PSSP System Administrator,* SG24-6953
- *An Introduction to CSM 1.3 for AIX 5L,* SG24-6859
- *An Introduction to Security in a CSM 1.3 for AIX 5L Environment,* SG24-6873
- *RSCT for AIX 5L: Messages,* GA22-7891
- *CSM for AIX 5L: Command and Technical Reference,* SA22-7934

- *CSM for AIX 5L: Hardware Control Guide,* SA22-7920
- *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919
- *CSM for AIX 5L: Administration Guide,* SA22-7918
- *A Practical Guide for Resource Monitoring and Control (RMC),* SG24-6615
- *AIX 5L V 5.2 Installation Guide and Reference,* SC23-4389
- *IBM Reliable Scalable Cluster Technology Administration Guide,* SA22-7889
- *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989
- *NIM: From A to Z in AIX 4.3*, SG24-5524

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2

Planning and considerations

This chapter provides an introduction to the transition planning steps that are required before converting an IBM Parallel System Support Program (PSSP) cluster into a Cluster Systems Management (CSM) cluster. This chapter provides information about the tools, documentation, and other resources available to help you plan before transitioning your cluster system from a PSSP-managed environment to a CSM-managed environment.

This document also examines the different paths you can take to make this transition and illustrates these different paths with step-by-step transition procedures. You can use the working knowledge presented in this publication to help you plan and accomplish the transition of your own cluster from PSSP to CSM.

In addition, this chapter contains information about the steps required to transition the High Performance Computing (HPC) software stack.

This chapter does not intend to provide you with all the possible variables that might be part of the transition from an IBM @server Cluster 1600 managed by PSSP to a CSM cluster. Its intention is to get you started on preparing your organization for transitioning, or at least understand what it takes to move your cluster from PSSP to CSM.

The following topics are covered in this chapter:

2.1 Why transition to Cluster Systems Management (CSM)?

Why move from a PSSP-managed Cluster to a CSM-managed one? A requirement for newer hardware and software will be the main driver:

- Release 3.5 is the last planned release of PSSP. As such, it currently does not and is not expected to support newer products such as AIX 5L Version 5.3, POWER5™-based hardware, and the new IBM @server pSeries High Performance Switch (HPS), previously known as the Federation Switch.
- Another issue to consider is the support of PSSP. At the time of writing, PSSP is expected to be supported until April 2007. This is for fixes of PSSP only; no new function is expected to be added to PSSP on top of what is already offered in PSSP Version 3.5.

PSSP and CSM provide support for different hardware and software, but there is some overlap between the two. Figure 2-1 on page 16 shows a graphical summary of the supported areas.

When considering a transition to a CSM-based cluster, either by a transition of your existing environment from PSSP to CSM or by purchasing new hardware, it is very important to understand PSSP, CSM, and your own environment. Your architects and administrators need to comprehend:

- The differences between the two clustering products and how they relate to your specific environment.
- The functions your environment provides, both on a cluster and application level.
- What the transition tools actually provide. CSM is not a one-to-one product in comparison to PSSP. Some configuration features can be transitioned from PSSP to CSM, some cannot.

Transitioning from PSSP to CSM, through whatever path your particular requirements take you, should be seen as the biggest change to your clustered environment since its installation. This transition is not comparable to upgrading from one version of AIX or PSSP to another. It is something much more significant than that. The transition tools cannot know or cope with all possible customer cluster configurations, some of which might need to be rewritten in your new CSM environment.

Compared to PSSP, CSM provides a modular framework to achieve many configuration goals; CSM does not always provide you with the method or means to achieve that goal. You should view PSSP and CSM as solutions that might achieve the same end result, but both have their own method of arriving at the same destination.

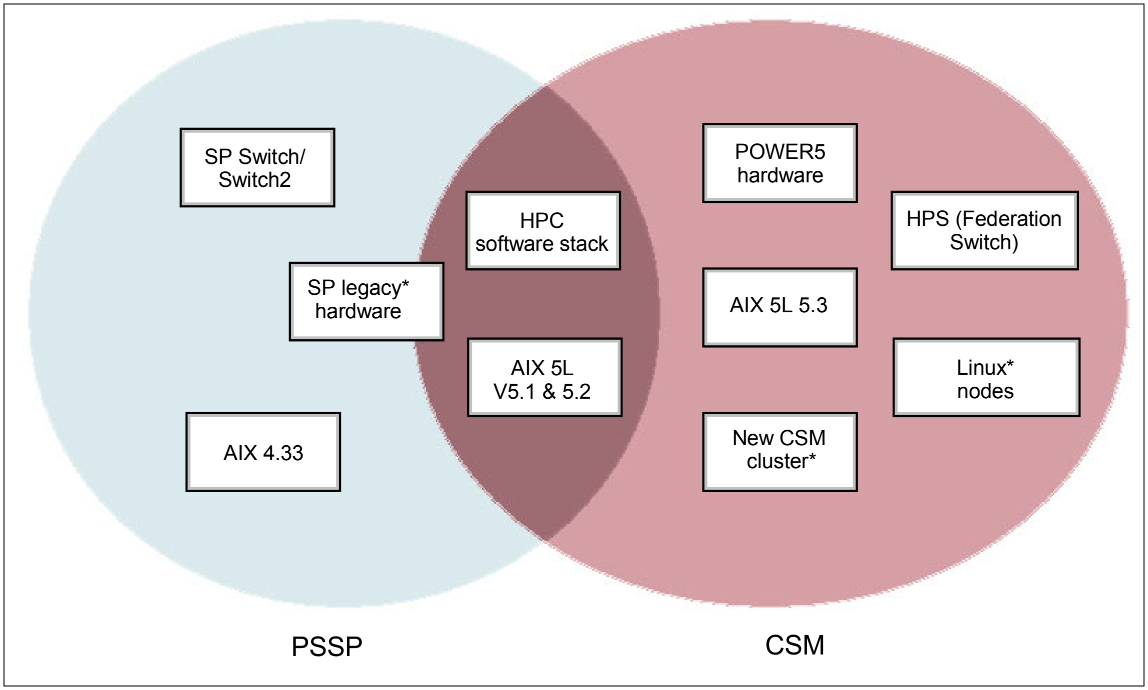

Figure 2-1 PSSP versus CSM support summary

> **Note:** Although older MCA nodes are not supported by CSM, some of the PCI SP nodes are supported. Only certain Linux distributions or versions are supported by CSM on given xSeries® or pSeries hardware. By "new CSM cluster," we mean a new Cluster 1600 installation. Refer to Chapter 1 of the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919, for supported hardware and software configurations.

If you do not have requirements for newer hardware or software, it is worth considering not to transition to CSM at this point in time; instead, wait until such a need presents itself. Planning and investigating the transition would still be a very valuable exercise, even if the goal is long term.

You should consider what you will transition and in what form:

- Do you want to keep all or part of your existing nodes?
- Are you transitioning to new hardware?

- If you have legacy switches that are not supported by CSM, do you need to consider installing a replacement high-speed network interface (such as the new IBM @server High Performance Switch (HPS) or Gigabit Ethernet) during the transition timeline?
- Are you going to have Linux nodes within your Cluster 1600? If you plan to add Linux nodes to your new CSM cluster, you need to consider the time when these nodes will be added to the cluster. Perhaps you already have an existing Cluster 1350 that you want to migrate? Refer to Chapter 6 of the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919, for more information about adding Linux nodes to your cluster.

Catalog all software used within your current cluster and see if there are any implications involved. Aside from moving from PSSP to CSM, you might also be upgrading from one version of AIX to another:

- Will all your applications and middleware support and run on AIX 5L?
- If you are moving from AIX 4.3.3 to AIX 5L, you need to consider which kernel (32-bit or 64-bit) you can use, based on your software requirements. For example, PSSP did not support the 64-bit AIX 5L kernel until Version 3.5.

2.2 Introduction to the PSSP to CSM transition tools

A set of tools has been created to assist in the transition from PSSP to CSM. The tools are fully described in the *IBM PSSP to CSM Transition Guide*. Prior to transition planning, you should become familiar with this document. In this section, we provide a brief introduction to the tools.

Important: You need to order a set of AIX 5L v5.2 RML3 to get the transition tools.

Note: Identical versions of the transition tools must be used. Results are unpredictable if different versions of the tools are mixed. All transition tools are run on the control workstation or the management server. None of the tools are run from the individual nodes.

2.2.1 Analysis tools

There are two analysis tools, **`mkpssprpt`** and **`mknoderpt`**, that interrogate the current PSSP-based system and create reports that are used in the transition planning process. These tools represent the first step in getting ready for the PSSP to CSM transition. Reports created by the tools are analyzed by the system administrator to establish the readiness of the cluster for the transition process. Both tools must be run to perform a complete analysis of the system. The tools should be run close enough to the PSSP to CSM transition date so that no further changes to the system are anticipated.

Cluster analysis tool: mkpssprpt

The cluster analysis tool generates a report (/var/opt/pssp_to_csm/data/pssprpt.<timestamp>.txt) that describes the details of the current PSSP cluster. For a detailed description of the report along with the interpretation of its contents, refer to the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

Table 2-1 shows whether there is a tool available to aid the transition of the various components identified by the report tool.

If a component is marked as:

- *Not applicable*, the transition tool is not applicable.
- *Not supported*, the component is not supported by CSM.
- *No*, there is no tool to aid the transition of a particular component. This does not mean the facility is not in use in the CSM cluster by AIX.

Table 2-1 Tool availability table

PSSP configuration component	Transition tool available
Site-wide configuration	Not applicable
Frame configuration	Not supported
Node configuration	Yes
SP LAN and additional adapters configuration	Yes
Switch configuration	Legacy: Not supported
Node group configuration	Yes
Security configuration	No
User management configuration	No
Automount configuration	No
Installation and boot configuration	No
NIM configuration	No
Cstartup and cshutdown configuration	Not supported

PSSP configuration component	Transition tool available
Accounting configuration	No
NTP configuration	No
Event management configuration	No
Problem management configuration	No

Node analysis tool: mknoderpt

The node analysis tool produces a report (/var/opt/pssp_to_csm/data/noderpt.<timestamp>) containing node-specific configuration data, file collections files, and configuration information such as the microcode level. In the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989, there is extensive discussion of this report, as well as sample output.

Table 2-2 shows whether there is a tool available to aid the transition of the various components identified by the report tool.

Table 2-2 Tool availability table

PSSP configuration component	Transition tool available
Boot install server node or nodes	Not applicable
Details of all file collections	Yes
Exceptions	No
HACMP	No

> **Note:** The report identifies which file collections are able to be transitioned, because not all PSSP file collection types are supported in CSM. Refer to the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide***, GA22-7989** for more information.

2.2.2 Configuration recording tool: mkcfgutils

The configuration recording tool is run after the analysis tools have been used to examine the readiness of the system for transition. After the analysis tools are run, the reports interpreted, and alterations to the system have been made for transition, the system administrator can run **mkcfgutils**. The configuration recording tool creates CSM configuration files based on the information it finds within the current PSSP system.

Data from the tool are placed in the directory /var/opt/pssp_to_csm/data and include:

- nodedef.<timestamp>.def
  The node configuration for use with the CSM **definenode** command.
- adapterdef.<timestamp>.def
  The additional adapter configuration.
- Up to two PSSP node group configuration files:
  - gngrpcfg.<timestamp>.def: If global node groups are configured.
  - pngrpcfg.<timestamp>.def: If partition bound node groups are configured.
- fc.stanza, fcfiles.tar, fc.files
  For file collections transition, used by the **cfgcfmutil** command.

The files created by the **mkcfgutils** tool are used as inputs to CSM commands that personalize the new CSM installation. The system administrator will run these commands using files created during this step only after PSSP has been removed from the system and CSM has been installed.

The *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989 refers to the files and CSM commands. It also contains additional details about the customization of the files and use with the appropriate CSM commands.

2.2.3 PSSP removal tools

After the date for transition arrives and the conversion information has been collected, PSSP must be removed from the system using the PSSP removal tools.

rmpsspnode

This tool removes PSSP from the nodes plus any other AIX configuration-related to the PSSP configuration. It is the first PSSP removal tool that is run. As for all the transition tools, it is executed on the control workstation.

rmpssp

This tool is used to remove PSSP from the control workstation. It is run only after PSSP has been successfully removed from all the nodes.

> **Note:** The **rmpssp** tool removes the NIM configuration (including NIM server filesets). Consider what needs to be backed up in your environment.

2.2.4 File collections to CFM conversion tool: cfgcfmutil

This tool runs on the CSM management server (MS). It is used to convert the PSSP file collections into cluster file management (CFM) file distributions. It uses files created in “Configuration recording tool: mkcfgutils” on page 19 to transfer the PSSP data into the CFM system.

2.3 Procedural steps for each of the transition types

For each of the different scenarios, a number of steps and operations are required to transition from PSSP to CSM. Some of these steps are common between scenarios, some of them are specific to a given one. There is always a logical sequence in which the steps must be executed. The following are high-level summary steps for the generic types of transition scenarios:

1. **Analyze:** Catalogue and analyze your current system with the supplied transition tools and knowledge of your system. Make note of what components your system is made up of. Record what functions of AIX and PSSP you make use of within your cluster.
2. **Prepare:** Draw on the lists created in the analysis to plan the required steps and the time frame required to achieve your transition:
   - Take note of the required sequence in which these events must be executed.
   - If you are planning a phased transition (refer to “Frame-at-a-time (phased) transition” on page 23 for a definition of a phased transition), remember that the hardware control boundary dictates the smallest unit that can be migrated. For example, all nodes in an SP frame must be moved at the same time. If you have a partitioned system, and you are planning to do a phased transition, you will need to unpartition your system first.
   - Consider any required education in this preparation process. For post-transition, your administrators need the skill and knowledge to support a CSM cluster. Do not overlook education. Although the high-level principles remain the same, the day-to-day cluster administration is very different.
   - Remember to think about contingency plans and back-ups, which might be required to restore the system to its original state.
   - Consider when the system or application outages occur and for how long.
   - Think about any required sequence of events with regard to your applications.
   - Detail any homegrown system customizations you might have developed and rely on, and understand their future within a CSM-based environment.

3. **Transition:** This encompasses the deinstallation of PSSP, the installation of CSM, and all the required steps to transition your existing system from one cluster architecture to the other. During this time, you will stop production use of your PSSP system (or part of it). Again, sequence is critical here to ensure that any required prerequisite or post-requisite steps are followed.
4. **Verify:** For post-transition, you need to verify that not only is your cluster functioning properly from a CSM viewpoint, but also from your own viewpoint. You need to ensure that the environment is working as you expect. You should plan to perform functional verification on all application and middleware components, in addition to similar verification of the cluster environment itself.
5. **Run:** Use your new CSM-based cluster as your production environment.

The following individual scenarios are discussed in more detail in chapter 3 of the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

> **Note:** During any of the transitions procedures, you might have to install and configure Network Installation Manager (NIM). For more information on the steps to install and configure NIM, please refer to 4.17, “NIM (Network Install Manager)” on page 115.

2.3.1 All-at-once transition

The transition from an existing PSSP-managed cluster to a CSM-managed cluster requires the following steps:

1. Analyze and catalogue the existing PSSP system using the supplied cluster analysis and configuration recording tools.
2. Set out the sequence of transition.
3. Educate system and application administrators, update processes and procedures, and prepare for a production cutover to the CSM cluster.
4. Create CSM stanza files using the configuration recording tool where appropriate.
5. Take appropriate system and application back-ups.
6. Stop production use of the PSSP cluster.
7. Remove PSSP from nodes (and CWS if it is going to be reused as the CSM management server) with the PSSP removal tools.
8. Ensure that AIX 5L is at Version 5.2 on what will become the MS.
9. Install CSM on the MS.

10. Upgrade nodes to AIX 5L V5.x if required.
11. Configure nodes to CSM using stanza files from step 4 where required.
12. Conduct system and application verification.
13. Resume production.

2.3.2 Frame-at-a-time (phased) transition

The transition from an existing PSSP-managed cluster in a phased (based on hardware control boundary) approach requires the following steps:

1. Install and configure CSM on your new management server.
2. Analyze and catalogue the existing PSSP system using supplied cluster analysis and configuration recording tools.
3. Plan the sequence of moves of the cluster nodes/frames.
4. Educate system and application administrators, update process and procedures, and prepare for a production cutover to the CSM cluster.
5. Create CSM stanza files using the configuration recording tool where appropriate.
6. Take appropriate system and application back-ups.
7. Stop production use of transitioning nodes.
8. Unpartition the system if necessary.
9. Remove PSSP from the transitioning nodes with the PSSP removal tools.
10. Delete the frame from the PSSP configuration.
11. Re-cable moving nodes from the CWS to the MS.
12. If necessary, upgrade AIX on transitioned nodes.
13. Use edited CSM stanza files from step 5 to configure transitioned nodes to CSM.
14. Conduct system and application verification on transitioned nodes.
15. Resume production on transitioned nodes.
16. Repeat steps 5 to 12 until all required nodes are transitioned.
17. Decommission CWS.

2.3.3 New hardware transition

The transition from an existing cluster to a new cluster built on new hardware requires the following steps:

1. Analyze and catalogue the existing PSSP system using the supplied cluster analysis and configuration recording tools.
2. Prepare and plan for the transition.
3. Educate system and application administrators, update processes and procedures, edit data files created by the transition tool or create new files to use with the CSM configuration commands, and prepare for a production cutover to the CSM cluster.
4. Install the new CSM management server.
5. Configure a CSM cluster on the new hardware using stanza files from step 1 where required.
6. Keep the PSSP cluster in production (therefore, system back-ups might not be required) while running the new CSM cluster in test.
7. Transition production applications from PSSP to the CSM cluster.
8. Decommission the PSSP cluster when appropriate.

2.4 Risks and time scales

We have already shown why you might need to transition to CSM. You might need to migrate to a later version of AIX or PSSP prior to or during the transition to CSM. Any form of software upgrade has an associated risk. Therefore, upgrading software during the PSSP to CSM transition adds risk to the transition itself. Although the transition is potentially complex, it should be apparent that the transitional steps need to be performed and completed in a given order; some steps must follow others, and some overlap or run parallel, but there is a definitive order. For example, if you need to upgrade your nodes to AIX 5L V5.2, you need to plan to upgrade all your nodes over a given time window. If you have to upgrade the HPC software stack and other Licensed Program Products (LPPs) during the transition, these naturally bring their own risks and issues. Figure 2-2 on page 25 shows a generic timeline of events.

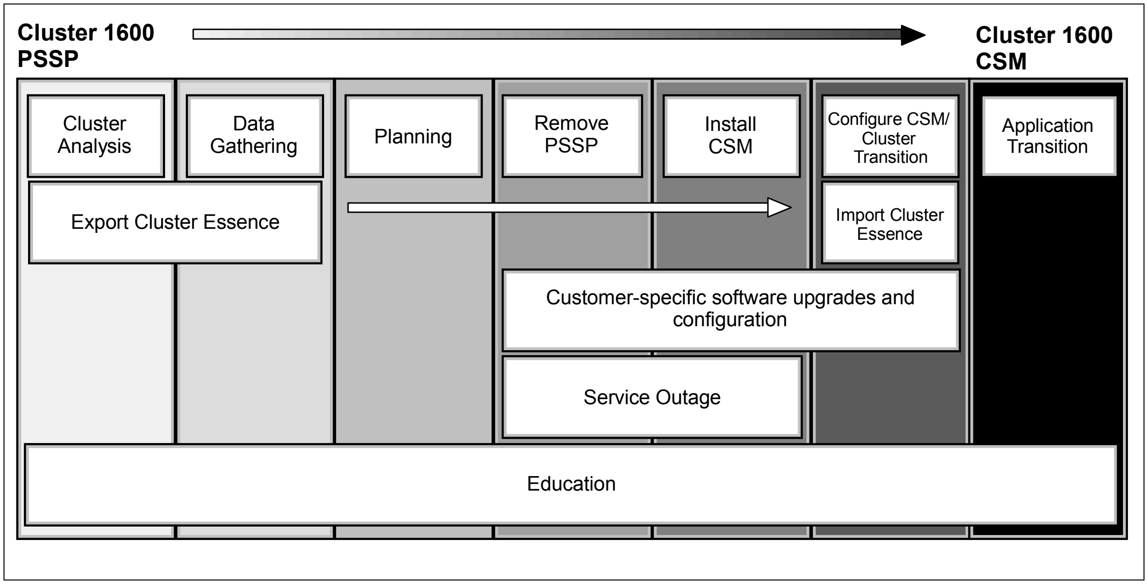

Figure 2-2 Transition timeline

Through your cluster investigations, you can identify the required software and hardware changes that need to occur during the CSM transition. From here, you can validate the sequence and estimate time scales based on your own environment size and available resources. Also understanding where in the transition application and cluster outages occur becomes clearer from your planning.

2.5 Hardware and software prerequisites

We have already touched on the potential hardware and software requirements that require you to transition your cluster from PSSP to CSM. Depending on your current system configuration, you can see from the scenarios we have outlined that some transitions require more steps than others. In some cases, there is more than one path to the same end goal.

If you are currently running AIX Version 4.3.3 on your nodes or CWS, you need to consider potential options depending on your individual requirements. You need to upgrade your nodes to AIX 5L V5.1 or later either before or during (for example, post PSSP removal) the transition. Your CWS also needs to be upgraded to AIX 5L V5.2 if you are going to keep it as your CSM management server (MS). If you are going to use a brand new MS, it needs to be installed with AIX 5L V5.2. If you are going to upgrade pre-transition to AIX 5L V5.2, you need to run PSSP V3.5. Depending on your cluster configuration (both software levels and size), you can, therefore, see which option would be more logistical.

Note: If you are going to reuse your existing CWS as your CSM MS, refer to Chapter 2 of *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919, for specific details regarding hardware and software requirements. In addition, for a complete list of what hardware and software is supported by PSSP, refer to *PSSP for AIX V3.5 Read This First*, GI10-0641.

2.6 Contingency plans

We cannot emphasize enough how important it is to spend time to plan your transition carefully. By understanding the implications of the transition and how this relates to the management of your cluster, you will be able to spot and resolve issues specific to your own environment. As you plan, appreciate the magnitude of the steps and consider contingency plans at the points of no return. If problems occur, you should be aware of potential options to recover from or continue with the transition.

2.6.1 Back-up

Prior to the transition process, you should perform your normal full system back-up. This includes the rootvg (**mksysb**), other required data volume groups (**savevg**), and your normal data back-ups.

After reviewing your cluster, consider if any additional back-ups need to be taken outside of your routine back-up schedules. Consider other areas of your cluster that might need special back-ups for the transition. Having a back-up is one thing, having a restore plan is equally as important. Restore planning and testing must be considered. Refer to Chapter 7 of the *Managing IBM (e)server Cluster 1600 - Power Recipes for PSSP 3.4,* SG24-6603, for suggested back-up and restore procedures.

If you have a mirrored rootvg or a spare disk in your system, you can perform an alternate disk install. With an alternate disk install, you can perform the transition on one rootvg disk while keeping the old rootvg intact on the alternate disk. If there is any problem during the transition, you can to bring your system back to its original state. Just boot your system from the alternate disk.

Note: Not all large GPFS users will need to back up all the data, but only a few required binaries, since they have STK solutions for ever-changing data.

2.6.2 Points of no return

The *point of no return* is the term we use to mark the first destructive (or significantly changing) step along the transition path. After you pass a point of no return, you either proceed to the completion of the CSM transition, or invoke your back-up and recovery plan to return to a PSSP-managed system. The cluster reporting tools can be repeatedly executed on a production system without any impact or change. In terms of the PSSP to CSM transition, it is the removal of PSSP from the nodes and the CWS that is the first destructive step. However, depending on your environment, you could have application-specific steps that have the same effect. In your planning procedures, you should be aware of such steps and their implications.

2.7 Cluster verification

Before using your newly transitioned CSM cluster for production use, it is important to perform functional verification to ensure your cluster is working correctly and that all components have been transitioned as planned. Transitioned components should also be verified to ensure they work as you expect.

2.7.1 CSM verification

CSM ships with a number of verification tests called probes, similar in respect to tests found in PSSP. These probes can be used to verify configuration of the MS and other parts of the cluster. Using probes along with CSM commands, such as **lsnode** and **csmstat**, can be used to verify the integrity of your CSM cluster.

Note: For more information about post-installation CSM verification using probes and other commands, refer to Chapter 9 of the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919. Also for more detailed information about probes, refer to Chapter 7 of the *CSM for AIX 5L: Administration Guide,* SA22-7918.

If you used the transition tools to preserve node configuration data, you should verify the data against what was listed in the **mkpssprpt** report prior to the transition. The **mkpssprpt** and **mknoderpt** output can also be used to help verify other transitioned components.

High Performance Computing (HPC) stack

Testing has to be done to ensure that the Licensed Program Products (LPPs) are working as expected. In order to quantify these tests, data would have to be gathered from the PSSP cluster prior to the transition. A set of test cases should be developed based on your site environment. These tests could be derived from typical application codes, existing test codes, or any other tools currently in use. The tests can include:

- LoadLeveler®: We advise that a group of jobs are run across the nodes using LoadLeveler. The tests should reflect site-specific LoadLeveler configuration.
- General Parallel File System (GPFS) and Virtual Shared Disk (VSD): Data integrity is paramount, so testing of files within a configured GPFS cluster can include:
  - Checksum comparisons on unchanged data (for example, non-temporary data).
  - Comparison of files listed in a constant state directory under GPFS type PSSP to GPFS type RSCT Peer Domain (RPD). This can be done by listing directories to flat files for comparison with **diff** or **wc** commands.
  - Ensure data has not become truncated.
  - Manipulation of files within a test directory on the file system to verify that data does not become corrupt.
- High Availability Cluster Multi-Processing (HACMP): Because HACMP is not dependent on PSSP or CSM, your HACMP cluster can remain active during a "same hardware" transition if the applications that HACMP is keeping highly available are also independent of PSSP and CSM. If you need to keep your production application active during the transition, use the HACMP cluster management tools to move your application between nodes. After the application is active on the back-up node, you can continue through the transition tool steps on the primary node. This minimizes disruption to your application during the transition window. Again, this is customer specific, but the fallover scenarios should be tested according to the current site policies.

Clearly, these testing strategies can be combined to include a basic set of serial and parallel jobs that are submitted to the LoadLeveler batch system. Optionally, the jobs could include Message Passing Interface (MPI) communications to verify Parallel Environment (PE) function. Data write, read, and verification functions to a GPFS system can be included as well. Finally, the test codes can invoke Parallel Engineering and Scientific Software Library (Parallel ESSL) operations to check the function of the parallel library. Using this method, a single series of batch jobs can be used as a very basic initial verification after the system has completed transition.

2.8 High Performance Computing (HPC) software stack

In addition to CSM, there are software tools that provide further utilization of the HPC platform. Collectively, these tools are known as the HPC software stack.

Software elements in this set of software and their associated transition steps are introduced here.

Table 2-3 summarizes the versions of the software tools relative to the versions of the system software components AIX, PSSP, and CSM.

Table 2-3 HPC software stack versions

	AIX	PSSP	CSM	Comments
LoadLeveler				
3.2	5.2	3.5	1.3.3	LoadLeveler V3.2 runs on either AIX 5L V5.2 and PSSP V3.5, or AIX 5L V5.2 and CSM V1.3.2 managed clusters.
3.1	5.1	3.4		
2.2	4.3.3	3.4		
GPFS				
2.1 or 2.2	5.2	3.5	1.3.3	GPFS V2.1 and V2.2 run on either AIX 5L V5.2 and PSSP 3.5, or AIX 5L V5.2 and CSM V1.3.2 managed clusters.
2.1	5.1			
1.5	4.3.3	3.4		
VSD				
4.1	5.2		1.3.3	Our sample scripts are shipping in: PSSP 3.5 PTF 17 APAR IY56668, and for the IBM @server High Performance Switch (HPS) PTF 6 APAR IY56669.
3.5	5.2	3.5		
3.4	5.1	3.4		
3.4	4.3.3	3.4		
PE				
4.1	5.2	3.5	1.3.3	
3.2	5.1	3.4		
3.1	4.3.3	3.4		
Parallel ESSL				
3.1	5.2	3.5	1.3.3	
2.3	5.1	3.4		
2.2	4.3.3	3.4		

	AIX	PSSP	CSM	Comments
HACMP				
5.1	5.2 or 5.1	3.4 or 3.5	1.3.3	
4.5	5.2 or 5.1	3.4 or 3.5	1.3.3	

2.8.1 LoadLeveler

LoadLeveler Version 3.2 runs on either AIX 5L V5.2 and PSSP V3.5, or AIX 5L V5.2 and CSM V1.3.3 managed systems. Therefore, a system administrator can gain experience with the new software version prior to the transition from PSSP to CSM by running LoadLeveler V3.2 on a PSSP managed system first. Even though the same LoadLeveler code can be used both prior to and after the transition from PSSP to CSM, there are changes that must be made to the LoadLeveler configuration files. Some considerations are included in this section. For further information, see *LoadLeveler Version 3 Release 2: Using and Administering*, SA22-7881.

admin file (LoadL_admin)

The admin file contains information about the node resources that are managed by LoadLeveler. Under PSSP, the `llextSDR` command is used to obtain information about the system in use using a query to the system data repository (SDR). When transitioning to a CSM-managed system, the data within the admin file should be changed. The original LoadL_admin file can be saved and the machine records replaced with the data obtained from the new command `llextRPD`, which obtains information from RSCT. Note that there is also a new feature that allows LoadLeveler to dynamically extract adapter information from RSCT, as opposed to maintaining this information within the admin file.

Local configuration files

The local configuration files might need to be changed to reflect associated alterations within the system. Very often, there is a unique local configuration for each node on the system. Also, it is common to name the local configuration file with some reference to the node name. If this is the case on the new system, the names of the local configuration files have to be changed. In addition, the placement of LoadLeveler daemons (schedd, startd, and negotiator) should be reconsidered. There might also be changes to the job classes allowed to execute at given nodes that imply changes to the class keyword in the local configuration files.

Limits

In general, limits (such as max_cpu_time and max_users) might need to be examined and changed in light of the new machine configuration. A different number of nodes and a change to the capacity of the new cluster (for example, more memory per node or faster inter-node communication) might imply that limits need to change.

2.8.2 General Parallel File System (GPFS)

Transitioning GPFS data from a PSSP to a CSM-based system requires the creation of an RSCT Peer Domain (RPD) and the creation of a GPFS cluster within this domain (as described in *GPFS for AIX in an RSCT peer domain: Concepts, Planning, and Installation*, SA22-7941). The new GPFS cluster can be defined over the same set of nodes as the original PSSP installation or over an entirely different set of nodes. Similarly, the actual GPFS file system data can remain on the original set of disks or be moved to a new set of disks. If the data is kept on the original set of disks, those disks can remain attached to their original nodes or can be moved to a different set of nodes.

Depending on the particular set of circumstances, the GPFS data can be transitioned using several techniques. Regardless of which approach is chosen, we strongly recommend that you first back up the file system data.

Backup and restore solution

This is the most straightforward approach. The GPFS data is saved under PSSP and restored under CSM. If a customer is already backing up the GPFS data, or if the amount of data that needs to be retained is small, this solution can be quite adequate. Although this is the simplest technique, it is not acceptable for large amounts of GPFS data. In addition, the back-up and restore operations could introduce long delays into the transition process and pose a certain amount of risk (from corrupted back-ups) as well.

Disk copy solution

For customers getting a completely new system, including new storage, a much quicker way to migrate their GPFS file system data is to copy it directly from the old filesystem (under PSSP) to the new filesystem (under CSM). This requires the simultaneous operation of both the old PSSP system and the new CSM system. This approach also has the advantage of allowing the transition to take place without significant, if any, down time. It is also the most fault tolerant, because data is copied. However, the copy process can be slow depending on the connection between the two systems and the amount of data within GPFS. A significant cost might also be incurred by the requirement for two complete GPFS configurations.

Swing disk copy solution

For customers replacing PSSP with CSM on the same system hardware, this alternative provides a way to copy the GPFS data from disk to disk.

- The customer starts by reducing the amount of used disk in the GPFS filesystem.
- The free disks are removed from the VSD configuration.
- The number of nodes in the GPFS nodeset is reduced.
- The number of of nodes in the VSD configuration is reduced.

Now that these nodes are free from any cluster configuration, and can be removed from the PSSP cluster and used to form a new CSM cluster. Note that this requires that the existing PSSP cluster be restriped, reflecting a quorum change on the system. Some of the GPFS data is copied from the PSSP cluster to the new CSM cluster. This frees up more disk space on the PSSP cluster. These nodes and the unused disk are then removed from the PSSP cluster and added to the CSM cluster. This step requires a restripe of both the PSSP cluster, to reflect the reduction in the GPFS nodeset, and the CSM cluster, to reflect the addition of nodes. This procedure continues until all nodes, disks, and data have been moved to the CSM cluster system. This approach has the advantage of allowing the transition to take place without significant, if any, down time, but requires more advanced dministration skills. This technique is also fault tolerant, because data is copied. However, the copy and restripe processes can be slow. Because the PSSP nodes are reused, the cost of supporting two simultaneous GPFS systems is eliminated.

File system move solution

Regarding customers where none of the above solutions is acceptable, GPFS provides a procedure for moving the GPFS file systems and associated VSDs directly from the PSSP cluster to the new cluster.

The main advantages of the file system move solution are the small amount of down time and no requirement for new disks. The down time depends on the number of disks and the time it takes to move them and recable the disks to the new nodes. The rest of the processing takes a relatively small amount of time. There is one drawback using this solution, the **`mmexportfs`** and **`mmimport`** commands are currently only shipped with GPFS 2.2 PTF 1, there for this needs to be installed on either one node in the GPFS nodeset or on the CWS in order to make use of these commands.

Important: To avoid potential file system and disk naming conflicts, the existing GPFS file systems should be imported before the new GPFS disks and file systems are created in the new GPFS cluster. In addition, a certain amount of risk is involved concerning the GPFS transition. It is possible that an error during the disk move and recabling steps might force the restoration from a back-up.

If using some of the other methods for transitioning the GPFS data, this procedure has to be adjusted accordingly. For example, you do not have to destroy the existing PSSP-based GPFS node sets if you are going to have two clusters running at the same time (if you decide to use one of the copying techniques).

2.8.3 Virtual Shared Disk (VSD)

In a PSSP environment, VSDs can be on their own or used as the base for a GPFS configuration. If the cluster is being transitioned, the VSD configuration is going to change in some way. Therefore, the implications of this process and a plan for transition need to be considered.

- Do I have, or want to, deal with the physical wiring and addition of adapters required to maintain the RPD GPFS cluster?
- How many nodes does a disk subsystem allow to access the data concurrently?

Important: Please pay close attention when using Concurrent Virtual Shared Disks (CVSD). If you activate the same CVSD in two different clusters, you will get data corruption. Please follow the strict transition instructions of removing the VSD information from the "old" node you are transitioning from before configuring VSD in the new cluster.

Layout and configuration considerations

VSDs that run in PSSP clusters have configuration files that live in the /var/adm/csd/vsdfiles directory. These files contain all the information required to map the layout of the VSDs across the cluster. It is important to know your configuration before trying to transition. In order to transition your VSDs configuration to a CSM environment, you need to be familiar with the following documents:

- *IBM Reliable Scalable Cluster Technology (RSCT) for AIX 5L: Managing Shared Disks*, SA22-7937
- *RSCT for AIX 5L: Technical Reference,* SA22-7890.

There are a few issues with the transition from PSSP to CSM that are going to affect the VSD configuration in the cluster:

- One main issue is that the version of the VSD software needs to change from the point the PSSP software is removed to the VSDs running on the CSM cluster. Refer to Table 2-3 on page 29.
- The loss of the SP Switch, or SP Switch2, and the potential implementation of either a Gigabit Ethernet environment or the new HPS.

2.8.4 Parallel Environment (PE)

With PE V4.1, the transition from PSSP to CSM has minimal impacts. PE V4.1 depends on either PSSP V3.5 or the rsct.lapi.rte fileset in AIX 5L V5.2 ML1 to provide the Message Passing Interface (MPI) and Low-level Application Programming Interface (LAPI) libraries needed for developing and executing parallel applications. Therefore, when converting from PSSP to CSM, PE users will require the installation of the rsct.lapi.rte fileset to run parallel applications. If you are using an earlier version of PE (Version 3.1 or 3.2), you need to upgrade to PE V4.1 after you move to CSM (refer to Table 2-3 on page 29).

2.8.5 Parallel Engineering and Scientific Software Library (ESSL)

Parallel ESSL is dependent on PE as a basis for communication using MPI. As long as the MPI communication base works with a system transitioned from PSSP to CSM, Parallel ESSL should work as well. Therefore, the transition from PSSP to CSM should be transparent to Parallel ESSL, as long as Parallel ESSL 3.1 is used in conjunction with PE V4.1. If you are using an earlier version of Parallel ESSL, you need to upgrade to Version 4.1 after the transition to CSM. Refer to Table 2-3 on page 29.

2.8.6 High Availability Cluster Multi-Processing (HACMP)

HACMP/ES V4.5 and HACMP V5.1 clusters are supported on installations where PSSP V3.5 or CSM V1.3.2 is used for systems management. When transitioning from PSSP to CSM, there are no special requirements placed on your HACMP cluster. HACMP has no direct dependencies on CSM and is outside the transition window.

Because HACMP is not dependent on PSSP or CSM, your HACMP cluster can remain active during a “same hardware” transition if the applications that HACMP is keeping highly available are also independent of PSSP and CSM. If you need to keep your production application active during the transition, use the HACMP cluster management tools to move your application between nodes. After the application is active on the back-up node, you can continue through the transition tool steps on the primary node. This minimizes disruption to your application during the transition window.

If the applications kept highly available by HACMP are dependent on PSSP or CSM, or both, you should follow the proper procedures to stop the application and the HACMP cluster prior to running the PSSP to CSM transition tools. After you finish your transition from PSSP to CSM along with transitioning your applications, you can restart the HACMP cluster. There is no need to resynchronize the cluster unless you have made changes to the cluster definition.

HACMP can also be used to minimize disruption processing during an AIX upgrade that might be required on your system for CSM. To do this, follow the HACMP steps to fallover your application from its primary node to its back-up, leaving the primary node available for an AIX upgrade. For more information, refer to the HACMP documentation in the *HACMP for AIX: Planning and Installation Guide*, SC23-4861.

3

Process steps for transition

This chapter contains the following sections:

- "Initial points to check" on page 38.
- "Process steps for various transition techniques" on page 39.
- "Detailed transition steps" on page 46.

3.1 Introduction

This chapter provides step-by-step instructions for successfully transitioning given scenarios from PSSP to CSM using the supplied transition tools. Due to resource constraints, we were not able to test every permutation of hardware and software configurations. For example, we were not able to attempt a transition on a 128-node cluster. As a result, we do not discuss the time required for transition, since it will vary depending on your own configuration.

Before you begin the transition and follow our steps, please read these instructions carefully. Do not undertake a transition without prior planning and investigation. Depending on your configuration, your transition may require additional steps we have not covered. We strongly advise you to read the previous chapters in this book if you have not already, or the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

> **Important:** It is very important to plan for a transition of PSSP to CSM carefully.

This chapter is divided into two logical parts:

- Description of each scenario, including our hardware, software and cluster configuration.
- A list of high-level steps to achieve transition. These high-level steps link to detailed steps in the latter part of the chapter. These expanded steps include the actual commands we used to perform the transition in our given scenarios.

3.2 Initial points to check

We recommend that you be aware of and check the following points:

- Ensure the tools are installed. They are bundled into a special fileset called ‘pssp.pssp_to_csm’ which can be located on CD #3 of the AIX 5L v5.2 ML3. Please refer to the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989, for instructions and installation requirements.

  > **Note:** For the writing of this book, we used the 1.1.0.0 release of the pssp.pssp_to_csm fileset.

  > **Note:** Remember to update your PATH with /opt/pssp_to_csm/bin.

- Tools are installed in /opt/pssp_to_csm/bin.

> **Note:** Identical versions of the transition tools must be used on both CWS and MS. Results are unpredictable if different versions of the analysis tools are mixed. The transition tools are only installed onto the CWS and MS. The tools, while run across the cluster, are executed from the CWS or the MS.

- Ensure you have another form of authentication running on the nodes since Kerberos will be removed.
- If you are using HPC software components, ensure that you have the appropriate levels which include required transition tools. Table 2-3 on page 29 contains a summary of the HPC software levels.
- As discussed in previous chapters, an alt_disk_install transition can be achieved using the command **`/usr/sbin/alt_disk_install`** as described in 3.4.32, "alt_disk_install procedure" on page 91.
- Ensure your system meets all the prerequisites conditions as discussed in *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989. For example, the VSD fieldsets vsd.vsdd, vsd.cmi and vsd.sysctl need to be removed prior to removing PSSP.
- The tools save all data and logs under /var, so ensure there is enough space free on both the CWS and the nodes.

3.3 Process steps for various transition techniques

The following sections highlight the various transition techniques that we explored during the writing of this redbook.

Please note that after PSSP software de-installation, the systems must be re-booted.

3.3.1 AIX 5.2/PSSP 3.5 to AIX 5.2/CSM 1.3.3 transition

This test is the all-at-once-alternate-disk transition. It is the simplest demonstration of the transition tools because the initial configuration of the CWS and the nodes is AIX 5.2 and PSSP 3.5, and the migration to CSM did not involve an AIX upgrade step. In this test, we tried to enable as many features in PSSP that are picked up by the tools as possible to demonstrate their usefulness in transition. In our scenario, below, we assume nothing changes in our system from the creation of the alternate-disk-install. The state of the hardware both before and after transition is shown in Figure 3-1 on page 40.

> **Note:** In this transition, the /spdata directory was already inside the rootvg. Therefore, there was no need to follow the instructions on how to move /spdata as described in *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

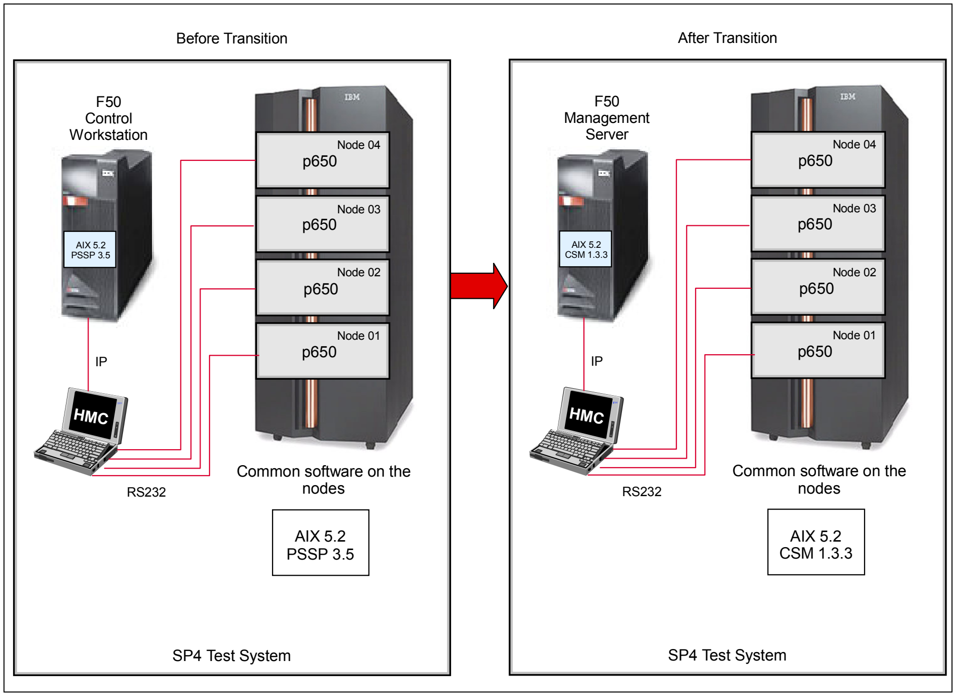

Figure 3-1 Transition from AIX 5.2 / PSSP 3.5 to a CSM managed cluster

Steps to convert a Cluster 1600 managed by PSSP to a Cluster 1600 managed by CSM are as follows:

1. “alt_disk_install procedure” on page 91.
2. “Run the PSSP cluster analysis report tool” on page 46.
3. “Run the PSSP node analysis report tool” on page 47.
4. “Run the PSSP configuration recording tool” on page 47.
5. “Review and check the reports” on page 49.
6. “Take system and application back-ups” on page 49.
7. “Stop production” on page 50.
8. Check the HMC password and ID on the report and record.

9. “Uninstall PSSP from the nodes” on page 56.
10. “Uninstall PSSP from CWS” on page 59.
11. I“Install and configure the NIM master on the CWS (MS)” on page 61.
12. “Install the CSM management server (MS)” on page 64.
13. “Define the nodes to the CSM cluster” on page 69.
14. “Create a NIM machine definition” on page 70.
15. “Update CSM filesets to nodes” on page 71.
16. “Adding nodes to the CSM cluster” on page 72.
17. .“Post installation tasks” on page 81.
18. “Verify the installation” on page 82.

Note: During any of the transitions procedures, you might have to install and configure Network Installation Manager (NIM). For more information on the steps to install and configure NIM, please refer to 4.17, “NIM (Network Install Manager)” on page 115.

3.3.2 AIX 5.1/PSSP 3.4 on an existing system to AIX 5.2/CSM 1.3.3 on a new system with elements of the HPC software stack

In this test, our initial machine was a six node Cluster 1600 configured with the following software set:

- AIX 5.1
- PSSP 3.4
- GPFS 1.5
- VSD 3.4

The target machine for transition was a pSeries 690 with four LPARs, each with two CPUs. The software for this machine included:

- AIX 5.2
- CSM 1.3.3
- GPFS 2.2
- VSD 3.5

Figure 3-2 on page 42 shows a diagram of the test platform. This test is designed to verify a new hardware transition. It is representative of a site that installs new hardware when deciding to perform a transition from cluster management using PSSP to CSM. In this case, there are elements of the PSSP-based system which will be mapped onto the new, CSM-managed system. Note that, in this model, the computing platform is intended to move from the PSSP to the CSM system using different hardware. At the end of transition, there will be two systems: a CSM-based system on the new machine and a PSSP-based system on existing hardware. Production is intended to move to the new platform, but the PSSP system will remain available after transition.

During this test, we also wanted to verify the transition of a GPFS file system. We established a GPFS file system consisting of four VSD servers on the PSSP machine. During the transition, we used the VSD and GPFS transition tools to move this GPFS system to the new machine.

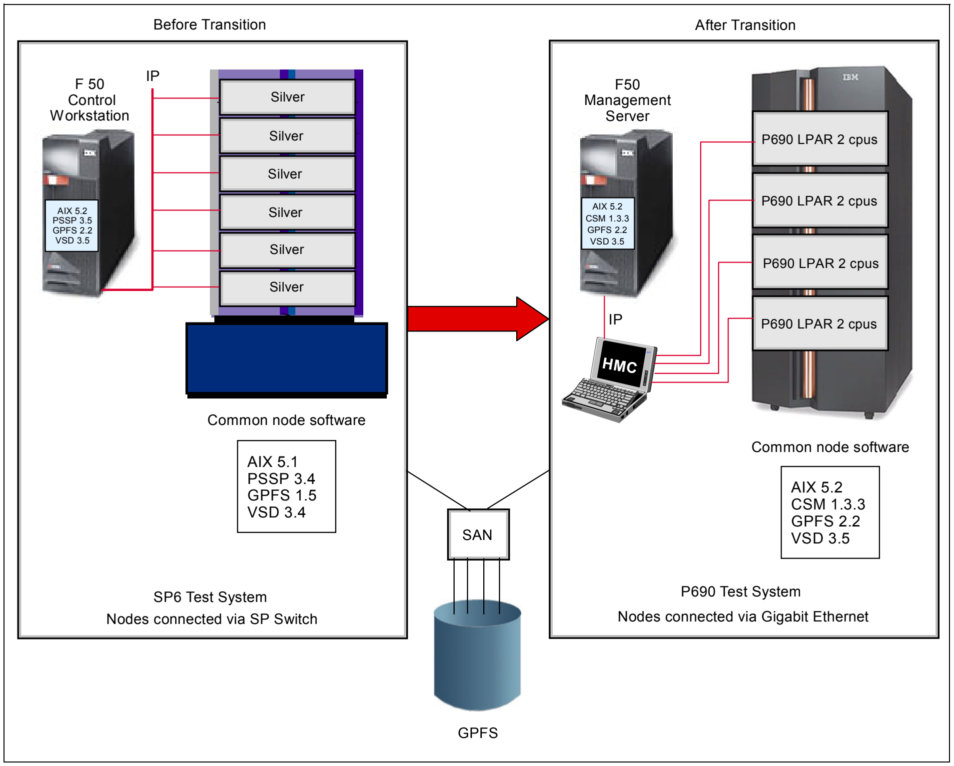

Figure 3-2 SP cluster to a pSeries cluster new hardware transition

The steps involved in this transition are discussed in the following sections:

1. 3.4.1, "Run the PSSP cluster analysis report tool" on page 46.
2. 3.4.2, "Run the PSSP node analysis report tool" on page 47.
3. 3.4.3, "Run the PSSP configuration recording tool" on page 47.
4. 3.4.4, "Review and check the reports" on page 49.
5. 3.4.5, "Take system and application back-ups" on page 49.

6. 3.4.6, “Stop production” on page 50.
7. 3.4.10, “Shut down GPFS” on page 53.

   In this case, we wanted to move the GPFS and VSD system from one machine to another. Therefore, the GPFS and VSD files saved during transition are moved from the old to the new machine.
8. 3.4.11, “Shut down VSD” on page 55.

   At this point in the transition, the PSSP-based machine has been stripped of all the configuration information required to transfer machine personality to the new CSM platform. The GPFS and VSD file sets as well as files saved by the PSSP configuration recording tool will be used on the CSM system.

   Note: We need not remove PSSP from the existing system because it is simply abandoned.

   The new system is pre-installed with CSM following steps in the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919. As a result, the configuration of the new system can start well beyond the point of CSM transition (which would be included in, for example, a transition of a machine already in-place).
9. 3.4.23, “Post installation tasks” on page 81.
10. 3.4.24, “Verify the installation” on page 82.
11. 3.4.25, “Set up a peer domain” on page 82.
12. 3.4.27, “Configure VSD” on page 83.
13. 3.4.28, “Configure GPFS” on page 86.

Note: For additional details concerning the GPFS and VSD transition tools, please see “VSD scripts, in conjunction with GPFS commands” on page 248.

3.3.3 AIX 5.2/PSSP 3.5 to AIX 5.2/CSM 1.3.3 transition with HPC

This test was performed as part of the product testing of the transition tools. The Product Evaluation Test (PET) group ran the test in order to verify the transition of a working system running AIX and associated features plus elements of the HPC software stack. The system and software are outlined in Figure 3-3 on page 44 and Figure 3-4 on page 45. In addition to the basic operating software (AIX, PSSP, and PSSP features) the software also included VSD, GPFS, HACMP, and LoadLeveler. With the fully configured system, an application was running which simulated an online bookstore complete with database transactions, browsing and book purchasing capabilities, and a simulation robot which exercized the application by purchasing books from the inventory. The software application is shown in Figure 3-3. The complete transition of this system is the closest example in the list of scenarios to a transition which would occur on a production system.

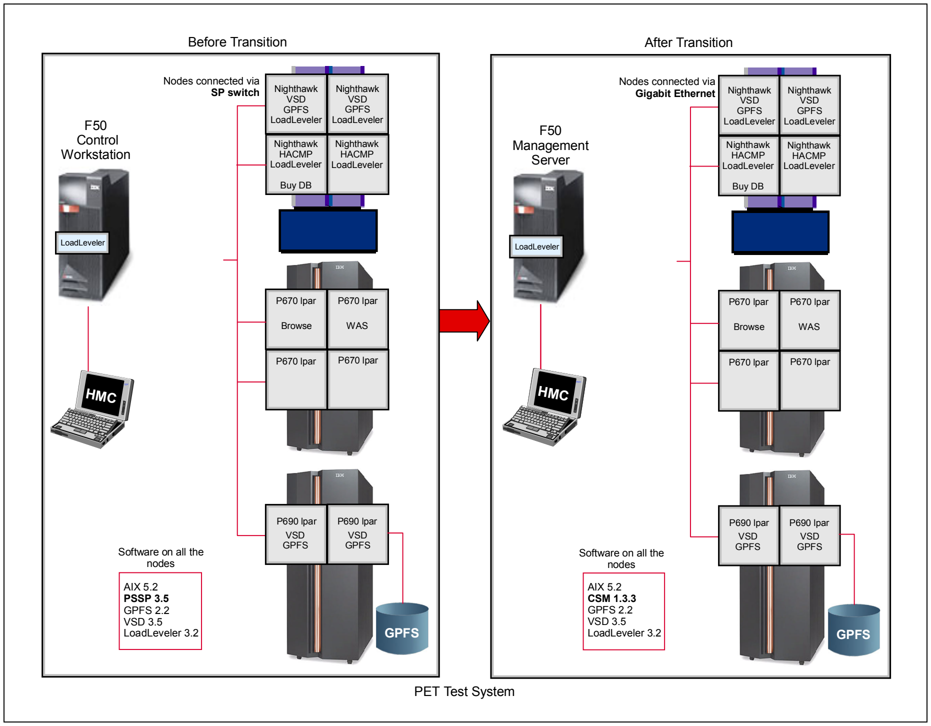

Figure 3-3 Transition from AIX 5.2/PSSP 3.5 to a CSM managed cluster at PET

This test used the following software levels on the initial PSSP-based system:

- AIX 5.2
- PSSP 3.5
- HACMP 5.1
- LoadLeveler 3.2 (LL)
- GPFS 2.2
- VSD 3.5

Since all of the software is at the latest level, transition tools in LoadLeveler, GPFS, and VSD are in place on the system.

The transition method for this machine was an all-at-once transition with an alt-disk-install. Various components of the system will remain on the same nodes as the system transitions from PSSP to CSM. These components include:

- Two HACMP nodes
- Four VSD nodes, and corresponding GPFS nodes
- The LL central manager, *schedd* and *startd* daemons

The idea behind this transition is to change as little as possible between the mapping of function between the PSSP and CSM machines. If changes to this mapping are necessary (for example, changes to the GPFS configuration or the LL configuration), these may be made after the transition. Because even a straightforward transition involves much re-configuration, additional re-configuration for structural changes should be minimized.

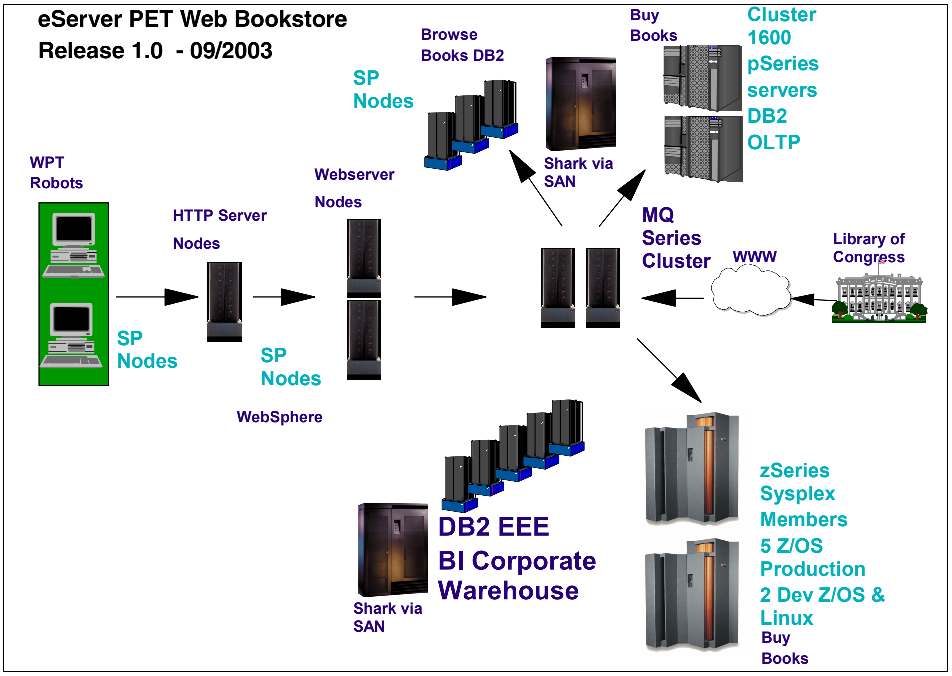

Figure 3-4 The bookstore application running during the PET test

Steps to follow to convert a Cluster 1600 managed by PSSP to a Cluster 1600 managed by CSM during the PET test (the PET server farm configuration is shown in Figure 3-4) are as detailed in the following sections:

1. 3.4.5, “Take system and application back-ups” on page 49.
2. 3.4.6, “Stop production” on page 50.
3. 3.4.7, “Shut down HACMP” on page 50.
4. 3.4.8, “Shut down LoadLeveler” on page 50.
5. 3.4.32, “alt_disk_install procedure” on page 91.

3.4 Detailed transition steps

The following sections further detail the transition steps.

3.4.1 Run the PSSP cluster analysis report tool

To generate a report on the PSSP cluster, run:

```
/opt/pssp_to_csm/bin/mkpssprpt -w
```

The -w option is to generate the report in HTML format since it may be easier to interpret. Please refer to Appendix C, “Transition tools sample outputs” on page 145 for sample output; also refer to the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

3.4.2 Run the PSSP node analysis report tool

To generate a report on the nodes within the PSSP Cluster, run:

```
/opt/pssp_to_csm/bin/mknoderpt -w
```

Again, the -w option is to generate HTML format. Please refer to Appendix C, “Transition tools sample outputs” on page 145 for sample output; also refer to *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

> **Note:** If there are any issues with running the reports, the error logs are generated in /var/log/pssp_to_csm. The file name is mkpssprpt.<timestamp>.log or mknoderpt.<timestamp>.log.

3.4.3 Run the PSSP configuration recording tool

To generate files that are used later in the configuration of the CSM cluster, run:

```
/opt/pssp_to_csm/bin/mkcfgutils
```

as shown in Example 3-1.

Example 3-1 Examples output from running mkcfgutil

```
# mkcfgutils

#               **********   mkcfgutils LOG File   **********
mkcfgutils:     ==> Extracting configuration data from SDR.


#               **********  Node Definition File  **********
mkcfgutils: One moment please.
        ==> Processing data to create the
/var/opt/pssp_to_csm/data/nodedef.20040504153204.def file.
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/nodedef.20040504153204.def file.


#       **********  Ethernet Secondary Adapters Definition File  **********
mkcfgutils: One moment please.
        ==> Processing data to create the
/var/opt/pssp_to_csm/data/adapterdef.20040504153204.def file.
```

```
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/adapterdef.20040504153204.def file.


#       **********  Global Node Groups Definition File  **********
mkcfgutils: One moment please.
        ==> Processing data to create the
/var/opt/pssp_to_csm/data/gngrpdef.20040504153204.def file.
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/gngrpdef.20040504153204.def file.


#       **********  Partition Node Groups Definition File  **********
mkcfgutils: One moment please.
        ==> Processing data to create the
/var/opt/pssp_to_csm/data/pngrpdef.20040504153204.def file.
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/pngrpdef.20040504153204.def file.


#               **********  File Collections Files **********
One Moment, Scanning user.admin
One Moment, Scanning node.root
One Moment, Scanning power_system
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/fc.stanza file.
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/fcfiles.tar file.
mkcfgutils: Completed successfully
```

In /var/opt/pssp_to_csm/data, you should see:

```
nodedef.<timestamp>.def
fcfiles.tar
fc.stanza
fc.files
```

If you have global node groups or partition node groups, you see:

```
gngrpcfg.<timestamp>.def
pngrpcfg.<timestamp>.def
```

All these files are discussed in Chapter 2, “Planning and considerations” on page 13, and in the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

3.4.4 Review and check the reports

Before going any further, you need to review the report files generated in the previous steps. These report files are located in /var/opt/pssp_to_csm/data. As discussed in Chapter 2, “Planning and considerations” on page 13, this is crucial time spent analyzing your system.

```
mkpssprt produces pssprpt.<timestamp>.txt|htm
mknoderpt produces noderpt.<timestamp>.txt|htm
```

Remember to check the files generated by the **mkcfgutils** and located in the /var/opt/pssp_to_csm/data directory. These include:

- nodedef.<timestamp>.tar
- fcfiles.tar
- fc.stanza
- fc.files
- gngrpcfg.<timestamp>.def (if node groups are used)
- pngrpcfg.<timestamp>.def (if node groups are used)

> **Important:** Remember to check all the files located in the /var/opt/pssp_to_csm/data directory. You can save much time later if you take the time to check these files thoroughly.

For more information about the output of the transition tools, please refer to Appendix C, “Transition tools sample outputs” on page 145 and to *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

3.4.5 Take system and application back-ups

Most systems are backed up on a regular basis by one of many back-up applications such as Tivoli Storage Manager or sysback, or perhaps using mksysb and savevg back-ups. We highly recommend that the system back-up and recovery solution be tested thoroughly before the transition removal tools are implemented. One of the transition scenarios discussed in this redbook and in the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989 is the alt-disk-install-all-at-once transition. Using an alt-disk-install solution on the CWS and the nodes ensures that, at any time, the system can be recovered quickly and safely to its original state. Once the removal tools have run successfully, there is no way to return to the working PSSP system without the use of a back-up/recovery solution.

> **Note:** Application back-ups should be taken according to local procedures. Procedures developed for periodic maintenance or regular checkpointing of applications can be used.

3.4.6 Stop production

Stopping the applications is the first step in quiescing the production system. Clearly, shutdown of production codes varies based on the application being run. Local application shutdown procedures, such as those developed for periodic maintenance windows, should be used.

In general, applications may be stand-alone or running under some type of scheduling code (such as LoadLeveler). If the applications are stand-alone, use the local shutdown procedures to stop the processes. If a batch scheduler is in use, scheduling commands should be used to stop user submission to the scheduler and to gracefully complete jobs running on the system. Note that the graceful shutdown of the jobs within the batch scheduler may include ending long-running jobs. Again, use established local polices which have been developed for application shutdown.

3.4.7 Shut down HACMP

After backing up and shutting down applications, HACMP may be stopped. On one of the nodes in the HACMP cluster, issue **`smitty hacmp`** and follow the links to **`system management`**, **`Manage HACMP Services`**, **`Stop Cluster Services`**.

As an alternative, HACMP may be allowed to continue running during the transition.

3.4.8 Shut down LoadLeveler

At this point, all the applications on the machine have been stopped. From the control workstation, issue **`llq`** and verify that there are no jobs running on the queue. If there are running jobs, these should be removed from the job queue using one of several methods:

- **`llctl -h <scheddNode> drain`** will allow the jobs on the queue to complete but prevent startup of idle jobs on the queue. If this command is issued for each **`<scheddNode>`** on the system, all running jobs will run to completion but no further jobs will be started. This method works well if there is time available to allow all jobs to complete. Note that the completion time of running jobs may be considerable (on the order of hours) depending on your particular LoadLeveler configuration.
- **`llctl -h <scheddNode> drain`** then **`llcancel <runningJobID>`** which simply cancels a running job. If the jobs currently running are non-critical and can be executed after the CSM transition, a simple job cancellation will remove them from the queue. Note that job cancellation should be done only after the LL schedd daemons have been drained to prevent idle jobs on the queue from starting up in place of the cancelled jobs.

Note that LL will be shut down when a machine is undergoing transition and the job queue should be empty.

There is no utility for preserving the waiting job queue during transition. Any idle jobs will be lost during transition.

Issue **llstatus** to check the state of the nodes in the LL cluster. Example 3-2 shows the output of llstatus for an idle machine. Note that the Run column contains all zeros indicating no jobs are running within LoadLeveler.

Example 3-2 Example **llstatus** *command for an idle machine*

```
loadl@p690_LPAR1:/auto/loadl: llstatus
Name                      Schedd  InQ Act Startd Run LdAvg Idle Arch      OpSys
p690_lpar1                Avail     0   0 Down     0 0.00     0 R6000     AIX52
p690_lpar2                Down      0   0 Idle     0 0.00  9999 R6000     AIX52
p690_lpar3                Down      0   0 Idle     0 0.00  9999 R6000     AIX52
p690_lpar4                Down      0   0 Idle     0 0.00   977 R6000     AIX52

R6000/AIX52                 4 machines      0  jobs      0  running
Total Machines              4 machines      0  jobs      0  running

The Central Manager is defined on p690_lpar1
The BACKFILL scheduler is in use
All machines on the machine_list are present.
```

If there are no running jobs, issue **llctl -g stop** to stop all the nodes in the LL cluster. Example 3-3 shows the result of **llq** for an idle machine. the **llq** is followed by **llctl** in order to shut down LL.

Example 3-3 **llq** *for an idle machine followed by llctl to stop LL*

```
loadl@p690_LPAR1:/auto/loadl: llq
llq: There is currently no job status to report.
loadl@p690_LPAR1:/auto/loadl: llctl -g stop
llctl: Sent stop command to host p690_lpar1
llctl: Sent stop command to host p690_lpar2
llctl: Sent stop command to host p690_lpar3
llctl: Sent stop command to host p690_lpar4
```

Again, issue **llstatus** to verify that LL has indeed stopped. Example 3-4 on page 52 shows the result of **llstatus** once LL has been stopped. Although the errors are messy, this is the normal response from llstatus when LL is not running. At this point, LL has been successfully stopped.

Example 3-4 llstatus output after LL has been stopped

```
loadl@p690_LPAR1:/auto/loadl: llstatus
05/04 19:11:10llstatus: 2539-463 Cannot connect to p690_lpar1
"LoadL_negotiator" on port 9614. errno = 79
05/04 19:11:10llstatus: 2539-463 Cannot connect to p690_lpar1
"LoadL_negotiator" on port 9614. errno = 79
llstatus: 2512-301 An error occurred while receiving data from the
LoadL_negotiator daemon on host p690_lpar1.
```

Once LL is stopped, save the contents of the /home/loadl directory. Included within this directory are the files /home/loadl/LoadL_admin and /home/loadl/LoadL_config files which are the key files used to customize LL. In addition, save any local configuration files which may be in directories outside of /home/loadl. You can determine the location of these files by checking the /home/loadl/LoadL_config for local configuration file settings.

> **Note:** If local configuration files are stored in a subdirectory of the /home/loadl directory, saving the entire directory will save all of the LL configuration directory.

3.4.9 Back up /spdata

The procedure to back up /spdata is identical to the procedure in the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989 transition manual, scenario 2: all-at-once-alternate-disk transition, step 2 plan for the first outage. The procedure is summarized below:

1. Run the /opt/pssp_to_csm/samples/stop_pssp_services script on the control workstation to stop any PSSP services that you have defined on your system.
2. Change the mount point for /spdata file system to /spdata.old by doing the following:
3. Unmount the /spdata file system by entering the command: umount /spdata
4. Enter the command: smitty chjfs

   `Select /spdata`
5. In SMIT, set the new mount point to /spdata.old. Set “Mount automatically at system restart?” to no.
6. Mount the file system at its new mount point by entering the command: mount /spdata.old.

7. Create a new /spdata file system in the root volume group by running the following:

```
crfs -v jfs -g rootvg -m /spdata -A yes -p rw -a size=1048576
mount /spdata
```

8. Copy the files that are needed from /spdata.old to /spdata. For the purpose of PSSP removal, copy everything in /spdata/sys1 except for the /spdata/sys1/install directory:

```
(cd /spdata.old; find ./ -print | grep -v í./sys1/installí | backup -i -qf
-) | (cd /spdata; restore -qf -)
```

9. Run /opt/pssp_to_csm/samples/start_pssp_services script on the control workstation to restart any PSSP services that you have defined on your system.

3.4.10 Shut down GPFS

The transition of the GPFS file system uses existing GPFS commands rather than newly designed transition tools. Refer to *General Parallel File System for Clusters: Concepts, Planning, and Installation Guide*, GA22-7968, Chapter 7 for information about the GPFS commands.

To shut down and export the GPFS:

> **Tip:** The **`lsof`** (list open files) command returns the user processes that are actively using a file system. It is sometimes helpful in determining why a file system remains in use and cannot be unmounted.

1. Check the file system using **`lsof`** or **`fuser -xuc /dev/gpfs`** to determine if any files in the file system are being accessed. Before proceeding, these files should be closed.
2. Run **`unmount /dev/gpfs`** on each of the nodes.
3. Shut down gpfs using **`mmshutdown`**
4. On one of the nodes in the GPFS cluster, run **`mmexportfs all -o /tmp/mmexportfs.out`** to export the metadata for all the GPFS file systems in the file /tmp/mmexportfs.out. Example 3-5 shows the file generated from the **`mmexportfs`** command.

Example 3-5 Output generated by mmexportfs

```
[c18001p5e0]:/tmp >cat mmexportfs.out
%%9999%%:00_VERSION_LINE::0:2:2::sp:_NOPRIMARY_::::gpfs1082387475:::::::::::
set1:10_NODESET_HDR:::4:TCP::6667:complete:6668:NULL:700:700:AIX:::::::::::
set1:70_MMFSCFG::1:#   ::::::::::::::::::::
```

```
set1:70_MMFSCFG::2:#   WARNING:   This is a machine generated file.  Do not
edit!      ::::::::::::::::::::
set1:70_MMFSCFG::3:#   Use the mmchconfig command to change configuration
parameters.  ::::::::::::::::::::
set1:70_MMFSCFG::4:#   ::::::::::::::::::::
set1:70_MMFSCFG::5:clusterType sp::::::::::::::::::::
set1:70_MMFSCFG::6:comm_protocol TCP::::::::::::::::::::
set1:70_MMFSCFG::7:multinode yes::::::::::::::::::::
set1:70_MMFSCFG::8:autoload yes::::::::::::::::::::
set1:70_MMFSCFG::9:useSingleNodeQuorum no::::::::::::::::::::
set1:70_MMFSCFG::10:group Gpfs.set1::::::::::::::::::::
set1:70_MMFSCFG::11:recgroup GpfsRec.set1::::::::::::::::::::
set1:70_MMFSCFG::12:maxFeatureLevelAllowed 700::::::::::::::::::::
set1:30_SG_HEADR:gpfs::150::::::::::::::::::::
set1:40_SG_ETCFS:gpfs:1:/gpfs:
set1:40_SG_ETCFS:gpfs:2:        dev            = /dev/gpfs
set1:40_SG_ETCFS:gpfs:3:        vfs            = mmfs
set1:40_SG_ETCFS:gpfs:4:        nodename       = -
set1:40_SG_ETCFS:gpfs:5:        mount          = mmfs
set1:40_SG_ETCFS:gpfs:6:        type           = mmfs
set1:40_SG_ETCFS:gpfs:7:        account        = false
set1:50_SG_MOUNT:gpfs::rw:nomtime:atime::::::::::::::::::
set1:60_SG_DISKS:gpfs:1:c18001p5vsd:15248:4005:dataAndMetadata::vsd:::::::::::
::::
set1:60_SG_DISKS:gpfs:2:c18001p5vsd1:15248:4005:dataAndMetadata::vsd::::::::::
:::::
set1:60_SG_DISKS:gpfs:3:c18001p5vsd2:15248:4005:dataAndMetadata::vsd::::::::::
:::::
set1:60_SG_DISKS:gpfs:4:c18001p5vsd3:15248:4005:dataAndMetadata::vsd::::::::::
:::::
```

5. On a node in the GPFS cluster, **`mmlsconfig`** and **`mmlsnode -a`** will give information about GPFS node sets and nodes in the cluster. You can also run **`mmlsconfig -C setname`** from the CWS ifyou know the setname of the GPFS cluster.
6. On a node in the GPFS cluster, run **`mmdelnode -a`** to remove all the nodes from the gpfs cluster. For a cluster type of sp, this is the only necessary command. Note that if the cluster is a different type (for example, rpd), the additional command **`mmdelcluster -a`** would be used to delete the now empty cluster.

> **Note:** For cluster type sp, you only need to run **`mmdelnode -a`**. For all other cluster types, you need the additional command **`mmdelcluster -a`** for all the defined (and now empty) clusters.

Save the file /tmp/mmexportfs.out to be used after the PSSP to CSM transition. This file will be used to restore the GPFS cluster in the CSM environment.

> **Note:** For additional details concerning the GPFS and VSD transition tools, please see “VSD scripts, in conjunction with GPFS commands” on page 248.

3.4.11 Shut down VSD

Once GPFS is shut down, VSD can also be stopped. The *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989 details the VSD shutdown procedure. The steps followed during several transitions include:

1. On each of the VSD nodes, run **`stopsrc -s rvsd`** to stop the rvsd subsystem.
2. On each of the VSD nodes, issue **`vsdPSSPCreateImportvgFile.perl -c`** which will create files in /tmp used to restore the vsd nodes after transition to CSM. **`vsdPSSPCreateImportvgFile.perl -c`** creates the files /tmp/vsdCreateImportvgFile.<hostname>.node<my_node_number>, one file for each volume group that has been defined. Save these files for use in 3.4.27, “Configure VSD” on page 83.

   > **Note:** This step is only run if the VSD will be moving from this node. If the node assignment for the VSDs is to be the same in the CSM system as in the PSSP system, this step should be skipped. For example, during the in-place PET transition, this command was not run.

3. On one of the VSD nodes, issue **`vsdClonePSSPcfg.perl`** which will create a file /tmp/vsdCloneCfg.<node>.ksh (for our example, this file is named /tmp/vsdCloneCfg.c18001p0e0.ksh). This file will be edited after the CSM transition to point to the new node numbers used by VSD. Example 3-6 shows a typical vsdClonecfg file created by the tool.

Example 3-6 Typical vsdClonecfg.ksh file created by the vsdClonePSSPcfg script

```
[c18001p5e0]:/tmp >cat vsdCloneCfg.c18cmsp0e0.ksh
#!/bin/ksh -x
### VSDNODE information ###
/opt/rsct/vsd/bin/vsdnode  5 en2 4096 131072 4 61440
/opt/rsct/vsd/bin/vsdnode  13 en2 4096 131072 4 61440
/opt/rsct/vsd/bin/vsdnode  33 en2 4096 131072 4 61440
/opt/rsct/vsd/bin/vsdnode  34 en2 4096 131072 4 61440

### VSD Global Volume Group information ###
/opt/rsct/vsd/bin/vsdvg -g c18001p5vsdgvg c18001p5vsdvg 5 13 1
/opt/rsct/vsd/bin/vsdvg -g c18001p5vsd1gvg c18001p5vsd1vg 5 13 1
/opt/rsct/vsd/bin/vsdvg -g c18001p5vsd2gvg c18001p5vsd2vg 5 13 1
```

```
/opt/rsct/vsd/bin/vsdvg -g c18001p5vsd3gvg c18001p5vsd3vg 5 13 1

### VSD Definitions ###
/opt/rsct/vsd/bin/defvsd  c18001p5vsdlv  c18001p5vsdgvg  c18001p5vsd
/opt/rsct/vsd/bin/defvsd  c18001p5vsd1lv  c18001p5vsd1gvg  c18001p5vsd1
/opt/rsct/vsd/bin/defvsd  c18001p5vsd2lv  c18001p5vsd2gvg  c18001p5vsd2
/opt/rsct/vsd/bin/defvsd  c18001p5vsd3lv  c18001p5vsd3gvg  c18001p5vsd3
```

4. Remove the VSD files with the following sequence of commands which are run on all of the vsd nodes and the control workstation:
   a. First, stop the VSD subsystem:
      - ha.vsd stop
      - hc.vsd stop
   b. Next, unconfigure the VSD servers:
      - ucfvgsd -a
      - ucfgvsd VSDO
   c. Finally, VSD can be uninstalled.
      - Check for the file ssp_vsdgui. If this exists, it must be uninstalled before the remaining VSD files. For this, use **installp -u ssp_vsdgui**.
      - Next, uninstall the remainder of the VSD files using **installp -u vsd.**

> **Note:** the state of the VSD daemons may be verified during the above steps using **export WCOLL=vsdnodes** then **dsh lvsd -l**.

3.4.12 Uninstall PSSP from the nodes

1. In case of problems, it is worth running an **/usr/lpp/ssp/bin/SDRArchive**. You may encounter problems when running the tools and the SDR may be altered in such a way that could affect the running of the tools later.

   > **Note:** It is advisable to run the removal tool pre-requisite check on just one node. This may help in familiarizing yourself with the output and operation of **rmpsspnode** command as shown in Example 3-7.

2. Run a prerequisite check on the node(s) to verify that PSSP can be removed without any issues.

Example 3-7 Example rmpsspnode output

```
root@sp4cws:/: rmpsspnode -c -n p650_D
p650_D: rmpssp: Pre-requisite check status: ssp.basic is installed.
p650_D: rmpssp: Pre-requisite check status: Passed dependent filesets check.
p650_D: rmpssp: Pre-requisite check status: SDR can be accessed.
p650_D: rmpssp: Pre-requisite check status: Node number can been read.
p650_D: rmpssp: The "Pre-requisite Check" subroutine completed succesfully.

rmpsspnode: rmpssp completed successfully on node 49.
```

For options related to this command, run:
`rmpsspnode -h`

> **Note:** You cannot use the partition nodes groups with the '**`rmpsspnode -c -N <group>`**' command. you need to use the system node groups since the script relies on the **`ngresolve -G`** command.

If there are any issues with removing PSSP then these need to be resolved before going any further. **`rmpsspnode`** fails if the prerequisites are not met.

3. Run the **`rmpsspnode`** prerequisite check on the remaining nodes.

> **Note:** Again, it is advisable to initially run the removal tool on just one node.

4. Now remove PSSP from the node(s) by running the **`rmpsspnode`** command as shown in Example 3-8.

Example 3-8 Example rmpsspnode output

```
root@sp4cws:/: rmpsspnode  -n p650_D
p650_D: rmpssp: The "Pre-requisite Check" subroutine completed successfully.
 p650_D: rmpssp: The "CSS Adapter Removal" subroutine completed successfully.
 p650_D: rmpssp: The "NIM Removal" subroutine completed successfully.
 p650_D: rmpssp: The "NFS Removal" subroutine completed successfully.
 p650_D: rmpssp: The "cron Removal" subroutine completed successfully.
 p650_D: rmpssp: The "Sequence Files Removal" subroutine completed successfully.
 p650_D: rmpssp: The "SP Accounting Removal" subroutine completed successfully.
 p650_D: rmpssp: The "SP User Management Removal" subroutine completed
successfully.
 p650_D: rmpssp: The "SP Security Removal" subroutine completed successfully.
 p650_D: rmpssp: The "SP Automount Removal" subroutine completed successfully.
 p650_D: rmpssp: The "SP Daemons Removal" subroutine completed successfully.
 p650_D: rmpssp: The "SP Logs Removal" subroutine completed successfully.
 p650_D: rmpssp: The "SP Data Files Removal" subroutine completed successfully.
 p650_D: rmpssp: The "Sysctl Removal" subroutine completed successfully.
 p650_D: rmpssp: The "ODM Removal" subroutine completed successfully.
```

```
 p650_D: rmpssp: The "Complete PSSP Removal" subroutine completed successfully.

rmpsspnode: rmpssp completed successfully on node 49.
```

Note: PSSP filesets are removed but as you can see in Example 3-8, all related customized components of a PSSP node are removed as well. Please refer to the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, **GA22-7989** for more information.

Note: If you have a BIS (Boot Install Server) within your cluster, we recommend you manually deconfigure them as NIM masters, prior to attempting to remove PSSP from these nodes. Depending on the state of your the NIM allocation, **rmpsspnode** may fail while attempting to deconfigure NIM. Under certain conditions, this can occur even if the preview (**rmpsspnode -c**) successfully completes. For further discussion of BIS please refer to 4.3, "BIS (Boot Install Server)" on page 97.

Important: When **rmpsspnode** has successfully removed PSSP from a given node, it will set the **last_install_image** attribute for that node to PSSP_REMOVED_by_pssp_to_csm within the SDR. Until all nodes within a cluster are in the same state, **rmpssp** will refuse to remove PSSP from your CWS.

5. Check if the SDR has been updated by running **splstdata -b** as shown in Example 3-9. The last_install_image field is updated with PSSP_REMOVED_by_pss.

Example 3-9 splstdata -b output after rmpsspnode -n <nodename> runs

```
root@sp4cws:/: splstdata -b
                  List Node Boot/Install Information

node# hostname      hdw_enet_adr  srvr response   install_disk
last_install_image  last_install_time   next_install_image  lppsource_name
pssp_ver            selected_vg
----- ----------------- ------------- ---- ------------
------------------------------------- ------------------- -------------------
------------------- -------------- ------------------- -------------------
   1 p650_A         0002553A068C    0 disk       hdisk0,hdisk1
bos.obj.mksysb.520  Fri_Apr_23_18:42:43 bos.obj.mksysb.520  aix520
PSSP-3.5            rootvg
```

```
  17 p650_B         0002553A0619    1 disk       hdisk0
bos.obj.mksysb.520  Fri_Apr_23_13:40:36 bos.obj.mksysb.520  aix520
PSSP-3.5            rootvg
  33 p650_C        0002553A062C    1 disk       hdisk0,hdisk1
bos.obj.mksysb.520  Fri_Apr_23_13:28:38 bos.obj.mksysb.520  aix520
PSSP-3.5            rootvg
  49 p650_D         0002553A07DB    1 disk       hdisk0
PSSP_REMOVED_by_pss Fri_Apr_23_18:23:36 bos.obj.mksysb.520  aix520
PSSP-3.5            rootvg
```

6. Run **rmpsspnode** on the remaining nodes.

> **Note:** In certain circumstances, **rmpsspnode** can fail. In such cases, you may find the **last_install_image** attribute has been updated even though the script failed in some part. During our testing, we found that on occasion we had to manually reset the **last_install_image** attribute to allow us to re-execute **rmpsspnode**.
>
> List the Node SDR class with: **/usr/lpp/ssp/bin/SDRGetObjects Node**
>
> Archive your SDR: **/usr/lpp/ssp/bin/SDRArchive**
>
> Carefully update the appropriate node's entry (replacing **<node number>** with your given node number), please note the syntax:
>
> **/usr/lpp/ssp/bin/SDRChangeAttrValues Node node_number==<node number> last_install_image=<image name>**
>
> Repeat the **SDRGetObjects** call to validate what you have changed. If an error occurs, you may need to run **SDRRestore** to correct your failed alteration. For further discussion of BIS, please refer to 4.3, "BIS (Boot Install Server)" on page 97.

3.4.13 Uninstall PSSP from CWS

> **Important:** Ensure that PSSP has been removed from *all* of your nodes before proceeding to 3.4.13, "Uninstall PSSP from CWS" on page 59. PSSP must be removed from *all* nodes in *all* frames before proceeding to the next step. We strongly recommended it.

1. When PSSP has been removed from all of the nodes, the next step is to remove PSSP from the CWS. First a pre-requisite check is run to ensure

PSSP can be removed without any problems as shown in Example 3-10 on page 60.

/opt/pssp_to_csm/bin/rmpssp -c

Example 3-10 rmpssp -c runs on the CWS

```
# rmpssp -c
rmpssp: Pre-requisite check status: ssp.basic is installed.
rmpssp: Pre-requisite check status: Passed dependent filesets check.
rmpssp: Pre-requisite check status: SDR can be accessed.
rmpssp: Pre-requisite check status: Node number can been read.
rmpssp: Pre-requisite check status: On the active and primary CWS.
rmpssp: Pre-requisite check status: PSSP uninstalled from all nodes.
rmpssp: The "Pre-requisite Check" subroutine completed succesfully.
```

2. If the prerequisite check passes, then PSSP and all additional configurations related to PSSP can be removed from the CWS by running **rmpssp** as shown in Example 3-11.

   /opt/pssp_to_csm/bin/rmpssp

> **Important:** Just because the pre-requisite check was successful does not mean the actual removal will be. If any of the NIM resources are allocated, this may cause the deletion of the NIM master to fail. If there is a failure, this needs to be resolved before **rmpssp** is successful.
>
> The NIM master is the management server (MS) in our test environment.

Example 3-11 rmpssp being run on the CWS.

```
# rmpssp
rmpssp: The "Pre-requisite Check" subroutine completed succesfully.
rmpssp: The "NIM Removal" subroutine completed succesfully.
rmpssp: The "NFS Removal" subroutine completed succesfully.
rmpssp: The "cron Removal" subroutine completed succesfully.
rmpssp: The "Sequence Files Removal" subroutine completed succesfully.
rmpssp: The "SP Accounting Removal" subroutine completed succesfully.
rmpssp: The "SP Security Removal" subroutine completed succesfully.
rmpssp: The "SP Automount Removal" subroutine completed succesfully.
rmpssp: The "SP Daemons Removal" subroutine completed succesfully.
rmpssp: The "SP Logs Removal" subroutine completed succesfully.
rmpssp: The "SP Data Files Removal" subroutine completed succesfully.
rmpssp: The "Sysctl Removal" subroutine completed succesfully.
rmpssp: The "ODM Removal" subroutine completed succesfully.
rmpssp: The "Complete PSSP Removal" subroutine completed succesfully.
```

Note: Please refer to Appendix C, "Transition tools sample outputs" on page 145 for more information on the related logs.

3.4.14 Remove the SP switch adapter from the nodes

If you have a SP adapter in the node, you need to get the IBM CE to remove the SP switch adapter. CSM does not support SP switches.

3.4.15 Install and configure the NIM master on the CWS (MS)

This section steps you through the configuration of the NIM master on the CSM MS, create the lppsource and spot resources.

Step 1: Prerequisites

The NIM master must have at least 4GB of available disk space for each AIX version. We recommend you to push in all the filesets from the AIX OS CD.

You also need to install the following filesets in the MS:

- bos.sysmgt.nim.client
- bos.sysmgt.nim.master

Step 2: Configure NIM master

Decide which network interface will be used for NIM operation. Make sure that the interface information is updated in the /etc/hosts file. Table 3-1 shows the used and configuration of the SP LAN en0.

Table 3-1 SP LAN en0 configuration

If using	Do this

smitty	`#smitty nimconfig`
	`Network Name`
	`[csm_network]`
	`Primary Network Install Interface [en0]`
	`Allow Machines to Register Themselves as Clients? [yes]`
	`Alternate Port Numbers for Network Communications (reserved values will be used if left blank)`
	`Client Registration []`
	`Client Communications []`

command	**`#nimconfig -a netname=csm_network -a pif_name=en0 \`** **`-a cable_type="N/A"`**

Step 3: Create filesystem for NIM operation

If you do not already have an lppsource directory, you need to create one. You can create different filesystems for AIX lppsources and spots. In our example, we have created three filesystems, two for AIX 5.1 and AIX 5.2 lppsource files, and one for spots generated for the two operating system versions. They are:

- /export/lppsource/aix510
- /export/lppsource/aix520
- /export/spot

Step 4. Copy lppsource filesets from OS CD into lppsource directory

To generate the lppsource from the CD, you can do the following:

If using	Do this

SMIT	**#smitty bffcreate**
	`Copy Software to Hard Disk for Future Installation`
	`INPUT device / directory for software /dev/cd0`
	`SOFTWARE package to copy [all]`
	`DIRECTORY for storing software package`
	`[/export/lppsource/aix520]`
	`DIRECTORY for temporary storage during copying [/tmp]`
	`EXTEND file systems if space needed? yes`
	`Process multiple volumes? yes`

command	**#bffcreate -d /dev/cd0 -f all -t /export/lppsource/aix520**

Step 5: Create lppsource resource

Once the lppsource is copied to the disk, create the lppsource resource. In this example, create lppsource resource for AIX5.2:

If using	Do this

SMIT	**#smitty nim_mkres**
	`Choose lpp_source for resource type`
	`Resource Name`
	`[aix520_lpp]`
	`Resource Type`
	`lpp_source`
	`Server of Resource [master]`
	`Location of Resource [/export/lppsource/aix520`
	`Architecture of Resource [power]`
	`Source of Install Images [/export/lppsource/aix520]`

If using	Do this
command	**#nim -o define -t lpp_source -a server=master \\ -a location=/export/lppsource/aix520 \\ -a source=/export/lppsource/aix520 aix520_lpp**

Note: You can combine Steps 3 to 5 into a single step to create the lppsource resource by using the smitty fast path:

```
#smitty nim_mkres_lpp_only
```

Step 6: Create Share Product Object Tree (SPOT) resource

Next, we create SPOT based on the aix520_lpp resource:

If using	Do this
SMIT	**#smitty nim_mkres** Choose spot for resource type Resource Name [aix520_spot] Resource Type spot Server of Resource [master] Source of Install Images [aix520_lpp] Location of Resource [/export/spot]
command	**#nim -o define -t spot -a server=master \\ -a location=/export/spot \\ -a source=aix520_lpp aix520_spot**

Note: You can combine Steps 2 to 6 into a single step to configure NIM master, create lppsource and spot resources by using:

```
#smitty nim_config_env
```

Once the lppsource and SPOT resources are created, you get the file structure shown in Figure 3-5 on page 64.

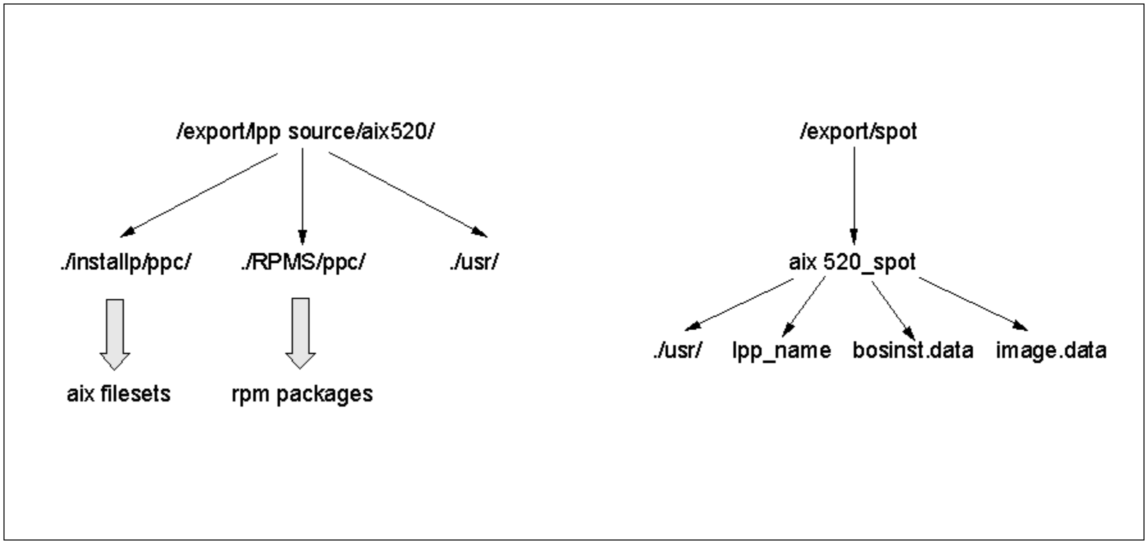

Figure 3-5 File structure of lppsource and spot directories

> **Note:** For more information on the NIM configuration, please refer to *Network Installation Management Guide and Reference*, SC23-4385.

3.4.16 Install the CSM management server (MS)

The following steps are needed to install CSM on the management server:

> **Important:** This section shows the steps that we have gone through while installing the MS. It does not describe in detail all the steps involved. Refer to the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919 for more details.

Step 1: Check the management server software requirement

Please refer to the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919.

Step 2: Register hostnames of nodes and management server

Edit the /etc/hosts file on the management server with the following entries:

- Management server
- Nodes that are being defined to the cluster
- Hardware control, if you have a Hardware Management Console (HMC)

Step 3: Update the PATH and MANPATH

```
#export PATH=$PATH:/opt/csm/bin
#export MANPATH=$MANPATH:/opt/csm/man
```

To permanently change them, edit your login environment, for example, /.profile.

Step 4: Create the /csminstall file system (optional)

We suggest you create a separate file system called /csminstall on the MS. This file system stores the files that are used by the CSM. The recommended size should be at least 120MB.

If you do not create this filesystem it will be created automatically. To create /csminstall, refer to Table 3-2.

Table 3-2 Creating the /csminstall file system

If using	Do this
SMIT	**#smitty crfs**
command	**#crfs -v jfs -g rootvg -m /csminstall -a size=120M**

Step 5: Download CSM updates

You can download the CSM updates from the IBM Web site.

Download the CSM update file to a temporary directory, (for example, /tmp/csm). Unwrap the CSM update file. If your update file is csm-aix-1.3.3.tar.gz, issue these commands:

```
#mkdir /tmp/csm
#cd /tmp/csm
#gunzip csm-aix-1.3.3.tar.gz
#tar -xvf csm-aix.1.3.3.tar
```

The **tar** command creates subdirectories in the /tmp/csm (./installp/ppc and ./RPMS/ppc).

Step 6: Download open source software

You need to download the openCIMOM rpm file to support the CSM hardware control functions.

Download OpenCIMOM from the following Web site:

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

You can download to the temporary directory which has created in Step 5. For example, /tmp/csm/RPMS/ppc.

Assuming the RPM package is openCIMOM-0.7-4.aix5.1.noarch.rpm, to install the rpm package:

```
#cd /tmp/csm/RPMS/ppc
#rpm -i openCIMOM-0.7-4.aix5.1.noarch.rpm
```

To verify whether the package is installed:

```
#rpm -qi openCIMOM
```

Step 7: Verify that the pre-requisite software is installed

When AIX is installed (AIX version 5.1 and above), the following base filesets are automatically installed:

- csm.core
- csm.client
- csm.dsh

If those files are not installed, you can get the filesets from either the AIX CDROM #1 or get it from the lppsource directory, if you have created one.

You also have to make sure that the rsct.core* and Java™* filesets are installed.The version of rsct is 2.3.3.0 for CSM 1.3.3.

The filesets are:

- rsct.core.auditrm
- rsct.core.errm
- rsct.core.fsrm
- rsct.core.gui
- rsct.core.hostrm
- rsct.core.rmc
- rsct.core.sec
- rsct.core.sensorrm
- rsct.core.sr

- rsct.core.utils
- Java141.license
- Java131.sdk

Step 8: Apply updates to CSM filesets that have already been installed

You need to update the following filesets to the latest, if there is any, before you proceed to install the CSM MS software:

- csm.core
- csm.client
- csm.dsh

Assume the csm update file is already downloaded to the /tmp/csm directory (in Step 5: Download CSM updates).

```
#geninstall -IaX -d /tmp/csm csm.core csm.client csm.dsh
```

Step 9: Install CSM Management Server software

The following AIX filesets and RPM packages are required for the CSM MS. They are available in AIX CDROM #2 or from the lppsource directory.

CSM on AIX filesets:

- csm.server
- csm.diagnostics
- csm.gui.dcem
- csm.gui.websm

Open source software:

- conserver
- expect
- tcl
- tk

To install this software directly from AIX CDROM #2:

```
#geninstall -IaX -d /dev/cd0 csm.server csm.diagnostics \ csm.gui.dcem
csm.gui.websm R:tcl R:tk R:conserver
```

To install this software from the lppsource directory, /export/lppsource/aix520:

```
#geninstall -IaX -d /export/lppsource/aix520 csm.server \ csm.diagnostics
csm.gui.dcem csm.gui.websm \
R:tcl R:tk R:conserver
```

> **Note:** Refer to *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919, if you encounter any installation and configuration issues.

Step 10: Apply management server software updates

If the CSM server installed in the previous step is not the latest, you need to update it. Assume the CSM update is downloaded in /tmp/csm directory:

```
#geninstall -IaX -d /tmp/csm/all
```

Step 11: Check the remote shell attribute

The **dsh** command uses a remote shell to issue remote commands to the managed nodes. You can use the default /usr/bin/rsh or /usr/bin/ssh. Refer to *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919 for information on the remote shell configuration.

Step 12: Accept the CSM License

The license key is located on the CSM CDROM. It is called the csmlum.full.

To apply the license key:

```
#mount -v cdrfs -o ro /dev/cd0 /mnt
#csmconfig -L /mnt/csmlum.full
```

Run **csmconfig** to verify that the license is applied. Look at the ExpDate field as shown in Example 3-12..

```
#csmconfig
```

Example 3-12 View license with csmconfig

```
# csmconfig
 AddUnrecognizedNodes = 0 (no)
 ClusterSNum =
 ClusterTM = 9078-160
 DeviceStatusFrequency = 12
 DeviceStatusSensitivity = 8
 ExpDate = Fri Jun 18 19:59:59 2004
 HAMode = 0
 HeartbeatFrequency = 12
 HeartbeatSensitivity = 8
 MaxNumNodesInDomain = -1 (unlimited)
 PowerStatusMode = 0 (Mixed)
 RegSyncDelay = 1
 RemoteCopyCmd = /usr/bin/rcp
 RemoteShell = /usr/bin/rsh
 SetupKRB5 = 0
 SetupRemoteShell = 1 (yes)
```

Step 13: Copy CSM files into the /csminstall subdirectories

Run the following **csmconfig** command to copy the CSM files into the proper /csminstall subdirectories:

```
#csmconfig -c
```

Step 15: Store Hardware Control Point, User IDs and Passwords (optional)

```
# systemid hmcitso.itso.ibm.com hscroot
```

You are asked to enter a password.

Step 14: Complete and verify the installation

To complete and verify the management server has completely installed, run the following:

```
#probemgr -p ibm.csm.ms -l 0
```

> **Note:** Enter the command above exactly as it is shown. Do not replace `ibm.csm.ms` with the name of the management server.

3.4.17 Define the nodes to the CSM cluster

Before you define the node to the CSM cluster, you need to review the node attributes in /var/opt/pssp_to_csm/data/nodedef.<timestamp>.def.

For more detail on the node attributes, refer to the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919.

The nodedef.<timestamp>.def has all the node definition entries of your PSSP cluster complex. If you are not defining all the nodes at one time, you need to modify the nodedef.<timestamp>.def file. Keep only the stanza of the nodes that you are going to define to the cluster.

To define the nodes to the cluster:

```
#definenode -v -f /var/opt/pssp_to_csm/data/nodedef.<timestamp>.def
```

To verify that the nodes are defined in the cluster, run the following command. You should see that the nodes are *PreManaged* as shown Example 3-13 on page 70.

```
#lsnode -a Mode
```

Example 3-13 View mode status of nodes with lsnode

```
sp6cws:/ # lsnode -a Mode|pg
sp6en01: PreManaged
sp6en03: PreManaged
sp6en05: PreManaged
:
```

3.4.18 Create a NIM machine definition

You do not have to create each NIM machine definition manually through NIM. The **csm2nimnodes** command helps create all the NIM machine definitions corresponding to the CSM node definitions.

To create NIM machine definition on all the nodes in the CSM database:

```
#csm2nimnodes -v -a
```

To create a NIM machine definition one node at a time, assume sp6en07 is one of the nodes to be defined:

```
#csm2nimnodes -v -n sp6en07
```

To verify that the NIM client is defined to the NIM master, run the **lsnim** command as shown in Example 3-14.

```
#lsnim
```

Example 3-14 List NIM machines with lsnim

```
sp6cws:/ # lsnim|pg
master                  machines        master
boot                    resources       boot
nim_script              resources       nim_script
csm_network             networks        ent
aix520_lpp              resources       lpp_source
aix520_spot             resources       spot
sp6en01                 machines        standalone
sp6en03                 machines        standalone
sp6en05                 machines        standalone
:
```

Example 3-15 List NIM machines with lsnim

```
sp6cws:/ # lsnim|pg
master                  machines        master
boot                    resources       boot
nim_script              resources       nim_script
csm_network             networks        ent
aix520_lpp              resources       lpp_source
```

```
aix520_spot                resources        spo
sp6en01                    machines         standalone
sp6en03                    machines         standalone
sp6en05                    machines         standalone
:
```

Note: The nodes that you are creating the NIM machine definitions, they must first be defined in the CSM cluster.

3.4.19 Update CSM filesets to nodes

If the CSM filesets in the nodes are not the latest version, you need to update them before you add the nodes to the CSM database (refer to the **updatenode** command in *CSM for AIX 5L: Command and Technical Reference,* SA22-7934).

For AIX 5.2 nodes, you have to update the following filesets:

- csm.core
- csm.client
- csm.dsh

For AIX 5.1 nodes, you have to update the following filesets:

- csm.core
- csm.client

If you have csm.diagnostics installed on nodes, you also need to update it.

Step 1: Copy the CSM filesets

Copy the CSM filesets to the correct lppsource version directory. If you have untared the CSM updates to the /tmp/csm directory, do the following:

```
#gencopy -d /tmp/csm -t /export/lppsource/aix520 csm.core \
csm.client csm.dsh
```

Step 2: Update the nodes

Perform the NIM cust operation to update the nodes:

If using	Do this
smitty	**#smitty nim_mac_op** Choose the Target machine. e.g.). sp6en07 Choose cust Target Name sp6en07 Fileset Names [csm.core csm.client csm.dsh] Fixes (Keywords) [] EXTEND file systems if space needed? yes installp Flags PREVIEW only? (install operation will NOT occur) no COMMIT software updates? no SAVE replaced files? yes AUTOMATICALLY install requisite software? yes OVERWRITE same or newer versions? no VERIFY install and check file sizes? no
command	**#nim -o cust -a lpp_source=aix520_lpp ** **-a filesets="csm.core csm.client csm.dsh" sp6en07**

3.4.20 Adding nodes to the CSM cluster

To allow the CSM management server to manage the nodes, we need to add the nodes to the cluster. The **updatenode** command adds the nodes to the cluster. It changes the node attribute Mode from `PreManaged` to `Managed`.

Before you proceed with the **updatenode** command, you need to consider the Remote shell authentication. You need to check the setting of these two attributes: *RemoteShell* and *SetupRemoteShell* as shown in Table 3-3.

Table 3-3 RemoteShell authentication attributes

RemoteShell	Specifies the path of the remote shell command that CSM should use to run commands on the nodes. The default is /usr/bin/rsh.
SetupRemoteShell	Indicates whether CSM should try to automatically set up security for the remote shell specified in the RemoteShell cluster attribute. The default is yes.

To view these settings, use the **csmconfig** command as shown in Example 3-16.

Example 3-16 View RemoteShell and SetupRemoteShell option using csmconfig

```
sp6cws:/ # csmconfig
 AddUnrecognizedNodes = 0 (no)
 ClusterSNum =
```

```
ClusterTM = 9078-160
ExpDate = Sun Dec 21 18:59:59 2003
HeartbeatFrequency = 12
HeartbeatSensitivity = 8
MaxNumNodesInDomain = -1 (unlimited)
PowerStatusMode = 0 (Mixed)
RegSyncDelay = 1
RemoteShell = /usr/bin/rsh
SetupRemoteShell = 1 (yes)
```

For example, if you specified `RemoteShell=/usr/bin/rsh` and `SetupRemoteShell=1`, the **updatenode** command sets up the remote shell access to the PreManaged nodes.

If you specified `SetupRemoteShell=0`, the **updatenode** command does not set up the remote access for the nodes.

To add the PreManaged nodes to the cluster:

#updatenode -P

> **Note:** The PSSP cluster nodes might not have the required CSM client's based filesets installed. Please refer to *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919, Chapter 2, for required filesets for your level of AIX. If they are not installed, you need to install them manually before you run the **updatenode** command.

Once you have added the nodes to the cluster, you can verify the status as shown in Example 3-17.

`#lsnode -a Mode,UpdatenodeFailed`

Example 3-17 View mode and UpdatenodeFailed status with lsnode

```
sp6cws:/ # lsnode -a Mode,UpdatenodeFailed
sp6en01:  Managed, 0
sp6en03:  Managed, 0
sp6en05:  Managed, 0
```

If the mode is not `Managed`, or if the `UpdatenodeFailed` is equal to `1`, then the nodes are not successfully added to the cluster. You can check in the following logs for error messages:

- /var/log/csm/updatenode.log on the management server
- /var/log/csm/install.log on the cluster node

3.4.21 Set up conserver

Setting up conserver allows you to open a remote console session using the **rconsole** command. Remote console is useful when performing AIX OS migration. You need to perform the following steps to get the remote console working:

Step 1: Ensure that conserver package is installed

```
#rpm -qi conserver
```

Step 2: Create a conserver.cf

We recommend you to make use of the conserver.cf template file.

```
#cp /etc/opt/conserver/conserver.cf.template \ /etc/opt/conserver.cf
```

Run the **chrconsolecfg** command to update the conserver.cf file using the CSM database. If this is the initial setup, you can update all the nodes entries with the **-a** option. If you just want to update a node, use a **-n** option.

```
#chrconsolecfg -a
#chrconsolecfg -n sp6en07
```

After the **chrconsolecfg** command is run, the node entries and the management server are updated in the conserver.cf file as shown in Example 3-18.

Example 3-18 View conserver configuration file (conserver.cf)

```
sp6cws: # vi /etc/opt/conserver/conserver.cf
# list of consoles we serve
sp6en01:|/opt/csm/bin/rconsole -t -c -n sp6en01::&
sp6en03:|/opt/csm/bin/rconsole -t -c -n sp6en03::&
sp6en05:|/opt/csm/bin/rconsole -t -c -n sp6en05::&
sp6en07:|/opt/csm/bin/rconsole -t -c -n sp6en07::&
%%
#
# list of clients we allow
# {trusted|allowed|rejected} : machines
#
allowed: sp6cws
```

Note: The “allowed: “ entry should be at the end of the file, following the “%%” line. The “%%” in the conserver.cf file must not be removed. **rconsole** does not work if they are removed.

Step 3: Open a remote console

To open up a remote session on sp6en07 in text as shown in Example 3-20 on page 84, read only mode run:

```
#rconsole -r -t -n sp6en07
```

Once you have opened up a read only session, you can swap to the read/write mode session by pressing: **`Ctrl + e, c, a`**

For example, press **Ctrl** and **e** key simultaneously, then press **c**, followed by **a**.

To open a remote session on sp6en07 in text, read/write mode:

```
#rconsole -t -n sp6en07
```

To exit from the remote console, type: **Ctrl + e**, **c**, **.** (period)

To get to the help menu for more options, type: **Ctrl + e**, **c**, **?**

Example 3-19 Open remote console with read only mode

```
sp6cws:# rconsole -t -r -n sp6en07
[Enter `^Ec?' for help]
[spying]

Ctrl + e, c, ?
.    disconnect                     a    attach read/write
b    send broadcast message         e    change escape sequence
f    force attach read/write        g    group info
i    information dump               o    (re)open the tty and log file
p    replay the last 60 lines       r    replay the last 20 lines
u    show host status               v    show version info
w    who is on this console         x    show console baud info
z    suspend the connection         <cr> ignore/abort command
?    print this message             ^R   replay the last line
```

3.4.22 AIX migration using NIM

This section shows you the steps to perform AIX Migration of the cluster nodes through NIM. Depending on whether you initiate the BOS installation from NIM master immediately after the BOS installation is enabled or initiate the BOS installation at later time (see the `Initiate Boot Operation on Client?` option in Step 5 on page 78), there are some steps that need to be performed.

Note: You can use the pre_migration and post_migration commands to check your system on performing migration. Please refer to *AIX 5L V 5.2 Installation Guide and Reference,* SC23-4389, "Pre_migration and Post_migration Checking" for further details.

This section also shows the no_prompt and prompt migration methods.

Before we can proceed with the NIM Installation, conserver needs to be set up. Please refer to 3.4.21, "Set up conserver" on page 74. NIM master must also be setup with the correct AIX version of lppsource and spot resources. NIM migration requires these resources.

If you intend to initiate the BOS installation from NIM master immediately after the BOS installation is enabled, you need to perform step 1: Set up remote shell and Step 2: Create /etc/niminfo on node.

If you want to perform a no_prompt operation, you have to create a bosinst_data resource for your migration as shown in "Step 3: Create bosinst.data resource (optional)" on page 77.

Step 1: Set up remote shell (optional)

Edit the /.rhosts file of the node that is performing the AIX migration. Add in the hostname of the NIM Master (in this case, the MS' hostname).

Step 2: Create /etc/niminfo on node (optional)

Perform the following command on the NIM master to create the /etc/niminfo file onto the client's node. This file contains a set of environment variables that will define the BOS installation environment.

On NIM master:

If using	Do this
smitty	**#smitty nim_mac** Specify New Master for Client Machine Choose the Client Machine, e.g.). sp6en07 Machine Name [sp6en07] Host Name of Network Install Master [sp6cws] Force no +
command	**#nim -o change -a new_master=sp6cws sp6en07**

Step 3: Create bosinst.data resource (optional)

If you want to perform the NIM installation without any prompt (no_prompt method), you need to create a bosinst.data file and a bosinst.data resource.

Copy the /var/adm/ras/bosinst.data to /export/lppsource/aix520/. It might want to rename the file for easy reference.

```
#cp /var/adm/ras/bosinst.data \
/export/lppsource/aix520/52bosinst.data.noprompt
```

Edit the file to suit your system environment. Fields that we have edited are:

- CONSOLE = /dev/tty0
- INSTALL_METHOD = migrate
- PROMPT = no
- EXISTING_SYSTEM_OVERWRITE = yes
- target_disk_data:
  - HDISKNAME = hdisk0

Note: You need to set the CONSOLE field to `/dev/tty0` to get to the correct console during your migration. You have to specify the `target_disk_data` to avoid overwriting to the wrong disk. If you have mirrored rootvg, you need to have multiple `target_disk_data` stanzas to point to the mirrored hdisk.

Once the file is modified, we can create the bosinst.data resource.

If using	Do this
smitty	**#smitty nim_mkres** Choose bosinst_data * Resource Name [52bos_migrate_noprompt> * Resource Type bosinst_data * Server of Resource [master] * Location of Resource [/export/lppsource/aix520/52bosinst.data.noprompt>
command	**#nim -o define -t bosinst_data -a server=master -a \ location='/export/lppsource/aix520/52bosinst.data.noprompt' \ 52bos_migrate_noprompt**

Step 4: Allocate NIM resources

We need to allocate the necessary resources for the NIM operation. We need to allocate the lppsource and spot resources. If you are using no_prompt method for migration, you need to allocate the bosinst_data resource as well.

To allocate these resources:

If using	Do this
smitty	**#smitty nim_mac_res** ► Allocate Network Install Resources ► Choose the Target machine. e.g.). sp6en07 ► Select the correct lppsource, spot and bosinst_data (if needed)
command	**#nim -o allocate -a lpp_source=aix520_lpp -a spot=aix520_spot \ -a bosinst_data=52bos_migrate_noprompt sp6en07**

Note: If you are migrating the AIX OS from version 4.3.3 to AIX 5L and have vacpp.ioc.aix43.rte, xlC.aix43.rte installed, please make sure that the lppsource directory contains the vacpp.ioc.aix50.rte and xlC.aix43.rte filesets. If they are not in the lppsource directory, your OS will not be in stable state after your OS migration (**lppchk -v**). If that is the case, you have to manually install them.

Step 5: Initiate NIM migration

Before we start to initiate the NIM migration, we would advised you to open up a remote console session (**read only**) on the node you are performing the OS migration:

```
#rconsole -r -t -n sp6en07
```

Note: At this point, you should open a read only console. Network boot fails if you use a read/write console.

You can choose to initiate BOS installation immediately after the BOS installation is enabled or initiate the BOS installation at later time. This is determined using the `Initiate Boot Operation on Client?` option.

Step 5a: To start NIM migration with BOS installation initiated immediately after the BOS installation is enabled

On NIM master:

If using	Do this
smitty	**#smitty nim_mac_op** Choose the Target machine. e.g.). sp6en07 Choose bos_inst Target Name sp6en07 Source for BOS Runtime Files rte installp Flags [-agX] Fileset Names [] Remain NIM client after install? yes Initiate Boot Operation on Client? yes Set Boot List if Boot not Initiated on Client? no Force Unattended Installation Enablement? no ACCEPT new license agreements? [yes]
command	**#nim -o bos_inst -a source-rte -a installp_flags='-agX' ** **-a accept_flags=yes -a accept_licenses=yes sp6en07**

You should see from your remote console that the node, sp6en07, reboots and starts the NIM migration process.

Step 5b: To start NIM migration with BOS installation initiated at later time

On NIM master:

If using	Do this
smitty	**#smitty nim_mac_op** Choose the Target machine. eg). sp6en07 Choose bos_inst Target Name sp6en07 Source for BOS Runtime Files rte installp Flags [-agX] Fileset Names [] Remain NIM client after install? yes Initiate Boot Operation on Client? no Set Boot List if Boot not Initiated on Client? no Force Unattended Installation Enablement? no ACCEPT new license agreements? [yes]
command	**#nim -o bos_inst -a source-rte -a installp_flags='-agX' ** **-a accept_flags=yes -a boot_client=no ** **-a accept_licenses=yes sp6en07**

Once you have enabled the BOS installation, you can initiate the BOS installation at any time. Below are the three methods to initiate the BOS installation.

1. **Netboot from NIM master**

   At NIM master, perform the network boot on sp6en07:

   ```
   #netboot -n sp6en07 &
   ```

   > **Note:** Open a **read only** console while performing netboot. netboot fails if there is already a read/write remote console opened. Swap over to read/write mode, if necessary, once netboot finishes successfully. To change from read only to read/write remote console, at the read only console, type in **Ctrl + e, c, a**.
   >
   > To view the netboot process:
   >
   > ```
   > #tail -f /var/log/csm/netboot/netboot.sp6en07.log.xxx
   > ```

2. **Network Boot initiated from the client using remote console**

   Perform a reboot of the client machine, for example sp6en07, on the NIM master:

   On the client:

   ```
   #shutdown -F
   ```

   On the NIM master:

   ```
   #rpower -n sp6en07 off
   #rpower -n sp6en07 on
   ```

   Open a read/write remote console. At NIM master:

   ```
   #rconsole -t -n sp6en07
   ```

   When the system starts up, press key **1** to go to SMS menu.

   You need to set to the NIM network interface as the first boot device and set the client's and NIM master's IP addresses.

3. **Network Boot initiated from client using bootlist**

   Set the bootlist to the correct NIM network interface. e.g.) ent0:

   ```
   #bootlist -m normal ent0
   ```

   Reboot the client:

   ```
   #shutdown -Fr
   ```

   Once the system starts to reboot, open a read/write remote console, set the client's and server's IP addresses. Refer to the previous step for more details.

If you are using the prompt method, you are asked to input the following information. This information is the same as the OS migration process on any AIX standalone machine:

- Define system console
- Select language
- System restoration menu
  - Change the installation method to `Migration`
  - Verify the install disk

To allow you to select the above settings, you need to have a interactive remote console, if you do not already have one. You can change the existing read only remote console to read/write or open another remote read/write console once the netboot has finished.

But if you use the no_prompt method, you do not have to enter any information shown above. All information has already been provided in the bosinst.data file. The migration continues until the system is migrated completely.

3.4.23 Post installation tasks

After the transition from PSSP to CSM has been finished and we have verified that the new CSM cluster is working well, there are a few extra tasks to do. The **mkcfgutils** generated a number stanza files for post transition configuration of:

- File collections

  The **cfgcfmutil** command uses the stanza and tar files generated from the PSSP system and enables the transition of the old PSSP file collection to CFM.

- Node groups

  Although there are default node groups in CSM, you can create custom ones. If you had a long list of PSSP node groups, you may want to transition these over for administration reasons.

- Secondary Adapters in NIM

  If NIM has been installed on the machine and you have additional adapters on your PSSP system, you may want to try and configure secondary adapters.

For further details on post-installation tasks, please refer to Chapter 4, “Implications of transition” on page 93.

3.4.24 Verify the installation

We recommend you validate your CSM installation before continuing with the transition. Please refer to 2.7, "Cluster verification" on page 27 for more details.

3.4.25 Set up a peer domain

The peer domain should span the entire machine, including the management server because some of the elements of the HPC software stack will use the RPD to access system information. This will ensure that the HPC stack software will be able to access any system in the cluster.

> **Tip:** GPFS, VSD, and LoadLeveler all use the RPD to obtain system information. By including all nodes in the peer domain, any software which needs access to node features via RPD will be ready to run anywhere on the system.

The process for creating an RPD is documented in *IBM Reliable Scalable Cluster Technology Administration Guide,* SA22-7889. The steps we used included:

```
dsh –av preprpnode –f nodelist
```

where `nodelist` is a file of all the nodes that will be in the peer domain.

```
mkrpdomain –f nodelist exampledomain
```

This command, run on the management server, creates the peer domain named *exampledomain* on the machine using the nodes in the nodelist file

```
startrpdomain –A exampledomain
```

which starts the *exampledoamin* peer domain.

> **Note:** To check the peer domain at any point, use the **`lsrpdomain`** command.

3.4.26 Set up HACMP

Use smit screens (or the corresponding commands) to restart HACMP. In order for HACMP to communicate, it must be configured with a new network before continuing with the restart.

1. Smitty hacmp and follow the links to the extended topology configuration.
2. If the css switch network was used, remove this from the HACMP configuration.

3. Again using the HACMP extended topology screens, discover the new HACMP communication network (for example, some of our transitions implemented gigabit ethernet).
4. Add the new network for HACMP
5. Add the adapters to hacmp on the new network. During transition, we added one adapter per node from the list resulting from the discovery phase.
6. Add the service label
7. Assign the service label resource
8. Run verification and synchronization.
9. start HACMP

3.4.27 Configure VSD

We performed the VSD migration using the instructions in the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

In order to simplify VSD transition, all of our testing transitioned the same number of VSDs. If the VSD set is going to either grow or shrink, we recommend that the change in the number of VSDs occur outside of transition.

Because the number of VSDs is the same on the PSSP and CSM systems, we started the same number of volume groups and used the same volume group names. These groups can be found in the VSD Global Volume Group Information section of the VSD Clone file Example 3-22 on page 85, which was created in 3.4.11, "Shut down VSD" on page 55. This file also indicates the primary and secondary VSD server nodes.

> **Note:** In 3.4.25, "Set up a peer domain" on page 82, a peer domain was established. Ensure that the VSD code is installed on all nodes in the specified peer domain. VSD will only run on the nodes used for the VSD cluster, but VSD needs to be installed on all nodes in the peer domain before it can be started.

You may run **`lvsg -o online`** at each of the nodes to check the state of the VSD system.

On the primary VSD server node, run **`varyonvg`** to bring the volume groups online (if they are offline). Example 3-20 on page 84 shows a typical output from a transition involving four volume groups.

Example 3-20 varyonvg command example

```
dsh -w c18001p5e0 varyonvg c18001p5vsdvg
dsh -w c18001p5e0 varyonvg c18001p5vsd1vg
dsh -w c18001p5e0 varyonvg c18001p5vsd2vg
dsh -w c18001p5e0 varyonvg c18001p5vsd3vg
```

For each of the new volume groups that are brought online, move a file created by the **vsdPSSPCreateImportvgFile.perl –c** command as discussed in 3.4.11, “Shut down VSD” on page 55. One of the saved files should be moved to each of the new nodes in the VSD volume group. Once the file has been moved to the node, the command:

```
vsdImportvg.perl /tmp/vsdCreateImportvgFile.<hostname>.node<my_node_number>
```

is used to import the volume group into the new server node. This command should be run using the appropriate vsdCreateImportvgFile at each of the new VSD server nodes.

> **Note:** The above command sequence is run only if the VSD servers are moved. If the VSD servers remain in the same location as on the PSSP system, the above sequence is not necessary.

Next, edit the file /tmp/vsdCloneCfg.<node>.ksh (in our example, this file is /tmp/vsdCloneCfg.c18cmsp0e0.ksh) to include the new node numbers. We determined the new node numbers using the following two commands:

```
export CT_MANAGEMENT_SCOPE=2
lsrsrc –a IBM.PeerNode Name NodeList
```

Example 3-21 shows some typical output from the **lsrsrc** command.These values need to be used to modify our example script file, /tmp/vsdCloneCfg.c18cmsp0e0.ksh.

Example 3-21 lsrsrc output example

[c18001p5e0]:/ >lsrsrc -a IBM.PeerNode Name NodeList

```
Resource Persistent Attributes for: IBM.PeerNode
resource 1:
        Name     = "c18001p9e0"
        NodeList = {3}
resource 2:
        Name     = "c18001p13e0"
        NodeList = {4}
resource 3:
        Name     = "c18003p1e0"
        NodeList = {9}
```

```
resource 4:
        Name     = "c18cmsp0e0"
        NodeList = {12}
resource 5:
        Name     = "c18002p1e0"
        NodeList = {5}
resource 6:
        Name     = "c18001p5e0"
        NodeList = {2}
resource 7:
        Name     = "c18002p3e0"
        NodeList = {7}
resource 8:
        Name     = "c18002p4e0"
        NodeList = {8}
resource 9:
        Name     = "c18002p2e0"
        NodeList = {6}
resource 10:
        Name     = "c18001p1e0"
        NodeList = {1}
resource 11:
        Name     = "c18003p2e0"
        NodeList = {10}
[c18001p5e0]:/ >
```

There are two sections of the Clone file which need to be changed. Add the correct node numbers to the *VSDNODE information* section of the Clone file.

> **Note:** Note that the node numbers to be used from the lsrsrc output are indicated in the NodeList field.

In addition, the Clone file section *VSD Global Volume Group information* needs to be altered to indicate the VSD primary and secondary server nodes. Example 3-22 indicates the fields which need to be changed

Example 3-22 An example clone file from the VSD transition tool

```
c18001p5e0]:/tmp/vsd >cat vsdCloneCfg.c18cmsp0e0.ksh
#!/bin/ksh -x
### VSDNODE information ###
/opt/rsct/vsd/bin/vsdnode  2 en3 4096 131072 4 61440
/opt/rsct/vsd/bin/vsdnode  4 en2 4096 131072 4 61440
/opt/rsct/vsd/bin/vsdnode  9 en1 4096 131072 4 61440
/opt/rsct/vsd/bin/vsdnode  10 en1 4096 131072 4 61440

### VSD Global Volume Group information ###
```

```
/opt/rsct/vsd/bin/vsdvg -g c18001p5vsdgvg c18001p5vsdvg 2 4 1
/opt/rsct/vsd/bin/vsdvg -g c18001p5vsd1gvg c18001p5vsd1vg 2 4 1
/opt/rsct/vsd/bin/vsdvg -g c18001p5vsd2gvg c18001p5vsd2vg 2 4 1
/opt/rsct/vsd/bin/vsdvg -g c18001p5vsd3gvg c18001p5vsd3vg 2 4 1

### VSD Definitions ###
/opt/rsct/vsd/bin/defvsd  c18001p5vsdlv  c18001p5vsdgvg  c18001p5vsd
/opt/rsct/vsd/bin/defvsd  c18001p5vsd1lv  c18001p5vsd1gvg  c18001p5vsd1
/opt/rsct/vsd/bin/defvsd  c18001p5vsd2lv  c18001p5vsd2gvg  c18001p5vsd2
/opt/rsct/vsd/bin/defvsd  c18001p5vsd3lv  c18001p5vsd3gvg  c18001p5vsd3
```

Once changes have been made to the file, run the script file vsdCloneCfg.<node>.ksh (our example is vsdCloneCfg.c18cmsp0e0.ksh) to apply the changes to VSD.

Check that the appropriate VSD version is in use by running **rvsdrestrict –l.** In order to use the correct VSD level, we ran **dsh rvsdrestrict –s RVSD4.1** to all the nodes.

Finally, run **ha_vsd** on all nodes in the VSD cluster to start VSD.

> **Note:** See “VSD scripts, in conjunction with GPFS commands” on page 248 for additional detail regarding VSD transition steps.

3.4.28 Configure GPFS

The steps for GPFS transition are in the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989. The *General Parallel File System for Clusters: Administration and Programming Reference*, GA22-7967 may also be consulted for specifics details for the commands.

> **Note:** In 3.4.25, “Set up a peer domain” on page 82, a peer domain was established. Ensure that the GPFS code is installed on all nodes in the specified peer domain. GPFS will only run on the nodes used for the GPFS cluster, but GPFS needs to be installed on all nodes in the peer domain before it can be started.

To transition GPFS, we used the following command sequence (each command is run on the primary GPFS cluster node):

1. **mmcrcluster -t rpd -n /tmp/gpfs/node.list -p c18001p5e0 -s c18001p13e0** to create the new GPFS cluster. This command was run on the primary node (for example, c18001p5e0). Note that this command specifies an *rpd* cluster type and uses the node.list in Example 3-23 on page 87. In

addition, the primary node (c18001p5e0) and secondary node (c18001p13e0) are specified.

Example 3-23 Sample Node list for the mmcrcluster command

```
[c18001p5e0]:/tmp/gpfs >cat node.list
c18001p5e0:manager
c18001p13e0:client
c18003p1e0:client
c18003p2e0:client
```

> **Note:** The **mmcrcluster** command may fail due to residual files remaining from the PSSP system. If the command fails due to a warning that the node is already in a GPFS cluster, first use **mmlscluster** to ensure the node is not in a valid GPFS cluster. Next, run **mmdelcluster -f** to force the deletion of any cluster related files. Finally, retry the original **mmcrcluster** command to create the new GPFS cluster.

2. **mmconfig –a –C set1** which will create the node set *set1* using all the nodes in the GPFS cluster. This command will need to be run for all GPFS sets defined in the export.out file.
3. **mmimportfs all –i /tmp/export.out** which will import the file system defined in the export.out file.
4. **mmstartup** will start the GPFS file system
5. Once the system is started, use the **mount /gpfs** command on each of the nodes in the GPFS cluster to mount the running GPFS file system.

At this point the GPFS file system is imported and has been restarted. You can use local tests to ensure the validity of the system. Since the transition does not alter GPFS data, there is little chance of data corruption during transfer. However, local techniques for file system verification should be used at this point.

> **Note:** Additional VSD and GPFS transition techniques are included in “VSD scripts, in conjunction with GPFS commands” on page 248.

3.4.29 Configure LoadLeveler

Restore the configuration data saved in 3.4.8, “Shut down LoadLeveler” on page 50 by copying site-specific files to the /home/loadl directory on the new system. The essential files to restore include /home/loadl/LoadL_admin, /home/loadl/LoadL_config and the local configuration files for the nodes.

Note: Depending on local naming conventions, some local configuration files may contain node names. If so, these names may need to be changed to reflect the node names on the new system.

Once the files are copied into /home/loadl, the following changes will need to be made:

1. Ensure that the loadl user id has been correctly configured in the automounter. For additional details, please see 4.14, "Automount" on page 110.
2. Change the machine and adapter records in the LoadL_admin file. Previously, under PSSP, these were generated from the output of the **llextSDR** command. To begin file modification, first copy the existing LoadL_admin file, then remove all the existing machine and adapter records. Under CSM, there are two possible methods for replacing the machine and adapter records:
   – Run the command**llextRPD -m > llextRPD.out** This will generate only the machine records and place them in the output file. Copy the contents on this file into the LoadL_admin file. By eliminating any adapter records from the LoadL_admin file, LL will determine adapter information as necessary from the RPD. Example 3-24 shows the output from this command.

Tip: This method yields a much shorter LoadL_admin file which is easier to understand and administer.

Example 3-24 Output from llextRPD -m which outputs only machine names

```
loadl@p690_LPAR1:/gpfs1: llextRPD -m
#llextRPD: Cluster = "LLdomain" ID = "1G6jGBDVeouuy8oeVXwCKo" on Wed May  5 
18:04:02 2004
csm_server: type = machine
p690_LPAR3: type = machine
        alias = p690_LP3_gigE
p690_LPAR4: type = machine
        alias = p690_LP4_gigE
p690_LPAR1: type = machine
        alias = p690_LP1_gigE
p690_LPAR2: type = machine
        alias = p690_LP2_gigE
```

   – Run the command **llextRPD > llextRPD.out** to obtain the more familiar output containing both machine and adapter records. Copy all the information from the output file into the LoadL_admin file. Example 3-25 on page 89 shows the output from this command.

Example 3-25 Output from llextRPD showing both machine and adapter records

```
loadl@p690_LPAR1:/gpfs1: llextRPD
csm_server: type = machine
        adapter_stanzas = csm_server
csm_server: type = adapter
        adapter_name = en0
        network_type = ethernet
        interface_address = 192.168.100.75
        interface_name = csm_server
        device_driver_name = ent0
p690_LPAR3: type = machine
        adapter_stanzas = p690_LPAR3 p690_LP3_gigE
        alias = p690_LP3_gigE
p690_LPAR3: type = adapter
        adapter_name = en0
        network_type = ethernet
        interface_address = 192.168.100.73
        interface_name = p690_LPAR3
        device_driver_name = ent0
p690_LP3_gigE: type = adapter
        adapter_name = en2
        network_type = ethernet
        interface_address = 10.10.100.3
        interface_name = p690_LP3_gigE
        device_driver_name = ent2
p690_LPAR4: type = machine

.................output continues for all nodes and adapters in the RPD
```

Note: For either of the above two methods, one of the machine records must be modified to include a LL central manager. Determine the central manger node and add central_manager=True to the machine record. For example:

`p690_LPAR3: type = machine` *central_manager=True*

3. If the names of the local config files are based on node names, change the file names to reflect the names of the new nodes.

Once these modifications have been made, LL is ready to start. Note that, since no other changes have been made to the LL files, the existing LL configuration will be preserved. That is, items such as job classes, user limits, and scheduler type will all be identical to the settings on the original PSSP system.

To start LL, log in as the loadl user to the central manager machine and issue **`llctl start`**. This will start LL only on the central manager. You can issue **`llstatus`** to see if LL started correctly on this single node. Once you are satisfied that LL started correctly, issue **llctl -g start** to start LL on all the remaining nodes. Again, use llstatus to check for correct LL operation. For additional information on these and other LL commands, refer to *LoadLeveler Version 3 Release 2: Using and Administering*, SA22-7881.

3.4.30 Change Hostname and IP address of MS or nodes (optional)

You perform this step only if you want to change the hostname and IP address of the MS (for example from existing CWS) or the nodes.

If the MS's hostname and IP address that needs to be changed is going to be used by the NIM installation, you have to change them before configuring the NIM master.

If you want to change the hostname and IP address of the nodes (e.g. sp6en07 to csmn07), you have to change them before you proceed to defining the nodes to the CSM Cluster.

You also have to update the following files in the MS before defining the nodes to the CSM Cluster.:

- Update the /etc/hosts in both MS and nodes
- Update the Management Server and Hostname fields in the node definition stanza file, /var/opt/pssp_to_csm/data/nodedef.<timestamp>.def, in the MS.

3.4.31 Store hardware control point user ID and password (Hardware Management Console (HMC) only)

You have to store the hardware controls point user id and password in the MS in order to access the remote hardware. This is only necessary if you have Hardware Management Console (HMC) configured in the CSM Cluster. You do not have to perform this step for any hardware that uses the csp for the PowerMethod, like the SP nodes and p660 servers.

To store the user id and password for remote hardware access:

Assume your HMC's hostname is hmc01, at the MS, issue this:

```
#systemid hmc01 hscroot
```

You will be prompt to enter the hscroot user's password.

3.4.32 alt_disk_install procedure

If you have a spare disk to create a mirror image of the current rootvg so that you can revert back to working PSSP config. In this example there is an assumption that the /spdata directory lives in the rootvg.

1. Clone the roovg:

If using	Do this
smitty	**#smitty alt_install** Choose: Clone the rootvg to an Alternate Disk * Target Disk(s) to install [hdisk1] Phase to execute all Set bootlist to boot from this disk on next reboot? no Reboot when complete? no Verbose output? yes Debug output? yes
command	**#alt_disk_install -C -P all hdisk1**

   You may want to select `Verbose output? = yes` and `Debug output? = yes`, in case the operation fails, since it does not seem to be too descriptive to why a failure may occur.

2. You will now have the original rootvg and altinst_rootvg. This can be checked by running **`lspv`**.
3. The **`bootlist -m normal -o`** output should be checked to ensure that it still set to boot off current boot disk. Alter this with the **`bootlist`** command if need be.
4. To avoid confusion, we advise that you install CSM on hdisk0.
5. To revert back to the original config set the boot list to boot off the disk in the altinst_rootvg
6. To create a new clone of the OS on the CSM installed disk, you need to run **`alt_disk_install -X altinst_rootvg`** to clean up the alternate disk volume group, then go to step 1.

Note: For more detailed information on the CSM installation and configuration steps, please refer to *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919. Also refer to *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

4

Implications of transition

In this chapter, we discuss some of the functions that are available in PSSP and how they are affected when transitioning to CSM. We also show some examples of how to configure your new CSM cluster. The tools aid in transitioning some functionalities, but the rest is left up to the administrator as shown in Table 2-1 on page 18 and Table 2-2 on page 19.

This chapter contains the following sections:

- “HACWS” on page 119.
- “Tivoli T/EC Adapter” on page 119.
- “DCE” on page 119.

4.1 Items to check before and after the transition

When **mkcfgutils** is run, it backs up files. When **rmpsspnode** and **rmpssp** are run, files are backed up and altered. This is discussed in Appendix C, "Transition tools sample outputs" on page 145.

Certain system and configuration files are not altered, removed or updated during the transition so manual intervention is required when you are administrating your new CSM cluster.

Table 4-1 and Table 4-2 show PSSP-related files and directories, and how they are affected by the transition tools. Table 4-1 shows files and directories that are not affected.

Note: There may be other files that we have not listed in the tables.

Table 4-1 PSSP relevant files that are not affected during transition

File or directory	Observations
/etc/rc.ntp	Remains unaltered on the system, containing PSSP references.
/etc/inetd.conf	Remains unaltered on the system, containing PSSP references.
/etc/sp_configd.pid & /etc/spa-srvtab	Remain unaltered on the system, containing PSSP references

Table 4-2 shows files and directories with observations about how they are altered.

Table 4-2 Reference to some PSSP relevant files are affected during transition

File or directory	Observations
.profile	The tools do not alter this file on the CWS or nodes, contain PSSP references.
/etc/rc.sp & /etc/rc.sp2	These are removed and are not backed up by the removal tools. The only 'rc' file backed up is the binary '/etc/rc'.
/etc/inittab	All SP daemons are removed from the file, and backed up in the /var/opt/pssp_to_csm/rmsaved directory.

File or directory	Observations
/etc/passwd & /etc/group	SP references are removed and the files are backed up in the /var/opt/pssp_to_csm/rmsaved directory.
/etc/niminfo	Removed from CWS and nodes. Backed up in /var/opt/pssp_to_csm/rmsaved on nodes only.
/etc/services	PSSP specific lines are hashed out of the file and an unaltered back-up is copied to /var/opt/pssp_to_csm/rmsaved.
/tftpboot	Filesystem remains but some files removed and saved to /var/opt/pssp_to_csm/rmsaved. More information is available on 4.17, "NIM (Network Install Manager)" on page 115. This is the case on both the CWS and the BIS.
/var/spool/cron/crontabs/root	References related to PSSP are hashed out. An unaltered copy is saved on /var/opt/pssp_to_csm/rmsaved.
/var/adm/SPlogs/kerberos	This is the only directory that remains on the system; it is backed up in /var/adm/SPlogs/kerberos. It is one out of six Kerberos related files or directories in a PSSP system.
/share/power/system/3.2	This is the directory for file collection 'power_system'. All subdirectories are not removed either. Plus any symbolic links pointing to files do not get removed even if the files no longer exist.

4.1.1 Data saved by the transition tools

The location of saved data on both CWS and nodes is /var/opt/pssp_to_csm. This is addressed in more detail in Appendix C, "Transition tools sample outputs" on page 145.

If you are going to restore your PSSP system, then we recommend using the alt-disk-at-once scenario. Also, if you do not have the disks available to do the alt-disk-at-once scenario, then the system administrator is expected to have up-to-date mksysb and savevg back-ups. The data may be useful as reference material but it would be very difficult, if not impossible, to rebuild the PSSP system back to its original state using the data files.

4.2 RRA (Restricted Root Access)

This is not supported with the High Performance Computing (HPC) stack. The transition report tools work with this enabled, or not, but if Kerberos 4 is implemented, it produces error messages in the log file.

4.3 BIS (Boot Install Server)

The configuration of the BIS is identified by the **mkpssprpt** tool. This is shown in the reports in Appendix C, "Transition tools sample outputs" on page 145. **rmpsspnode** cannot successfully run a prerequisite check exclusively against a BIS or actually remove PSSP from it unless the other dependent nodes in the cluster have PSSP removed first. The tool advises the user that the dependent nodes need to have the **rmpsspnode** command run successfully against them first, as shown in Example 4-1.

Example 4-1 Log of rmpsspnode failure on BIS

```
rmpsspnode: rmpsspnode was invoked at Sun May 2 17:19:41 EDT 2004 with these
flags:  -c -N Group_1.
rmpsspnode: 2657-742 You have specified a BIS node, node 1, for PSSP removal,
but one of its clients, node 33, was not specified.  If a BIS node is specified
for removal, all of its clients must also be specified.
rmpsspnode: 2657-734 rmpsspnode completed with one or more failures.  For more
information, examine the program output or the log file:
/var/log/pssp_to_csm/rmpsspnode.log.
```

However, **rmpsspnode -a** (execute across all nodes) can successfully executed across the cluster, even if a BIS is present. It is advisable to deconfigure any BIS servers prior to transition since complications can occur with the PSSP removal process. **rmpsspnode** will attempt to deconfigure the NIM master and remove the NIM master filesets on a configured BIS. However, problems can occur if your NIM master has allocated resources or is misconfigured. We recommend that you either deconfigure the BIS prior to migration or quiesce the NIM environment by ensuring all resources are deallocated.

> **Note:** If the BIS was previously a NIM client, **rmpsspnode** will also remove /etc/niminfo (which will be NIM-master-specific) and rename /etc/niminfo.prev back to /etc/niminfo (which is NIM-client-specific).

4.4 Kerberos

As shown in Table 4-2 on page 95, Kerberos is more or less removed from the system. Since all of the ssp.* filesets are removed from the CWS and nodes, you would expect the files related to these filesets to be removed at the same time. In CSM 1.3.3, there is the option to use Kerberos V5 authentication and authorization. We do not cover this in this redbook. For more information, refer to the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919.

4.5 Security on PSSP versus CSM

The CSM security model is comparable to the model used in PSSP, but there are differences regarding root usage within the cluster. For a detailed comparison of the two security models, please refer to Chapter 4 of the *CSM Guide for the PSSP System Administrator,* SG24-6953. CSM 1.3.3 now supports Kerberos 5. For a more detailed explanation of CSM security, please refer to the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919 or the redbook *An Introduction to Security in a CSM 1.3 for AIX 5L Environment,* SG24-6873.

4.6 File collections

File collections are heavily used in the PSSP environment to enable management of many PSSP controlled functions, for example User Management or automount.

The tools, **mkcfgutils** and **cfgcfmutil**, allow us to transition some of the functionality of file collections to CFM by generating the files fc.files, fcfiles.tar and fc.stanza. These files need to be checked and changes made according to your requirements.

About the transition to CFM

The fc.files file needs to be analyzed by the administrator and altered to reflect the files to be used with CFM. Not all of the files listed in Example 4-2 will be useful in the new cluster.

Example 4-2 Example of fc.files

```
# cat fc.files
./etc/acct/holidays
./etc/amd/amd-maps/amd.u
./etc/auto/refauto
./etc/auto.master
./etc/auto/maps/auto.u
```

```
./etc/environment
./etc/group
./etc/hosts
./etc/passwd
./etc/passwd.id.idx
./etc/passwd.nm.idx
./etc/profile
./etc/security/group
./etc/security/passwd
./etc/security/passwd.idx
./etc/sysctl.acl
./etc/sysctl.haem.acl
./etc/sysctl.pman.acl
./etc/sysctl.rootcmds.acl
```

The fc.stanza file identifies what type of file collection has been associated with the files from the PSSP system. This information allows you to identify what files will need more customization when in CFM and where they will be distributed. You need to be aware that **mkcfgutil** takes all files in the running PSSP file collections, apart from sup.admin. sup.admin is part of core supper functionality. Therefore, the collected files need to be checked carefully in order to ensure that they are required and are not going to overwrite new system files. This is even more relevant if you are using new IP addresses, node names, etc. More detail on this is discussed in Appendix C, “Transition tools sample outputs” on page 145.

Example 4-3 Example of fc.stanza file.

```
# cat fc.stanza
./etc/acct/holidays     /etc/acct/holidays      primary
./etc/amd/amd-maps/amd.u        /etc/amd/amd-maps/amd.u primary
./etc/auto/refauto      /etc/amd/refresh_amd    link_execute_primary
./etc/auto.master       /etc/auto.master        primary
./etc/auto/maps/auto.u  /etc/auto/maps/auto.u   primary
./etc/environment       /etc/environment        primary
./etc/group     /cfmroot/etc/group      pwd_primary
./etc/hosts     /etc/hosts      primary
./etc/passwd    /cfmroot/etc/passwd     pwd_primary
./etc/passwd.id.idx     /cfmroot/etc/passwd.id.idx      pwd_primary
./etc/passwd.nm.idx     /cfmroot/etc/passwd.nm.idx      pwd_primary
./etc/profile   /etc/profile    primary
./etc/security/group    /cfmroot/etc/security/group     pwd_primary
./etc/security/passwd   /cfmroot/etc/security/passwd    pwd_primary
./etc/security/passwd.idx       /cfmroot/etc/security/passwd.idx
pwd_primary
./etc/sysctl.acl        /share/power/system/3.2/etc/sysctl.acl  link_primary
./etc/sysctl.haem.acl   /share/power/system/3.2/etc/sysctl.haem.acl
link_primary
```

```
./etc/sysctl.pman.acl   /share/power/system/3.2/etc/sysctl.pman.acl
link_primary
./etc/sysctl.rootcmds.acl      /share/power/system/3.2/etc/sysctl.rootcmds.acl
link_primary
```

The fc.stanza, the fcfiles.tar, and the report from **mknoderpt** identify which files are going to be saved and potentially transition to the CSM cluster with **cfgcfmutil**. Using the fc.stanza file **cfgcfmutil** identifies which files are going to be replaced when the fcfile.tar file as shown in Example 4-4 is extracted by **cfgcfmutil**.

Example 4-4 Listing of fcfiles.tar

```
# tar -tvf fcfiles.tar
-rw-rw-r--   0 4     1089 Apr 09 11:53:24 2004 ./etc/acct/holidays
-rw-r--r--   0 0     2165 Apr 29 15:27:39 2004 ./etc/amd/amd-maps/amd.u
-rwxr-xr-x   0 0     2839 May 06 13:44:29 2004 ./etc/auto/refauto
-rw-r--r--   0 0      357 Apr 14 13:52:02 2004 ./etc/auto.master
-rw-r--r--   0 0     1672 Apr 29 15:27:39 2004 ./etc/auto/maps/auto.u
-rw-rw-r--   0 0     1976 Apr 27 12:02:21 2004 ./etc/environment
-rw-rw-r--   0 7      487 May 06 13:44:26 2004 ./etc/group
-rw-rw-r--   0 0     1233 Apr 29 17:12:17 2004 ./etc/hosts
-rw-rw-r--   0 7     1014 May 06 13:44:26 2004 ./etc/passwd
-rw-rw-r--   0 7     5924 Apr 15 11:46:51 2004 ./etc/passwd.id.idx
-rw-rw-r--   0 7     7524 Apr 15 11:46:51 2004 ./etc/passwd.nm.idx
-r-xr-xr-x   2 2     1862 Apr 27 12:02:06 2004 ./etc/profile
-rw-r-----   0 7      589 Apr 22 11:42:53 2004 ./etc/security/group
-rw-r-----   0 7      815 Apr 29 15:52:19 2004 ./etc/security/passwd
-rw-r-----   0 7     7524 Apr 14 13:51:55 2004 ./etc/security/passwd.idx
-rw-r--r--   0 0      196 Apr 29 15:58:10 2004 ./etc/sysctl.acl
-rw-r--r--   0 0      328 May 02 14:13:27 2004 ./etc/sysctl.haem.acl
-rw-------   0 0      436 Apr 29 17:30:42 2004 ./etc/sysctl.pman.acl
-rw-r--r--   0 0      537 Apr 29 15:56:39 2004 ./etc/sysctl.rootcmds.acl
```

Also, when **cfgcfmutil** is run a log file is generated on the machine. This file identifies what action needs to be taken against certain files in order for the functionality to be the same as it was in file collection under PSSP. The log file is called /var/log/pssp_to_csm/cfgcfmutil.<timestamp>.log.

When **cfgcfmutil** is run it makes a back-up of all the files that is replaces from the tar ball.

> **Note:** It is important to review what files are replaced on the management server (MS) when the **cfgcfmutil** command is run as this may have a detrimental affect on your system.

In Example 4-3 on page 99, you will notice that the /etc/hosts file is listed as primary collection type. This means that the current /etc/hosts file will be replaced when **cfgcfmutils** is run. The file is backed up as /var/opt/pssp_to_csm/data/fc_backup/etc/hosts.<timestamp>. You can run **cfgcfmutil** as many times as you want and it will keep replacing the /etc/hosts files with the one in the tar ball. You can always get the file back as long as you know where to look. This is shown in Example 4-5.

Example 4-5 Sequence of /etc/hosts file replacement by **cfgcfmutil**

```
Extract from /var/log/pssp_to_csm/cfgcfmutil.<timestamp>.log
..snip..
cfgcfmutil: /etc/hosts exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/etc/hosts.20040507203416
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/hosts copied to /etc/hosts
cfgcfmutil: /cfmroot/etc/hosts exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/cfmroot/etc/hosts.20040507203416
cfgcfmutil: /etc/hosts linked to /cfmroot/etc/hosts.
..snip..
```

If **cfgcfmutil** is run again, another back-up of the replaced /etc/hosts file is created, which may cause confusion if you need to get the original /etc/hosts file back. You can identify the first replaced file by the time stamp appended to the file. Do not rely in the file date from AIX as shown in Example 4-6.

Example 4-6 Backed up /etc/hosts files after multiple cfgcfmutil commands

```
# ls -ltr /var/opt/pssp_to_csm/data/fc_backup/etc/hosts*
-rw-rw-r-- 1 root system 1233 Apr 29 17:12
/var/opt/pssp_to_csm/data/fc_backup/etc/hosts.20040507212138
-rw-rw-r-- 1 root system 1233 Apr 29 17:12
/var/opt/pssp_to_csm/data/fc_backup/etc/hosts.20040507212136
-rw-rw-r-- 1 root system 921 May 7 20:31
/var/opt/pssp_to_csm/data/fc_backup/etc/hosts.20040507212132 <--original file
```

For more detail on the functionality of CFM and how **cfgcfmutils** works please refer to the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

> **Note:** When the **rmpsspnode** and **rmpssp** commands are run, /share/power/system/3.2 is *not* removed. Also, the symbolic links within the directories are maintained even if the files they are linked to are removed using **rmpsspnode**.

In Example 4-3 on page 99, you can see there are two types of file collection that have been identified by **mkcfgutils**, primary and pwd_primary. The primary files collection files will overwrite the existing ones on the MS. The pwd_primary files do not overwrite the files on the MS but will be placed in /cfmroot to be distributed to the nodes when **cfmupdatenode** is run from the MS. Any files that are replaced are backed up, as discussed earlier in this chapter. There are more than these two types of file collection in CFM and any other supper type file collections that are not available in CFM can be replicated by the use of *.pre* and *.post* files. All of this is covered in detail in the following documentation:

- *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989
- *CSM for AIX 5L: Administration Guide,* SA22-7918
- *CSM Guide for the PSSP System Administrator,* SG24-6953

In addition, we would recommend that you read through Appendix C, "Transition tools sample outputs" on page 145 and refer to the **mkcfgutils** and **cfgcfmutil** sections for more details on their functionality.

4.7 User management

CSM does not provide an interface for user management as found in PSSP. There is no concept of *spusers* in a CSM cluster. CFM, however, can be configured to replicate synchronizing feature the user.admin supper collection provided. Also, NIS and LDAP can be used to centrally manage users. For a detailed explanation and examples please refer to Chapter 5 of the *CSM Guide for the PSSP System Administrator,* SG24-6953.

4.8 Monitoring

Monitoring is different between PSSP and CSM. However, there are no tools to facilitate the transition of the monitoring facilities available in PSSP to CSM. The reporting tools do extract all Problem Management (pman) definitions from the SDR, but it is up to the administrator to create new, comparable CSM definitions. The tools do not extract the EM_Condition SDR conditions even though it identifies their presence. If pman is used extensively in your system, the change of monitoring function will be one of the most time consuming steps in the transition from PSSP to CSM.

In this section, we summarize the differences between monitoring in PSSP and in CSM. We then show some samples of a monitoring transition. For a detailed explanation and examples, please refer to Chapter 6 of the *CSM Guide for the PSSP System Administrator*, SG24-6953.

4.8.1 Differences in monitoring between PSSP to CSM

In the PSSP monitoring, two subsystems called Event Management (EM) and pman, which are components of Reliable Scalable Cluster Technology (RSCT) are used. The pmand daemon is a client of EM. It can be configured to register for EM events and perform actions when those events occur. The **pmandef** command which is a command of PSSP is used for registration of an event and specification of action.

In CSM monitoring, Resource Monitoring and Control (RMC) which is the new component of RSCT is used. RM (Resource Manager) subsystem exists as an interface of RMC and a resource. RM collects the information of the resource status and save them in RMC Repository. Specific RM collects information of specific resource class. If it says taking the case of a file system, the "IBM.FSRM" RM collects the information of the "IBM.FileSystem" resource class.

Resources belong to a resource class and the resource class has some attributes. There are two kinds of attributes, static attributes and dynamic attributes. Monitoring is performed by setting a threshold as dynamic attribute. In case of monitoring FileSystem usage, "IBM.FileSystem" resource class and the attribute "PercentTotUsed" is used, for example "PercentTotUsed>80" is set. This work is called "create condition" in CSM, it is the same as "registration of an event" in PSSP. Next step is "create response" which equals "specification of action" in PSSP.

Although one command performs registration of an event and specification of action in PSSP, in CSM condition and response are created separately and combined later. By this method, we can use the same response for some conditions. You can also define multiple responses for a single condition. It is reusable and flexible.

The process from the start of monitoring to finish in CSM is as follows:

1. Create condition using **mkcondition**.
2. Create response using **mkresponse**.
3. Create condition with response using **mkcondresp** (optional).
4. Start monitoring using **startcondresp**.
5. Stop monitoring using **stopcondresp**.

> **Note:** The **startcondresp** command links a condition with a response and starts monitoring. Therefore, Step 3 above is optional.

In PSSP, this is performed by adding a monitoring item to start monitoring, and deleting the monitoring item to stop monitoring. In CSM, if a monitoring item is implemented once, a command can perform a start and stop of the monitoring. It is not necessary to create a script as in PSSP. Moreover, in CSM, an AIX command is used instead of a special command. Thus, the device is such the that cluster administrator's burden may be eased.

CSM has useful default setting of conditions, responses and conditions with response on the Management Server. Condition has more than 100 items for example filesystem, processor, memory, process, disk and network adapter. It is sufficient to use default conditions, although it is possible to create new conditions, of course. The response has fewer than 20 items, for example sending e-mail to administrators, recording on a log, etc. It is also possible to create new responses which perform scripts. Regarding condition with response, the default is only a few items. You can combine condition and response to create your favorite monitoring items. Each item can be referred to using **lscondition**, **lsresponse** or **lscondresp**. You can also edit default setups.

4.8.2 Sample of monitoring item

There are three sample monitoring items in PSSP and CSM:

- Host responds check
- /tmp fs full check
- /var fs full check

Further examples of this type can be found in Appendix C, "Transition tools sample outputs" on page 145.

Host responds check

Example 4-7 checks for hosts responds from the nodes.

Example 4-7 Host responds check in PSSP

```
pmandef -s "host_responds"  \
    -e "IBM.PSSP.Response.Host.state:NodeNum=*:X==0"  \
    -r 'X!=0'   \
    -c '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -C '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -n 0 -U root
[[ $? -ne 0 ]] && print -u2 "Problem with host_responds" && exit 1
```

For this monitoring, we use "NodeReachability" condition and "LogCSMEventsAnyTime" response in CSM as shown in Example 4-8 on page 105. Therefore, we only make link of condition and response and start monitoring.

Example 4-8 Host responds check in CSM

```
<Create condition>
Use "NodeReachability"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "NodeReachability" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "NodeReachability" "LogCSMEventsAnyTime"
```

/tmp fs full check

In Example 4-9, when the usage of /tmp filesystem exceeds 90%, the event is triggered and recorded to a log. And when the usage becomes 75%, the event is rearmed. The rearm of the monitor is logged as well.

Example 4-9 /tmp fs full check in PSSP

```
vgName="rootvg"
lvName="hd3"

pmandef -s "tmp_usage"  \
    -e "IBM.PSSP.aixos.FS.%totused:NodeNum=*;VG=$vgName;LV=$lvName:X>90"  \
    -r 'X<75'   \
    -c '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -C '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -n 0 -U root
[[ $? -ne 0 ]] && print -u2 "Problem with tmp_usage" && exit 1
```

In PSSP, NodeNum=* means all nodes and CWS. In CSM, we cannot cover all nodes and management server (MS) in one condition. We have to use two conditions to separate nodes and MS. For this monitoring, we use "AnyNodeTmpSpaceUsed" condition and "LogCSMEventsAnyTime" response for nodes. On the other hand, we use "/tmp space used" condition and "LogCSMEventsAnyTime" response for MS as shown in Example 4-10 Example 4-11 on page 106.

The difference between "AnyNodeTmpSpaceUsed" and "/tmp space used" is MgtScope which is showed by **lscondition** command. Please refer to the **-m** option in the **mkcondition** command.

Example 4-10 /tmp fs full check for nodes in CSM

```
<Create condition>
Use "AnyNodeTmpSpaceUsed"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "AnyNodeTmpSpaceUsed" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "AnyNodeTmpSpaceUsed" "LogCSMEventsAnyTime"
```

Example 4-11 /tmp fs full check for MS in CSM

```
<Create condition>
Use "/tmp space used"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "/tmp space used" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "/tmp space used" "LogCSMEventsAnyTime"
```

/var fs full check

In Example 4-12, when the usage of /var filesystem exceeds 95%, the event is triggered and recorded to a log. And when the usage becomes 80%, the event is rearmed. The rearm of the monitor is logged as well.

Example 4-12 /var fs full check in PSSP

```
vgName="rootvg"
lvName="hd9var"

pmandef -s "var_usage"  \
    -e "IBM.PSSP.aixos.FS.%totused:NodeNum=*;VG=$vgName;LV=$lvName:X>95"  \
    -r 'X<80'   \
    -c '/usr/lpp/ssp/bin/log_event VAR_FULL /var/adm/SPlogs/pman/pmevent.log' \
    -C '/usr/lpp/ssp/bin/log_event VAR_OK /var/adm/SPlogs/pman/pmevent.log' \
    -n 0 -U root
[[ $? -ne 0 ]] && print -u2 "Problem with var_usage" && exit 1
```

For this monitoring, we use "AnyNodeVarSpaceUsed" condition and "LogCSMEventsAnyTime" response for nodes. The other hand, we use "/var space used" condition and "LogCSMEventsAnyTime" response for MS.

Also, Example 4-13 and Example 4-14 show the changing of the default condition. In "AnyNodeVarSpaceUsed" and "/var space used" conditions, the threshold is set to `90` to action an event and `75` for rearm event by default. We need to change these values to `95` and `80` for each threshold.

Example 4-13 /var fs full check for nodes in CSM

```
<Create condition>
Chanege "AnyNodeVarSpaceUsed"
# chcondition -e "PercentTotUsed > 95" -E "PercentTotUsed < 80"
"AnyNodeVarSpaceUsed"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "AnyNodeVarSpaceUsed" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "AnyNodeVarSpaceUsed" "LogCSMEventsAnyTime"
```

Example 4-14 /var fs full check for MS in CSM

```
<Create condition>
Chanege "/var space used"
# chcondition -e "PercentTotUsed > 95" -E "PercentTotUsed < 80" "/var space
used"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "/tmp space used" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "/tmp space used" "LogCSMEventsAnyTime"
```

4.9 Custom SDR classes

PSSP provides the ability to create custom SDR classes; these can be used by Customers for their own uses, such as automation or additional administration functions. Currently there is no comparable function within CSM/RSCT. While

RSCT has it’s own System Registry (SR), there is no available method to create custom tables.

Depending on your use of the custom classes, one potential alternative would be to export the custom SDR classes to a file, and distribute the file through CFM. You would need to update your custom scripts not to use SDR command and to reference the flat file instead. Alternatively compared to PSSP, the CSM framework may provide new solutions for the original reason you used custom classes.

4.10 Customer scripts for specific tasks

It should be obvious by now that moving from PSSP to CSM changes many things. As all the “S” commands no longer exist, you need to consider where you might be using their function. For example, do you have any homegrown scripts which make use of /usr/lpp/ssp/install/bin/node_number to check 0 (that is, CWS)? There is no concept of node numbers in CSM, in the sense you are used to in PSSP. Certain CSM Management classes only exist on the MS and others only on the managed nodes. So there is potential to perform some form of boolean operation based around return codes of **lsrsrc** commands. For example, querying IBM.ManagedNode on a node gives a return code of 5 since the class does not exist; whereas on the MS itself, the query completes with a zero:

```
#!/usr/bin/perl
#---------------------------------------------------------------------#
#
#
#   CheckLocation.sh : Sample code to check execution location
#
#
#
#   Function : Query RSCT SR class, based on return code determine if query
#
#              is being executed on the MS or a Managed Node
#
#
#
#              The command is issued and the return code checked.
#
#
#
#-----------------------------------------------------------------------
-#
$me=$0;
chop($me=`basename $me`);
```

```
chop($cmdout=`/usr/bin/lsrsrc -l IBM.ManagedNode 2>/dev/null`);
$rc=$?;

if ($rc != 0) {
   print "$me : I am running on a Managed Node\n";
} else {
   print "$me : I am running on the CSM MS\n";
}

exit 0;
```

The above code sample works on this principle and could be used as a suitable MS/node boolean test.

4.11 Node-to-node access within CSM, RPD

CSM is used to configure a set of nodes for manageability. The CSM cluster is known as the Management Domain. A management server in the CSM cluster administers a number of managed nodes. The MS knows the knowledge of all the managed nodes and the managed nodes know the MS. But between the managed nodes, they do not know each other. There is no communication between the managed nodes.

In order for the managed nodes to communicate with each other, which is required by VSD and GPFS, we need to configure the RSCT Peer domain (RPD).

Within an RPD domain, there is no concept of of a master node. All nodes are aware of each other. You can perform the administration commands on any nodes.

RPD domain uses the Topology Services subsystem to monitor the network adapter status and the node connectivity of all RPD domain nodes. It also uses the Group Services subsystem to provide cross node/process coordination. Group Services monitors the status of all processes that are joined to a group, making sure that any changes of processes in the group is updated.

Please refer to *IBM Reliable Scalable Cluster Technology Administration Guide,* SA22-7889 for information about creating a RPD domain in the CSM cluster.

4.12 sysctl

Customers are known to have specific programs that utilize the functionality of sysctl. There is not such function in CSM so administrators need to bare this in mind. At the time of this redbook being written there is mention of future plans for this functionality to be written into CSM.

4.13 NTP

The Network Time Protocol (NTP) is part of the TCPIP client within AIX. While CSM does not currently provide a direct interface into the use and management of the Network Time Protocol (NTP) in the way PSSP did, it does provide the framework in which NTP can be used and managed. The PSSP script /etc/rc.sp has a call to restart xntp after a reboot; in comparison CSM does not install such a mechanism by default. An example method is shipped with CSM 1.3.3. Please refer to chapter 1 of the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919. An alternative method is described in chapter 3 of the *CSM Guide for the PSSP System Administrator,* SG24-6953; both are valid examples of how NTP can be configured and managed within a CSM environment.

With regard to a transition, the **rmpssp** script will not remove existing ntp.conf files on the node or MS; it is just the restart mechanism which is removed. As detailed in the above references, CFM can be used to populate ntp.conf to your nodes and start up the required daemon. Depending on your transition type, you may need to update the servers or IP addresses referenced in ntp.conf. In PSSP, the CWS is either configured to synchronize from an external time source, or itself; the nodes are configured to synchronize from the CWS, thereby keeping the entire cluster in harmony. In CSM, the same principles are true.

While not required, it is recommended you use NTP to synchronize time within your cluster. Aside from scheduled events, other cluster components (for example, Kerberos) require the cluster to be time synchronized.

4.14 Automount

The Automount function allows file systems to be automatically mounted when needed and unmounted when they are no longer being used. There is a basic automount function included within the AIX operating system, AutoFS, which is described in *AIX System Management Guide: Communication and Networks*, SC23-4127.

PSSP has used the basic AutoMount function within AIX since the PSSP 2.3 release level. The current version of PSSP 3.5 invokes the AutoFS functions in AIX 5.2. The interrelationship between PSSP and AIX is described further in chapter 10 of the *PSSP Administration Guide,* SA22-7348. A high-level interpretation of this relationship is illustrated in Figure 4-1.

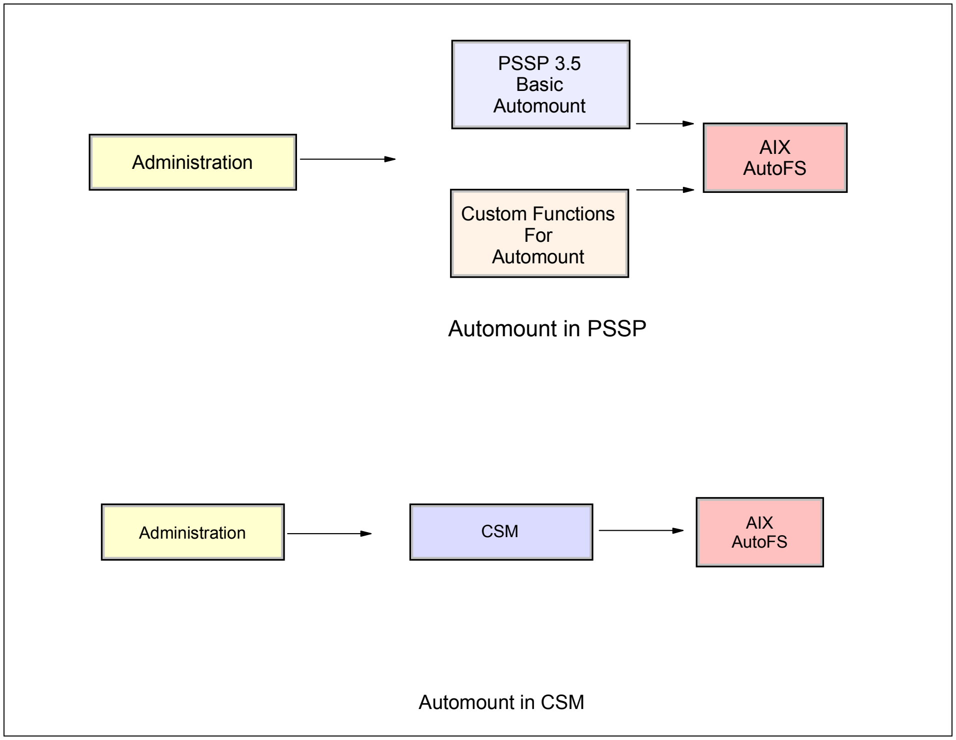

Figure 4-1 Relationship between AIX automount in PSSP and CSM

In Figure 4-1, the functionality of the PSSP automount function is separated into several areas. The basic automount function uses AIX AutoFS to control file system mount access using /etc/auto.master. PSSP is also capable of automatically managing the /u file system, adding and deleting user home directories from automount control as they are either added of deleted from the system. Finally, custom automount functions are provided by PSSP scripting code which are used by the system administrator for site-specific alterations to standard AIX AutoFS operation. After the transition to CSM, the basic automount functions are preserved by AIX AutoFS. However, the additional automount control provided by PSSP will be lost by default.

The PSSP to CSM transition tools provide reports on existing basic automount functions. In the report, the setting for amd_config is indicated. If amd_config is true, then PSSP automount functions are currently operational. If amd_config is false, PSSP is not being use for automount and no transition will be necessary. In addition, the report will include the existence of the following files:

- /etc/auto.master - The automount master file which contains a list of all the file systems addressed by automount. all of the automount map files are listed within the auto.master file.
- The contents of the /etc/auto subdirectory
- /etc/auto/maps - The maps files tell automount which files to support in the file systems defined within auto.master

Although the cluster analysis transition tool lists these files, there are no additional tools used to transition automounter function from PSSP to CSM. If only basic automount functions are used within the PSSP system, no transition tools will be necessary. The auto.master and maps files are preserved during the transition. Once the system has been converted to CSM, AutoFS within AIX will simply use the files as previously defined under PSSP control to provide identical automount function.

Beginning with version 1.3.3, CSM ships with some sample files to illustrate how automounter can be used to provide PSSP-like handling of home directories within a cluster. Please refer to chapter 1 of the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919.

However, there are two additional considerations when transitoning automount. First, PSSP provides some level of automated maintenance for automount features. If PSSP automounter functions are used in conjunction with the SP User Management interface, then the /u file system will be automatically controlled by automounter. In addition, PSSP creates and maintains an automount map file for users home directories. Please refer to chapter 10 of the *PSSP Administration Guide,* SA22-7348. These maintenance functions are NOT supported by CSM. Therefore, even though identical automount functions are preserved immediately after the PSSP to CSM conversion occurs, maintenance of changes which were automatic within the PSSP environment will no longer occur. Under CSM, maintenance of the /u file system will be the same as any other file system managed by AutoFS. That is, additions and deletions of records reflecting changes to the /u file system will have to be done manually under CSM.

A second conversion point to consider is that PSSP allows for custom functions under automounter. Within the /etc/auto/cust directory, a set of files can exist which control automounter customization. These files include:

- cfgauto.cust - configuration of automounter directories and default files
- startauto.cust - for starting the automounter daemon
- refauto.cust - for refreshing the automounter daemon
- checkauto.cust - verification of automounter configuration and daemon execution

- mkautoent.cust - controls additions to the automount map file for user home directories
- rmautoent.cust - removal of an entry from the automount map file for user home directories
- lsautoent.cust - listing entries from the automount map file for user home directories

The transition tool **mkpssprpt** will list these custom functions if they exist so the tool will alert system administrators to these custom changes. However, the capability to continue to use these custom functions within the CSM implementation is NOT supported. In order to continue to use the custom functions within the CSM system, they will have to be rewritten to exploit the AIX AutoFS function.

> **Note:** While the transition tools can migrate over your file collections, by default CSM does not install any restart mechanism for automountd. An example method is shipped with CSM 1.3.3. Please refer to chapter 1 of the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919.

4.15 Accounting

Job accounting tracks resource usage of the system. AIX implements accounting functions which may be used directly or built upon by other software running on the system (see chapter 11, system accounting of the *AIX Systems Management: Operating System and Devices*, SC23-4126). PSSP extends AIX accounting in a number of ways (for further details see *PSSP Administration Guide,* SA22-7348, chapter 12). PSSP extends the basic function of AIX accounting in the following ways:

- Cluster accounting: PSSP provides two commands, nrunacct which runs at each node to collect accounting statistics, and crunacct, which runs on the CWS to accumulate node accounting information in a single location.
- Accounting Classes: PSSP provides for the grouping of similar nodes. Accounting data for the nodes in a single accounting class will be merged and reported together.
- Exclusive use accounting: This allows accounting for jobs which require exclusive use of the resources.

In the transition to CSM, The custom features of PSSP will be lost. However, basic AIX accounting commands upon which the PSSP function was built may be used to reproduce the PSSP function. For example, suggestions for recreating cluster accounting are given in *CSM Guide for the PSSP System Administrator,* SG24-6953. In a similar fashion, accounting classes and exclusive use accounting functions could be reproduced.

Ideas for exclusive use accounting - LLsubmit wrapper which check exclusive use accounting record, adds start and end prolog and epilog. Cron job from redbook watches for these markers in accounting records and changes accounting accordingly.

4.16 Node groups

> **Note:** Use of the generated nodegroup stanza files as discussed in Appendix C, "Transition tools sample outputs" on page 145.

Both PSSP and CSM support the concept of node groups. The **mkcfgutils** tool exports your PSSP nodegroups into stanza files, which can then be used post transition as input to the **nodegrp** command to recreate these. **mkcfgutils** will only transition a non-empty group. Please refer to chapter 5 of the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989 for more details.

Although there are no default node groups in PSSP, CSM has about 30 node groups. You can plan to use default ones. You can use **nodegrp** to list the node groups.

In PSSP, there are two types of node groups, the local group and the global group, because of the partition concept. In CSM, there is no partition concept, and we don't distinguish node groups from this point of view. Separately, there are two types of node groups, the static node group and the dynamic node group.

To add the nodes in the static node group, we have to use the **nodegrp -a** command explicitly. On the other hand, the dynamic node group is defined with the node attribute; nodes are added/removed automatically. There are two types of node attributes, the static attribute and the dynamic attribute. You can show the node attributes by using the **lsnode -l** command. All of the default node groups are dynamic node groups, and you can show their attributes by using the **nodegrp -L** command.

Restriction: To define the NIM node group, you can use CSM node groups by using **csm2nimgrps** command. After running **csm2nimgrps** command, if you add/remove nodes in the CSM node group, the NIM node group isn't changed automatically. You have to change the member of the NIM node group manually.

4.17 NIM (Network Install Manager)

It is advised that NIM should be used in a CSM environment. It is not essential but most CSM nodes either don't have their own CD drive or the system is too large to install from CD. The configuration of the NIM master is discussed in 3.4.15, "Install and configure the NIM master on the CWS (MS)" on page 61. As discussed in Chapter 2, "Planning and considerations" on page 13 the administration of NIM is not longer concealed by the PSSP scripts, it is now the responsibility of the administrator to use and maintain NIM. NIM can be utilized to reflect the same functionality as in PSSP. NIM supports the three types of BOS (Base Operating System) installations; overwrite, preservation and migration. With the use of **rconsole** the admin can have a console session on any node, using this they can interact with the node and use NIM functionality to put the node in maintenance or diagnostic modes.

Even though NIM can be used to reflect the same functionality as in a PSSP system there is many more advantages to its use, as listed below:

- Not only does this remove the need for diagnostic boot media, it also eliminates the need to have diagnostics installed on the local disks of machines.
- Using the Alternate Disk option.
- NIM can be used to clone the running of rootvg to an alternate disk, or install a mksysb image to an alternate disk.
- Running shell scripts on client machines for configuration after software has been installed.
- Preform push or pull installation operations, committing or rejecting software updates, or even preform de-install operations.
- Define a group of machines, and preform all at once operations.

Note: **rmpssp** removes the NIM master filesets from the CWS and BIS.

4.17.1 Adding the secondary adapters

mkcfgutils creates a stanza file /var/opt/pssp_to_csm/data/adapterdef.<timestamp>.def file. Please refer to Appendix C, "Transition tools sample outputs" on page 145 for more information. This file can be used in conjunction with NIM commands to create secondary adapters in the CSM cluster.

In *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989, there is section that touches on the creation of secondary adapter within NIM. Also, this is covered in both *CSM for AIX 5L: Administration Guide,* SA22-7918.

In the next steps, we go through the steps to create these in the CSM cluster using NIM:

1. Define CSM nodes to NIM. (optional)

   If the nodes have not been defined to NIM yet you can use a CSM command, **/opt/csm/bin/csm2nimnodes**, to define the nodes as NIM standalone resources. To define all of the CSM nodes to NIM run the following command:

   ```
   # /opt/csm/bin/csm2nimnodes -a -v
   ```

> **Note:** If the nodes have not been defined to NIM before the NIM master needs to be defined on each node. Do this by running **smitty nim_mac**, then select the option "Specify New Master for Client Machine" and follow the smitty screens to add a **/etc/niminfo** file to the nodes.

2. Create an adapter resource.

   First a directory for the resource needs to be created. This is where the adapter definition files for each node will be placed.

   ```
   # mkdir /export/nim/adapt_defs
   ```

   Now the resource can be generated using the **nim** command.

   ```
   # nim -o define -t adapter_def -a server=master -a /
   location=/export/nim/adapt_defs my_adapter_res
   ```

   This can then be checked using **lsnim**, as show in Example 4-15.

Example 4-15 Example of **lsnim** *output*

```
# lsnim
master              machines        master
boot                resources       boot
nim_script          resources       nim_script
csm_network         networks        ent
```

```
aix520_lpp          resources       lpp_source
aix520_spot         resources       spot
new_net             networks        ent
p650_A              machines        standalone
p650_B              machines        standalone
p650_C              machines        standalone
p650_D              machines        standalone
my_adapter_res      resources       adapter_def
```

3. Creating secondary adapter configuration files.

   The **nimadapters** command is used to generate the configuration files for secondary adapters of the nodes in NIM. It uses the stanza file /var/opt/pssp_to_csm/data/adapterdef.<timestamp>.def as shown in Example 4-16.

   On checking the stanza file we noticed the *location* code for the adapters was missing. This can be determined by using the **lscfg -p** command on each of the nodes.

Example 4-16 Original /var/opt/pssp_to_csm/data/adapterdef.<timestamp>.def file

```
..snip..
p650_B:
   netaddr=192.168.10.11
   subnet_mask=255.255.255.0
   media_speed=auto_Half_Duplex
   location=""
..snip..
```

> **Important:** The stanza field `media_speed=auto_Half_Duplex` is also incorrect and will generate errors when you come to customize the node. If you remove it this will fix the problem and set the speed to Auto_Negotiation as shown in Example 4-17.

Example 4-17 Altered /var/opt/pssp_to_csm/data/adapterdef.<timestamp>.def file

```
..snip..
p650_B:
   netaddr=192.168.10.11
   subnet_mask=255.255.255.0
   location=U0.1-P2-I5/E1
..snip..
```

It is advised to first run the **nimadapters** command in preview mode to identify any errors before defining the adapters.

```
# nimadapters -p -f \
/var/opt/pssp_to_csm/data/adapterdef.<timestamp>.def my_adapter_res
```

If any problems are identified here you will need to resolve them before trying to define the adapters. After you have resolved any possible problems then you can define the adapters to NIM as shown in Example 4-18 on page 118 or by running the command:

```
# nimadapters -d -f \
/var/opt/pssp_to_csm/data/adapterdef.<timestamp>.def my_adapter_res
```

Example 4-18 Example of secondary adapters being defined to NIM

```
# cd /var/opt/pssp_to_csm/data
# nimadapters -d -f adapterdef.20040504153204.def my_adapter_res

Summary

    4  Machines will be added to the NIM environment.
```

4. In order to create the secondary adapters on the nodes use the customize functionality in NIM. Example 4-19 provides an example of NIM configuration of secondary adapters. If there are any problems with the configuration files the operation will fail, as discussed earlier in this section. The command syntax use is:

   ```
   # nim -o cust -a adapter_def=my_adapter_def p650_C
   ```

Example 4-19 Example of NIM configuration of secondary adapters

```
# nim -o cust -a adapter_def=my_adapter_res p650_C
nim_name = p650_C
machine_type = secondary
network_type = en
logical_name =
location = U0.1-P2-I5/E1
secondary_hostname =
netaddr = 192.168.10.12
subnet_mask = 255.255.255.0
cable_type = N/A
media_speed = Auto_Negotiation
attributes =
Secondary adapter and interface do not conflict with NIM
en1
en1 changed
```

5. In order for the changes to take affect the nodes will then need to be rebooted. You can reboot the node using normal AIX commands on the node or use the CSM command **netboot**.

   In order to monitor the nodes progress you can used the CSM command **csmstat** and if there are communication problems with the node via telnet the CSM command **rconsole** may come in handy.

4.18 HACWS

A high availability option was an option for the CWS in PSSP but currently there is not comparable facility for the CSM MS. IBM intends to release a high availability MS in future releases of CSM.

4.19 Tivoli T/EC Adapter

PSSP provided a custom Tivoli Enterprise™ Console (TEC) Adapter, integrated into the PSSP application. This could be used to forward PSSP-specific events directly from the application to a TEC Server.

CSM does not provide any Tivoli integration by default, and cannot use the custom PSSP Adapter. However, since CSM generates text logfiles, a standard Tivoli Logfile Adapter can be configured by the Customer to monitor these logfiles and forward important messages and warnings to a TEC Server.

Since CSM runs on top of a standard AIX base, the Tivoli Endpoint is supported on the system running CSM; standard Tivoli applications (such as IBM Tivoli Monitoring Resource Models, Tivoli Inventory, Tivoli Software Distribution etc) can be used on the CSM system. However, there is no CSM-specific functionality provided as default by any of these applications.

Unfortunately we did not have a suitable Tivoli infrastructure in our test lab in which we could demonstrate this.

4.20 DCE

We do not cover DCE in this redbook. Although there are transition steps available in the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

5

High Performance Computing (HPC) recommendations

In this chapter, we will try to cover some of the philosophy of transition methods for the HPC software stack. Up to this point, we have covered the tools to transition a system between a PSSP management and CSM management systems. In this chapter, we will cover approaches for the transition of the HPC software stack and any special procedures we discovered during our testing. The elements of the HPC software stack we considered include:

- General Parallel File System (GPFS) and Virtual Shared Disk (VSD)
- High Availability Cluster Multi-Processing (HACMP)
- LoadLeveler
- Parallel Engineering and Scientific Software Library (PESSL)
- Parallel Environment (PE)

5.1 High Performance Computing (HPC) transition

Figure 5-1 illustrates the order of HPC software transition. The order in the figure indicates the order at which a software product is disabled before PSSP to CSM transition and the order at which it is restarted after transition.

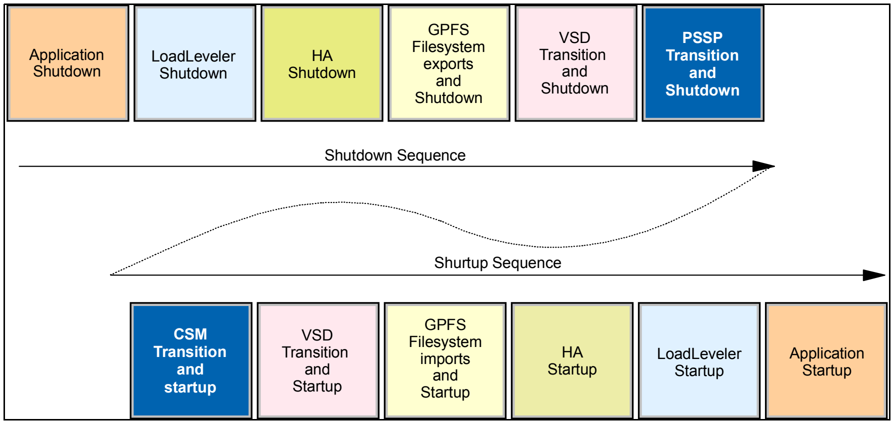

Figure 5-1 Transition order for the HPC software stack

5.2 GPFS and VSD transition

Both GPFS and VSD have transition paths. Because the internal data structure for both VSD and GPFS will change when transitioned from PSSP to CSM, some amount of transition is required for both products. However, the user data within the GPFS filesystem *does not* change during transition. Since GPFS currently supports four different cluster configurations, LC, RPD, HACMP and SP, choosing the correct configuration is essential for a successful transition. Please refer to the *General Parallel File System for Clusters: Concepts, Planning, and Installation Guide*, GA22-7968 for more detailed information about each cluster type.

> **Important:** The user data within the GPFS file system *does not* change when transitioning from PSSP to CSM. Only the internal data structures within GPFS and VSD are affected by the transition and require migration tools. The data is *not* altered by the transition from PSSP to CSM.

5.2.1 GPFS and VSD transition tools

There is a set of processes for transitioning GPFS from a PSSP to a CSM managed system. These steps are supported by a set of transition tools for both GPFS and VSD. Consider a scenario where you are planning to transition a system from PSSP to CSM and this system is running GPFS and VSD. The transition steps for VSD and GPFS are covered in both 3.3.2, "AIX 5.1/PSSP 3.4 on an existing system to AIX 5.2/CSM 1.3.3 on a new system with elements of the HPC software stack" on page 41 and "VSD scripts, in conjunction with GPFS commands" on page 248. These sections can be referenced for the actual transition steps.

5.2.2 GPFS and VSD transition scenarios

There are several possibilities for the transition of GPFS and VSD from PSSP to CSM. Some of these involve the transition tools, others do not. Depending on your hardware and future expansion of your cluster, you should consider which type of system transition you will be performing and use the appropriate transition techniques for GPFS and VSD.

Replicating GPFS on a new system

If you replace an entire PSSP-based HPC system with a new CSM based HPC system, you might also be replacing the entire GPFS system. Refer to Figure 5-2 on page 124 for an illustration of this GPFS transition. In this case, the current system is being replaced by entirely new hardware. New GPFS servers and storage are included with the new system. Since both cluster configurations exist and are online at the same time transition between the two systems is less complicated, while this configuration provides the best conditions for successful transition it is also the most expensive.

One of the benefits of having two active systems is that you can transfer data from the old system to the new system with out having any outage. Downtime is a critical factor in most environments and is eliminated in this case. In the new CSM based cluster GPFS might begin as a small file system which may grow incrementally over time. However since the old PSSP-based cluster is still available, data can be mounted to the new HPC system using NFS. By providing this connection, the CSM based system can access the existing, PSSP-based file system. However if the existing GPFS is above 250 GB, extra planning might be required to optimize the connection between the two systems to provide a fast and stable connection; this will be dependant on the required availability of the old GPFS. Users can then copy/move data from old to new. On larger configurations it would be advisable to reduce the quota hard limit as well as soft limit; this allows the system administrators to reduce the amount of storage used, forcing users to move there data rather than just copy it over, at a committed date the old GPFS system is made unavailable (residual files should be accessible by special request). In the end of the attritions phase the old GPFS system is turned off (residual files are lost).

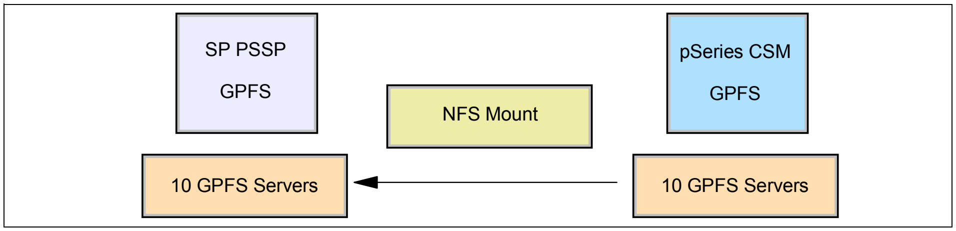

Figure 5-2 Transition of GPFS from an old HPC to new HPC system

In this type of transition, the following timetable acts as a guideline:

1. Implement the two HPC systems, each with a GPFS implementation. NFS mount the existing production system to the new system.
2. Allow a trusted user set onto the new system. These users then load data from the production system using the NFS mountpoint onto the new CSM managed GPFS configuration.
3. Once the system is verified by the trusted user set, the entire user set moves to the new system.
4. Once the entire user community has successfully tested and configured their applications on the new system, access to the old production GPFS system is removed. Files may still be moved by special request.
5. At some point, the old GPFS system is decommissioned.

Advantages:

1. The users are responsible for the file transfer. This provides a natural parallelism for file transfer. There is no coordinated file set move necessary by system administrators.
2. There is minimal risk of data loss due to the natural redundancy of the two file systems.
3. From the user point of view, data is available at all times. There is no need for the user to wait for files to be transferred to the new system by a system administrator. As soon as a user needs to use the new system, processing resources and data are available.
4. There is a natural file system cleanup. Residual files are eventually removed from the file system if no user comes forward to claim them.
5. This method is not sensitive to software levels. Since the migration tools are not used, the existing and new GPFS systems may be at different levels.

Disadvantages:

1. Since two systems are online, there are additional cost and space issues involved.
2. Resources for high bandwidth transfers might be needed.

Recommended for centers:

1. Approaching a storage or system upgrade.
2. With 24/7 system access requirements.

5.2.3 Staged GPFS and VSD move: shrink and grow

In Figure 5-3, a the new CSM system begins with a small GPFS cluster. This cluster may be created by compressing the existing GPFS cluster from the PSSP machine and using free disks to implement a new GPFS cluster on the new CSM machine. Keep in mind that there are special quorum rules that apply to both VSD and GPFS configurations.

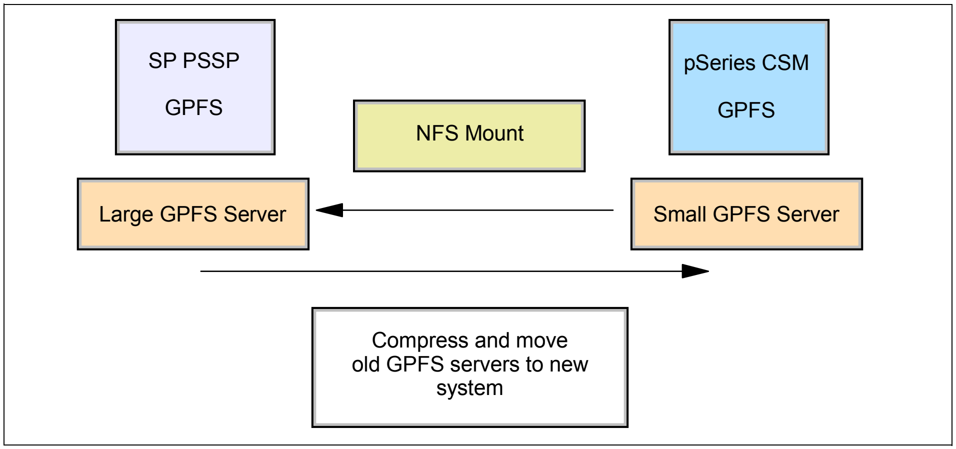

Figure 5-3 Stage GPFS and VSD move

Once the system is successfully established, users can begin to copy/move files between the two systems using a NFS mount. As files are moved the demand for storage will decrease, therefore whenever possible the GPFS administrator should reduce the amount of disks on the old GPFS configuration. Doing this will eventually shrink the size of the filesystem, however since the demand for storage increases on the new system these disks can be added to the new configuration. Eventuall, y further down the migration path, cluster nodes should be deleted and moved.

When the transition reaches its final phase, access to the old GPFS system should be eliminated, and the NFS mountpoint removed – residual files should however be available by special request (tape back-up, DVD, CD-Rom, file servers). Since this is the end of life for the old cluster, any remaining cluster components could be used on the newly created CSM cluster.

Advantages:

1. Low cost – a minimal number of nodes and storage is required to get started. Ideally, the initial server cost would be zero if the existing PSSP cluster could be reduced, since these servers could be used. However, it is required that the hardware be supported in the CSM configuration.
2. Low risk of data loss - this depends on how the files are transferred: copied or moved. If copied, they might exist on both systems for a time, providing a natural redundancy, but this method might extend the transition time due to the fact that files are duplicated rather than moved, and the requirement for storage might increase rather than decrease. Changes in quota limits on the old system as well as on the new system might be advisable. A management server (MS) is required to build a cluster managed by CSM.
3. Natural file system cleanup – unclaimed files are eventually removed.
4. Two GPFS systems available to users quickly – there may be some file size limits as transfer is underway, but access to both file systems is simultaneous

Disadvantages

1. Administrator effort – monitoring of GPFS system and successive reduction of disks and server transfer from old to new systems.
2. Some GPFS quorum risk – At the start of the new GPFS system and the end of the old GPFS system, GPFS quorum functions may be lost due to the small number of GPFS servers. This may be acceptable since at the start of the new system, data traffic is light (so frequent back-ups are possible). A similar argument holds for the end of the old GPFS system, at which point most files have been moved to the new system.
3. Transfer capacity - There might be issues with free space for very large files, and optimization of the NFS clients/demons. A fast bandwidth is recommended to ease the pain and time when coping/moving files.

Recommendations:

1. Preserving existing GPFS server hardware (including some disks).
2. Not approaching a storage upgrade. There may be newer storage on-site, which could be migrated over, or extended on the new system, then migrated.

5.2.4 GPFS and VSD in-place migration

In Figure 5-4, GPFS and VSD migration scenario, the transition tools are used to save the VSD and GPFS information. Once saved, the GPFS cluster is removed. The disks with the GPFS data are physically/logically moved to the new system. A new GPFS cluster is then configured on the new system using the output of the migration files, the VSDs are configured and activated, and the GPFS information is imported. Note that the GPFS data are NOT being migrated and will remain on the disks. Control information for VSDs and GPFS are migrated to the new environment but the actual data content in the GPFS files do NOT change.

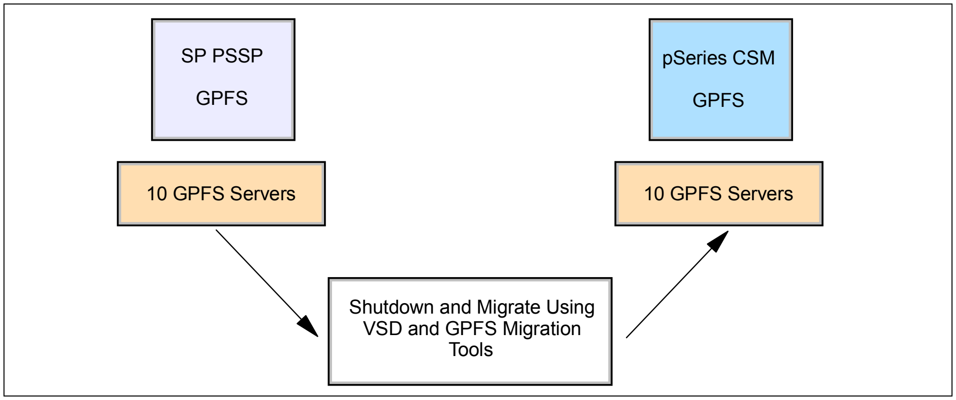

Figure 5-4 GPFS and VSD in-place migration

At a high level, the procedure consists of the following steps:

1. Unmount the GPFS file system
2. Follow the VSD transition procedure to create VSD clone and importvg data
3. Run the **mmexportfs** command in the old PSSP cluster. This extracts all the relevant GPFS configuration information, as well as VSD-related data from the SDR and stores it into a user-specified file to be used in subsequent steps. For more details on VSD processes, please refer to Chapter 3, “Process steps for transition” on page 37.
4. Move (re-cable) the disks as necessary.
5. Use the VSD transition script that will import the VGs, configure RVSD, define VSDs. For more information, please refer to Chapter 3, “Process steps for transition” on page 37.
6. Run the **mmimportfs** command in the new RPD cluster, which:
   - Verifies that there are no naming conflicts.
   - Recreates the GPFS control structures in the new cluster.

7. Mount the GPFS filesystem

Advantages:

1. No GPFS data transfer time.
2. No new hardware
3. In case of a required fallback VSD configuration is easy to restore

Disadvantages:

1. Longer down time – during transition, VSD and GPFS is needs to be stopped.
2. Migration Risks – Planning is essential, any problems while configuring the system could result in a painful and time consuming migration. Any migration issues will be with the VSD or GPFS control information only. Since the GPFS data remains on the disks untouched during the entire migration the risk of data loss is reduced considerably.
3. This migration requires specific software installed in order use the migration tools. The existing production system must have at the following software levels installed and operational on the CWS - AIX 5.2, PSSP 3.5, GPFS 2.2(ptf 1). The new system must have at least the following software levels AIX 5.2, CSM 1.3.3, GPFS2.2 (ptf1) and VSD 4.1.

5.3 High Availability Cluster Multi-Processing (HACMP)

High Availability Cluster Multi-Processing (HACMP) software can be utilized in a standalone environment or with IBMs systems management software, PSSP and CSM. Since HACMP is a key component of your overall system and keeps your applications highly available, it can be used in the same manner during your transition effort from PSSP to CSM. HACMP can help you minimize disruption of application processing that is so valuable to your business.

Your HACMP cluster can remain active during a transition where the same hardware is being used if the applications that HACMP is keeping highly available are also independent of PSSP and CSM. If you need to keep your production application active during the transition, HACMP cluster management tools can be used to move your application between nodes. Once the application is active on the back-up node, you can continue through the transition tool steps on the primary node. This minimizes disruption to your application during the transition window.

If the applications kept highly available by HACMP are dependent on PSSP and CSM, you should follow the proper procedures to stop the application and the HACMP cluster prior to running the PSSP to CSM transition tools. Once you have finished your transition from PSSP to CSM along with transitioning your applications, you can restart the HACMP cluster. Refer to the *HACMP for AIX: Planning and Installation Guide*, SC23-4861 for more information on starting and stopping the HACMP cluster.

Transition and HACMP versions

HACMP/ES 4.5 and HACMP 5.1 clusters are supported on installations where PSSP 3.5 or CSM 1.3.3 is being used for systems management. When transitioning from PSSP to CSM, there are no special requirements placed on your HACMP cluster. HACMP has no direct dependencies on CSM and can be outside of the transition window.

If you are running on an HACMP Classic (HAS) 4.5 or earlier version of HACMP and want to migrate to a later version, please refer to the HACMP documentation for migration in the *HACMP for AIX: Planning and Installation Guide*, SC23-4861.

Restriction: HACMP is not supported with the HPS interface.

Transition options using HACMP

HACMP can be used in conjunction with other transition planning procedures to minimize your application outage window during a transition from PSSP to CSM. See the following examples:

1. If you are transitioning from PSSP to CSM and continuing to use the same hardware, then HACMP can keep your application highly available if the application is independent of PSSP and CSM (for example, not dependent on the SP switch). HACMP will manage the moving of your application to a different cluster node, allowing its primary node to be transitioned from PSSP to CSM. See the *HACMP for AIX: Planning and Installation Guide*, SC23-4861 for more information.
2. HACMP can also be used to minimize disruption of application processing during an AIX upgrade that may be required for CSM. To do this, follow the HACMP steps to fail over your application from its primary node to its back-up, leaving the primary node available for an AIX upgrade. For more information, refer to the HACMP documentation in the *HACMP for AIX: Planning and Installation Guide*, SC23-4861.

Transition considerations for HACMP

Depending on how HACMP is configured on your PSSP system, there may be changes required to remove HACMPs dependency on PSSP prior to removing PSSP during transition (for example, when PSSP is removed by the Transition Removal Utilities and HACMP remains).

Here are two cases where HACMP is found to be dependent on PSSP:

1. Nodes using HACMP enhanced security: The nodes being used with HACMP may have been configured to use HACMP enhanced security. If this is the case, then HACMP is dependent on PSSP should a failover occur. Instructions have been added below that allow you to dynamically disable enhanced security to standard security while HACMP is running. Once it is changed to standard security, PSSP can be removed without affecting HACMP.
2. Nodes dependent on the SP switch: If HACMP is dependent on the SP switch, then HACMP is dependent on PSSP should a failover occur. In this case, it would not be recommended to remove PSSP with HACMP still running and watching over your applications.

When it is determined from the cases above that HACMP and the application that HACMP is keeping highly available, are or have been made to be independent of PSSP, then HACMP and the application workload can continue while the PSSP to CSM transition tools are being used.

Determining and changing security level used in an HACMP configuration: HACMP administrators can choose between standard security and enhanced security. Enhanced security relies on the Kerberos setup and authentication provided by PSSP. There is no agent or mechanism for HACMP to detect that a customer has performed a PSSP to CSM transition which effectively disables HACMPs ability to use enhanced security. Therefore, you need to change your HACMP configuration to use standard security before starting PSSP to CSM transition

Determining and changing security level used in an HACMP configuration: HACMP users can choose between standard security and enhanced security. Enhanced security relies on the Kerberos setup and authentication provided by PSSP. There is no agent or mechanism for HACMP to detect that a customer has performed a PSSP to CSM transition which effectively disables HACMPs ability to use enhanced security. Therefore, you need to change your HACMP configuration to use standard security before starting their PSSP to CSM transition. To determine if your HACMP configuration is using standard or enhanced security:

1. Run the Analysis Node Report. See 2.2.1, “Analysis tools” on page 17 to learn how to create this node report. Refer to the: **mkpssprpt** and **mknoderpt** output reports in Appendix C, “Transition tools sample outputs” on page 145 to view an example node report.
2. Check the HACMP Information for Reachable Nodes section of this report which displays your HACMP nodes and the security setting they have enabled. Example 5-1 on page 131 is an excerpt of the report that details the HACMP security mode chosen on the nodes

Example 5-1 An excerpt that details the HACMP security mode

```
HACMP Information for Reachable Nodes
-------------------------------------
Node Filesets Security level
---------------------------------
3 Installed Enhanced
5 Installed Not Configured
7 Not Installed Not Configured
17 Installed Standard
21 Installed Not Configured.
```

To set the HACMP security mode:

1. Enter the fast path: **smitty cl_admin**
2. Select HACMP Security and Users Management -> Change/Show HACMP Security Mode. The Change/Show HACMP Security SMIT screen appears.
3. Set the security mode to standard.
4. Synchronize the cluster.

For more information, refer to the *HACMP for AIX: Administration and Troubleshooting Guide*, SC23-4862 regarding HACMP security modes.

5.4 LoadLeveler

The transition of LoadLeveler (LL) from PSSP to CSM is facilitated by the ability of LL 3.2 to operate in both the PSSP (3.5) and CSM 1.3.3 environments. Since the same LL software package may be used in both instances, the new level may be verified on the existing PSSP system prior to making the change to CSM. In addition, functional changes between LL 3.1 and LL 3.2 are quite minor. Upgrading along this path should present few scheduling problems. For details of functional changes in LL 3.2, refer to *LoadLeveler Version 3 Release 2: Using and Administering*, SA22-7881.

During the transition from PSSP to CSM, the only major change which needs to be considered for LL concerns the point at which LL obtains system information. Under the PSSP system, LL obtains information from the SDR while under CSM, LL obtains information from the RPD. In PSSP, there is an LL command used to extract information from the SDR for placement in the LoadL_admin file. **llextSDR** extracts machine and adapter information from the cluster. These data are added to the LoadL_admin for use by LL.

In CSM, the functions of the SDR as a link into system information for LL is replaced by the RPD. So, the command used to extract data from the machine has also changed. LL now uses **llextRPD** as a functional replacement for the old **llextSDR** command. **llextRPD** will query the RPD and produce output in the form of machine and adapter records for inclusion in the LoadL_admin file.

> **Tip:** We have found it efficient to define the RPD on the entire set of nodes we planned to use in our cluster. This made it easy to include nodes later within LL.

There is a new feature within LL 3.2 which makes using **llextRPD** even easier. If **llextRPD -m** is run, only the machine records are produced. By including only these records in LoadL_admin without any adapter stanzas, LL knows to query the SDR for any necessary adapter access. This feature is nice because the LoadL_admin file contains less information, administration is simplified, and the adapter data are returned dynamically.

Since only the machine and adapter records are changed in LL under CSM, the majority of the LL configuration in the LoadL_admin and Loadl_config files can be maintained during the transition. Site-specific items such as job classes, and user limits may be preserved during the transition. Note that LL will be shutdown when a machine is undergoing transition and the job queue should be empty. There is no utility for preserving the waiting job queue during transition. Any idle jobs will be lost during transition.

For additional information on LoadLeveler (LL) commands, please refer to *LoadLeveler Version 3 Release 2: Using and Administering*, SA22-7881. For information on LL during PSSP to CSM transition, please refer to *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

5.5 PE and PESSL

Changes to both PE and PESSL are minor for the transition from PSSP to CSM. For PE, please refer to 2.8.4, “Parallel Environment (PE)” on page 34; for Parallel ESSL, please refer to 2.8.5, “Parallel Engineering and Scientific Software Library (ESSL)” on page 34.

A

How to configure monitoring in CSM from pman subscriptions

This appendix is an extension of the examples found in Chapter 4, “Implications of transition” on page 93. We list old pman subscriptions and go through the examples on how to achieve the same monitoring conditions in CSM.

This appendix contains the following:

Switch responds check

Example A-1 checks for switch responds on the nodes.

Example: A-1 Switch responds check in PSSP

```
pmandef -s "switch_responds"  \
    -e "IBM.PSSP.Response.Switch.state:NodeNum=*:X==0"  \
    -r 'X!=0'   \
    -c '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -C '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -n 0 -U root
[[ $? -ne 0 ]] && print -u2 "Problem with switch_responds" && exit 1
```

For this monitoring, we use "AnyNodeSwitchResponds" condition and "LogCSMEventsAnyTime" response in CSM as shown in Example A-2. Therefore we only make use of condition, response and start monitoring.

Example: A-2 Switch responds check in CSM

```
<Create condition>
Use "AnyNodeSwitchResponds"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "AnyNodeSwitchResponds" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "AnyNodeSwitchResponds" "LogCSMEventsAnyTime"
```

/ (root) fs full check

When the usage of / filesystem exceeds 95%, the event is triggerred and recorded to a log as shown in Example A-3. And when the usage becomes 80%, the event is rearmed. The rearm of the monitor is also logged.

Example: A-3 / fs full check in PSSP

```
vgName="rootvg"
lvName="hd4"

pmandef -s "root_usage"  \
    -e "IBM.PSSP.aixos.FS.%totused:NodeNum=*;VG=$vgName;LV=$lvName:X>95"  \
```

```
    -r 'X<80'   \
    -c '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -C '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -n 0 -U root
[[ $? -ne 0 ]] && print -u2 "Problem with root_usage" && exit 1
```

For monitoring this event, there is no suitable default condition. We have to create new condition. We use the "LogCSMEventsAnyTime" for a response as show in Example A-4.

Example: A-4   / fs full check for nodes in CSM

```
<Create condition>
# mkcondition -r IBM.FileSystem \
-e "PercentTotUsed > 95" \
-E "PercentTotUsed < 80" \
-s 'Name=="/"' -S c -m m "AnyNodeRootSpaceUsed"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "AnyNodeRootSpaceUsed" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "AnyNodeRootSpaceUsed" "LogCSMEventsAnyTime"
```

Additionally, we need to create a separate condition for the management server (MS) and the nodes as shown in Example A-5. This is covered in the /tmp monitoring examples in Chapter 3, “Process steps for transition” on page 37**.**.

Example: A-5   / fs full check for MS in CSM

```
<Create condition>
# mkcondition -r IBM.FileSystem \
-e "PercentTotUsed > 95" \
-E "PercentTotUsed < 80" \
-s 'Name=="/"' -S i -m l "root space used"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "root space used" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "root space used" "LogCSMEventsAnyTime"
```

Tip: When you create new conditions, you can see the sample **mkcondition** command with the default condition by using the **lscondition -C** <default condition name> command. You can also copy and change the existing condition to a new condition. Please see "hardmon monitor on CWS check" on page 137 to see how to copy and change existing conditions.

Page space usage check

In Example A-6, when the usage of paging space exceeds 90%, the event is triggered and recorded to a log. When the usage becomes 85%, the event is rearmed and logged.

Example: A-6 Page space usage check in PSSP

```
pmandef -s "page_space_usage"  \
    -e "IBM.PSSP.aixos.PagSp.%totalused:NodeNum=*:X>90"  \
    -r 'X<85'   \
    -c '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -C '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -n 0 -U root
[[ $? -ne 0 ]] && print -u2 "Problem with page_space_usage" && exit 1
```

For Example A-7, we use the "AnyNodePagingPercentSpaceFree" condition and "LogCSMEventsAnyTime" responses for the nodes.

Example: A-7 Page space usage check for nodes in CSM

```
<Create condition>
Use "AnyNodePagingPercentSpaceFree"
# chcondition -E "PctTotalPgSpFree > 20" "AnyNodePagingPercentSpaceFree"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "AnyNodePagingPercentSpaceFree" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "AnyNodePagingPercentSpaceFree" "LogCSMEventsAnyTime"
```

Alternatively, we use the "Paging percent space free" condition and the "LogCSMEventsAnyTime" response as shown in Example A-8 on page 137 for the MS as described in , "Switch responds check" on page 134.

Example: A-8 Page space usage check for MS in CSM

```
<Create condition>
Use "Paging percent space free"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "Paging percent space free" "LogCSMEventsAnyTime"

<Start monitoring>
# startcondresp "Paging percent space free" "LogCSMEventsAnyTime"
```

hardmon monitor on CWS check

This monitor checks the hardmon daemon response. The hardmon daemon monitors and controls the state of the SP hardware as shown in Example A-9. The IBM.HWCTRLRM daemon is equivalent to hardmon daemon in CSM.

Example: A-9 hardmon monitor on CWS check in PSSP

```
pmandef -s "hardmon_monitor"  \
-e "IBM.PSSP.Prog.xpcount:NodeNum=0;ProgName=hardmon;UserName=root:X@0==0" \
    -r 'X@0>0'   \
    -c '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -C '/usr/lpp/ssp/bin/log_event /var/adm/SPlogs/pman/pmevent.log' \
    -n 0 -U root
[[ $? -ne 0 ]] && print -u2 "Problem with hardmon_monitor" && exit 1
```

For Example A-10, there is no suitable default condition. We need to create new condition. "LogCSMEventsAnyTime" is used as a response.

Example: A-10 IBM.HWCTRLRM monitor on MS check in CSM

```
<Create condition>
Copy "Inetd daemon state" and create "IBM.HWCTRLRM state"
# mkcondition -c "Inetd daemon state" \
-s "ProgramName == \"IBM.HWCTRLRM\" && Filter == \"ruser==\\\"root\\\"\"" \
"IBM.HWCTRLRM state"

<Create response>
Use "LogCSMEventsAnyTime"

<Create condition with response> (option)
# mkcondresp "IBM.HWCTRLRM state" "LogCSMEventsAnyTime"
```

```
<Start monitoring>
# startcondresp "IBM.HWCTRLRM state" "LogCSMEventsAnyTime"
```

Tip: In your system, hags and hats may be monitored. In CSM, Group services and Topology services are not used.

Important: The later part of the **-s** flag in the **mkcondition** command has a dependency on your LANG environment variable. Please check the value is valid by using the **lscondition -C "Inetd daemon state"** command on your environment.

B

Hints and tips

This appendix contains recommendations (hints and tips) discovered while transitioning Clusters managed by PSSP to clusters managed by CSM.

Here are our recommendations

Hints and tips from our transition experiences:

- Running **cfgcfmutils** without checking (or editing, if required) the fc.stanza file may cause many problems. *Do not do it*. Also, if you run **cfgcfmutils** more than *twice*, it leads to unexpected back-up file behavior. Please refer to Chapter 4, “Implications of transition” on page 93 for details.
- According to accepted definitions, additional adapters in PSSP are known as secondary adapters in CSM. However, the transition tools use the two terms interchangeably, regardless of the system. Therefore, in terms of the transition tools, additional adapters equal to secondary adapters.
- Regarding legacy switches: SP switches prior to the IBM @server High Performance Switch (HPS) are not supported by CSM, and the HPS is not supported by PSSP. If you are performing an in-place transition, you must physically remove the unsupported switch cards and cables from your cluster prior to installing CSM. As such an operation requires an IBM CE, remember to build such a requirement into your transition planning.
- Sample scripts provided with CSM: as of CSM 1.3.3, sample configuration scripts are provided for NTP, Automount and network tuning. Please refer to chapter 1 of the *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919.
- Cluster startup and shutdown: at the time of this publication, CSM does not provide scripts to manage this function. It does however provide framework to implement such a requirement. An example implementation is detailed in appendix B of the *CSM Guide for the PSSP System Administrator,* SG24-6953.
- On large clusters, use the command **wc -l fc.stanza** compared to **tar -tvf fc.tar | wc -l.** These commands should output identical word counts if the tool has generated the correct fc.tar.
- Transition tool de-installation: when the transition has been performed the administrator may want to de-install the tools from the system. The tools and related files reside on the management server (MS) in the following directories:
  - /opt/pssp_to_csm
  - /var/log/pssp_to_csm
  - /var/opt/pssp_to_csm

  The transition tools fileset pssp.pssp_to_csm can be removed using **installp** at the command line or via smitty.

Important: The directories listed above and the a lot of the data within these directories are not removed by de-installing the tools. Currently you will have to removed the directories manually.

- When considering transitioning to a CSM-based cluster, either by a transition of your existing environment from PSSP to CSM or by purchasing new hardware, it is very important to understand PSSP, CSM, and your own environment. Architects and administrators need to understand the following:
  - The differences between the two clustering products and how they relate to your specific environment.
  - The functions your environment provides, both on a cluster level and on an application level.
  - What the transition tools actually provide. CSM is not a one-to-one product in comparison to PSSP--some configuration features can be transitioned from PSSP to CSM, but others cannot.
- Transitioning from PSSP to CSM, through whatever path your particular requirements take you, should be seen as the biggest change to your clustered environment since its installation. This transition is not comparable to upgrading from one version of AIX or PSSP to another; it is a more significant change than that. The transition tools cannot know or cope with all possible customer cluster configurations, some of which may be lost or may need to be rewritten in your new CSM environment.
- Compared to PSSP, CSM provides a modular framework to achieve many configuration goals; however, CSM does not always provide you with the method or means to achieve those goals. PSSP and CSM are solutions that may achieve the same end result, but each has its own method of arriving at the same destination.

General recommendations

Keep the following general recommendations in mind before transitioning from a Cluster 1600 managed by PSSP to a Cluster 1600 managed by CSM:

- Back up your system, file systems, and application data prior to transitioning.
- Pay attention to the various software levels for AIX, PSSP, and the High Performance Computing (HPC) software stack tools, because there are many combinations to consider.
- **`rmpssp`** removes /spdata/sys1, so be sure to back up all data you want to preserve before you remove PSSP.
- Partition-bound node groups are not supported under CSM; only global node groups are supported. However, the configuration recording tool collects both types. Be aware that there is an option to implement existing partition-bound node groups as global node groups under the new CSM system.
- Consider using mirrored rootvg and alternate disk install as a method for backing up your system during transitioning.
- A back-up or contingency plan needs to be considered when transitioning the PSSP cluster. The contingency plan must be tested before the actual transition is attempted.

Keep the following recommendations about the reporting tools in mind when transitioning from a Cluster 1600 managed by PSSP to a Cluster 1600 managed by CSM.

Reporting tools (`mkpssprpt` and `mknoderpt`):

- In the reporting tools, there is a flag that allows you to generate the report in HTML format. We recommend that you use HTML format, as it is easier to identify individual sections of the report.
- If you use problem management (PMAN) subscriptions, you need to know the location of the subscription scripts. Why? Because the **`mkppsprpt`** tool extracts the subscriptions from the system data repository (SDR), but does not provide the location of the script files.

Keep the following recommendations about the Network Installation Manager (NIM) in mind when transitioning from a Cluster 1600 managed by PSSP to a Cluster 1600 managed by CSM.

Network Installation Manager (NIM):

- **`rmpssp`** removes NIM from the CWS, so reinstallation of NIM is required during the transition from PSSP to CSM.

- Because NIM is removed from the control workstation (CWS), and any related NIM configuration is removed from the nodes, we recommend that you back up the NIM configuration data before the removal tools are run.
- NIM configuration information can be useful in helping you to install and administer the software in your CSM cluster, and you can use NIM commands (such as **lsnim**) to analyze the current NIM configuration on your PSSP cluster.

Users of the High Performance Computing (HPC) software stack should keep the following recommendations in mind before transitioning from a Cluster 1600 managed by PSSP to a Cluster 1600 managed by CSM.

High Performance Computing (HPC) software stack recommendations

- You must clearly understand the configuration of the different LPPs in the HPC software stack before transitioning - this is imperative when dealing with Virtual Shared Disks (VSD) or a General Parallel File System (GPFS), because if a mistake is made while transitioning VSD and GPFS, your data may be lost.
- Stop and drain LoadLeveler before transition to ensure that there are no jobs on the queue, and shut down all daemons.
- Develop a job test suite as a quick verification of successful transition.
- When considering a GPFS transition, and if you use **mmexportfs**/**mmimportfs** - be sure to take back-ups! In case something fails, you'll need back-ups in order to preserve your data on the file system.

C

Transition tools sample outputs

This appendix shows the output files that are generated by the transition tools. Each section also has a short description of the output with added observations.

This appendix contains the following sections:

Map of logs and saved files for each tool

This section contains a list of files and logs that each tool generates.

1. **mkpssprpt**

   Location: CWS

   a. /var/log/pssp_to_csm/mkpssprpt.<timestamp>.log

2. **mknoderpt**

   Location: CWS (what can be seen on the screen is split into separate logs)

   a. /var/log/pssp_to_csm/mknoderpt.<timestamp>.log (log without node detail)

   b. /var/log/pssp_to_csm/nodedetails/<nodename>.log (node detail. This is the data that is located between "`mknoderpt: Collecting Node Exceptions & Report complete.`" in log **a**.)

   Location: Node

   c. /var/log/pssp_to_csm/rmpssp.log (this shows **rmpssp** with **-c** (prerequisite flag) as used in underlying report code.)

3. **mkcfgutils**

   This tool does not have a log. Although this creates a back-up of all the files is creates in /var/opt/pssp_to_csm/backup on the CWS.

4. **rmpsspnode**

   Location: CWS

   a. /var/log/pssp_to_csm/rmpsspnode.log.

   b. /var/log/pssp_to_csm/nodedetails/<nodename>.<timestamp>.log

      Location: Node

      > **Note:** The rmsaved may put a TS on the rmsaved directory, but we did not test this.

   c. c) /var/log/pssp_to_csm/rmpssp.log

   d. b) /var/opt/pssp_to_csm/rmsaved (this is where the files that are altered by rmpssp, which is run by rmpsspnode, are saved)

5. **rmpssp**

   Location: CWS

   a) /var/log/pssp_to_csm/rmpssp.log

b) /var/opt/pssp_to_csm/rmsaved (same as above, if run more that once it will generate a /var/opt/pssp_to_csm/rmsaved.<timestamp> directory.)

6. **cfgcfmutil**

   Location: CWS

   a) /var/log/pssp_to_csm/cfgcfmutil.<timestamp>.log

Example output from running mkpssprpt

Example C-1 shows the output of the **mkpssprpt** tool. If the command fails, the errors are logged on the screen and in a log file, /var/log/pssp_to_csm/mkpssprpt.<timestamp>.log, as discussed in "Map of logs and saved files for each tool" on page 146.

Example: C-1 Example of running mkpssprpt

```
# mkpssprpt
mkpssprpt: Collecting Site Wide Configuration......done
mkpssprpt: Collecting Frame Configuration......done
mkpssprpt: Collecting Node Configuration......done
mkpssprpt: Collecting SP LAN and Secondary Adapter Configuration......done
mkpssprpt: Collecting Switch Configuration......done
mkpssprpt: Collecting Node Group Configuration......done
mkpssprpt: Collecting Security Configuration......done
mkpssprpt: Collecting User Management Configuration......done
mkpssprpt: Collecting Automount Configuration......done
mkpssprpt: Collecting Installation and Boot Configuration......done
mkpssprpt: Collecting Cstartup and Cshutdown Configuration......done
mkpssprpt: Collecting Accounting Configuration......done
mkpssprpt: Collecting Network Time Protocol (NTP) Configration......done
mkpssprpt: Collecting Event Management (EM) Configuration......done
mkpssprpt: Collecting Problem Management (PMAN) Configuration......done
mkpssprpt: Collecting NIM Configuration......done
mkpssprpt: Completed successfully
mkpssprpt: Report file written to
/var/opt/pssp_to_csm/data/pssprpt.20040506154311.txt
mkpssprpt: Log file written to
/var/log/pssp_to_csm/mkpssprpt.20040506154311.log
```

Example log file from running mkpssprpt

The log file is located in /var/log/pssp_to_csm/mkpssprpt.<timestamp>.log. Example C-2 shows the output log file from the **mkpssprtp** tool.

Example: C-2 Output of log file from mkpssprpt

```
root@sp4cws:/: cat /var/log/pssp_to_csm/mkpssprpt.20040506154311.log
mkpssprpt: Program start 15:43:11
mkpssprpt: Collecting Site Wide Configuration......done
mkpssprpt: Collecting Frame Configuration......done
mkpssprpt: Collecting Node Configuration......done
mkpssprpt: Collecting SP LAN and Secondary Adapter Configuration......done
mkpssprpt: Collecting Switch Configuration......done
mkpssprpt: Collecting Node Group Configuration......done
mkpssprpt: Collecting Security Configuration......done
mkpssprpt: Collecting User Management Configuration......done
mkpssprpt: Collecting Automount Configuration......done
mkpssprpt: Collecting Installation and Boot Configuration......done
mkpssprpt: Collecting Cstartup and Cshutdown Configuration......done
mkpssprpt: Collecting Accounting Configuration......done
mkpssprpt: Collecting Network Time Protocol (NTP) Configration......done
mkpssprpt: Collecting Event Management (EM) Configuration......done
mkpssprpt: Collecting Problem Management (PMAN) Configuration......done
mkpssprpt: Collecting NIM Configuration......done
mkpssprpt: Completed successfully
mkpssprpt: Report file written to
/var/opt/pssp_to_csm/data/pssprpt.20040506154311.txt
mkpssprpt: Log file written to
/var/log/pssp_to_csm/mkpssprpt.20040506154311.log
```

Example output from running mknoderpt

When the **mknoderpt** command runs, as shown in Example C-3, basic output is logged in the log file /var/log/pssp_to_csm/mknoderpt.<timestamp>.log. Standard error output and node details are logged in more detail in /var/log/pssp_to_csm/nodedetails/<nodename>.log. Standard errors and standard output are logged to the screen at the time of running.

The location of the logs is discussed in "Map of logs and saved files for each tool" on page 146.

Example: C-3 Example of running mknoderpt

```
root@sp4cws:/: mknoderpt
mknoderpt: Log file written to
/var/log/pssp_to_csm/mknoderpt.20040504152819.log
mknoderpt: Collecting BIS Node List......done
mknoderpt: Collecting Active File Collections......done
mknoderpt: Collecting File Collection File List......done
mknoderpt: Collecting List of File for Transfer
...One Moment, Scanning user.admin
One Moment, Scanning node.root
One Moment, Scanning power_system
...done
mknoderpt: Collecting Node Exceptions
...p650_A: rmpssp: Pre-requisite check status: ssp.basic is installed.
 p650_A: rmpssp: Pre-requisite check status: Passed dependent filesets check.
 p650_A: rmpssp: Pre-requisite check status: SDR can be accessed.
 p650_A: rmpssp: Pre-requisite check status: Node number can been read.
 p650_A:        mknoderpt: HACMP filesets not installed.
 p650_A: rmpssp: The "Pre-requisite Check" subroutine completed succesfully.

check_each_node: rmpssp completed successfully on node 1.
p650_B: rmpssp: Pre-requisite check status: ssp.basic is installed.
 p650_B: rmpssp: Pre-requisite check status: Passed dependent filesets check.
 p650_B: rmpssp: Pre-requisite check status: SDR can be accessed.
 p650_B: rmpssp: Pre-requisite check status: Node number can been read.
 p650_B:        mknoderpt: HACMP filesets not installed.
 p650_B: rmpssp: The "Pre-requisite Check" subroutine completed succesfully.

check_each_node: rmpssp completed successfully on node 33.
p650_D: rmpssp: Pre-requisite check status: ssp.basic is installed.
 p650_D: rmpssp: Pre-requisite check status: Passed dependent filesets check.
 p650_D: rmpssp: Pre-requisite check status: SDR can be accessed.
 p650_D: rmpssp: Pre-requisite check status: Node number can been read.
 p650_D:        mknoderpt: HACMP filesets not installed.
 p650_D: rmpssp: The "Pre-requisite Check" subroutine completed succesfully.
```

```
check_each_node: rmpssp completed successfully on node 49.
...done
Report complete.
mknoderpt: Report file written to
/var/opt/pssp_to_csm/data/noderpt.20040504152819.txt
mknoderpt: Log file written to
/var/log/pssp_to_csm/mknoderpt.20040504152819.log
```

Example log from running mknoderpt

This is the standard log file location for the **mknoderpt** command as shown in Example C-4, /var/log/pssp_to_csm/mknoderpt.<timestamp>.log. This log file is also discussed in “Map of logs and saved files for each tool” on page 146.

Example: C-4 Log file /var/log/pssp_to_csm/mknoderpt.<timestamp>.log

```
cat mknoderpt.20040426113205.log
mknoderpt: Program start 11:32:05
mknoderpt: Log file written to
/var/log/pssp_to_csm/mknoderpt.20040426113205.log
mknoderpt: Collecting BIS Node List......done
mknoderpt: Collecting Active File Collections......done
mknoderpt: Collecting File Collection File List......done
mknoderpt: Collecting List of File for Transfer
...One Moment, Scanning user.admin
...done
mknoderpt: Collecting Node Exceptions

Report complete.
mknoderpt: Report file written to
/var/opt/pssp_to_csm/data/noderpt.20040426113205.htm
mknoderpt: Log file written to
/var/log/pssp_to_csm/mknoderpt.20040426113205.log
```

For more details, please refer to “Example log file from rmpssp” on page 193.

Example PSSP analysis report from mkpssprpt

This is a text example of running the **mkpssprpt** command. The file name is /var/opt/pssp_to_csm/data/pssprpt.20040503160038.txt. The contents of the log are shown in Example C-5. The log information is discussed in "Map of logs and saved files for each tool" on page 146.

Example: C-5 report file /var/opt/pssp_to_csm/data/pssprpt.20040503160038.txt

```
PSSP Analysis Report
CWS name: sp4cws
Date & Time:  Mon May  3 16:00:38 EDT 2004



Site Wide Configuration
=======================



SP Information
--------------

SDR Attribute Name   = Value
------------------   = -----
admin_locale         = en_US
code_version         = PSSP-3.5
control_workstation  = sp4cws
cw_ipaddrs           = 192.168.100.178:192.168.44.210
cw_lppsource_name    = aix520
filecoll_config      = true
IsPartitionable      = false
layout_dir           = ""
primary_node         = 1
SDR_ASCII_only       = true
SP_serial_number     = ""
SP_type_model        = ""
spacct_enable        = true
usermgmt_config      = true



HACWS Configuration
-------------------
There is no HACWS configuration present on the system.



SDR Attribute Name  = Value
```

```
------------------  = -----
active_cw           = ""
backup_cw           = ""
ipaddrs_bucw        = ""



Partition Information
---------------------

syspar_name ip_address      syspar_dir code_version
---------------------------------------------------
sp4cws      192.168.100.178 ""         PSSP-3.5


          *******************************************


Frame Configuration
===================


SDR Attribute Name  = Value              Value          Value          Value
------------------  = -----              -----          -----          -----
frame #             = 1                  2              3              4
tty                 = ""                 ""             ""             ""
frame_type          = ""                 ""             ""             ""
MACN                = sp4cws             sp4cws         sp4cws         sp4cws
backup_MACN         = ""                 ""             ""             ""
slots               = 16                 16             16             16
frame_in_config     = ""                 ""             ""             ""
snn_index           = ""                 ""             ""             ""
switch_config       = ""                 ""             ""             ""
hardware_protocol   = HMC                HMC            HMC            HMC
control_ipaddrs     = 192.168.100.69     192.168.100.69 192.168.100.69 192.168.100.69
domain_name         = p650_A             p650_B         p650_C         p650_D


List of Nodes in Frames
-----------------------

Frame Name:
   Nodes

Frame 1:
   p650_A

Frame 2:
   p650_B
```

```
Frame 3:
   p650_C

Frame 4:
   p650_D


         *******************************************


Node Configuration
==================


Partition sp4cws
----------------


Supported on CSM with Hardware Control
......................................

node # rel hostname    init hostname   hdw_enet_addr code ver   lppsource    description
LPAR_name  exp nodes
-----------------------------------------------------------------------------------------------
---------------------
1      p650_A          p650_A          0002553A068C  PSSP-3.5   aix520       7038-6M2
p650_A     ""
17     p650_B          p650_B          0002553A0619  PSSP-3.5   aix520       7038-6M2
p650_B     ""
33     p650_C          p650_C          0002553A062C  PSSP-3.5   aix520       7038-6M2
p650_C     ""
49     p650_D          p650_D          0002553A07DB  PSSP-3.5   aix520       7038-6M2
p650_D     ""


Supported on CSM without Hardware Control
.........................................
None Found


Not Supported on CSM
....................
None Found


CSM Support Status Unknown
..........................
None Found
```

```
Expansion Node Configuration
............................
None Found

         *******************************************


SP LAN and Secondary Adapter Configuration
==========================================


Partition sp4cws
----------------


SP LAN Adapters
---------------

node # adapter_type netaddr         subnet          netmask         other_addrs
location
-----------------------------------------------------------------------------------------------
------------
1      en0          192.168.100.77  192.168.100.0   255.255.255.0   ""
U0.1-P2/E1
17     en0          192.168.100.78  192.168.100.0   255.255.255.0   ""
U0.1-P2/E1
33     en0          192.168.100.81  192.168.100.0   255.255.255.0   ""
U0.1-P2/E1
49     en0          192.168.100.80  192.168.100.0   255.255.255.0   ""
U0.1-P2/E1


Secondary Adapters
------------------

node # adapter_type netaddr         subnet          netmask         other_addrs
location
-----------------------------------------------------------------------------------------------
------------
1     en1        192.168.10.10  192.168.10.0   255.255.255.0   ""                ""
17    en1        192.168.10.11  192.168.10.0   255.255.255.0   ""                ""
33    en1        192.168.10.12  192.168.10.0   255.255.255.0   ""                ""
49    en1        192.168.10.13  192.168.10.0   255.255.255.0   ""                ""

         *******************************************
```

```
Switch Configuration
====================


Partition sp4cws
----------------

node # adptr css_type       netaddr         subnet          netmask         othr addrs
ucode ver    location
------------------------------------------------------------------------------------------------
--------------------


Aggregate IPs
-------------
None Found


Extension Node Configuration (SP Switch Router)
-----------------------------------------------


Node Configuration
..................
None Found


Adapter Configuration
.....................
None Found

         *******************************************


Node Group Configuration
========================
Nested Node Group names marked with *'



System Node Groups
------------------
Group Name:
   Nodes

Group_1:
   p650_A
   p650_B
```

```
Group_2:
   p650_C
   p650_D

Group_All:
   Group_1*
   Group_2*
   Group_3*



Partition sp4cws
----------------


Node Groups
...........
Group Name:
   Nodes

Partition_1:
   p650_A
   p650_B

Partition_2:
   p650_C
   p650_D

Partition_All:
   Partition_1*
   Partition_2*
   Partition_3*

         *******************************************


Security Configuration
======================


General
-------

authent_server sec_master passwd_file_loc cw_dcehostname cds_server cell_name
-----------------------------------------------------------------------------
ssp            ""         sp4cws          ""             ""         ""
```

```
RRA and Remote Command Setup
----------------------------

restrict_root_rcmd rcmd_pgm dsh_remote_cmd remote_copy_cmd
-----------------------------------------------------------
false              rsh      ""             ""


Sysctl Configuration
--------------------

Subsystem Group PID   Status
----------------------------
sysctld   ""    20646 active

Related Files Found:
   /etc/logmgt.acl
   /etc/sysctl.acl
   /etc/sysctl.haem.acl
   /etc/sysctl.install.acl
   /etc/sysctl.pman.acl
   /etc/sysctl.rootcmds.acl



Secure File Collections Configuration
-------------------------------------

filecoll_config supman_passwd_enabled
-------------------------------------
true            true


PSSP Authentication Methods
---------------------------

syspar_name auth_install auth_root_rcmd ts_auth_methods auth_methods
---------------------------------------------------------------------
sp4cws      k4:std       k4:std         compat          k4:std


HMC ID List
-----------


IP_address     userid
----------------------
192.168.100.69 spadmin
```

```
         *******************************************


User Management Configuration
=============================


General
-------

usermgmt_config passwd_file passwd_file_loc filecoll_config
-----------------------------------------------------------
true            /etc/passwd sp4cws          true


Home Directory Support
----------------------

amd_config homedir_server homedir_path
--------------------------------------
true       sp4cws         /home/sp4cws

Related Files Found:
   /usr/bin/chfn
   /usr/bin/chsh
   /usr/bin/passwd


         *******************************************


Automount Configuration
=======================


amd_config filecoll_config
--------------------------
true       true

Related Files Found:
   /var/sysman/sup/user.admin/list

   /etc/auto.master

   /etc/auto:
   maps
   refauto
   startauto
```

```
   /etc/auto/maps:
   auto.u


         ******************************************


Installation and Boot Configuration
===================================


Installation Information
------------------------

Related Files Found:
   /tftpboot/firstboot.cust
   /tftpboot/script.cust
   /tftpboot/tuning.cust



Partition sp4cws
----------------


Nodes Served by Boot Install Server (BIS) Node 1
................................................

node # bootdisk bootp_response install_image   install_disk   last inst time   last inst img
selected_vg
------------------------------------------------------------------------------------------------
--------------
17     hdisk0   disk           bos.obj.mksysb. hdisk0         Fri_Apr_23_13:40 bos.obj.mksysb.
rootvg
                          520                       :36_EDT_2004    520
33     hdisk0   disk           bos.obj.mksysb. hdisk0,hdisk1  Fri_Apr_23_13:28 bos.obj.mksysb.
rootvg
                          520                       :38_EDT_2004    520
49     hdisk0   disk           bos.obj.mksysb. hdisk0         Fri_Apr_23_18:23 bos.obj.mksysb.
rootvg
                          520                       :36_EDT_2004    520


Nodes Served by Boot Install Server (BIS) Node 0
................................................

node # bootdisk bootp_response install_image   install_disk   last inst time   last inst img
selected_vg
```

```
----------------------------------------------------------------------------------------------
--------------
1      hdisk0   disk          bos.obj.mksysb. hdisk0,hdisk1  Fri_Apr_23_18:42 bos.obj.mksysb.
rootvg
                          520                       :43_EDT_2004    520

         *******************************************


Cstartup and Cshutdown Configuration
====================================


Related Files Found:
   /etc/cstartSeq

   /etc/cshutdown

   /etc/subsysSeq



         *******************************************


Accounting Configuration
========================


Site Wide Settings
------------------

SDR Attribute Name     = Value
------------------     = -----
spacct_enable          = true
spacct_excluse_enable  = true
acct_master            = 0
spacct_actnode_thresh  = 80


Node Specific Settings
----------------------

node # acct_enable acct_excluse_enable acct_class_id acct_job_charge
--------------------------------------------------------------------
1      default     false               default       1.0
17     default     false               default       1.0
33     default     false               default       1.0
49     default     false               default       1.0
```

```
          *******************************************


Network Time Protocol (NTP) Configration
========================================


Site Wide Settings
------------------

SDR Attribute Name  = Value
------------------  = -----
ntp_config          = consensus
ntp_server          = ""
ntp_version         = 3

Related Files Found:
   /etc/ntp.conf


sp4cws is NTP server


          *******************************************


Event Management (EM) Configuration
===================================


Subsystems
----------

Subsystem         Group PID   Status
-----------------------------------
haem.sp4cws       haem  18842 active
haemaixos.sp4cws  haem  22216 active



Partition sp4cws
----------------


EM_Condition Data
-----------------
Class contains data
```

```
Related Files Found:
   /usr/sbin/rsct/install/config/haemloadlist



         *******************************************


Problem Management (PMAN) Configuration
=======================================


Subsystems
----------

Subsystem     Group PID   Status
--------------------------------
pman.sp4cws   pman  25300 active
pmanrm.sp4cws pman  24534 active

Related Files Found:
   /usr/lpp/ssp/install/bin/pmandefaults



T/EC Adapter Information
------------------------

Related Files Found:
   /usr/lpp/ssp/tecad/tecad_pssp

   /usr/lpp/ssp/tecad/pssp_classes.baroc





Partition sp4cws
----------------


PMAN_Subscription Data
......................

SDR Attribute Name    = Value                  Value                  Value
------------------    = -----                  -----                  -----
pmTargetType        = NODE_RANGE             NODE_RANGE             NODE_RANGE
pmTarget            = 0                      0                      0
```

```
pmRvar                = IBM.PSSP.aixos.FS.%totused    IBM.PSSP.pm.Errlog
IBM.PSSP.Prog.xpcount
pmIvec                = NodeNum=*;VG=rootvg;LV=hd9var NodeNum=*
NodeNum=*;ProgName=inetd;User
                                                                  Name=root
pmPred             = X>95                   X@0!=X@P0 && X@3=="PERM"     X@0==0
pmCommand             = /usr/lpp/ssp/bin/notify_event /usr/lpp/ssp/bin/notify_event
/usr/lpp/ssp/bin/notify_event
pmCommandTimeout      = 0                      0                        0
pmHandle              = varFull                       errLog
Monitor_inetd_daemon
pmTrapid            = -1                      -1                        -1
pmPPSlog            = 0                       0                         0
pmThrottle          = ""                      ""                        ""
pmRearmPred         = X<70                    ""                        X@0>0
pmRearmTrapid        = -1                      -1                        -1
pmRearmPPSlog        = 0                       0                         0
pmRearmCommand        = /usr/lpp/ssp/bin/notify_event ""
/usr/lpp/ssp/bin/notify_event
                          -r                              -r
pmRearmCommandTimeout  = 0                      0                        0
pmUsername          = root                    root                      root
pmPrincipal           = root.admin@SP4CWS             root.admin@SP4CWS
root.admin@SP4CWS
pmHost             = sp4cws                  sp4cws                    sp4cws
pmDeactivated        = NONE                    NONE                      NONE
pmText              = ""                      ""                        ""
pmRearmText         = ""                      ""                        ""
pmUserLabel         = varFull                 errLog                     ""
pmInitEval          = -1                      -1                        -1
pmDCEPrincipal       = ""                      ""                        ""
pmAIXOwner          = root                    root                      root

SDR Attribute Name    = Value                   Value                     Value
------------------    = -----                   -----                     -----
pmTargetType        = NODE_RANGE              NODE_RANGE                NODE_RANGE
pmTarget            = 0                       0                         0
pmRvar                = IBM.PSSP.Prog.xpcount         IBM.PSSP.Prog.pcount
IBM.PSSP.Prog.xpcount
pmIvec                = NodeNum=*;ProgName=sysctld;Us NodeNum=*;ProgName=fault_serv
NodeNum=0;ProgName=sdrd;UserN
                 erName=root              ice_Worm_RTG_SP;UserName=root ame=root

pmPred                = X@0==0                        X@0==0                        X@0!=X@1
|| X@0==0
pmCommand             = /usr/lpp/ssp/bin/notify_event /bin/ksh -c "if [[ $PMAN_LOCA /bin/ksh
-c "ACTUAL=${PMAN_RV
                                                      TION -ne 0 ]];then /usr/lpp/s
FIELD0#CurPIDCount=};EXPECTED
```

```
sp/bin/notify_event ; fi"     =$(( $(/bin/lssrc -g sdr | /b
                                                                                     in/wc -l)
- 1 ));if [[ \$ACTU
                                                                                     AL -lt
\$EXPECTED ]];then pri
                                                                                    nt \"There
should be \$EXPECT
                                                                                     ED SDR
daemons running on the

control\\nworkstation, but n
                                                                                     ow there
are only \${ACTUAL}.
                                                                                     \" | mail
-s Monitor_sdrd_dae
                                                                                     mon
\$LOGNAME;fi"
pmCommandTimeout      = 0                       0                        0
pmHandle               = Monitor_sysctld_daemon        Monitor_fault_service_daemon
Monitor_sdrd_daemon
pmTrapid            = -1                     -1                        -1
pmPPSlog            = 0                      0                         0
pmThrottle          = ""                     ""                        ""
pmRearmPred         = X@0>0                  X@0>0                     ""
pmRearmTrapid        = -1                    -1                        -1
pmRearmPPSlog        = 0                     0                         0
pmRearmCommand     = /usr/lpp/ssp/bin/notify_event /bin/ksh -c "if [[ $PMAN_LOCA ""
                         -r                           TION -ne 0 ]];then /usr/lpp/s
                                                      sp/bin/notify_event -r ; fi"
pmRearmCommandTimeout  = 0                      0                        0
pmUsername          = root                   root                      root
pmPrincipal            = root.admin@SP4CWS           root.admin@SP4CWS
root.admin@SP4CWS
pmHost             = sp4cws                 sp4cws                    sp4cws
pmDeactivated       = NONE                   ALL                       NONE
pmText             = ""                     ""                        ""
pmRearmText         = ""                     ""                        ""
pmUserLabel         = ""                     ""                        ""
pmInitEval          = -1                     -1                        -1
pmDCEPrincipal       = ""                     ""                        ""
pmAIXOwner          = root                   root                      root

SDR Attribute Name    = Value                  Value                     Value
------------------    = -----                  -----                     -----
pmTargetType        = NODE_RANGE             NODE_RANGE                NODE_RANGE
pmTarget            = 0                      0                         0
pmRvar                 = IBM.PSSP.Prog.xpcount        IBM.PSSP.pm.Errlog
IBM.PSSP.pm.Errlog
```

```
pmIvec            = NodeNum=0;ProgName=hrd;UserNa NodeNum=*              NodeNum=*
                        me=root
pmPred                 = X@0!=X@1 || X@0==0           X@5=="SYSIOS" && X@8=="EPOW_S
X@5=="sysman" && X@8=="SYSMAN
                                            US"                          001_ER"
pmCommand              = /bin/ksh -c "ACTUAL=${PMAN_RV /bin/ksh -c "print \"Potentia /bin/ksh
-c "print \"One or m
                         FIELD0#CurPIDCount=};EXPECTED l non-critical power loss or  ore
processors may have been
                         =$(( $(/bin/lssrc -g hr | /bi fan failure on node ${PMAN_LO taken
off-line on node ${PMAN
                         n/wc -l) - 1 ));if [[ \$ACTUA CATION}.\\nCheck the AIX erro
_LOCATION}.\\nCheck the AIX e
                         L -lt \$EXPECTED ]];then prin r log on node ${PMAN_LOCATION rror log
on node ${PMAN_LOCAT
                         t \"There should be \$EXPECTE }.\\n\" | mail -s Non_critica ION}.\\n\"
| mail -s processo
                         D host_responds daemons runni l_power_loss_or_fan_failure $ rsOffline
$LOGNAME"
                   ng on the control\\nworkstati LOGNAME"
                   on, but now there are only \$
                   {ACTUAL}.\" | mail -s Monitor
                   _hrd_daemon \$LOGNAME;fi"
pmCommandTimeout      = 0                      0                        0
pmHandle               = Monitor_hrd_daemon           Non_critical_power_loss_or_fa
processorsOffline
                                                      n_failure
pmTrapid            = -1                      -1                        -1
pmPPSlog            = 0                       0                         0
pmThrottle          = ""                      ""                        ""
pmRearmPred         = ""                      ""                        ""
pmRearmTrapid       = -1                      -1                        -1
pmRearmPPSlog       = 0                       0                         0
pmRearmCommand      = ""                      ""                        ""
pmRearmCommandTimeout  = 0                     0                         0
pmUsername          = root                    root                      root
pmPrincipal            = root.admin@SP4CWS            root.admin@SP4CWS
root.admin@SP4CWS
pmHost              = sp4cws                  sp4cws                    sp4cws
pmDeactivated       = NONE                    NONE                      NONE
pmText              = ""                      ""                        ""
pmRearmText         = ""                      ""                        ""
pmUserLabel            = ""                           ""
processorsOffline
pmInitEval          = -1                      -1                        -1
pmDCEPrincipal      = ""                      ""                        ""
pmAIXOwner          = root                    root                      root

SDR Attribute Name    = Value                  Value                     Value
```

```
------------------    = -----                    -----                    -----
pmTargetType        = NODE_RANGE               NODE_RANGE               NODE_RANGE
pmTarget            = 0                        0                        0
pmRvar                 = IBM.PSSP.Prog.xpcount         IBM.PSSP.aixos.FS.%totused
IBM.PSSP.aixos.FS.%totused
pmIvec                 = NodeNum=0;ProgName=hags;UserN NodeNum=*;VG=rootvg;LV=hd3
NodeNum=*;VG=rootvg;LV=hd4
                         ame=root
pmPred              = X@0==0                   X>90                     X>95
pmCommand              = /usr/lpp/ssp/bin/log_event /v /usr/lpp/ssp/bin/log_event /v
/usr/lpp/ssp/bin/log_event /v
                         ar/adm/SPlogs/pman/pmevent.lo ar/adm/SPlogs/pman/pmevent.lo
ar/adm/SPlogs/pman/pmevent.lo
                    g                        g                        g
pmCommandTimeout      = 0                        0                        0
pmHandle            = hags_monitor             tmp_usage                root_usage
pmTrapid            = -1                       -1                       -1
pmPPSlog            = 0                        0                        0
pmThrottle          = ""                       ""                       ""
pmRearmPred         = X@0>0                    X<80                     X<80
pmRearmTrapid        = -1                       -1                       -1
pmRearmPPSlog        = 0                        0                        0
pmRearmCommand         = /usr/lpp/ssp/bin/log_event /v /usr/lpp/ssp/bin/log_event /v
/usr/lpp/ssp/bin/log_event /v
                         ar/adm/SPlogs/pman/pmevent.lo ar/adm/SPlogs/pman/pmevent.lo
ar/adm/SPlogs/pman/pmevent.lo
                    g                        g                        g
pmRearmCommandTimeout  = 0                        0                        0
pmUsername          = root                     root                     root
pmPrincipal            = root.admin@SP4CWS             root.admin@SP4CWS
root.admin@SP4CWS
pmHost              = sp4cws                   sp4cws                   sp4cws
pmDeactivated        = NONE                     NONE                     NONE
pmText              = ""                       ""                       ""
pmRearmText          = ""                       ""                       ""
pmUserLabel          = ""                       ""                       ""
pmInitEval          = -1                       -1                       -1
pmDCEPrincipal       = ""                       ""                       ""
pmAIXOwner          = root                     root                     root

SDR Attribute Name    = Value                    Value                    Value
------------------    = -----                    -----                    -----
pmTargetType        = NODE_RANGE               NODE_RANGE               NODE_RANGE
pmTarget            = 0                        0                        0
pmRvar                 = IBM.PSSP.aixos.FS.%totused    IBM.PSSP.Response.Host.state
IBM.PSSP.Response.Switch.stat
                                                                        e
pmIvec            = NodeNum=*;VG=rootvg;LV=hd9var NodeNum=*               NodeNum=*
pmPred              = X>95                     X==0                     X==0
```

```
pmCommand              = /usr/lpp/ssp/bin/log_event VA /usr/lpp/ssp/bin/log_event /v
/usr/lpp/ssp/bin/log_event /v
                         R_FULL /var/adm/SPlogs/pman/p ar/adm/SPlogs/pman/pmevent.lo
ar/adm/SPlogs/pman/pmevent.lo
                    mevent.log                g                        g
pmCommandTimeout      = 0                      0                        0
pmHandle               = var_usage                    host_responds
switch_responds
pmTrapid            = -1                      -1                       -1
pmPPSlog            = 0                       0                        0
pmThrottle          = ""                      ""                       ""
pmRearmPred         = X<80                    X!=0                     X!=0
pmRearmTrapid        = -1                      -1                       -1
pmRearmPPSlog        = 0                       0                        0
pmRearmCommand         = /usr/lpp/ssp/bin/log_event VA /usr/lpp/ssp/bin/log_event /v
/usr/lpp/ssp/bin/log_event /v
                         R_OK /var/adm/SPlogs/pman/pme ar/adm/SPlogs/pman/pmevent.lo
ar/adm/SPlogs/pman/pmevent.lo
                    vent.log                  g                        g
pmRearmCommandTimeout  = 0                     0                        0
pmUsername          = root                    root                     root
pmPrincipal            = root.admin@SP4CWS            root.admin@SP4CWS
root.admin@SP4CWS
pmHost             = sp4cws                  sp4cws                   sp4cws
pmDeactivated       = NONE                    NONE                     NONE
pmText              = ""                      ""                       ""
pmRearmText         = ""                      ""                       ""
pmUserLabel         = ""                      ""                       ""
pmInitEval          = -1                      -1                       -1
pmDCEPrincipal       = ""                      ""                       ""
pmAIXOwner          = root                    root                     root

SDR Attribute Name    = Value                  Value                    Value
------------------    = -----                  -----                    -----
pmTargetType        = NODE_RANGE              NODE_RANGE               NODE_RANGE
pmTarget            = 0                       0                        0
pmRvar                 = IBM.PSSP.aixos.PagSp.%totalus IBM.PSSP.Prog.xpcount
IBM.PSSP.Prog.xpcount
                         ed
pmIvec                 = NodeNum=*                    NodeNum=0;ProgName=hardmon;Us
NodeNum=0;ProgName=hats;UserN
                                                erName=root              ame=root
pmPred             = X>90                     X@0==0                   X@0==0
pmCommand              = /usr/lpp/ssp/bin/log_event /v /usr/lpp/ssp/bin/log_event /v
/usr/lpp/ssp/bin/log_event /v
                         ar/adm/SPlogs/pman/pmevent.lo ar/adm/SPlogs/pman/pmevent.lo
ar/adm/SPlogs/pman/pmevent.lo
                    g                        g                        g
pmCommandTimeout      = 0                      0                        0
```

```
pmHandle               = page_space_usage              hardmon_monitor
hats_monitor
pmTrapid            = -1                         -1                        -1
pmPPSlog            = 0                          0                         0
pmThrottle          = ""                         ""                        ""
pmRearmPred         = X<80                       X@0>0                     X@0>0
pmRearmTrapid        = -1                         -1                        -1
pmRearmPPSlog        = 0                          0                         0
pmRearmCommand         = /usr/lpp/ssp/bin/log_event /v /usr/lpp/ssp/bin/log_event /v
/usr/lpp/ssp/bin/log_event /v
                         ar/adm/SPlogs/pman/pmevent.lo ar/adm/SPlogs/pman/pmevent.lo
ar/adm/SPlogs/pman/pmevent.lo
                    g                        g                        g
pmRearmCommandTimeout  = 0                         0                        0
pmUsername          = root                       root                      root
pmPrincipal            = root.admin@SP4CWS              root.admin@SP4CWS
root.admin@SP4CWS
pmHost             = sp4cws                     sp4cws                    sp4cws
pmDeactivated       = NONE                       NONE                      NONE
pmText             = ""                         ""                        ""
pmRearmText         = ""                         ""                        ""
pmUserLabel         = ""                         ""                        ""
pmInitEval          = -1                         -1                        -1
pmDCEPrincipal       = ""                         ""                        ""
pmAIXOwner          = root                       root                      root


pmanrmd_Config Data
...................
None Found

          *******************************************


NIM Configuration
=================


NIM Version: 5.2.0.30
.....................


Current NIM Objects on sp4cws
-----------------------------

object           class     type
---------------------------------------
boot             resources boot
lppsource_aix520 resources lpp_source
```

```
master          machines  master
migrate         resources bosinst_data
mksysb_1        resources mksysb
nim_script      resources nim_script
noprompt        resources bosinst_data
p650_A          machines  standalone
prompt          resources bosinst_data
psspscript      resources script
spnet_en0       networks  ent
spnet_en1       networks  ent
spot_aix520     resources spot
1_migrate       resources bosinst_data
1_noprompt      resources bosinst_data



NIM Resource Details for sp4cws (lsnim -l output). The lsnim -l output can be shortened by
removing the “1_noprompt” and “1_migrate”.
-------------------------------------------------
If you have multiple BIS nodes, please run lsnim -l on each for a full list of your systems

master:
   class               = machines
   type                = master
   max_nimesis_threads = 20
   if_defined          = chrp.mp.ent
   comments            = machine which controls the NIM environment
   platform            = chrp
   netboot_kernel      = up
   if1                 = spnet_en0 sp4cws_en 000629DC250D
   if2                 = spnet_en1 sp4cws 0004ac57456d ent
   cable_type1         = N/A
   cable_type2         = N/A
   Cstate              = ready for a NIM operation
   prev_state          = ready for a NIM operation
   Mstate              = currently running
   serves              = 1_migrate
   serves              = 1_noprompt
   serves              = boot
   serves              = lppsource_aix520
   serves              = migrate
   serves              = mksysb_1
   serves              = nim_script
   serves              = noprompt
   serves              = prompt
   serves              = psspscript
   serves              = spot_aix520
   master_port         = 1058
   registration_port   = 1059
```

```
   reserved            = yes
boot:
   class       = resources
   type        = boot
   comments    = represents the network boot resource
   Rstate      = ready for use
   location    = /tftpboot
   alloc_count = 0
   server      = master
   reserved    = yes
nim_script:
   class       = resources
   type        = nim_script
   comments    = directory containing customization scripts created by NIM
   Rstate      = ready for use
   location    = /export/nim/scripts
   alloc_count = 0
   server      = master
   reserved    = yes
spnet_en0:
   class      = networks
   type       = ent
   Nstate     = ready for use
   prev_state = ready for use
   net_addr   = 192.168.44.0
   snm        = 255.255.255.0
spnet_en1:
   class      = networks
   type       = ent
   Nstate     = ready for use
   prev_state = information is missing from this object's definition
   net_addr   = 192.168.100.0
   snm        = 255.255.255.0
psspscript:
   class       = resources
   type        = script
   Rstate      = ready for use
   prev_state  = unavailable for use
   location    = /spdata/sys1/install/pssp/pssp_script
   alloc_count = 0
   server      = master
prompt:
   class       = resources
   type        = bosinst_data
   Rstate      = ready for use
   prev_state  = unavailable for use
   location    = /spdata/sys1/install/pssp/bosinst_data_prompt
   alloc_count = 0
   server      = master
```

```
noprompt:
   class       = resources
   type        = bosinst_data
   Rstate      = ready for use
   prev_state  = unavailable for use
   location    = /spdata/sys1/install/pssp/bosinst_data
   alloc_count = 0
   server      = master
migrate:
   class       = resources
   type        = bosinst_data
   Rstate      = ready for use
   prev_state  = unavailable for use
   location    = /spdata/sys1/install/pssp/bosinst_data_migrate
   alloc_count = 0
   server      = master
lppsource_aix520:
   class       = resources
   type        = lpp_source
   arch        = power
   Rstate      = ready for use
   prev_state  = unavailable for use
   location    = /spdata/sys1/install/aix520/lppsource
   simages     = yes
   alloc_count = 0
   server      = master
1_noprompt:
   class       = resources
   type        = bosinst_data
   Rstate      = ready for use
   prev_state  = unavailable for use
   location    = /spdata/sys1/install/pssp/1.noprompt
   alloc_count = 0
   server      = master
1_migrate:
   class       = resources
   type        = bosinst_data
   Rstate      = ready for use
   prev_state  = unavailable for use
   location    = /spdata/sys1/install/pssp/1.migrate
   alloc_count = 0
   server      = master
p650_A:
   class          = machines
   type           = standalone
   platform       = chrp
   netboot_kernel = mp
   if1            = spnet_en1 p650_A 0002553A068C ent
   cable_type1    = tp
```

```
   Cstate         = ready for a NIM operation
   prev_state     = BOS installation has been enabled
   Mstate         = currently running
   Cstate_result  = reset
mksysb_1:
   class       = resources
   type        = mksysb
   Rstate      = ready for use
   prev_state  = unavailable for use
   location    = /spdata/sys1/install/images/bos.obj.mksysb.520
   version     = 5
   release     = 2
   mod         = 0
   oslevel_r   = 5200-01
   alloc_count = 0
   server      = master
spot_aix520:
   class         = resources
   type          = spot
   plat_defined  = chrp
   arch          = power
   Rstate        = ready for use
   prev_state    = verification is being performed
   location      = /spdata/sys1/install/aix520/spot/spot_aix520/usr
   version       = 5
   release       = 2
   mod           = 0
   oslevel_r     = 5200-03
   alloc_count   = 0
   server        = master
   if_supported  = chrp.mp ent
   Rstate_result = success

         *******************************************

Report complete.
```

Note about the output from the pssprpt text file: It is not clear from the text output what the main section of the report is. If the **-w** flag is used with the flag to produce an HTML report, it is easier to translate.

Example output of the mknoderpt report

Example C-6 shows the text output from running the **mknoderpt** command. The file name is /var/opt/pssp_to_csm/data/noderpt.20040502175940.txt. The log information is discussed in "Map of logs and saved files for each tool" on page 146.

Example: C-6 Report /var/opt/pssp_to_csm/data/noderpt.20040502175940.txt

```
File Collection and Node Analysis Report
CWS name: sp4cws
Date & Time:  Sun May  2 17:59:40 EDT 2004




All Boot Install Server (BIS) Nodes
-----------------------------------
BIS-nodes:
              1




All Defined File Collections
----------------------------

Name         Status
---------------------
user.admin   active
sup.admin    inactive
node.root    active
power_system active


Details of All File Collections
-------------------------------

Collection   Status   Type      Based On     Access Dir             Prefix
----------------------------------------------------------------------------------------------
user.admin   active   primary   -            /                      /
sup.admin    inactive ""        ""           ""                     ""
node.root    active   secondary power_system /                      /share/power/system/3.2/
power_system active   primary   -            /share/power/system/3.2 /


Details of All Active File Collections
--------------------------------------
```

```
user.admin-active        Mode    File to Execute
-----------------------------------------------------
/etc/passwd              upgrade ""
/etc/passwd.nm.idx       upgrade ""
/etc/passwd.id.idx       upgrade ""
/etc/group               upgrade ""
/etc/security/group      upgrade ""
/etc/security/passwd     upgrade ""
/etc/security/passwd.idx upgrade ""
/etc/auto.master         upgrade ""
/etc/auto/maps/auto.*    upgrade ""
/etc/auto/maps/auto.u    execute /etc/amd/refresh_amd
/etc/auto/cust/*         upgrade ""
/etc/amd/amd-maps/amd.*  upgrade ""
/etc/amd/amd-maps/amd.u  execute /etc/amd/refresh_amd
/etc/acct/holidays       upgrade ""
/etc/hosts               upgrade ""
/etc/profile             upgrade ""
/etc/environment         upgrade ""

node.root-active Mode File to Execute
-------------------------------------

power_system-active     Mode    File to Execute
-----------------------------------------------
/share/power/system/3.2 upgrade ""


All Active Files to be Transitioned to CFM
------------------------------------------
FilesForCsm:
   /etc/acct/holidays
   /etc/amd/amd-maps/amd.u
   /etc/auto/refauto
   /etc/auto.master
   /etc/auto/maps/auto.u
   /etc/environment
   /etc/group
   /etc/hosts
   /etc/passwd
   /etc/passwd.id.idx
   /etc/passwd.nm.idx
   /etc/profile
   /etc/security/group
   /etc/security/passwd
   /etc/security/passwd.idx
   /etc/logmgt.acl
   /etc/sysctl.acl
   /etc/sysctl.haem.acl
```

```
   /etc/sysctl.install.acl
   /etc/sysctl.pman.acl
   /etc/sysctl.rootcmds.acl


There are no Nodes that have Exceptions
---------------------------------------


There are no Nodes that have HACMP installed
--------------------------------------------


Report complete.
```

The following are some points to note about the output of the noderpt text file:

- In the Exceptions section, if you see "`failed ucode check`" it usually means the microcode for the node in the cluster is down level. This can also occur if the report tool fails for some reason.
- The file collections output is not clearly represented.
  - `user.admin` - this is the only collection that is reported about correctly. There is a list of files that are in this collection.
  - sup.admin - this is not checked since it is the a supper administration collection which is PSSP-specific and is lost when PSSP is removed. The tool shows this as inactive, which means it is not valid for transition.
  - node.root - this shows up as active but the relevant files in this collection do not show up in the related file list.
  - power_system - this shows as active but, again, the relevant files in this collection are not represented in the related file list.
  - All of the files that are distributed by file collections are listed in the final list `FilesForCsm`. This table shows all the files from the above file collections, except sup.admin, even though they do not show up in the individual tables. These files are copied into a tar file called /var/opt/pssp_to_csm/data/fcfiles.tar when **`mkcfgutils`** is run.
- It is not clear from the text output what the main titles in the report are. The html report, generated by using the **`-w`** flag, creates a more user-friendly output.

Example output files from the mkcfgutils command

As previously discussed, this tool generates the files on the CWS, /var/opt/pssp_to_csm/data, as shown in Table C-1. There are examples of the files with comments after the table.

mkcfgutils creates back-ups of these generated files in /var/opt/pssp_to_csm/backup. The output of the **mkcfgutils** command is shown in Example C-7.

> **Note:** No log file is generated by the **mkcfgutils** command. If there are any failures, the only record is present on the screen when **mkcfgutils** is run.

Table C-1 Files generated by mkctgutils

Purpose of file	File Name
The node configuration for use with the CSM **definenode** command.	nodedef.<timestamp>.def
The additional adapter configuration. Use this file with NIM commands.	adapterdef.<timestamp>.def
Used if system node groups are configured.	gngrpcfg.<timestamp>.def
Used if partition bound node groups are configured.	pngrpcfg.<timestamp>.def
For file collections transition, used by the **cfgcfmutil** command.	fc.stanza, fcfiles.tar, fc.files

Please refer to Chapter 3, “Process steps for transition” on page 37 or the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989 for more information on these files.

Example: C-7 Output from running mkcfgutils

```
# mkcfgutils


#               **********   mkcfgutils LOG File   **********
mkcfgutils:     ==> Extracting configuration data from SDR.


#               **********  Node Definition File  **********
mkcfgutils: One moment please.
        ==> Processing data to create the
/var/opt/pssp_to_csm/data/nodedef.20040504153204.def file.
```

```
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/nodedef.20040504153204.def file.


#       **********  Ethernet Secondary Adapters Definition File  **********
mkcfgutils: One moment please.
        ==> Processing data to create the
/var/opt/pssp_to_csm/data/adapterdef.20040504153204.def file.
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/adapterdef.20040504153204.def file.


#       **********  Global Node Groups Definition File  **********
mkcfgutils: One moment please.
        ==> Processing data to create the
/var/opt/pssp_to_csm/data/gngrpdef.20040504153204.def file.
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/gngrpdef.20040504153204.def file.


#       **********  Partition Node Groups Definition File  **********
mkcfgutils: One moment please.
        ==> Processing data to create the
/var/opt/pssp_to_csm/data/pngrpdef.20040504153204.def file.
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/pngrpdef.20040504153204.def file.


#               **********  File Collections Files **********
One Moment, Scanning user.admin
One Moment, Scanning node.root
One Moment, Scanning power_system
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/fc.stanza file.
mkcfgutils:     ==> Successfully created the
/var/opt/pssp_to_csm/data/fcfiles.tar file.
mkcfgutils: Completed successfully
```

Example: C-8 nodedef.20040503162703.def

```
p650_A:
   PowerMethod=hmc
   HWControlPoint=192.168.100.69
   HWControlNodeId=p650_A
   ConsoleMethod=hmc
   ConsoleServerName=192.168.100.69
   ConsoleServerNumber=
   ConsoleSerialDevice=
   ConsolePortNum=1
   InstallAdapterMacaddr=0002553A068C
   InstallAdapterType=ent
   InstallAdapterSpeed=100
   InstallAdapterDuplex=full


p650_B:
   PowerMethod=hmc
   HWControlPoint=192.168.100.69
   HWControlNodeId=p650_B
   ConsoleMethod=hmc
   ConsoleServerName=192.168.100.69
   ConsoleServerNumber=
   ConsoleSerialDevice=
   ConsolePortNum=1
   InstallAdapterMacaddr=0002553A0619
   InstallAdapterType=ent
   InstallAdapterSpeed=100
   InstallAdapterDuplex=full


p650_C:
   PowerMethod=hmc
   HWControlPoint=192.168.100.69
   HWControlNodeId=p650_C
   ConsoleMethod=hmc
   ConsoleServerName=192.168.100.69
   ConsoleServerNumber=
   ConsoleSerialDevice=
   ConsolePortNum=1
   InstallAdapterMacaddr=0002553A062C
   InstallAdapterType=ent
   InstallAdapterSpeed=100
   InstallAdapterDuplex=full


p650_D:
   PowerMethod=hmc
```

```
   HWControlPoint=192.168.100.69
   HWControlNodeId=p650_D
   ConsoleMethod=hmc
   ConsoleServerName=192.168.100.69
   ConsoleServerNumber=
   ConsoleSerialDevice=
   ConsolePortNum=1
   InstallAdapterMacaddr=0002553A07DB
   InstallAdapterType=ent
   InstallAdapterSpeed=100
   InstallAdapterDuplex=full
```

Note: The adapterdef.<timestamp>.def file, as shown in Example C-9, should be checked before trying to define secondary adapters with NIM. Currently, the media_speed field may show `auto_Half_Duplex`. This is not correct and will cause a failure. Also, the location code is missing. This is discussed in 4.17.1, "Adding the secondary adapters" on page 116.

Example: C-9 adapterdef.20040503162703.def

```
default:
   machine_type=secondary
   network_type=en
   cable_type=N/A

p650_A:
   netaddr=192.168.100.10
   subnet_mask=255.255.255.0
   media_speed=auto_Half_Duplex
   location=""

p650_B:
   netaddr=192.168.100.11
   subnet_mask=255.255.255.0
   media_speed=auto_Half_Duplex
   location=""

p650_C:
   netaddr=192.168.100.12
   subnet_mask=255.255.255.0
   media_speed=auto_Half_Duplex
   location=""
```

```
p650_D:
   netaddr=192.168.100.13
   subnet_mask=255.255.255.0
   media_speed=auto_Half_Duplex
   location=""
```

You will notice that in the node group files, as shown in Example C-10 and Example C-11, there is a group that does not exist in the nested node group examples appended with `_All`. When these are defined with the **`nodegrp -f <filename>`**, you will get a failure when creating the node group made up of node groups. The missing groups were empty under PSSP and are not transferred over for this reason. Groups will be created successfully while the groups exist.

Example: C-10 gngrpdef.20040503162703.def

```
Group_1: static, validated, p650_A p650_B
Group_2: static, validated, p650_C p650_D
Group_All: static, validated, +Group_1 +Group_2 +Group_3
```

Note: Examples group definition stanza files containing empty groups within their nested group are shown in Example C-10.

Example: C-11 pngrpdef.20040503162703.def

```
Partition_1: static, validated, p650_A p650_B
Partition_2: static, validated, p650_C p650_D
Partition_All: static, validated, +Partition_1 +Partition_2 +Partition_3
```

Example: C-12 fc.files

```
./etc/acct/holidays
./etc/amd/amd-maps/amd.u
./etc/auto/refauto
./etc/auto.master
./etc/auto/maps/auto.u
./etc/environment
./etc/group
./etc/hosts
./etc/passwd
./etc/passwd.id.idx
./etc/passwd.nm.idx
./etc/profile
./etc/security/group
./etc/security/passwd
./etc/security/passwd.idx
./etc/logmgt.acl
```

```
./etc/sysctl.acl
./etc/sysctl.haem.acl
./etc/sysctl.install.acl
./etc/sysctl.pman.acl
./etc/sysctl.rootcmds.acl
```

Example: C-13   fcfiles.tar

```
# tar -tvf fcfiles.tar
-rw-rw-r-- root/adm       1089 2004-04-09 11:53:24 ./etc/acct/holidays
-rw-r--r-- root/system    2165 2004-04-29 15:27:39 ./etc/amd/amd-maps/amd.u
-rwxr-xr-x root/system    2839 2004-05-02 18:11:56 ./etc/auto/refauto
-rw-r--r-- root/system     357 2004-04-14 13:52:02 ./etc/auto.master
-rw-r--r-- root/system    1672 2004-04-29 15:27:39 ./etc/auto/maps/auto.u
-rw-rw-r-- root/system    1976 2004-04-27 12:02:21 ./etc/environment
-rw-rw-r-- root/security   492 2004-05-02 18:11:53 ./etc/group
-rw-rw-r-- root/system    1233 2004-04-29 17:12:17 ./etc/hosts
-rw-rw-r-- root/security  1052 2004-05-02 18:11:53 ./etc/passwd
-rw-rw-r-- root/security  5924 2004-04-15 11:46:51 ./etc/passwd.id.idx
-rw-rw-r-- root/security  7524 2004-04-15 11:46:51 ./etc/passwd.nm.idx
-r-xr-xr-x bin/bin        1862 2004-04-27 12:02:06 ./etc/profile
-rw-r----- root/security   589 2004-04-22 11:42:53 ./etc/security/group
-rw-r----- root/security   815 2004-04-29 15:52:19 ./etc/security/passwd
-rw-r----- root/security  7524 2004-04-14 13:51:55 ./etc/security/passwd.idx
-rw-r--r-- root/system     198 2004-04-14 12:57:34 ./etc/logmgt.acl
-rw-r--r-- root/system     196 2004-04-29 15:58:10 ./etc/sysctl.acl
-rw-r--r-- root/system     299 2004-04-14 12:57:34 ./etc/sysctl.haem.acl
-rw-r--r-- root/system     299 2004-04-14 12:57:34 ./etc/sysctl.install.acl
-rw------- root/system     436 2004-04-29 17:30:42 ./etc/sysctl.pman.acl
-rw-r--r-- root/system     537 2004-04-29 15:56:39 ./etc/sysctl.rootcmds.acl
```

Example: C-14   fc.stanza

```
./etc/acct/holidays/etc/acct/holidaysprimary
./etc/amd/amd-maps/amd.u/etc/amd/amd-maps/amd.uprimary
./etc/auto/refauto/etc/amd/refresh_amdlink_execute_primary
./etc/auto.master/etc/auto.masterprimary
./etc/auto/maps/auto.u/etc/auto/maps/auto.uprimary
./etc/environment/etc/environmentprimary
./etc/group/cfmroot/etc/grouppwd_primary
./etc/hosts/etc/hostsprimary
./etc/passwd/cfmroot/etc/passwdpwd_primary
./etc/passwd.id.idx/cfmroot/etc/passwd.id.idxpwd_primary
./etc/passwd.nm.idx/cfmroot/etc/passwd.nm.idxpwd_primary
./etc/profile/etc/profileprimary
./etc/security/group/cfmroot/etc/security/grouppwd_primary
./etc/security/passwd/cfmroot/etc/security/passwdpwd_primary
./etc/security/passwd.idx/cfmroot/etc/security/passwd.idxpwd_primary
```

```
./etc/logmgt.acl/share/power/system/3.2/etc/logmgt.acllink_primary
./etc/sysctl.acl/share/power/system/3.2/etc/sysctl.acllink_primary
./etc/sysctl.haem.acl/share/power/system/3.2/etc/sysctl.haem.acllink_primary
./etc/sysctl.install.acl/share/power/system/3.2/etc/sysctl.install.acllink_primary
./etc/sysctl.pman.acl/share/power/system/3.2/etc/sysctl.pman.acllink_primary
./etc/sysctl.rootcmds.acl/share/power/system/3.2/etc/sysctl.rootcmds.acllink_primary
```

If the stanza file is edited then the changes will reflect the behavior of the **cfgcfmutil** command. Please refer to *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

Please refer to "Output from the cfgcfmutil command" on page 227 for more details on the usage of file collection files.

Example log file showing activity of rmpsspnode

When the **rmpsspnode** command is run from the CWS on the node, it logs files in different locations as shown in Example C-15 and Example C-16; this is also discussed in “Map of logs and saved files for each tool” on page 146.

> **Note:** Before the alterations and removal of data is performed, **rmpssp**, which is run by **rmpsspnode** on the node, copies the configuration files to /var/opt/pssp_to_csm/rmsaved. For the list of files, please refer to “List of files generated and saved by rmpssp on the node” on page 219.

- On CWS: /var/log/pssp_to_csm/rmpsspnode.log
- On CWS: /var/log/pssp_to_csm/nodedetails/<nodename>.<timestamp>.log
- On Node: /var/log/pssp_to_csm/rmpssp.log

Example: C-15 /var/log/pssp_to_csm/rmpsspnode.log

```
rmpsspnode: rmpsspnode was invoked at Sun May 2 17:19:27 EDT 2004 with these
flags:  -?.
rmpsspnode:2657-710 Incorrect command syntax.
rmpsspnode: Syntax:
 rmpsspnode [-h] [-c] {-a | -N <node_group_list> |
           -n <host_name_list> | -l <node_number_list>}

rmpsspnode: rmpsspnode was invoked at Sun May 2 17:19:41 EDT 2004 with these
flags:  -c -N Group_1.
rmpsspnode: 2657-742 You have specified a BIS node, node 1, for PSSP removal,
but one of its clients, node 33, was not specified.  If a BIS node is specified
for removal, all of its clients must also be specified.
rmpsspnode: 2657-734 rmpsspnode completed with one or more failures.  For more
information, examine the program output or the log file:
/var/log/pssp_to_csm/rmpsspnode.log.

rmpsspnode: rmpsspnode was invoked at Thu May 6 16:00:53 EDT 2004 with these
flags:  -c -N Group_2.
/opt/pssp_to_csm ro
exported /opt/pssp_to_csm
rmpsspnode: rmpssp completed successfully on node 33.
rmpsspnode: rmpssp completed successfully on node 49.
```

Example: C-16 /var/log/pssp_to_csm/nodedetails/<nodename>.<timestamp>.log

```
rmpssp: rmpssp was invoked at Thu May 6 15:52:36 EDT 2004 with these flags: -c.
rmpssp: Pre-requisite check status: ssp.basic is installed.
rmpssp: Pre-requisite check status: Passed dependent filesets check.
rmpssp: Pre-requisite check status: SDR can be accessed.
```

```
rmpssp: Pre-requisite check status: Node number can been read.
   mknoderpt: HACMP filesets not installed.
rmpssp: The "Pre-requisite Check" subroutine completed succesfully.

rmpssp: rmpssp was invoked at Thu May 6 16:00:54 EDT 2004 with these flags:
none.
rmpssp: The "Pre-requisite Check" subroutine completed succesfully.
0513-044 The haem Subsystem was requested to stop.
0513-044 The hagsglsm Subsystem was requested to stop.
0513-044 The hags Subsystem was requested to stop.
5 objects deleted
0 objects deleted
0 objects deleted
0 objects deleted
0 objects deleted
rmpssp: The "CSS Adapter Removal" subroutine completed succesfully.
delnimmast: Node 1 (p650_A) unconfigured as a NIM master.
+-----------------------------------------------------------------------------+
          Pre-deinstall Verification...
+-----------------------------------------------------------------------------+
Verifying selections...done
Verifying requisites...done
Results...

FILESET STATISTICS
------------------
    1  Selected to be deinstalled, of which:
        1  Passed pre-deinstall verification
  ----
    1  Total to be deinstalled

+-----------------------------------------------------------------------------+
            Deinstalling Software...
+-----------------------------------------------------------------------------+

installp: DEINSTALLING software for:
   bos.sysmgt.nim.master 5.2.0.0

Finished processing all filesets.  (Total time:  9 secs).

+-----------------------------------------------------------------------------+
            Summaries:
+-----------------------------------------------------------------------------+

Installation Summary
--------------------
Name                        Level           Part        Event       Result
-------------------------------------------------------------------------------
bos.sysmgt.nim.master       5.2.0.0         USR         DEINSTALL   SUCCESS
```

```
+-----------------------------------------------------------------------------+
          Pre-deinstall Verification...
+-----------------------------------------------------------------------------+
Verifying selections...done
Verifying requisites...done
Results...

FILESET STATISTICS
------------------
    1  Selected to be deinstalled, of which:
        1  Passed pre-deinstall verification
  ----
    1  Total to be deinstalled

+-----------------------------------------------------------------------------+
            Deinstalling Software...
+-----------------------------------------------------------------------------+

installp: DEINSTALLING software for:
   bos.sysmgt.nim.spot 5.2.0.0

Finished processing all filesets.  (Total time:  0 secs).

+-----------------------------------------------------------------------------+
            Summaries:
+-----------------------------------------------------------------------------+

Installation Summary
--------------------
Name                        Level           Part        Event       Result
-------------------------------------------------------------------------------
bos.sysmgt.nim.spot         5.2.0.0         USR         DEINSTALL   SUCCESS
rmpssp: The "NIM Removal" subroutine completed succesfully.
exportfs: /spdata/sys1/install/pssplpp: No such file or directory
rmnfsexp: /usr is not currently exported and is not in /etc/exports
rmpssp: The "NFS Removal" subroutine completed succesfully.
rmpssp: The "cron Removal" subroutine completed succesfully.
rmpssp: The "Sequence Files Removal" subroutine completed succesfully.
rmpssp: The "SP Accounting Removal" subroutine completed succesfully.
rmpssp: The "SP User Management Removal" subroutine completed succesfully.
rmpssp: The "SP Security Removal" subroutine completed succesfully.
rmpssp: The "SP Automount Removal" subroutine completed succesfully.
sp:2:wait:/etc/rc.sp > /dev/console 2>&1
sp2:2:once:/etc/rc.sp2 > /dev/console 2>&1
sysctld:2:once:/usr/bin/startsrc -s sysctld
fsd:2:once:/usr/lpp/ssp/css/rc.switch
sp_configd:2:once:/usr/bin/startsrc -s sp_configd
hats:2:once:/usr/bin/startsrc -g hats > /dev/console 2>&1
hags:2:once:/usr/bin/startsrc -g hags > /dev/console 2>&1
```

```
haem:2:once:/usr/bin/startsrc -g haem > /dev/console 2>&1
pman:2:once:/usr/bin/startsrc -g pman >/dev/console 2>&1
st_sw_num:2:once:/usr/lpp/ssp/bin/st_set_switch_number > /dev/console 2>&1
st_reset:2:once:/usr/lpp/ssp/bin/st_reset_datafiles
start_net:2:wait:/usr/lpp/ssp/install/bin/start_net > /dev/console
0513-044 The sysctld Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
0513-044 The supfilesrv Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
rmpssp: The "SP Daemons Removal" subroutine completed succesfully.
rmpssp: The "SP Logs Removal" subroutine completed succesfully.
spseccfg6681/tcp
sysctl 6680/tcpsysctld
switchtbld4466/tcp
supfilesrv8431/tcp
rmpssp: The "SP Data Files Removal" subroutine completed succesfully.
rmpssp: The "Sysctl Removal" subroutine completed succesfully.
0 objects deleted
1 objects deleted
rmpssp: The "ODM Removal" subroutine completed succesfully.
0513-044 The pman Subsystem was requested to stop.
0513-044 The pmanrm Subsystem was requested to stop.
0513-044 The hats Subsystem was requested to stop.
+-----------------------------------------------------------------------------+
          Pre-deinstall Verification...
+-----------------------------------------------------------------------------+
Verifying selections...done
Verifying requisites...done
Results...

SUCCESSES
---------
  Filesets listed in this section passed pre-deinstall verification
  and will be removed.

  Selected Filesets
  -----------------
  ssp.basic 3.5.0.0                           # SP System Support Package
  ssp.clients 3.5.0.0                         # SP Authenticated Client Comm...
  ssp.css 3.5.0.0                             # SP Communication Subsystem P...
  ssp.css.lapi 3.5.0.0                        # SP Communication Subsystem L...
  ssp.ha_topsvcs.compat 3.5.0.0               # Compatability for ssp.ha and...
  ssp.perlpkg 3.5.0.0                         # SP PERL Distribution Package
  ssp.pman 3.5.0.0                            # SP Problem Management
  ssp.st 3.5.0.0                              # Job Switch Resource Table Se...
  ssp.sysctl 3.5.0.0                          # SP Sysctl Package
  ssp.sysman 3.5.0.0                          # Optional System Management p...

  << End of Success Section >>
```

```
FILESET STATISTICS
------------------
   10  Selected to be deinstalled, of which:
       10  Passed pre-deinstall verification
  ----
   10  Total to be deinstalled

+-----------------------------------------------------------------------------+
            Deinstalling Software...
+-----------------------------------------------------------------------------+

installp: DEINSTALLING software for:
   ssp.ha_topsvcs.compat 3.5.0.0

Filesets processed:  1 of 10  (Total time:  1 secs).

installp: DEINSTALLING software for:
   ssp.css 3.5.0.0

105 entries added.
0 entries deleted.
103 entries updated.
0 entries added.
207 entries deleted.
1 entries updated.
Filesets processed:  2 of 10  (Total time:  18 secs).

installp: DEINSTALLING software for:
   ssp.css.lapi 3.5.0.0

Filesets processed:  3 of 10  (Total time:  20 secs).

installp: DEINSTALLING software for:
   ssp.pman 3.5.0.0

0 entries added.
3 entries deleted.
0 entries updated.
Filesets processed:  4 of 10  (Total time:  21 secs).

installp: DEINSTALLING software for:
   ssp.st 3.5.0.0

0513-095 The request for subsystem refresh was completed successfully.
0 entries added.
3 entries deleted.
0 entries updated.
rmitab: no match on ident field
```

```
rmitab: no match on ident field
0513-095 The request for subsystem refresh was completed successfully.
Filesets processed:  5 of 10  (Total time:  31 secs).

installp: DEINSTALLING software for:
   ssp.sysctl 3.5.0.0

0513-085 The sysctld Subsystem is not on file.
/usr/sbin/rmitab: no match on ident field
0513-084 There were no records that matched your request.
#sysctl6680/tcpsysctld
Filesets processed:  6 of 10  (Total time:  33 secs).

installp: DEINSTALLING software for:
   ssp.sysman 3.5.0.0

Filesets processed:  7 of 10  (Total time:  36 secs).

installp: DEINSTALLING software for:
   ssp.basic 3.5.0.0

0 entries added.
13 entries deleted.
1 entries updated.
0 objects deleted
SDRDeleteObjects: 0025-001 A read-only SDR session was obtained.  Operations
that create or change data are not allowed.
Filesets processed:  8 of 10  (Total time:  51 secs).

installp: DEINSTALLING software for:
   ssp.clients 3.5.0.0

0 entries added.
20 entries deleted.
0 entries updated.
0513-095 The request for subsystem refresh was completed successfully.

installp: DEINSTALLING software for:
   ssp.perlpkg 3.5.0.0

0513-085 The spnkeyman Subsystem is not on file.
0513-084 There were no records that matched your request.

########################################


Run '/usr/lpp/ssp/perl/bin/h2ph * sys/*' in /usr/include directory
if installp automatically re-installed a previous version of perl
########################################
```

```
Finished processing all filesets.  (Total time:  1 mins 4 secs).

+-----------------------------------------------------------------------------+
             Summaries:
+-----------------------------------------------------------------------------+

Installation Summary
--------------------
Name                        Level           Part        Event       Result
-------------------------------------------------------------------------------
ssp.ha_topsvcs.compat       3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.ha_topsvcs.compat       3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.css                     3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.css                     3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.css.lapi                3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.css.lapi                3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.pman                    3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.pman                    3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.st                      3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.st                      3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.sysctl                  3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.sysctl                  3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.sysman                  3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.sysman                  3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.basic                   3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.basic                   3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.clients                 3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.clients                 3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.perlpkg                 3.5.0.0         USR         DEINSTALL   SUCCESS
+-----------------------------------------------------------------------------+
          Pre-deinstall Verification...
+-----------------------------------------------------------------------------+
Verifying selections...done
Verifying requisites...done
Results...

SUCCESSES
---------
  Filesets listed in this section passed pre-deinstall verification
  and will be removed.

  Selected Filesets
  -----------------
  rsct.basic.sp 2.3.1.0                      # RSCT Basic Function (PSSP Su...
  rsct.compat.basic.sp 2.3.1.0               # RSCT Event Management Basic ...
  rsct.compat.clients.sp 2.3.1.0             # RSCT Event Management Client...

  << End of Success Section >>
```

```
FILESET STATISTICS
------------------
    3  Selected to be deinstalled, of which:
        3  Passed pre-deinstall verification
  ----
    3  Total to be deinstalled

+-----------------------------------------------------------------------------+
            Deinstalling Software...
+-----------------------------------------------------------------------------+

installp: DEINSTALLING software for:
   rsct.compat.basic.sp 2.3.1.0

Filesets processed:  1 of 3  (Total time:  1 secs).

installp: DEINSTALLING software for:
   rsct.compat.clients.sp 2.3.1.0

Filesets processed:  2 of 3  (Total time:  1 secs).

installp: DEINSTALLING software for:
   rsct.basic.sp 2.3.1.0

Finished processing all filesets.  (Total time:  2 secs).

Please wait...

   /usr/sbin/rsct/install/bin/ctposti
done
+-----------------------------------------------------------------------------+
            Summaries:
+-----------------------------------------------------------------------------+

Installation Summary
--------------------
Name                        Level           Part        Event       Result
-------------------------------------------------------------------------------
rsct.compat.basic.sp        2.3.1.0         USR         DEINSTALL   SUCCESS
rsct.compat.clients.sp      2.3.1.0         USR         DEINSTALL   SUCCESS
rsct.basic.sp               2.3.1.0         USR         DEINSTALL   SUCCESS
1 objects deleted
swcons: console output redirected to: /dev/tty0
rmpssp: The "Complete PSSP Removal" subroutine completed succesfully.
```

Example log file from rmpssp

rmpssp is utilized by **mkpssprpt**, **mknoderpt** and **rmpsspnode**. When you finally run **rmpssp** to remove PSSP from the CWS, a log of the activities is placed in /var/log/pssp_to_csm/rmpssp.log as shown in Example C-17.

This records both its own prerequisite checks and the actual de-installation of the CWS. Other tools that use this command log the output in their respective log files.

> **Tip:** All files that are altered are saved the /var/opt/pssp_to_csm/rmsaved directory first. Please refer to “Files generated and saved by rmpssp and mkcfgutils” on page 203.

> **Note:** The rmpssp log does not detail what files are saved on the system in the /var/opt/pssp_to_csm/rmsaved directory. Neither it is clear which files it alters and deletes during this removal process. For more details on what files are removed and altered, please refer to *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

Example: C-17 /var/log/pssp_to_csm/rmpssp.log

```
rmpssp: rmpssp was invoked at Tue May 4 16:53:21 EDT 2004 with these flags: -c.
rmpssp: Pre-requisite check status: ssp.basic is installed.
rmpssp: Pre-requisite check status: Passed dependent filesets check.
rmpssp: Pre-requisite check status: SDR can be accessed.
rmpssp: Pre-requisite check status: Node number can been read.
rmpssp: Pre-requisite check status: On the active and primary CWS.
rmpssp: Pre-requisite check status: PSSP uninstalled from all nodes.
rmpssp: The "Pre-requisite Check" subroutine completed succesfully.

rmpssp: rmpssp was invoked at Tue May 4 16:53:38 EDT 2004 with these flags:
none.
rmpssp: The "Pre-requisite Check" subroutine completed succesfully.
delnimmast: Node 0 (sp4cws) unconfigured as a NIM master.
+-----------------------------------------------------------------------------+
          Pre-deinstall Verification...
+-----------------------------------------------------------------------------+
Verifying selections...done
Verifying requisites...done
Results...

FILESET STATISTICS
------------------
    1  Selected to be deinstalled, of which:
```

```
        1  Passed pre-deinstall verification
  ----
    1  Total to be deinstalled

+-----------------------------------------------------------------------------+
             Deinstalling Software...
+-----------------------------------------------------------------------------+

installp: DEINSTALLING software for:
   bos.sysmgt.nim.master 5.2.0.0

Finished processing all filesets.  (Total time:  22 secs).

+-----------------------------------------------------------------------------+
             Summaries:
+-----------------------------------------------------------------------------+

Installation Summary
--------------------
Name                        Level           Part        Event       Result
-------------------------------------------------------------------------------
bos.sysmgt.nim.master       5.2.0.0         USR         DEINSTALL   SUCCESS
+-----------------------------------------------------------------------------+
           Pre-deinstall Verification...
+-----------------------------------------------------------------------------+
Verifying selections...done
Verifying requisites...done
Results...

FILESET STATISTICS
------------------
    1  Selected to be deinstalled, of which:
        1  Passed pre-deinstall verification
  ----
    1  Total to be deinstalled

+-----------------------------------------------------------------------------+
             Deinstalling Software...
+-----------------------------------------------------------------------------+

installp: DEINSTALLING software for:
   bos.sysmgt.nim.spot 5.2.0.0

Finished processing all filesets.  (Total time:  1 secs).

+-----------------------------------------------------------------------------+
             Summaries:
+-----------------------------------------------------------------------------+
```

```
Installation Summary
--------------------
Name                        Level           Part        Event       Result
-------------------------------------------------------------------------------
bos.sysmgt.nim.spot         5.2.0.0         USR         DEINSTALL   SUCCESS
rmpssp: The "NIM Removal" subroutine completed succesfully.
unexported /spdata/sys1/install/pssplpp
unexported /spdata/sys1/install/aix520/lppsource
rmnfsexp: /usr is not currently exported and is not in /etc/exports
rmpssp: The "NFS Removal" subroutine completed succesfully.
rmpssp: The "cron Removal" subroutine completed succesfully.
rmpssp: The "Sequence Files Removal" subroutine completed succesfully.
rmnfsexp: /var/adm/acct is not currently exported and is not in /etc/exports
rmpssp: The "SP Accounting Removal" subroutine completed succesfully.
rmpssp: The "SP Security Removal" subroutine completed succesfully.
rmpssp: The "SP Automount Removal" subroutine completed succesfully.
kadm:2:once:/usr/bin/startsrc -s kadmind
sdrd:2:once:/usr/bin/startsrc -g sdr
sp:2:wait:/etc/rc.sp > /dev/console 2>&1
sysctld:2:once:/usr/bin/startsrc -s sysctld
hardmon:2:once:/usr/bin/startsrc -s hardmon
hr:2:once:/usr/bin/startsrc -g hr > /dev/console 2>&1
fsd:2:once:/usr/lpp/ssp/css/rc.switch
kerb:2:once:/usr/bin/startsrc -s kerberos
splogd:2:once:/usr/bin/startsrc -s splogd
sp_configd:2:once:/usr/bin/startsrc -s sp_configd
hats:2:once:/usr/bin/startsrc -g hats > /dev/console 2>&1
hags:2:once:/usr/bin/startsrc -g hags > /dev/console 2>&1
haem:2:once:/usr/bin/startsrc -g haem > /dev/console 2>&1
pman:2:once:/usr/bin/startsrc -g pman >/dev/console 2>&1
st_sw_num:2:once:/usr/lpp/ssp/bin/st_set_switch_number > /dev/console 2>&1
st_reset:2:once:/usr/lpp/ssp/bin/st_reset_datafiles
spmgr:2:once:/usr/bin/startsrc -s spmgr
swt:2:once:/usr/lpp/ssp/css/start_swt > /dev/console 2>&1
0513-044 The hardmon Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
0513-044 The spmgr Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
0513-044 The splogd Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
0513-044 The sysctld Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
0513-044 The supfilesrv Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
0513-083 Subsystem has been Deleted.
0513-083 Subsystem has been Deleted.
0513-083 Subsystem has been Deleted.
0513-044 The kadmind Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
```

```
0513-044 The kerberos Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
0513-083 Subsystem has been Deleted.
rmpssp: The "SP Daemons Removal" subroutine completed succesfully.
rmpssp: The "SP Logs Removal" subroutine completed succesfully.
spseccfg6681/tcp
sysctl 6680/tcpsysctld
#switchbld4466/tcp
#switchtbld4466/tcp
switchtbld4466/tcp
#hardmon8435/tcp
hardmon8435/tcp
#kfcli 32801/tcp
#srvsupkf 32850/tcp
#supfilesrv8431/tcp
supfilesrv8431/tcp
#haemd 10003/tcp
haemd  10003/tcp
spmgrd-trap162/udp
#hahmcd8436/tcp
hahmcd 8436/tcp
rmpssp: The "SP Data Files Removal" subroutine completed succesfully.
rmpssp: The "Sysctl Removal" subroutine completed succesfully.
0 objects deleted
1 objects deleted
rmpssp: The "ODM Removal" subroutine completed succesfully.
0513-044 The pman.sp4cws Subsystem was requested to stop.
0513-044 The pmanrm.sp4cws Subsystem was requested to stop.
0513-044 The hr.sp4cws Subsystem was requested to stop.
0513-044 The haem.sp4cws Subsystem was requested to stop.
0513-044 The haemaixos.sp4cws Subsystem was requested to stop.
0513-044 The hagsglsm.sp4cws Subsystem was requested to stop.
0513-044 The hags.sp4cws Subsystem was requested to stop.
0513-044 The hats.sp4cws Subsystem was requested to stop.
0513-006 The Subsystem, hagsglsm.sp4cws, is currently stopping its execution.
+-----------------------------------------------------------------------------+
          Pre-deinstall Verification...
+-----------------------------------------------------------------------------+
Verifying selections...done
Verifying requisites...done
Results...

SUCCESSES
---------
  Filesets listed in this section passed pre-deinstall verification
  and will be removed.

  Selected Filesets
  -----------------
```

```
  ssp.authent 3.5.0.0                         # SP Authentication Server
  ssp.basic 3.5.0.0                           # SP System Support Package
  ssp.cediag 3.5.0.0                          # SP CE Diagnostics
  ssp.clients 3.5.0.0                         # SP Authenticated Client Comm...
  ssp.css 3.5.0.0                             # SP Communication Subsystem P...
  ssp.css.lapi 3.5.0.0                        # SP Communication Subsystem L...
  ssp.docs 3.5.0.0                            # SP man pages and PDF files a...
  ssp.gui 3.5.0.0                             # SP System Monitor Graphical ...
  ssp.ha_topsvcs.compat 3.5.0.0               # Compatability for ssp.ha and...
  ssp.perlpkg 3.5.0.0                         # SP PERL Distribution Package
  ssp.pman 3.5.0.0                            # SP Problem Management
  ssp.public 3.5.0.0                          # Public Code Compressed Tarfiles
  ssp.spmgr 3.5.0.0                           # SP Extension Node SNMP Manager
  ssp.st 3.5.0.0                              # Job Switch Resource Table Se...
  ssp.sysctl 3.5.0.0                          # SP Sysctl Package
  ssp.sysman 3.5.0.0                          # Optional System Management p...
  ssp.tecad 3.5.0.0                           # SP HA TEC Event Adapter Package
  ssp.top 3.5.0.0                             # SP Communication Subsystem T...
  ssp.top.gui 3.5.0.0                         # SP System Partitioning Aid
  ssp.ucode 3.5.0.0                           # SP Supervisor Microcode Package

  << End of Success Section >>

FILESET STATISTICS
------------------
   20  Selected to be deinstalled, of which:
       20  Passed pre-deinstall verification
  ----
   20  Total to be deinstalled

+-----------------------------------------------------------------------------+
             Deinstalling Software...
+-----------------------------------------------------------------------------+

installp: DEINSTALLING software for:
   ssp.cediag 3.5.0.0

Filesets processed:  1 of 20  (Total time:  3 secs).

installp: DEINSTALLING software for:
   ssp.ha_topsvcs.compat 3.5.0.0


installp: DEINSTALLING software for:
   ssp.public 3.5.0.0

Filesets processed:  3 of 20  (Total time:  6 secs).

installp: DEINSTALLING software for:
```

```
   ssp.spmgr 3.5.0.0

0 entries added.
2 entries deleted.
0 entries updated.
Filesets processed:  4 of 20  (Total time:  9 secs).

installp: DEINSTALLING software for:
   ssp.tecad 3.5.0.0

Filesets processed:  5 of 20  (Total time:  11 secs).

installp: DEINSTALLING software for:
   ssp.ucode 3.5.0.0

Filesets processed:  6 of 20  (Total time:  13 secs).

installp: DEINSTALLING software for:
   ssp.authent 3.5.0.0

grep: can't open /etc/sysctl.conf
Filesets processed:  7 of 20  (Total time:  18 secs).

installp: DEINSTALLING software for:
   ssp.css 3.5.0.0

0 entries added.
0 entries deleted.
208 entries updated.
0 entries added.
207 entries deleted.
1 entries updated.
Filesets processed:  8 of 20  (Total time:  47 secs).

installp: DEINSTALLING software for:
   ssp.css.lapi 3.5.0.0


installp: DEINSTALLING software for:
   ssp.docs 3.5.0.0

Filesets processed:  10 of 20  (Total time:  2 mins 13 secs).

installp: DEINSTALLING software for:
   ssp.pman 3.5.0.0

0 entries added.
3 entries deleted.
0 entries updated.
```

```
Filesets processed:  11 of 20  (Total time:  2 mins 16 secs).

installp: DEINSTALLING software for:
   ssp.st 3.5.0.0

0513-095 The request for subsystem refresh was completed successfully.
0 entries added.
3 entries deleted.
0 entries updated.
rmitab: no match on ident field
rmitab: no match on ident field
0513-095 The request for subsystem refresh was completed successfully.

installp: DEINSTALLING software for:
   ssp.top.gui 3.5.0.0
   ssp.gui 3.5.0.0

Filesets processed:  14 of 20  (Total time:  2 mins 55 secs).

installp: DEINSTALLING software for:
   ssp.sysctl 3.5.0.0

0513-085 The sysctld Subsystem is not on file.
/usr/sbin/rmitab: no match on ident field
0513-084 There were no records that matched your request.
#sysctl6680/tcpsysctld
Filesets processed:  15 of 20  (Total time:  3 mins 0 secs).

installp: DEINSTALLING software for:
   ssp.sysman 3.5.0.0

Filesets processed:  16 of 20  (Total time:  3 mins 7 secs).

installp: DEINSTALLING software for:
   ssp.top 3.5.0.0

Filesets processed:  17 of 20  (Total time:  3 mins 36 secs).

installp: DEINSTALLING software for:
   ssp.basic 3.5.0.0

0 entries added.
13 entries deleted.
1 entries updated.
0 objects deleted
Filesets processed:  18 of 20  (Total time:  4 mins 4 secs).

installp: DEINSTALLING software for:
   ssp.clients 3.5.0.0
```

```
0 entries added.
20 entries deleted.
0 entries updated.
0513-095 The request for subsystem refresh was completed successfully.

installp: DEINSTALLING software for:
   ssp.perlpkg 3.5.0.0

0513-085 The spnkeyman Subsystem is not on file.
0513-084 There were no records that matched your request.

########################################


Run '/usr/lpp/ssp/perl/bin/h2ph * sys/*' in /usr/include directory
if installp automatically re-installed a previous version of perl
########################################

Finished processing all filesets.  (Total time:  4 mins 29 secs).

+-----------------------------------------------------------------------------+
             Summaries:
+-----------------------------------------------------------------------------+

Installation Summary
--------------------
Name                        Level           Part        Event       Result
-------------------------------------------------------------------------------
ssp.cediag                  3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.cediag                  3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.ha_topsvcs.compat       3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.ha_topsvcs.compat       3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.public                  3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.spmgr                   3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.spmgr                   3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.tecad                   3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.tecad                   3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.ucode                   3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.ucode                   3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.authent                 3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.authent                 3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.css                     3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.css                     3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.css.lapi                3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.css.lapi                3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.docs                    3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.pman                    3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.pman                    3.5.0.0         USR         DEINSTALL   SUCCESS
```

```
ssp.st                      3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.st                      3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.top.gui                 3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.gui                     3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.sysctl                  3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.sysctl                  3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.sysman                  3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.sysman                  3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.top                     3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.top                     3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.basic                   3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.basic                   3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.clients                 3.5.0.0         ROOT        DEINSTALL   SUCCESS
ssp.clients                 3.5.0.0         USR         DEINSTALL   SUCCESS
ssp.perlpkg                 3.5.0.0         USR         DEINSTALL   SUCCESS
+-----------------------------------------------------------------------------+
          Pre-deinstall Verification...
+-----------------------------------------------------------------------------+
Verifying selections...done
Verifying requisites...done
Results...

SUCCESSES
---------
  Filesets listed in this section passed pre-deinstall verification
  and will be removed.

  Selected Filesets
  -----------------
  rsct.basic.sp 2.3.0.0                      # RSCT Basic Function (PSSP Su...
  rsct.compat.basic.sp 2.3.0.0               # RSCT Event Management Basic ...
  rsct.compat.clients.sp 2.3.0.0             # RSCT Event Management Client...

  << End of Success Section >>

FILESET STATISTICS
------------------
    3  Selected to be deinstalled, of which:
        3  Passed pre-deinstall verification
  ----
    3  Total to be deinstalled

+-----------------------------------------------------------------------------+
            Deinstalling Software...
+-----------------------------------------------------------------------------+

installp: DEINSTALLING software for:
   rsct.compat.basic.sp 2.3.0.0
```

```
Filesets processed:  1 of 3  (Total time:  2 secs).

installp: DEINSTALLING software for:
   rsct.compat.clients.sp 2.3.0.0

Filesets processed:  2 of 3  (Total time:  3 secs).

installp: DEINSTALLING software for:
   rsct.basic.sp 2.3.0.0

Finished processing all filesets.  (Total time:  4 secs).

Please wait...

   /usr/sbin/rsct/install/bin/ctposti
done
+-----------------------------------------------------------------------------+
            Summaries:
+-----------------------------------------------------------------------------+

Installation Summary
--------------------
Name                        Level           Part        Event       Result
-------------------------------------------------------------------------------
rsct.compat.basic.sp        2.3.0.0         USR         DEINSTALL   SUCCESS
rsct.compat.clients.sp      2.3.0.0         USR         DEINSTALL   SUCCESS
rsct.basic.sp               2.3.0.0         USR         DEINSTALL   SUCCESS
1 objects deleted
0513-044 The sdr.sp4cws Subsystem was requested to stop.
0513-083 Subsystem has been Deleted.
#sdr   5712/tcp
#sdrprot1712/tcp
rmpssp: The "Complete PSSP Removal" subroutine completed succesfully.
```

Files generated and saved by rmpssp and mkcfgutils

If **rmpssp** runs multiple times on the same system, then there will be directories in `/var/opt/pssp_to_csm` called rmsaved.<timestamp>.old as shown in Example C-18. This directory has not been expanded in the output shown in Example C-18.

Example: C-18 Files and direct

```
/var/opt/pssp_to_csm
#ls -lR
total 48
drwxr-xr-x   2 root     system        1024 May  4 15:32 backup
drwxr-xr-x   2 root     system        3072 May  4 15:32 data
drwxr-xr-x   6 root     system         512 May  4 17:01 rmsaved
drwxr-xr-x   6 root     system         512 Apr 14 11:57 rmsaved.20040504165338.old

./backup:
total 136
-rw-r--r--   1 root     system         479 May  2 16:07 adapterdef.20040502160714.def
-rw-r--r--   1 root     system         479 May  3 15:42 adapterdef.20040503154200.def
-rw-r--r--   1 root     system         479 May  3 16:27 adapterdef.20040503162703.def
-rw-r--r--   1 root     system         479 May  4 15:32 adapterdef.20040504153204.def
-rw-r--r--   1 root     system        1239 May  4 15:32 fc.stanza
-rw-r--r--   1 root     system         141 May  2 16:07 gngrpdef.20040502160714.def
-rw-r--r--   1 root     system         141 May  3 15:42 gngrpdef.20040503154200.def
-rw-r--r--   1 root     system         141 May  3 16:27 gngrpdef.20040503162703.def
-rw-r--r--   1 root     system         141 May  4 15:32 gngrpdef.20040504153204.def
-rw-r--r--   1 root     system        1236 May  2 16:07 nodedef.20040502160714.def
-rw-r--r--   1 root     system        1236 May  3 15:42 nodedef.20040503154200.def
-rw-r--r--   1 root     system        1236 May  3 16:27 nodedef.20040503162703.def
-rw-r--r--   1 root     system        1236 May  4 15:32 nodedef.20040504153204.def
-rw-r--r--   1 root     system         211 May  2 16:07 pngrpdef.20040502160714.def
-rw-r--r--   1 root     system         165 May  3 15:42 pngrpdef.20040503154200.def
-rw-r--r--   1 root     system         165 May  3 16:27 pngrpdef.20040503162703.def
-rw-r--r--   1 root     system         165 May  4 15:32 pngrpdef.20040504153204.def

./data:
total 3048
-rw-r--r--   1 root     system         479 May  2 16:07 adapterdef.20040502160714.def
-rw-r--r--   1 root     system         479 May  3 15:42 adapterdef.20040503154200.def
-rw-r--r--   1 root     system         479 May  3 16:27 adapterdef.20040503162703.def
-rw-r--r--   1 root     system         479 May  4 15:32 adapterdef.20040504153204.def
-rw-r--r--   1 root     system         412 May  4 15:32 fc.files
-rw-r--r--   1 root     system        1239 May  4 15:32 fc.stanza
-rw-r--r--   1 root     system       61440 May  4 15:32 fcfiles.tar
-rw-r--r--   1 root     system         141 May  2 16:07 gngrpdef.20040502160714.def
-rw-r--r--   1 root     system         141 May  3 15:42 gngrpdef.20040503154200.def
-rw-r--r--   1 root     system         141 May  3 16:27 gngrpdef.20040503162703.def
```

```
-rw-r--r--   1 root     system         141 May  4 15:32 gngrpdef.20040504153204.def
-rw-r--r--   1 root     system        1236 May  2 16:07 nodedef.20040502160714.def
-rw-r--r--   1 root     system        1236 May  3 15:42 nodedef.20040503154200.def
-rw-r--r--   1 root     system        1236 May  3 16:27 nodedef.20040503162703.def
-rw-r--r--   1 root     system        1236 May  4 15:32 nodedef.20040504153204.def
-rw-r--r--   1 root     system        2869 Apr 28 18:33 noderpt.20040428183319.txt
-rw-r--r--   1 root     system        4472 Apr 28 19:04 noderpt.20040428190450.htm
-rw-r--r--   1 root     system        2869 Apr 29 17:56 noderpt.20040429175642.txt
-rw-r--r--   1 root     system        2869 Apr 29 17:57 noderpt.20040429175722.txt
-rw-r--r--   1 root     system        2869 Apr 29 18:01 noderpt.20040429180058.txt
-rw-r--r--   1 root     system        2923 Apr 29 18:05 noderpt.20040429180515.txt
-rw-r--r--   1 root     system        2923 Apr 29 18:06 noderpt.20040429180642.txt
-rw-r--r--   1 root     system        2923 Apr 29 18:08 noderpt.20040429180810.txt
-rw-r--r--   1 root     system        2923 Apr 29 18:10 noderpt.20040429181009.txt
-rw-r--r--   1 root     system        2923 Apr 29 18:10 noderpt.20040429181030.txt
-rw-r--r--   1 root     system        2923 Apr 29 18:20 noderpt.20040429182053.txt
-rw-r--r--   1 root     system        2923 Apr 30 09:30 noderpt.20040430093050.txt
-rw-r--r--   1 root     system        2923 Apr 30 16:20 noderpt.20040430162018.txt
-rw-r--r--   1 root     system        2923 Apr 30 16:26 noderpt.20040430162610.txt
-rw-r--r--   1 root     system        2523 Apr 30 16:28 noderpt.20040430162845.txt
-rw-r--r--   1 root     system        2523 Apr 30 16:29 noderpt.20040430162926.txt
-rw-r--r--   1 root     system        2523 May  2 14:51 noderpt.20040502145112.txt
-rw-r--r--   1 root     system        3851 May  2 14:51 noderpt.20040502145141.htm
-rw-r--r--   1 root     system        3099 May  2 15:10 noderpt.20040502151001.txt
-rw-r--r--   1 root     system        4510 May  2 15:10 noderpt.20040502151043.htm
-rw-r--r--   1 root     system        4510 May  2 17:32 noderpt.20040502173155.htm
-rw-r--r--   1 root     system        3099 May  2 17:32 noderpt.20040502173239.txt
-rw-r--r--   1 root     system        3099 May  2 17:33 noderpt.20040502173328.txt
-rw-r--r--   1 root     system        3099 May  2 17:38 noderpt.20040502173623.txt
-rw-r--r--   1 root     system        3099 May  2 17:38 noderpt.20040502173844.txt
-rw-r--r--   1 root     system        3099 May  2 17:41 noderpt.20040502174113.txt
-rw-r--r--   1 root     system        3099 May  2 17:49 noderpt.20040502174922.txt
-rw-r--r--   1 root     system        3099 May  2 17:59 noderpt.20040502175940.txt
-rw-r--r--   1 root     system        4510 May  3 17:14 noderpt.20040503171420.htm
-rw-r--r--   1 root     system        4510 May  4 15:28 noderpt.20040504152819.htm
-rw-r--r--   1 root     system         211 May  2 16:07 pngrpdef.20040502160714.def
-rw-r--r--   1 root     system         165 May  3 15:42 pngrpdef.20040503154200.def
-rw-r--r--   1 root     system         165 May  3 16:27 pngrpdef.20040503162703.def
-rw-r--r--   1 root     system         165 May  4 15:32 pngrpdef.20040504153204.def
-rw-r--r--   1 root     system       17485 Apr 28 18:32 pssprpt.20040428183238.txt
-rw-r--r--   1 root     system       17485 Apr 28 18:39 pssprpt.20040428183906.txt
-rw-r--r--   1 root     system       22568 Apr 28 19:04 pssprpt.20040428190435.htm
-rw-r--r--   1 root     system       22618 Apr 28 21:36 pssprpt.20040428213556.htm
-rw-r--r--   1 root     system       17757 Apr 28 21:36 pssprpt.20040428213609.txt
-rw-r--r--   1 root     system       19405 Apr 29 17:18 pssprpt.20040429171816.txt
-rw-r--r--   1 root     system       24575 Apr 29 17:24 pssprpt.20040429172402.htm
-rw-r--r--   1 root     system       43855 Apr 29 17:53 pssprpt.20040429175259.txt
-rw-r--r--   1 root     system       43855 Apr 30 09:09 pssprpt.20040430090946.txt
-rw-r--r--   1 root     system       44065 May  2 14:49 pssprpt.20040502144946.txt
```

```
-rw-r--r--   1 root     system        44109 May  2 14:50 pssprpt.20040502145042.txt
-rw-r--r--   1 root     system        43628 May  2 14:50 pssprpt.20040502145051.htm
-rw-r--r--   1 root     system        43628 May  2 15:08 pssprpt.20040502150808.htm
-rw-r--r--   1 root     system        44109 May  2 17:39 pssprpt.20040502173857.txt
-rw-r--r--   1 root     system        44109 May  2 17:41 pssprpt.20040502174104.txt
-rw-r--r--   1 root     system        43892 May  2 18:47 pssprpt.20040502184726.txt
-rw-r--r--   1 root     system        44000 May  3 13:22 pssprpt.20040503132222.txt
-rw-r--r--   1 root     system        43940 May  3 13:50 pssprpt.20040503135016.txt
-rw-r--r--   1 root     system        43940 May  3 13:59 pssprpt.20040503135932.txt
-rw-r--r--   1 root     system        43959 May  3 14:45 pssprpt.20040503144457.txt
-rw-r--r--   1 root     system        43985 May  3 14:46 pssprpt.20040503144616.txt
-rw-r--r--   1 root     system        43985 May  3 14:47 pssprpt.20040503144726.txt
-rw-r--r--   1 root     system        43982 May  3 14:48 pssprpt.20040503144851.txt
-rw-r--r--   1 root     system        43937 May  3 15:29 pssprpt.20040503152926.txt
-rw-r--r--   1 root     system        44024 May  3 15:37 pssprpt.20040503153745.txt
-rw-r--r--   1 root     system        44024 May  3 16:00 pssprpt.20040503160038.txt
-rw-r--r--   1 root     system        43625 May  3 17:14 pssprpt.20040503171411.htm
-rw-r--r--   1 root     system        44033 May  3 17:22 pssprpt.20040503172240.txt
-rw-r--r--   1 root     system        44033 May  3 17:27 pssprpt.20040503172656.txt
-rw-r--r--   1 root     system        44033 May  3 17:50 pssprpt.20040503175045.txt
-rw-r--r--   1 root     system        43634 May  3 18:13 pssprpt.20040503181354.htm
-rw-r--r--   1 root     system        43634 May  4 15:26 pssprpt.20040504152612.htm

./rmsaved:
total 64
-rw-------   1 root     system            8 Apr 14 13:03 .k
-rw-------   1 root     system          133 May  2 17:40 .klogin
-rw-------   1 root     system          370 May  2 17:40 .spgen_klogin
-rw-------   1 root     system          217 May  4 16:46 .spgen_rhosts
drwxr-xr-x   4 root     system          512 May  4 16:56 etc
drwxr-xr-x   3 root     system          512 May  4 17:01 spdata
drwxr-xr-x   2 root     system          512 May  4 16:56 tftpboot
drwxr-xr-x   5 root     system          512 May  4 16:56 var

./rmsaved/etc:
total 184
-rw-r--r--   1 root     system           90 Apr 14 13:14 SDR_dest_info
drwxr-xr-x   2 bin      bin            1024 Apr 14 13:05 SP
drwxr-xr-x   3 root     system          512 May  4 16:56 auto
-rw-r--r--   1 root     system          357 Apr 14 13:52 auto.master
-rw-r--r--   1 root     system            0 Apr 29 16:51 cstartSeq
-rw-r--r--   1 root     system           75 May  4 16:51 exports
-rw-------   1 root     system         3877 May  4 16:56 inittab
-rw-r--r--   1 root     system           34 Apr 14 13:02 krb.conf
-rw-r--r--   1 root     system          186 Apr 30 18:19 krb.realms
-rw-r--r--   1 root     system          198 Apr 14 12:57 logmgt.acl
-r-xr-xr--   1 bin      bin            3459 Apr  8 17:58 rc
-rw-r--r--   1 root     system        23665 Apr 29 15:45 services
-rw-r--r--   1 root     system            0 Apr 29 16:51 subsysSeq
```

```
-rw-r--r--   1 root     system          196 Apr 29 15:58 sysctl.acl
-rw-r--r--   1 root     system         2871 Apr 14 13:06 sysctl.conf
-rw-r--r--   1 root     system          299 Apr 14 12:57 sysctl.haem.acl
-rw-r--r--   1 root     system          299 Apr 14 12:57 sysctl.install.acl
-rw-------   1 root     system          436 Apr 29 17:30 sysctl.pman.acl
-rw-r--r--   1 root     system          537 Apr 29 15:56 sysctl.rootcmds.acl
-rw-r--r--   1 root     system         4065 Apr 14 11:42 syslog.conf

./rmsaved/etc/SP:
total 280
-rw-r--r--   1 bin      bin            4500 Nov 25 2002  Eclock.top.1nsb.0isb.0
-rw-r--r--   1 bin      bin            4512 Nov 25 2002  Eclock.top.1nsb_8.0isb.0
-rw-r--r--   1 bin      bin            4558 Nov 25 2002  Eclock.top.2nsb.0isb.0
-rw-r--r--   1 bin      bin            5168 Nov 25 2002  Eclock.top.3nsb.0isb.0
-rw-r--r--   1 bin      bin            5842 Nov 25 2002  Eclock.top.4nsb.0isb.0
-rw-r--r--   1 bin      bin            4808 Nov 25 2002  Eclock.top.4nsb.2isb.0
-rw-r--r--   1 bin      bin            4768 Nov 25 2002  Eclock.top.5nsb.0isb.0
-rw-r--r--   1 bin      bin            5044 Nov 25 2002  Eclock.top.5nsb.4isb.0
-rw-r--r--   1 bin      bin            5031 Nov 25 2002  Eclock.top.6nsb.4isb.0
-rw-r--r--   1 bin      bin            5094 Nov 25 2002  Eclock.top.7nsb.4isb.0
-rw-r--r--   1 bin      bin            5153 Nov 25 2002  Eclock.top.8nsb.4isb.0
-rwxr-xr--   1 bin      bin            3133 Apr 14 12:57 Emonitor.cfg
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.0nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.0nsb.0isb.0
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.1nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.1nsb.0isb.0
lrwxrwxrwx   1 root     sys              65 May  4 16:56 expected.top.1nsb_8.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.1nsb_8.0isb.0
lrwxrwxrwx   1 root     sys              65 May  4 16:56 expected.top.1nsb_8.0isb.1 ->
/spdata/sys1/syspar_configs/topologies/expected.top.1nsb_8.0isb.1
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.2nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.2nsb.0isb.0
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.3nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.3nsb.0isb.0
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.4nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.4nsb.0isb.0
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.5nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.5nsb.0isb.0
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.5nsb.4isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.5nsb.4isb.0
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.6nsb.4isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.6nsb.4isb.0
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.7nsb.4isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.7nsb.4isb.0
lrwxrwxrwx   1 root     sys              63 May  4 16:56 expected.top.8nsb.4isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.8nsb.4isb.0

./rmsaved/etc/auto:
total 32
```

```
drwxr-xr-x   2 root     system          512 Apr 29 15:27 maps
-rwxr-xr-x   1 root     system         2839 May  4 16:46 refauto
-rwxr-xr-x   1 root     system         5672 May  4 16:46 startauto

./rmsaved/etc/auto/maps:
total 8
-rw-r--r--   1 root     system         1672 Apr 29 15:27 auto.u

./rmsaved/spdata:
total 8
drwxr-xr-x   4 root     system          512 May  4 17:01 sys1

./rmsaved/spdata/sys1:
total 16
drwx------   6 root     system          512 May  2 14:50 sdr
drwxr-xr-x   3 bin      bin             512 May  4 17:01 spmon

./rmsaved/spdata/sys1/sdr:
total 40
-rw-r--r--   1 root     system           50 May  2 14:50 SDR_config.sig
drwx------   2 root     system          512 May  4 15:41 archives
drwx------   2 root     system         1536 Apr 22 08:54 defs
drwx------   3 root     system          512 Apr 14 13:05 partitions
drwx------   5 root     system          512 Apr 14 13:05 system

./rmsaved/spdata/sys1/sdr/archives:
total 3680
-rw-r--r--   1 root     system        81920 Apr 14 14:04 backup.04105.1404
-rw-r--r--   1 root     system        81920 Apr 14 14:05 backup.04105.1405.SDR_config
-rw-r--r--   1 root     system        92160 Apr 21 21:30 backup.04112.2130
-rw-r--r--   1 root     system        92160 Apr 21 21:32 backup.04112.2132
-rw-r--r--   1 root     system        92160 Apr 22 09:00 backup.04113.0900
-rw-r--r--   1 root     system        92160 Apr 22 09:01 backup.04113.0901
-rw-r--r--   1 root     system        92160 Apr 22 09:01 backup.04113.0901.SDR_config
-rw-r--r--   1 root     system       174080 Apr 23 20:47 backup.04114.2047.SDR_config
-rw-r--r--   1 root     system       174080 Apr 27 11:13 backup.04118.1113.SDR_config
-rw-r--r--   1 root     system       174080 Apr 29 14:53 backup.04120.1453
-rw-r--r--   1 root     system       174080 Apr 29 15:05 backup.04120.1505
-rw-r--r--   1 root     system       174080 Apr 29 17:15 backup.04120.1715
-rw-r--r--   1 root     system       184320 May  2 14:50 backup.04123.1450.SDR_config
-rw-r--r--   1 root     system       184320 May  4 15:41 backup.04125.1541

./rmsaved/spdata/sys1/sdr/defs:
total 448
-rw-------   1 root     system          241 Apr 14 13:05 Adapter
-rw-------   1 root     system          108 Apr 14 13:05 Aggregate_IP
-rw-------   1 root     system           27 Apr 14 13:05 CSS_Adapter_Info
-rw-------   1 root     system           42 Apr 14 13:05 CSS_Type
-rw-------   1 root     system           39 Apr 14 13:05 DependentAdapter
```

```
-rw-------   1 root     system          221 Apr 14 13:05 DependentNode
-rw-------   1 root     system           29 Apr 14 13:05 Dont_care_pool_list
-rw-------   1 root     system           95 Apr 14 13:05 EM_Condition
-rw-------   1 root     system          105 Apr 14 13:05 EM_Resource_Class
-rw-------   1 root     system           64 Apr 14 13:05 EM_Resource_ID
-rw-------   1 root     system          162 Apr 14 13:05 EM_Resource_Monitor
-rw-------   1 root     system          285 Apr 14 13:05 EM_Resource_Variable
-rw-------   1 root     system           92 Apr 14 13:05 EM_Structured_Byte_String
-rw-------   1 root     system          189 Apr 14 13:05 Frame
-rw-------   1 root     system           52 Apr 14 13:05 GMT_Global_smt_nds
-rw-------   1 root     system           37 Apr 14 13:05 GS_Config
-rw-------   1 root     system           18 Apr 14 13:05 HSD_Minor_Number
-rw-------   1 root     system           93 Apr 14 13:05 HSD_Table
-rw-------   1 root     system          158 Apr 14 13:05 JM_domain_info
-rw-------   1 root     system          240 Apr 14 13:05 JM_job_info
-rw-------   1 root     system           57 Apr 14 13:05 JM_node_usage
-rw-------   1 root     system           31 Apr 14 13:05 JM_server_nodes
-rw-------   1 root     system           73 Apr 14 13:05 Network
-rw-------   1 root     system         1094 Apr 14 13:05 Node
-rw-------   1 root     system          145 Apr 14 13:05 NodeControl
-rw-------   1 root     system          111 Apr 14 13:05 NodeExpansion
-rw-------   1 root     system           21 Apr 14 13:05 NodeGroup
-rw-------   1 root     system           58 Apr 14 13:05 Node_VPD
-rw-------   1 root     system          394 Apr 14 13:05 PMAN_Subscription
-rw-------   1 root     system           52 Apr 14 13:05 Pool
-rw-------   1 root     system          118 Apr 14 13:05 ProcessorExtensionNode
-rw-------   1 root     system           21 Apr 14 13:05 RVSD_Restrict_Level
-rw-------   1 root     system          903 Apr 14 13:05 SP
-rw-------   1 root     system           73 Apr 14 13:05 SP_Restricted
-rw-------   1 root     system           32 Apr 14 13:05 SP_ports
-rw-------   1 root     system           27 Apr 14 13:05 Subnet
-rw-------   1 root     system          209 Apr 14 13:05 Switch
-rw-------   1 root     system          130 Apr 14 13:05 Switch_adapter_port
-rw-------   1 root     system          289 Apr 14 13:05 Switch_partition
-rw-------   1 root     system          218 Apr 14 13:05 Switch_plane
-rw-------   1 root     system           21 Apr 14 13:05 SysNodeGroup
-rw-------   1 root     system          168 Apr 14 13:05 Syspar
-rw-------   1 root     system           90 Apr 14 13:05 Syspar_map
-rw-------   1 root     system           23 Apr 14 13:05 Syspar_ports
-rw-------   1 root     system           85 Apr 14 13:05 TS_Config
-rw-------   1 root     system           46 Apr 14 13:05 TS_Tunable
-rw-------   1 root     system           73 Apr 14 13:05 TaskGuide
-rw-------   1 root     system           69 Apr 14 13:05 VSD_Cluster_Info
-rw-------   1 root     system           35 Apr 14 13:05 VSD_Fence
-rw-------   1 root     system          163 Apr 14 13:05 VSD_Global_Volume_Group
-rw-------   1 root     system           18 Apr 14 13:05 VSD_Minor_Number
-rw-------   1 root     system          129 Apr 14 13:05 VSD_Table
-rw-------   1 root     system          208 Apr 14 13:05 Volume_Group
-rw-------   1 root     system           34 Apr 14 13:05 host_responds
```

```
-rw-------   1 root     system           94 Apr 14 13:05 pmanrmdConfig
-rw-------   1 root     system          277 Apr 14 13:05 switch_responds

./rmsaved/spdata/sys1/sdr/partitions:
total 8
drwx------   4 root     system          512 Apr 14 13:05 192.168.100.178

./rmsaved/spdata/sys1/sdr/partitions/192.168.100.178:
total 16
drwx------   2 root     system          512 May  4 17:01 classes
drwx------   2 root     system          512 May  4 17:01 files

./rmsaved/spdata/sys1/sdr/partitions/192.168.100.178/classes:
total 168
-rw-------   1 root     system          771 Apr 29 17:17 Adapter
-rw-------   1 root     system         5004 Apr 27 11:28 EM_Condition
-rw-------   1 root     system            1 May  4 17:01 EM_Resource_Class
-rw-------   1 root     system            1 May  4 17:01 EM_Resource_ID
-rw-------   1 root     system            1 May  4 17:01 EM_Resource_Monitor
-rw-------   1 root     system            1 May  4 17:01 EM_Resource_Variable
-rw-------   1 root     system            1 May  4 17:01 EM_Structured_Byte_String
-rw-------   1 root     system            1 May  4 17:01 GS_Config
-rw-------   1 root     system         1634 May  4 16:51 Node
-rw-------   1 root     system          228 Apr 28 18:52 NodeGroup
-rw-------   1 root     system          144 May  2 10:41 Node_VPD
-rw-------   1 root     system         6941 Apr 30 17:33 PMAN_Subscription
-rw-------   1 root     system           66 Apr 15 11:46 Switch_plane
-rw-------   1 root     system           94 May  4 17:01 Syspar
-rw-------   1 root     system           16 May  4 17:01 Syspar_ports
-rw-------   1 root     system            1 May  4 17:01 TS_Config
-rw-------   1 root     system           76 Apr 14 13:14 TS_Tunable
-rw-------   1 root     system          654 May  4 16:45 Volume_Group
-rw-------   1 root     system           36 May  4 16:49 host_responds

./rmsaved/spdata/sys1/sdr/partitions/192.168.100.178/files:
total 0

./rmsaved/spdata/sys1/sdr/system:
total 24
drwx------   2 root     system          512 May  4 17:01 classes
drwx------   2 root     system          512 Apr 14 13:05 files
drwx------   2 root     system          512 May  4 17:01 locks

./rmsaved/spdata/sys1/sdr/system/classes:
total 80
-rw-------   1 root     system          103 Apr 14 13:14 CSS_Adapter_Info
-rw-------   1 root     system          882 Apr 14 13:14 CSS_Type
-rw-------   1 root     system          213 May  2 14:50 Frame
-rw-------   1 root     system         1286 Apr 14 13:14 NodeControl
```

```
-rw-------   1 root     system          332 Apr 29 22:37 SP
-rw-------   1 root     system           16 May  2 17:40 SP_Restricted
-rw-------   1 root     system           91 May  4 17:01 SP_ports
-rw-------   1 root     system            1 Apr 21 21:32 Switch
-rw-------   1 root     system          172 Apr 28 18:50 SysNodeGroup
-rw-------   1 root     system          204 Apr 22 09:02 Syspar_map

./rmsaved/spdata/sys1/sdr/system/files:
total 0

./rmsaved/spdata/sys1/sdr/system/locks:
total 0

./rmsaved/spdata/sys1/spmon:
total 16
drw-------   2 root     system          512 Apr 22 08:59 hmc_passwd
-rw-------   1 root     system          374 Apr 14 13:05 netfinity_passwd

./rmsaved/spdata/sys1/spmon/hmc_passwd:
total 16
-r--------   1 root     system            8 Apr 22 08:59 .key
-r--------   1 root     system           24 Apr 22 08:59 192.168.100.69

./rmsaved/tftpboot:
total 168
-rw-r--r--   1 root     sys           22064 Apr 23 12:29 firstboot.cust
-rw-r--r--   1 root     sys             228 Apr 30 18:19 p650_A.config_info
-rw-r--r--   1 root     sys            1055 Apr 30 18:19 p650_A.install_info
-rw-r--r--   1 root     sys             156 Apr 23 13:25 p650_B.config_info
-rw-r--r--   1 root     sys            1055 Apr 23 13:25 p650_B.install_info
-rw-r--r--   1 root     sys             157 Apr 23 13:25 p650_C.config_info
-rw-r--r--   1 root     sys            1055 Apr 23 13:25 p650_C.install_info
-rw-r--r--   1 root     sys             156 Apr 23 18:08 p650_D.config_info
-rw-r--r--   1 root     sys            1055 Apr 23 18:08 p650_D.install_info
-rw-r--r--   1 root     sys           20810 Apr 23 12:24 script.cust
-rw-r--r--   1 root     system         2998 Apr 14 13:06 tuning.cust

./rmsaved/var:
total 24
drwxr-xr-x   5 root     system          512 May  4 16:56 adm
drwxr-xr-x   3 root     system          512 May  4 16:56 spool
drwxr-xr-x   5 root     system          512 May  4 16:56 sysman

./rmsaved/var/adm:
total 24
drwxr-xr-x  20 bin      bin             512 May  4 16:56 SPlogs
drwxr-xr-x   2 root     system          512 May  4 16:56 acct
drwxr-xr-x  11 adm      adm            1024 May  4 16:56 cacct
```

```
./rmsaved/var/adm/SPlogs:
total 152
-rw-r--r--   1 root     system           86 Apr 22 08:54 SDR_test.log
drwxr-xr-x   2 bin      bin             512 Apr 14 12:57 SPconfig
drwxr-xr-x   2 bin      bin             512 Apr 14 15:05 auth_install
drwxr-xr-x   2 root     system          512 May  4 16:46 auto
drwxrwx---   2 root     shutdown        512 Apr 14 12:57 cs
drwxr-xr-x   2 root     system          512 May  2 14:49 css
drwxr-xr-x   3 root     system          512 Apr 14 12:57 css0
drwxr-xr-x   3 root     system          512 Apr 14 12:57 css1
drw-r--r--   2 root     system          512 May  2 18:04 filec
drwxr-xr-x   2 bin      bin             512 Apr 14 12:57 get_keyfiles
drwxr-xr-x   2 bin      bin             512 Apr 14 12:57 install
drwx------   2 root     system          512 Apr 14 13:03 kerberos
drwxr-xr-x   2 bin      bin             512 Apr 23 18:42 kfserver
drwxr-xr-x   2 root     system          512 May  2 14:49 pman
drwx------   2 root     system          512 May  4 15:55 sdr
drwxr-xr-x   2 root     system          512 Apr 14 12:57 spmgr
drwxr-xr-x  10 bin      bin             512 May  2 14:49 spmon
drwxr-xr-x   2 root     system          512 Apr 14 12:57 st
drwxr-xr-x   2 bin      bin             512 Apr 14 13:06 sysctl

./rmsaved/var/adm/SPlogs/SPconfig:
total 0

./rmsaved/var/adm/SPlogs/auth_install:
total 64
-rw-r--r--   1 root     system        29361 May  4 16:46 log

./rmsaved/var/adm/SPlogs/auto:
total 16
-rw-r--r--   1 root     system         4370 May  4 16:46 auto.log

./rmsaved/var/adm/SPlogs/cs:
total 0

./rmsaved/var/adm/SPlogs/css:
total 24
-rw-r--r--   1 root     system          224 Apr 15 11:46 Ecommands.log
-rw-r--r--   1 root     system          107 May  2 14:49 rc.switch.log
-rw-r--r--   1 root     system          108 Apr 27 11:11 rc.switch.log.previous

./rmsaved/var/adm/SPlogs/css0:
total 8
drwxr-xr-x   2 root     system          512 Apr 14 12:57 p0

./rmsaved/var/adm/SPlogs/css0/p0:
total 0
```

```
./rmsaved/var/adm/SPlogs/css1:
total 8
drwxr-xr-x   2 root     system          512 Apr 14 12:57 p0

./rmsaved/var/adm/SPlogs/css1/p0:
total 0

./rmsaved/var/adm/SPlogs/filec:
total 104
-rw-r--r--   1 root     system          346 May  4 16:46 regserver.log
lrwxrwxrwx   1 root     system           42 Apr 29 22:05 rsup ->
/var/adm/SPlogs/filec/sup04.29.2004.22.05r
-rw-------   1 root     system          293 Apr 23 18:13 srvsuppwd.log.34320
lrwxrwxrwx   1 root     system           41 Apr 29 22:05 sup ->
/var/adm/SPlogs/filec/sup04.29.2004.22.05
-rw-------   1 root     system          462 Apr 29 15:44 sup.log.p650_a.30104
-rw-------   1 root     system          462 Apr 23 19:02 sup.log.p650_a.37292
-rw-------   1 root     system          463 Apr 29 15:44 sup.log.p650_b.28008
-rw-------   1 root     system          463 Apr 29 15:44 sup.log.p650_c.27346
-rw-------   1 root     system          463 May  2 18:04 sup.log.p650_c.32896
-rw-------   1 root     system          463 Apr 23 13:45 sup.log.p650_c.36950
-rw-------   1 root     system          463 Apr 29 15:44 sup.log.p650_d.28844
-rw-------   1 root     system          463 May  2 18:04 sup.log.p650_d.33574
-rw-------   1 root     system          463 Apr 23 18:35 sup.log.p650_d.36538
-rw-r--r--   1 root     system          731 Apr 29 22:16 sup04.29.2004.22.05
-rw-r--r--   1 root     system            0 Apr 29 22:05 sup04.29.2004.22.05r
-rw-r--r--   1 root     system         2951 Apr 29 15:45 suppwd.log

./rmsaved/var/adm/SPlogs/get_keyfiles:
total 0

./rmsaved/var/adm/SPlogs/install:
total 0

./rmsaved/var/adm/SPlogs/kerberos:
total 16
-rw-r--r--   1 root     system          417 May  4 16:56 admin_server.syslog
-rw-r--r--   1 root     system          156 May  2 14:49 kerberos.log

./rmsaved/var/adm/SPlogs/kfserver:
total 40
-rw-r--r--   1 root     system          325 Apr 23 18:42 kfserver.log.p650_a.27826
-rw-r--r--   1 root     system          326 Apr 23 13:40 kfserver.log.p650_b.30060
-rw-r--r--   1 root     system          326 Apr 23 13:21 kfserver.log.p650_c.37092
-rw-r--r--   1 root     system          326 Apr 23 18:23 kfserver.log.p650_d.36458
-rw-r--r--   1 root     system          343 May  4 16:46 regserver.log

./rmsaved/var/adm/SPlogs/pman:
total 272
```

```
-rw-r--r--   1 root     system        21402 May  4 16:57 pmand.sp4cws.log
-rw-r--r--   1 root     system        21731 May  2 10:46 pmand.sp4cws.log.1
-rw-r--r--   1 root     system         8844 Apr 27 11:27 pmand.sp4cws.log.2
-rw-r--r--   1 root     system         9382 Apr 27 11:03 pmand.sp4cws.log.3
-rwxr-xr-x   1 root     system            0 May  2 14:49 pmanrmd.sp4cws.log
-rw-r--r--   1 root     system        65536 May  2 14:50 pmevent.log

./rmsaved/var/adm/SPlogs/sdr:
total 48
-rw-r--r--   1 root     system         1320 May  2 14:50 SDR_config.log
-rw-r--r--   1 root     system          586 Apr 21 21:32 plane.info
-rw-rw-rw-   1 root     system          167 May  2 10:45 sdrdlog.192.168.100.178.14458
-rw-rw-rw-   1 root     system          167 May  4 15:55 sdrdlog.192.168.100.178.15234
-rw-rw-rw-   1 root     system          167 Apr 27 11:03 sdrdlog.192.168.100.178.23198
-rw-rw-rw-   1 root     system          167 May  4 17:01 sdrdlog.192.168.100.178.33530

./rmsaved/var/adm/SPlogs/spmgr:
total 0

./rmsaved/var/adm/SPlogs/spmon:
total 112
drwxr-xr-x   2 bin      bin             512 May  2 14:49 hahmcd
drwxr-xr-x   2 bin      bin             512 Apr 14 12:57 hardmon
drwxr-xr-x   2 bin      bin             512 May  2 14:49 hmcd
-rw-r--r--   1 root     system          924 Apr 21 21:32 hmlogfile.105
-rw-r--r--   1 root     system          874 Apr 27 11:03 hmlogfile.113
-rw-r--r--   1 root     system          579 May  2 10:45 hmlogfile.118
-rw-r--r--   1 root     system          580 May  4 16:56 hmlogfile.123
drwxr-xr-x   2 bin      bin             512 Apr 22 13:45 nc
drwxr-xr-x   2 bin      bin             512 Sep 18 2002  nfd
drwxr-xr-x   2 bin      bin             512 Apr 14 12:57 s70d
drwxr-xr-x   2 bin      bin             512 May  4 16:56 splogd
-rw-r--r--   1 root     system           82 Apr 22 09:04 spmon_ctest.log
-rw-r--r--   1 root     system           80 Apr 22 08:55 spmon_itest.log
drwxr-xr-x   2 bin      bin             512 Apr 14 12:57 ucode

./rmsaved/var/adm/SPlogs/spmon/hahmcd:
total 24
-rw-r--r--   1 root     system         1250 Apr 27 11:03 hahmcd.log.113
-rw-r--r--   1 root     system          624 May  2 10:45 hahmcd.log.118
-rw-r--r--   1 root     system          626 May  4 16:56 hahmcd.log.123

./rmsaved/var/adm/SPlogs/spmon/hardmon:
total 0

./rmsaved/var/adm/SPlogs/spmon/hmcd:
total 176
-rw-r--r--   1 root     system        26277 May  4 16:56 hmcd[192.168.100.69].java_trace
-rw-r--r--   1 root     system        35656 Apr 27 11:03 hmcd[192.168.100.69].log.113
```

```
-rw-r--r--   1 root     system        18935 May  2 10:45 hmcd[192.168.100.69].log.118
-rw-r--r--   1 root     system          526 May  4 16:56 hmcd[192.168.100.69].log.123

./rmsaved/var/adm/SPlogs/spmon/nc:
total 72
-rw-r--r--   1 root     system         4141 Apr 22 14:05 nc.1.1
-rw-r--r--   1 root     system         4022 Apr 14 14:45 nc.1.5
-rw-r--r--   1 root     system         4457 Apr 22 10:33 nc.2.1
-rw-r--r--   1 root     system         4457 Apr 22 10:48 nc.3.1
-rw-r--r--   1 root     system         4457 Apr 22 11:05 nc.4.1

./rmsaved/var/adm/SPlogs/spmon/nfd:
total 0

./rmsaved/var/adm/SPlogs/spmon/s70d:
total 0

./rmsaved/var/adm/SPlogs/spmon/splogd:
total 8
-rw-r--r--   1 root     system            5 May  2 14:49 splogd.pid

./rmsaved/var/adm/SPlogs/spmon/ucode:
total 0

./rmsaved/var/adm/SPlogs/st:
total 0

./rmsaved/var/adm/SPlogs/sysctl:
total 128
-rwxr-xr-x   1 root     system            0 May  2 14:49 daemon.start.log
-rw-r--r--   1 root     system        64732 May  4 16:56 sysctld.log

./rmsaved/var/adm/acct:
total 0

./rmsaved/var/adm/cacct:
total 232
drwxr-xr-x   4 adm      adm             512 Apr 22 13:21 1
drwxr-xr-x   4 adm      adm             512 Apr 14 15:05 17
drwxr-xr-x   4 adm      adm             512 Apr 14 15:05 33
drwxr-xr-x   4 adm      adm             512 Apr 22 13:21 49
drwxr-xr-x   4 adm      adm             512 Apr 14 15:05 5
-rw-rw-r--   1 adm      adm             335 Apr 15 04:10 active20040415
-rw-rw-r--   1 adm      adm             225 Apr 16 04:00 active20040416
-rw-rw-r--   1 adm      adm             225 Apr 17 04:00 active20040417
-rw-rw-r--   1 adm      adm             225 Apr 19 04:00 active20040419
-rw-rw-r--   1 adm      adm             225 Apr 20 04:00 active20040420
-rw-rw-r--   1 adm      adm             225 Apr 21 04:00 active20040421
-rw-rw-r--   1 adm      adm             225 Apr 22 04:00 active20040422
```

```
-rw-rw-r--   1 adm      adm             225 Apr 23 04:00 active20040423
-rw-rw-r--   1 adm      adm             225 Apr 24 04:00 active20040424
-rw-rw-r--   1 adm      adm             225 Apr 26 04:00 active20040426
-rw-rw-r--   1 adm      adm             225 Apr 27 04:00 active20040427
-rw-rw-r--   1 adm      adm             225 Apr 28 04:00 active20040428
-rw-rw-r--   1 adm      adm             225 Apr 29 04:00 active20040429
-rw-rw-r--   1 adm      adm             225 Apr 30 04:00 active20040430
-rw-rw-r--   1 adm      adm             225 May  1 04:00 active20040501
-rw-rw-r--   1 adm      adm             225 May  3 04:00 active20040503
-rw-rw-r--   1 adm      adm             225 May  4 04:00 active20040504
drwxr-xr-x   3 adm      adm             512 May  1 05:15 fiscal
-rw-rw-r--   1 adm      adm               9 Apr 15 04:00 lastcycle
-rw-rw-r--   1 adm      adm               9 Apr 15 04:00 lastdate
drwxr-xr-x   3 adm      adm             512 Apr 15 04:00 nite
drwxr-xr-x   2 adm      adm             512 Apr 14 13:52 node_mnt
-rw-rw-r--   1 adm      adm               6 Apr 15 04:00 statefile
drwxr-xr-x   3 adm      adm             512 Apr 14 15:05 sum

./rmsaved/var/adm/cacct/1:
total 16
drwxr-xr-x   2 adm      adm             512 Apr 22 13:21 nite
drwxr-xr-x   2 adm      adm             512 Apr 22 13:21 sum

./rmsaved/var/adm/cacct/1/nite:
total 0

./rmsaved/var/adm/cacct/1/sum:
total 0

./rmsaved/var/adm/cacct/17:
total 16
drwxr-xr-x   2 adm      adm             512 Apr 14 15:05 nite
drwxr-xr-x   2 adm      adm             512 Apr 14 15:05 sum

./rmsaved/var/adm/cacct/17/nite:
total 0

./rmsaved/var/adm/cacct/17/sum:
total 0

./rmsaved/var/adm/cacct/33:
total 16
drwxr-xr-x   2 adm      adm             512 Apr 14 15:05 nite
drwxr-xr-x   2 adm      adm             512 Apr 14 15:05 sum

./rmsaved/var/adm/cacct/33/nite:
total 0

./rmsaved/var/adm/cacct/33/sum:
```

```
total 0

./rmsaved/var/adm/cacct/49:
total 16
drwxr-xr-x   2 adm      adm             512 Apr 22 13:21 nite
drwxr-xr-x   2 adm      adm             512 Apr 22 13:21 sum

./rmsaved/var/adm/cacct/49/nite:
total 0

./rmsaved/var/adm/cacct/49/sum:
total 0

./rmsaved/var/adm/cacct/5:
total 16
drwxr-xr-x   2 adm      adm             512 Apr 14 15:05 nite
drwxr-xr-x   2 adm      adm             512 Apr 14 15:05 sum

./rmsaved/var/adm/cacct/5/nite:
total 0

./rmsaved/var/adm/cacct/5/sum:
total 0

./rmsaved/var/adm/cacct/fiscal:
total 8
drwxr-xr-x   2 adm      adm             512 Apr 14 15:05 default
-rw-r--r--   1 adm      adm               0 May  1 05:15 fiscrpt05

./rmsaved/var/adm/cacct/fiscal/default:
total 0

./rmsaved/var/adm/cacct/nite:
total 8
-rw-r--r--   1 adm      adm               0 May  4 04:00 accterr
drwxr-xr-x   2 adm      adm             512 Apr 14 15:05 default

./rmsaved/var/adm/cacct/nite/default:
total 0

./rmsaved/var/adm/cacct/node_mnt:
total 0

./rmsaved/var/adm/cacct/sum:
total 8
drwxr-xr-x   2 adm      adm             512 May  1 05:15 default

./rmsaved/var/adm/cacct/sum/default:
total 0
```

```
-rw-rw-r--   1 adm      adm               0 May  1 05:15 cms
-rw-rw-r--   1 adm      adm               0 May  1 05:15 tacct

./rmsaved/var/spool:
total 8
drwxr-xr-x   3 root     system          512 May  4 16:56 cron

./rmsaved/var/spool/cron:
total 8
drwxr-xr-x   2 root     system          512 May  4 16:56 crontabs

./rmsaved/var/spool/cron/crontabs:
total 8
-rw-------   1 root     cron           2065 May  4 16:46 root

./rmsaved/var/sysman:
total 152
-rwxr-xr--   1 bin      bin             738 Sep  9 2002  collection.host.list
drwxr-xr-x   2 root     system          512 Apr 14 13:51 etc
-rwxr-xr--   1 bin      bin             528 Sep  9 2002  file.collections
drwxr-xr-x   2 root     system          512 Apr 14 13:51 logs
drwxr-xr-x   7 root     system          512 May  4 15:32 sup
-r-xr-x---   1 bin      bin           56812 Nov 25 2002  supper

./rmsaved/var/sysman/etc:
total 680
-rwxr-xr--   1 bin      bin          136492 Sep  9 2002  sup
-rwxr-xr--   1 bin      bin          143095 Sep  9 2002  supfilesrv
-rwxr-xr--   1 bin      bin           62095 Sep  9 2002  supscan

./rmsaved/var/sysman/logs:
total 0

./rmsaved/var/sysman/sup:
total 56
-rw-r--r--   1 root     system           37 Apr 29 22:07 .resident.26334
drwxr-xr-x   2 root     system          512 Apr 14 13:51 lists
drwxr-xr-x   2 root     system          512 May  4 16:46 node.root
drwxr-xr-x   2 root     system          512 May  4 16:46 power_system
drwxr-xr-x   2 root     system          512 May  4 16:46 sup.admin
-rw-r--r--   1 root     system            6 May  4 16:46 supfilesrv.pid
drwxr-xr-x   2 root     system          512 May  4 16:46 user.admin

./rmsaved/var/sysman/sup/lists:
total 0
lrwxrwxrwx   1 root     system           30 Apr 14 13:51 node.root ->
/var/sysman/sup/node.root/list
lrwxrwxrwx   1 root     system           33 Apr 14 13:51 power_system ->
/var/sysman/sup/power_system/list
```

```
lrwxrwxrwx   1 root     system           30 Apr 14 13:51 sup.admin ->
/var/sysman/sup/sup.admin/list
lrwxrwxrwx   1 root     system           31 Apr 14 13:51 user.admin ->
/var/sysman/sup/user.admin/list

./rmsaved/var/sysman/sup/node.root:
total 40
-rw-r--r--   1 root     system         1096 May  4 16:46 host
--w----r--   1 root     system           93 May  2 18:12 host.bin
-rwxr-xr--   1 bin      bin              11 Sep  9 2002  list
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  lock
-rwxr-xr--   1 bin      bin              24 May  4 15:32 prefix
-rwxr-xr--   1 bin      bin               1 Sep  9 2002  refuse
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  supperlock

./rmsaved/var/sysman/sup/power_system:
total 40
-rw-r--r--   1 root     system         1096 May  4 16:46 host
--w----r--   1 root     system           93 May  2 18:12 host.bin
-rwxr-xr--   1 bin      bin              44 Sep  9 2002  list
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  lock
-rwxr-xr--   1 bin      bin               2 May  4 15:32 prefix
-rwxr-xr--   1 bin      bin               1 Sep  9 2002  refuse
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  supperlock

./rmsaved/var/sysman/sup/sup.admin:
total 40
-rw-r--r--   1 root     system         1096 May  4 16:46 host
--w----r--   1 root     system           93 May  2 18:12 host.bin
-rwxr-xr--   1 bin      bin             251 May  2 17:59 list
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  lock
-rwxr-xr--   1 bin      bin               2 Sep  9 2002  prefix
-rwxr-xr--   1 bin      bin               1 Sep  9 2002  refuse
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  supperlock

./rmsaved/var/sysman/sup/user.admin:
total 40
-rw-r--r--   1 root     system         1096 May  4 16:46 host
--w----r--   1 root     system           93 May  2 18:12 host.bin
-rwxr-xr--   1 bin      bin             594 Apr 27 10:20 list
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  lock
-rwxr-xr--   1 bin      bin               2 May  4 15:32 prefix
-rwxr-xr--   1 bin      bin               1 Sep  9 2002  refuse
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  supperlock
```

Note: The rmsaved directory may be timestamped if rmpssp is run more than once on a node.

List of files generated and saved by rmpssp on the node

When the **rmpsspnode** command is run, it invokes **rmpssp** on the node via an NFS mount. It saves a selection of files locally on the node in /var/opt/pssp_to_csm/rmsaved as shown in Example C-19.

Again, this may be useful as reference but it would be very difficult to rebuild your old PSSP system from these files.

Example: C-19 Listing of /var/opt/pssp_to_csm/rmsaved directory

```
total 8
drwxr-xr-x   5 root     system          512 May  6 16:03 rmsaved
/var/opt/pssp_to_csm/rmsaved:
total 48
-rw-r--r--   1 root     system          133 May  6 11:12 .klogin
-rw-------   1 root     system          370 May  6 11:12 .spgen_klogin
-rw-------   1 root     system          210 May  6 11:12 .spgen_rhosts
drwxr-xr-x   4 root     system          512 May  6 16:03 etc
drwxr-xr-x   2 root     system          512 May  6 16:03 tftpboot
drwxr-xr-x   5 root     system          512 May  6 16:03 var

/var/opt/pssp_to_csm/rmsaved/etc:
total 176
-rw-r--r--   1 root     system           90 May  6 10:56 SDR_dest_info
drwxr-xr-x   2 bin      bin             512 May  6 10:58 SP
drwxr-xr-x   3 root     system          512 May  6 16:03 auto
-rw-r--r--   1 root     system          357 Apr 14 13:52 auto.master
-rw-r--r--   1 root     system          108 May  6 13:45 exports
-rw-r--r--   1 root     system         3284 May  6 16:03 inittab
-rw-r--r--   1 root     system           34 May  6 11:12 krb.conf
-rw-r--r--   1 root     system          186 May  6 11:12 krb.realms
-rw-r--r--   1 root     system          198 May  6 10:57 logmgt.acl
-rw-r--r--   1 root     system        23371 May  6 11:12 services
-rw-r--r--   1 root     system          167 May  6 10:58 sysctl.acl
-rw-r--r--   1 root     system         2539 May  6 10:58 sysctl.conf
-rw-r--r--   1 root     system          299 May  6 10:58 sysctl.haem.acl
-rw-r--r--   1 root     system          299 May  6 10:58 sysctl.install.acl
-rw-------   1 root     system          407 May  6 10:59 sysctl.pman.acl
-rw-r--r--   1 root     system          508 May  6 10:58 sysctl.rootcmds.acl
-rw-r--r--   1 root     system         4000 May  6 10:57 syslog.conf

/var/opt/pssp_to_csm/rmsaved/etc/SP:
total 104
-rwxr-xr--   1 bin      bin            3133 May  6 10:57 Emonitor.cfg
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.0nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.0nsb.0isb.0
```

```
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.1nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.1nsb.0isb.0
lrwxrwxrwx   1 root     sys              65 May  6 16:03
expected.top.1nsb_8.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.1nsb_8.0isb.0
lrwxrwxrwx   1 root     sys              65 May  6 16:03
expected.top.1nsb_8.0isb.1 ->
/spdata/sys1/syspar_configs/topologies/expected.top.1nsb_8.0isb.1
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.2nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.2nsb.0isb.0
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.3nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.3nsb.0isb.0
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.4nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.4nsb.0isb.0
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.5nsb.0isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.5nsb.0isb.0
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.5nsb.4isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.5nsb.4isb.0
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.6nsb.4isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.6nsb.4isb.0
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.7nsb.4isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.7nsb.4isb.0
lrwxrwxrwx   1 root     sys              63 May  6 16:03
expected.top.8nsb.4isb.0 ->
/spdata/sys1/syspar_configs/topologies/expected.top.8nsb.4isb.0

/var/opt/pssp_to_csm/rmsaved/etc/auto:
total 32
drw-------   2 root     system          512 May  6 11:12 maps
-rwxr-xr-x   1 root     system         2839 May  6 13:45 refauto
-rwxr-xr-x   1 root     system         5672 May  6 13:45 startauto

/var/opt/pssp_to_csm/rmsaved/etc/auto/maps:
total 8
-rw-r--r--   1 root     system         1672 Apr 29 15:27 auto.u

/var/opt/pssp_to_csm/rmsaved/tftpboot:
total 136
-rwxr--r--   1 root     system        22064 May  6 11:12 firstboot.cust
-rw-r--r--   1 root     system          228 May  6 10:56 p650_A.config_info
-rw-r--r--   1 root     system         1055 May  6 10:56 p650_A.install_info
```

```
-rw-r--r--   1 root     system          222 May  6 13:45 p650_B.config_info
-rw-r--r--   1 root     system         1054 May  6 13:45 p650_B.install_info
-rwxr--r--   1 root     system        20810 May  6 10:56 script.cust
-rwxr--r--   1 root     system         2998 May  6 10:56 tuning.cust

/var/opt/pssp_to_csm/rmsaved/var:
total 24
drwxr-xr-x   3 root     system          512 May  6 16:03 adm
drwxr-xr-x   3 root     system          512 May  6 16:03 spool
drwxr-xr-x   5 root     system          512 May  6 16:03 sysman

/var/opt/pssp_to_csm/rmsaved/var/adm:
total 8
drwxr-xr-x  18 bin      bin             512 May  6 16:03 SPlogs

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs:
total 144
drwxr-xr-x   2 bin      bin             512 May  6 10:57 SPconfig
-rw-r--r--   1 root     system         6535 May  6 16:50 SPdaemon.log
drwxr-xr-x   2 bin      bin             512 May  6 11:12 auth_install
drwxr-xr-x   2 root     system          512 May  6 13:45 auto
drwxrwx---   2 root     shutdown        512 May  6 10:57 cs
drwxr-xr-x   2 root     system          512 May  6 11:13 css
drwxr-xr-x   3 root     system          512 May  6 10:59 css0
drwxr-xr-x   3 root     system          512 May  6 10:59 css1
drw-r--r--   2 root     system         1024 May  6 16:00 filec
drwxr-xr-x   2 bin      bin             512 May  6 11:11 get_keyfiles
drwxr-xr-x   2 bin      bin             512 May  6 10:57 install
drwxr-xr-x   2 bin      bin             512 May  6 10:57 kfserver
drwxr-xr-x   2 root     system          512 May  6 11:13 pman
drwxr-xr-x  10 bin      bin             512 May  6 10:58 spmon
drwxr-xr-x   2 root     system          512 May  6 11:02 st
drwxr-xr-x   2 bin      bin             512 May  6 11:13 sysctl
drw-r--r--   2 root     system          512 May  6 11:12 sysman

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/SPconfig:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/auth_install:
total 8
-rw-r--r--   1 root     system         1804 May  6 11:12 log

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/auto:
total 8
-rw-r--r--   1 root     system          459 May  6 13:45 auto.log

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/cs:
total 0
```

```
/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/css:
total 24
-rw-r--r--   1 root     system          630 May  6 16:03 la_event_d.trace
-rwxr-xr-x   1 root     system            0 May  6 11:13
la_event_d_stderr.trace
-rwxr-xr-x   1 root     system           43 May  6 16:03
la_event_d_stdout.trace
-rw-r--r--   1 root     system          107 May  6 11:13 rc.switch.log

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/css0:
total 8
drwxr-xr-x   2 root     system          512 May  6 10:59 p0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/css0/p0:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/css1:
total 8
drwxr-xr-x   2 root     system          512 May  6 10:59 p0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/css1/p0:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/filec:
total 136
lrwxrwxrwx   1 root     system           41 May  6 16:00 rsup ->
/var/adm/SPlogs/filec/sup05.6.2004.16.00r
lrwxrwxrwx   1 root     system           40 May  6 16:00 sup ->
/var/adm/SPlogs/filec/sup05.6.2004.16.00
-rw-r--r--   1 root     system          581 May  6 11:12 sup05.6.2004.11.12
-rw-r--r--   1 root     system          330 May  6 11:12 sup05.6.2004.11.12r
-rw-r--r--   1 root     system          583 May  6 11:16 sup05.6.2004.11.16
-rw-r--r--   1 root     system          330 May  6 11:16 sup05.6.2004.11.16r
-rw-r--r--   1 root     system          778 May  6 12:00 sup05.6.2004.12.00
-rw-r--r--   1 root     system         1883 May  6 12:00 sup05.6.2004.12.00r
-rw-r--r--   1 root     system          778 May  6 13:00 sup05.6.2004.13.00
-rw-r--r--   1 root     system         1824 May  6 13:00 sup05.6.2004.13.00r
-rw-r--r--   1 root     system          583 May  6 13:45 sup05.6.2004.13.45
-rw-r--r--   1 root     system          330 May  6 13:45 sup05.6.2004.13.45r
-rw-r--r--   1 root     system          778 May  6 14:00 sup05.6.2004.14.00
-rw-r--r--   1 root     system         1883 May  6 14:00 sup05.6.2004.14.00r
-rw-r--r--   1 root     system          778 May  6 15:00 sup05.6.2004.15.00
-rw-r--r--   1 root     system         1824 May  6 15:00 sup05.6.2004.15.00r
-rw-r--r--   1 root     system          778 May  6 16:00 sup05.6.2004.16.00
-rw-r--r--   1 root     system         1824 May  6 16:00 sup05.6.2004.16.00r
-rw-r--r--   1 root     system         1798 May  6 13:45 suppwd.log

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/get_keyfiles:
total 8
```

```
-rw-r--r--   1 root     system          424 May  6 11:12 get_keyfiles.log

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/install:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/kfserver:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/pman:
total 56
-rw-r--r--   1 root     system        26060 May  6 16:03 pmand.log
-rwxr-xr-x   1 root     system            0 May  6 11:13 pmanrmd.log

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/spmon:
total 64
drwxr-xr-x   2 bin      bin             512 May  6 10:58 hahmcd
drwxr-xr-x   2 bin      bin             512 May  6 10:57 hardmon
drwxr-xr-x   2 bin      bin             512 May  6 10:57 hmcd
drwxr-xr-x   2 bin      bin             512 May  6 10:57 nc
drwxr-xr-x   2 bin      bin             512 Sep 18 2002  nfd
drwxr-xr-x   2 bin      bin             512 May  6 10:57 s70d
drwxr-xr-x   2 bin      bin             512 May  6 10:57 splogd
drwxr-xr-x   2 bin      bin             512 May  6 10:57 ucode

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/spmon/hahmcd:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/spmon/hardmon:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/spmon/hmcd:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/spmon/nc:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/spmon/nfd:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/spmon/s70d:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/spmon/splogd:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/spmon/ucode:
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/st:
```

```
total 0

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/sysctl:
total 8
-rwxr-xr-x   1 root     system           0 May  6 11:13 daemon.start.log
-rw-r--r--   1 root     system         574 May  6 16:03 sysctld.log

/var/opt/pssp_to_csm/rmsaved/var/adm/SPlogs/sysman:
total 216
-rw-r--r--   1 root     system         400 May  6 11:02 mirror.out
-rw-r--r--   1 root     system       71782 May  6 11:02 p650_A.config.log.3756
-rw-r--r--   1 root     system       18437 May  6 11:12
p650_A.configfb.log.12326
-rw-r--r--   1 root     system        2071 May  6 11:13 p650_A.console.log
-rw-r--r--   1 root     system         522 May  6 11:12 spfbcheck.log
-rw-r--r--   1 root     system         161 May  6 11:02 unmirror.out

/var/opt/pssp_to_csm/rmsaved/var/spool:
total 8
drwxr-xr-x   3 root     system         512 May  6 16:03 cron

/var/opt/pssp_to_csm/rmsaved/var/spool/cron:
total 8
drwxr-xr-x   2 root     system         512 May  6 16:03 crontabs

/var/opt/pssp_to_csm/rmsaved/var/spool/cron/crontabs:
total 8
-rw-------   1 root     cron          1481 May  6 13:45 root

/var/opt/pssp_to_csm/rmsaved/var/sysman:
total 152
-rwxr-xr--   1 bin      bin            738 Sep  9 2002  collection.host.list
drwxr-xr-x   2 root     system         512 Apr 14 13:51 etc
-rwxr-xr--   1 bin      bin            528 Sep  9 2002  file.collections
drwxr-xr-x   2 root     system         512 Apr 14 13:51 logs
drwxr-xr-x   7 root     system         512 May  6 15:57 sup
-r-xr-x---   1 bin      bin          56812 Nov 25 2002  supper

/var/opt/pssp_to_csm/rmsaved/var/sysman/etc:
total 680
-rwxr-xr--   1 bin      bin         136492 Sep  9 2002  sup
-rwxr-xr--   1 bin      bin         143095 Sep  9 2002  supfilesrv
-rwxr-xr--   1 bin      bin          62095 Sep  9 2002  supscan

/var/opt/pssp_to_csm/rmsaved/var/sysman/logs:
total 0

/var/opt/pssp_to_csm/rmsaved/var/sysman/sup:
total 64
```

```
-rw-r--r--   1 root     system            7 May  6 13:45 .active
-rw-r--r--   1 root     system           52 May  6 11:16 .resident
drwxr-xr-x   2 root     system          512 Apr 14 13:51 lists
drwxr-xr-x   2 root     system          512 May  6 16:00 node.root
drwxr-xr-x   2 root     system          512 May  6 16:00 power_system
drwxr-xr-x   2 root     system          512 May  6 16:00 sup.admin
-rw-r--r--   1 root     system            6 May  6 13:45 supfilesrv.pid
drwxr-xr-x   2 root     system          512 May  6 16:00 user.admin

/var/opt/pssp_to_csm/rmsaved/var/sysman/sup/lists:
total 0
lrwxrwxrwx   1 root     system           30 May  6 11:12 node.root ->
/var/sysman/sup/node.root/list
lrwxrwxrwx   1 root     system           33 May  6 11:12 power_system ->
/var/sysman/sup/power_system/list
lrwxrwxrwx   1 root     system           30 May  6 11:12 sup.admin ->
/var/sysman/sup/sup.admin/list
lrwxrwxrwx   1 root     system           31 May  6 11:12 user.admin ->
/var/sysman/sup/user.admin/list

/var/opt/pssp_to_csm/rmsaved/var/sysman/sup/node.root:
total 56
-rw-r--r--   1 root     system         1022 May  6 13:45 host
--w----r--   1 root     system           75 May  6 14:34 host.bin
-rw-------   1 root     system            0 May  6 16:00 last
-rwxr-xr--   1 bin      bin              11 Sep  9 2002  list
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  lock
-rwxr-xr--   1 bin      bin              24 May  6 16:00 prefix
-rwxr-xr--   1 bin      bin               1 May  6 16:00 refuse
-rw-r--r--   1 root     system            3 May  6 16:00 scan
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  supperlock
-rw-------   1 root     system            4 May  6 16:00 when

/var/opt/pssp_to_csm/rmsaved/var/sysman/sup/power_system:
total 56
-rw-r--r--   1 root     system         1022 May  6 13:45 host
-rw-------   1 root     system          221 May  6 16:00 last
-rwxr-xr--   1 bin      bin              44 Sep  9 2002  list
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  lock
-rwxr-xr--   1 bin      bin               2 May  6 16:00 prefix
-rwxr-xr--   1 bin      bin               1 May  6 16:00 refuse
-rw-r--r--   1 root     system          398 May  6 16:00 scan
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  supperlock
-rw-------   1 root     system            4 May  6 16:00 when

/var/opt/pssp_to_csm/rmsaved/var/sysman/sup/sup.admin:
total 64
-rw-r--r--   1 root     system         1022 May  6 13:45 host
--w----r--   1 root     system           75 May  6 14:34 host.bin
```

```
-rw-------   1 root     system          390 May  6 16:00 last
-rwxr-xr--   1 bin      bin             219 Sep  9 2002  list
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  lock
-rwxr-xr--   1 bin      bin               2 May  6 16:00 prefix
-rwxr-xr--   1 bin      bin               1 May  6 16:00 refuse
-rw-r--r--   1 root     system          875 May  6 16:00 scan
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  supperlock
-rw-------   1 root     system            4 May  6 16:00 when

/var/opt/pssp_to_csm/rmsaved/var/sysman/sup/user.admin:
total 64
-rw-r--r--   1 root     system         1022 May  6 13:45 host
--w----r--   1 root     system           75 May  6 14:34 host.bin
-rw-------   1 root     system          236 May  6 16:00 last
-rwxr-xr--   1 bin      bin             594 Apr 27 10:20 list
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  lock
-rwxr-xr--   1 bin      bin               2 May  6 16:00 prefix
-rwxr-xr--   1 bin      bin               1 May  6 16:00 refuse
-rw-r--r--   1 root     system          689 May  6 16:00 scan
-rwxr-xr--   1 bin      bin               0 Sep  9 2002  supperlock
-rw-------   1 root     system            4 May  6 16:00 when

total 32
-rw-r--r--   1 root     system        13498 May  6 16:04 rmpssp.log
```

Output from the cfgcfmutil command

If you are using a new Management Server (MS) that has not had PSSP removed from it, you will need to install the pssp.pssp_to_csm fileset (please refer to 2.2, “Introduction to the PSSP to CSM transition tools” on page 17 for more information on the tools fileset). The only tool that you can use when CSM is installed is **/opt/pssp_to_csm/bin/cfgcfmutil**. This tool makes use of the file collections files listed in “Example output files from the mkcfgutils command” on page 178.

> **Note:** In order to run the **cfgcfmutils** command successfully, the files need to be placed in the directory /var/opt/pssp_to_csm/data. In Example C-20, **cfgcfmutil** fails because the directory and the files are not in the correct place.

Example: C-20 cfgcfmutil failure

```
# /opt/pssp_to_csm/bin/cfgcfmutil
cfgcfmutil:2657-704 /var/opt/pssp_to_csm/data/fcfiles.tar not found
```

> **Note:** **mkcfgutil** and **cfgcfmutil** are not selective about the files they collect and reconfigure in CFM. It is up to the administrator to alter the fc.stanza file accordingly.

Example C-21 on page 228 shows the **cfgcfmutil** command running on an unaltered fc.stanza file; please refer to *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989 for more information.

Example: C-21 Successful execution of cfgcfmutil command

```
# /opt/pssp_to_csm/bin/cfgcfmutil
cfgcfmutil: /var/opt/pssp_to_csm/data/fcfiles.tar untarred successfully.
cfgcfmutil: Processing stanza file......done

cfgcfmutil: Summary:

cfgcfmutil: The following files were either linked files or linked execute
files in a primary PSSP file collection. ".post" files need to be created in
order to recreate the link:
        /etc/auto/refauto
        /etc/logmgt.acl
        /etc/sysctl.acl
        /etc/sysctl.haem.acl
        /etc/sysctl.install.acl
        /etc/sysctl.pman.acl
        /etc/sysctl.rootcmds.acl

cfgcfmutil: Completed successfully
cfgcfmutil: Log file written to
/var/log/pssp_to_csm/cfgcfmutil.20040505195510.log
```

Important: If you do not alter the fc.stanza correctly, especially on a new MS, you may end up overwriting an important file. The files that are replaced are saved on the MS in var/opt/pssp_to_csm/data/fc_backup/cfmroot/. It does not matter how many times the file is replaced, it can still be located in this directory. You will need to refer to the relevant /var/log/pssp_to_csm/cfgcfmutil.<timestamp>.log to locate the original file.

Examples of logs generated by cfgcfmutil

If the cfgcfmutil command is run multiple times, it generates a new log as shown in Example C-22 so you are able to search through all of the logs to locate a file that may been overwritten. For more information, please refer to 4.6, “File collections” on page 98.

Example: C-22 Output from /var/log/pssp_to_csm/cfgcfmutil.20040507190540.log

```
#cat /var/log/pssp_to_csm/cfgcfmutil.20040507190540.log
cfgcfmutil: Program start 19:05:40
cfgcfmutil: Directory /var/opt/pssp_to_csm/data/fc_backup/etc/acct created.
cfgcfmutil: /etc/acct/holidays exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/etc/acct/holidays.20040507190540
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/acct/holidays copied to
/etc/acct/holidays
cfgcfmutil: Directory /cfmroot/etc/acct created.
cfgcfmutil: /etc/acct/holidays linked to /cfmroot/etc/acct/holidays.
cfgcfmutil: Directory /etc/amd/amd-maps created.
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/amd/amd-maps/amd.u copied to
/etc/amd/amd-maps/amd.u
cfgcfmutil: Directory /cfmroot/etc/amd/amd-maps created.
cfgcfmutil: /etc/amd/amd-maps/amd.u linked to /cfmroot/etc/amd/amd-maps/amd.u.
cfgcfmutil: Directory /etc/auto created.
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/auto/refauto copied to
/etc/auto/refauto
cfgcfmutil: Directory /cfmroot/etc/auto created.
cfgcfmutil: /etc/auto/refauto linked to /cfmroot/etc/auto/refauto.
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/auto.master copied to
/etc/auto.master
cfgcfmutil: /etc/auto.master linked to /cfmroot/etc/auto.master.
cfgcfmutil: Directory /etc/auto/maps created.
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/auto/maps/auto.u copied to
/etc/auto/maps/auto.u
cfgcfmutil: Directory /cfmroot/etc/auto/maps created.
cfgcfmutil: /etc/auto/maps/auto.u linked to /cfmroot/etc/auto/maps/auto.u.
cfgcfmutil: /etc/environment exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/etc/environment.20040507190540
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/environment copied to
/etc/environment
cfgcfmutil: /etc/environment linked to /cfmroot/etc/environment.
cfgcfmutil: Directory /var/opt/pssp_to_csm/data/fc_backup/cfmroot/etc created.
cfgcfmutil: /cfmroot/etc/group exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/cfmroot/etc/group.20040507190540
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/group copied to /cfmroot/etc/group
cfgcfmutil: /etc/hosts exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/etc/hosts.20040507190540
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/hosts copied to /etc/hosts
```

```
cfgcfmutil: /cfmroot/etc/hosts exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/cfmroot/etc/hosts.20040507190540
cfgcfmutil: /etc/hosts linked to /cfmroot/etc/hosts.
cfgcfmutil: /cfmroot/etc/passwd exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/cfmroot/etc/passwd.20040507190540
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/passwd copied to
/cfmroot/etc/passwd
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/passwd.id.idx copied to
/cfmroot/etc/passwd.id.idx
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/passwd.nm.idx copied to
/cfmroot/etc/passwd.nm.idx
cfgcfmutil: /etc/profile exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/etc/profile.20040507190540
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/profile copied to /etc/profile
cfgcfmutil: /etc/profile linked to /cfmroot/etc/profile.
cfgcfmutil: Directory /var/opt/pssp_to_csm/data/fc_backup/cfmroot/etc/security
created.
cfgcfmutil: /cfmroot/etc/security/group exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/cfmroot/etc/security/group.20040507190540
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/security/group copied to
/cfmroot/etc/security/group
cfgcfmutil: /cfmroot/etc/security/passwd exists. Backed up to
/var/opt/pssp_to_csm/data/fc_backup/cfmroot/etc/security/passwd.20040507190540
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/security/passwd copied to
/cfmroot/etc/security/passwd
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/security/passwd.idx copied to
/cfmroot/etc/security/passwd.idx
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/sysctl.acl copied to
/etc/sysctl.acl
cfgcfmutil: /etc/sysctl.acl linked to /cfmroot/etc/sysctl.acl.
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/sysctl.haem.acl copied to
/etc/sysctl.haem.acl
cfgcfmutil: /etc/sysctl.haem.acl linked to /cfmroot/etc/sysctl.haem.acl.
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/sysctl.pman.acl copied to
/etc/sysctl.pman.acl
cfgcfmutil: /etc/sysctl.pman.acl linked to /cfmroot/etc/sysctl.pman.acl.
cfgcfmutil: /var/opt/pssp_to_csm/data/fc/etc/sysctl.rootcmds.acl copied to
/etc/sysctl.rootcmds.acl
cfgcfmutil: /etc/sysctl.rootcmds.acl linked to
/cfmroot/etc/sysctl.rootcmds.acl.
...done
cfgcfmutil: Summary:
cfgcfmutil: The following files were either linked files or linked execute
files in a primary PSSP file collection. ".post" files need to be created in
order to recreate the link:
```

```
        /etc/auto/refauto
        /etc/sysctl.acl
        /etc/sysctl.haem.acl
        /etc/sysctl.pman.acl
        /etc/sysctl.rootcmds.acl
cfgcfmutil: Completed successfully
```

D

Additional GPFS/VSD sample scenarios

In this appendix, we try to cover a few more transitions in which the High Performance Computing (HPC) software is involved. We have no intention of covering the use of GPFS, VSD and LoadLeveler or their technical workings. There are much better books to describe this, but we do make use of standard HPC terms, so basic HPC skills are required.

We list the commands used for different tasks, but installing HPC components does require a fair amount of preparation. Although you can modify your configuration after it has been set, a little consideration before installation and initial setup will reward you with a more efficient system, especially with GPFS. GPFS requires you to specify several operational parameters that reflect your hardware resources and operating environment; in our case, we more or less use the default settings.

Through the different scenarios, we use SP6, which is an SP frame managed by PSSP, and p690, which is a p690 configured with four LPARs. All our storage is located on an ESS 800, SAN attached through 2x 2109-F32; Figure D-2 on page 236 shows a few more details about our configuration. The important fact is that the configuration allows us to access our storage from different systems; in our configuration, we also added zoning to increase security and ease administration.

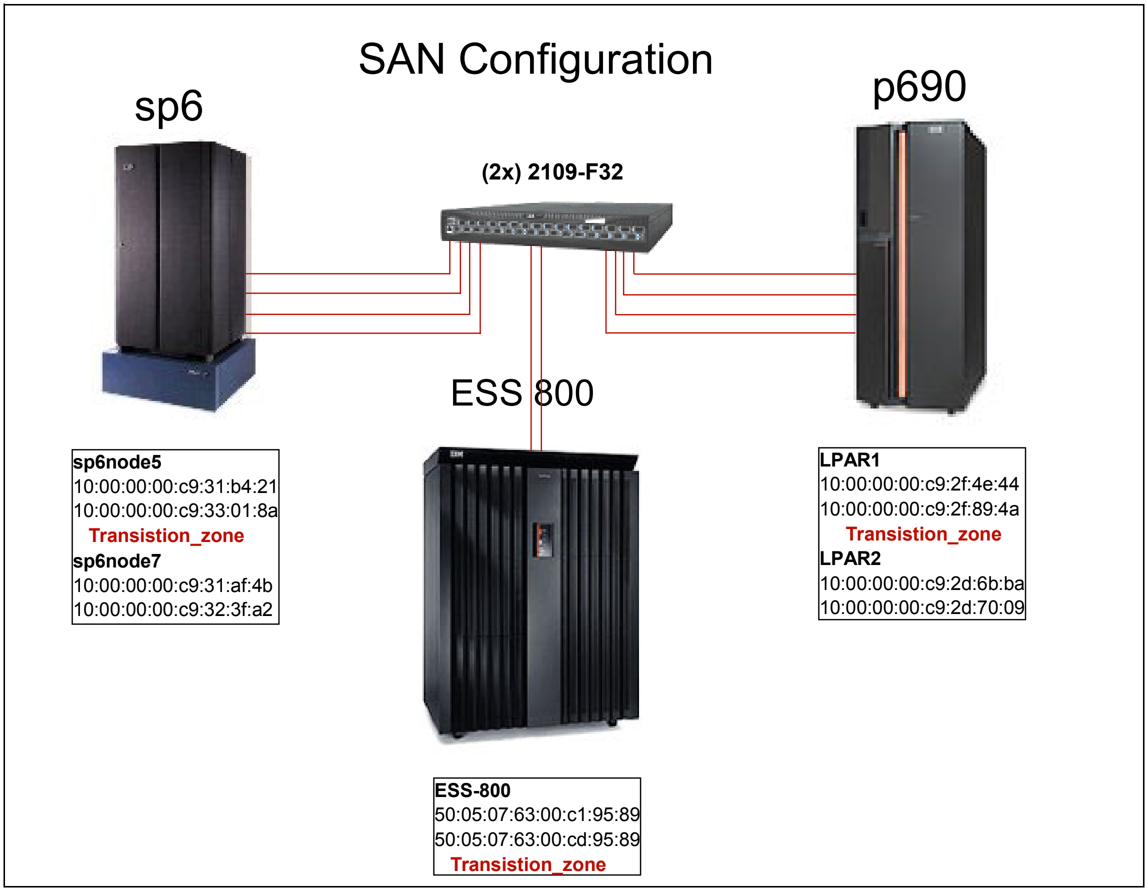

Figure D-1 SAN configuration for SP6 and p690 (testlab)

Shrink and grow

In considering methods for transitioning test systems from PSSP to CSM, we discussed several models which might best represent real-world systems. We also had the opportunity of discussing the transition with several administrators of large clusters in an effort to understand actual issues they were facing. From these considerations, we tested one method which, although not technically a PSSP to CSM transition, does represent a useful method for moving a production system between PSSP and CSM.

The test system we used for the shrink and grow GPFS data migration is shown in Figure D-2 on page 236. On the left is an SP system which is running PSSP and, on the right, is a pSeries system configured with CSM. In this model, the new system would be purchased as a hardware upgrade (in this case, from SP to pSeries). However, the intention is to preserve the possibly large disk investment of the existing system. To move the GPFS system to the new machine, a small GPFS system is created on the new pSeries system. Using a connection between the two systems, data from the existing GPFS system may be moved to the small system. As the existing GPFS system empties, the remaining servers can be re-striped to peel off free disks. These free disks may then be added to the new system and additional files may be moved. This cycle of data move, shrinkage of the existing system, and growing of the new GPFS system is repeated until the entire capacity has been migrated to the new platform. Some comments about this method:

- This method may be used while both systems are in production. There is no down time required since GPFS allows disks to be removed and integrated while the system is running. It is true that the re-striping operations may take time and consume I/O bandwidth and cpu time, but these are only short periodic spikes of activity. It may be a small price to pay for the ability to maintain production during the data migration.
- We discovered this method to work smoothly if you have some amount of free space on the existing file system. As will be detailed below, our GPFS system was divided into twelfths and we started with a 65% full system. We were able to start our new GPFS system by initially pulling off two out of the twelve disks and creating the small cluster.
- We tested this method using an NFS mounted link and obtained adequate transfer rates for the hardware we used. Clearly, these rates could be improved through the use of additional links between the two systems.
- We modelled file transfer as on-demand by the user community. The idea here is that users would run batch jobs (through a scheduler such as LoadLeveler) which would copy data to the new system, then delete it from the existing GPFS system. In this way, file transfers may be both randomized an parallelized over time by the natural ordering of jobs within the batch queue.
- Performing this type of GPFS data migration over several weeks (with administrator monitoring) would allow a gentle transfer of data from one system to the other.
- This method is not dependent on any match between GPFS levels. If the existing system is at a lower level than the new system it makes absolutely no difference since the data are moved from one file system to another over a network. This eliminates the need for upgrading file system software.
- The GPFS file systems may also be at completely different cluster types. This also has no impact on the transfer.
- The method can be extended to include compute nodes as well, something we did not have time to test. As more users migrate to the new system, nodes could be removed from the old system and transitioned with the PSSP to

CSM transition to be included into the new cluster. This extends the idea to include both the file system, and computing capability.

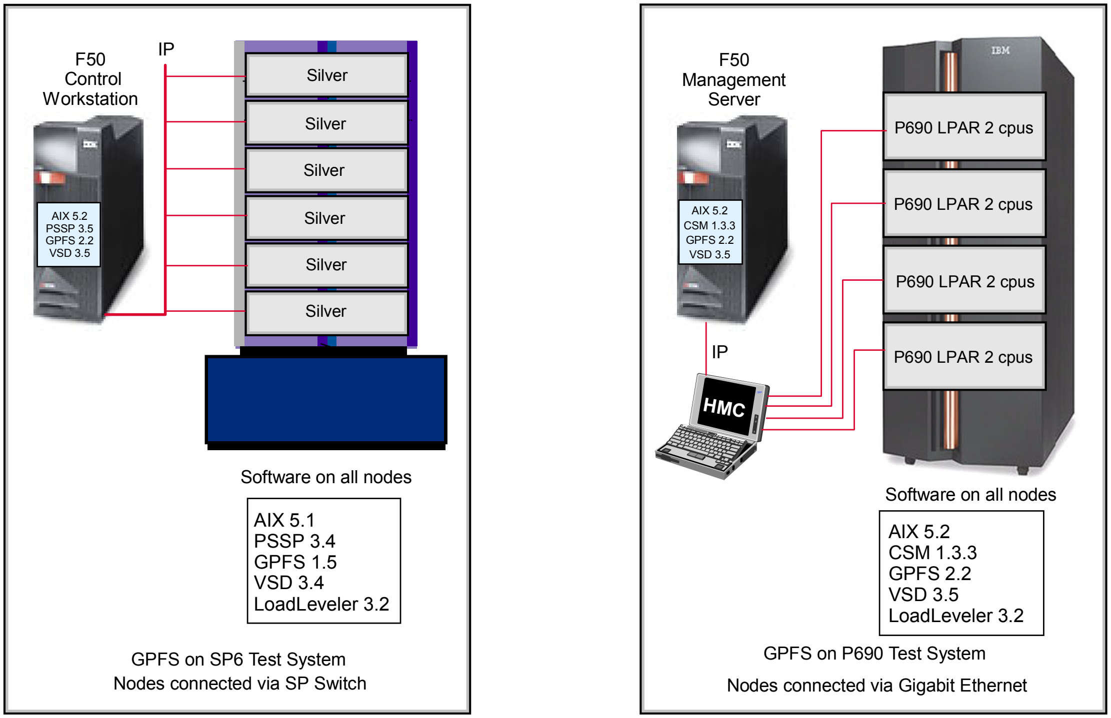

Figure D-2 System used for the shrink and Grow GPFS transition

In this scenario, we reduce the amount of disks used by /gpfs0 on SP6 (our old system) and add these disks on to p690 (our new) system, and then use them to create /gpfs1 on p690 (our new system). The essence test is to keep our two systems up and running without having any scheduled down time. The shrink and grow does require a fair amount of planning, especially by the system administrator, if re-cabling is required documentation is essential, especially on larger systems with a large amount of configured storage.

First, we need to identify which disk we want to reduce/remove from our existing file system on SP6, in this test we plan to move gpfsvsd11 and gpfsvsd12, then move data from SP6 to p690 and there by reducing the amount of storage needed on SP6, then we will repeat reduce/remove the step. However first we need to identify the physical disks, since we are using VSDs we can use the **vsdatalst** command to point out the VG as shown in Example D-1.

Example: D-1 Using vsdatalst to identify the VG of gpfs11vsd and gpfs12vsd

```
root@sp6cws_en:/tmp-> vsdatalst -v
          VSD Table
VSD name             logical volume  Global Volume Group   minor# option    size_in_MB
-------------------- --------------- --------------------- ------ --------- ----------
gpfs1vsd             gpfs1lv         gpfs1gvg                   1 nocache    9472
gpfs2vsd             gpfs2lv         gpfs2gvg                   2 nocache    9472
gpfs3vsd             gpfs3lv         gpfs3gvg                   3 nocache    9472
gpfs4vsd             gpfs4lv         gpfs4gvg                   4 nocache    9472
gpfs5vsd             gpfs5lv         gpfs5gvg                   5 nocache    9472
gpfs6vsd             gpfs6lv         gpfs6gvg                   6 nocache    9472
gpfs7vsd             gpfs7lv         gpfs7gvg                   7 nocache    9472
gpfs8vsd             gpfs8lv         gpfs8gvg                   8 nocache    9472
gpfs9vsd             gpfs9lv         gpfs9gvg                   9 nocache    9472
gpfs10vsd            gpfs10lv        gpfs10gvg                 10 nocache    9472
gpfs11vsd            gpfs11lv        gpfs11gvg                 11 nocache    9472
gpfs12vsd            gpfs12lv        gpfs12gvg                 12 nocache    9472
```

This shows that gpfs11vsd and gpfs12vsd are global volume groups gpfs11gvg and gpfs12gvg, by using the same command but with the **-g** flag, we get the global VG vs local VG reference and using that in conjunction with the **lspv**, we get the PVID, in our case we got the following relation as shown in Example D-2.

Example: D-2 VSD to hdisk relation

```
gpfs11gvg > gpfs11gvg > gpfs11vg > hdisk12 > is PVID 0000331209edfde2
gpfs12gvg > gpfs12gvg > gpfs11vg > hdisk13 > is PVID 0000331209edfe88
```

Our recommendation is to use the PVID as a reference point since this is a unique identifier from the physical disk, and will never change unlike hdisk numbering etc.

Now that we got the our PVID listed we know which disks that we need to use on our new system, since we are using a Storage Area Network (SAN), it is important to assure that the SAN configuration is updated as well.

Before moving/reducing, we verify that the total amount of used storage will not get critical after the reduction, the **mmdf** command is use full for this purpose as shown in Example D-3.

Example: D-3 mmdf on our old system

```
root@sp6cws_en:/-> mmdf gpfs0
mmrts: Executing "mmdf /dev/gpfs0" on node sp6node1
disk            disk size  failure holds    holds         free KB         free KB
name                in KB    group metadata data   in full blocks    in fragments
--------------- --------- -------- -------- ----- --------------- ---------------
```

```
gpfs1vsd         9699328     4005 yes      yes     3798784 (39%)      9256 ( 0%)
gpfs2vsd         9699328     4005 yes      yes     3796992 (39%)      7536 ( 0%)
gpfs3vsd         9699328     4005 yes      yes     3793408 (39%)      9216 ( 0%)
gpfs5vsd         9699328     4005 yes      yes     3788288 (39%)     10368 ( 0%)
gpfs6vsd         9699328     4005 yes      yes     3790080 (39%)      9616 ( 0%)
gpfs7vsd         9699328     4005 yes      yes     3787264 (39%)      6536 ( 0%)
gpfs8vsd         9699328     4005 yes      yes     3786496 (39%)      7592 ( 0%)
gpfs9vsd         9699328     4005 yes      yes     3788032 (39%)      9752 ( 0%)
gpfs10vsd        9699328     4005 yes      yes     3784192 (39%)     11088 ( 0%)
gpfs11vsd        9699328     4005 yes      yes     3785216 (39%)     10232 ( 0%)
gpfs12vsd        9699328     4005 yes      yes     3796224 (39%)      8672 ( 0%)
               ---------                         -------------- --------------
(total)        106692608                         41694976 (39%)     99864 ( 0%)

Inode Information
------------------
Total number of inodes: 107008
Total number of free inodes: 106112
```

As the output from the **mmdf** shows in Example D-3 on page 237, we have plenty of space, and reducing the file system by two disks (gpfs11vsd and gpfs12vsd) should not cause any space allocation problems since we are only using 40% of our total storage. In Example D-4, we use the **mmdeldisk** command to reduce gpfs0.

Example: D-4 mmdedisk on /gpfs0 on SP6 to remove gpfs11vsd and gpfs12vsd

```
root@sp6cws_en:/-> mmdeldisk gpfs0 "gpfs12vsd;gpfs11vsd" -r
Deleting disks ...
mmrts: Executing "tsdeldisk /dev/gpfs0 -d "gpfs11vsd;gpfs12vsd"" on node
sp6node1
Scanning file system metadata, phase 1 ...
Scan completed successfully.
Scanning file system metadata, phase 2 ...
Scan completed successfully.
Scanning file system metadata, phase 3 ...
Scan completed successfully.
Scanning user file metadata ...
   1 % complete on Tue May  4 11:48:01 2004
   2 % complete on Tue May  4 11:48:47 2004
   ....
   64 % complete on Tue May  4 12:07:35 2004
   100 % complete on Tue May  4 12:07:48 2004
Scan completed successfully.
tsdeldisk completed.
mmdeldisk: Propagating the changes to all affected nodes.
This is an asynchronous process.
Restriping gpfs0 ...
mmrts: Executing "tsrestripefs /dev/gpfs0 -b" on node sp6node1
```

```
Scanning file system metadata, phase 1 ...
  51 % complete on Tue May  4 12:20:56 2004
 100 % complete on Tue May  4 12:20:59 2004
Scan completed successfully.
Scanning file system metadata, phase 2 ...
Scan completed successfully.
Scanning file system metadata, phase 3 ...
Scan completed successfully.
Scanning user file metadata ...
   1 % complete on Tue May  4 12:29:11 2004
   2 % complete on Tue May  4 12:31:44 2004
   ....
   64 % complete on Tue May  4 13:58:42 2004
  99 % complete on Tue May  4 13:58:47 2004
 100 % complete on Tue May  4 14:00:00 2004
Scan completed successfully.
Done
```

In Example D-5, we use the **mmlsdisk** command to reveal that the disks was removed from the GPFS configuration.

Example: D-5 mmlsdisk on gpfs0 to shows that gpfs11vsd and gpfs12vsd are gone

```
root@sp6cws_en:/-> mmlsdisk gpfs0
mmrts: Executing "mmlsdisk /dev/gpfs0" on node sp6node1
disk         driver   sector failure holds    holds
name         type       size   group metadata data  status        availability
------------ -------- ------ ------- -------- ----- ------------- ------------
gpfs1vsd     disk        512    4005 yes      yes   ready         up
gpfs2vsd     disk        512    4005 yes      yes   ready         up
gpfs3vsd     disk        512    4005 yes      yes   ready         up
gpfs5vsd     disk        512    4005 yes      yes   ready         up
gpfs6vsd     disk        512    4005 yes      yes   ready         up
gpfs7vsd     disk        512    4005 yes      yes   ready         up
gpfs8vsd     disk        512    4005 yes      yes   ready         up
gpfs9vsd     disk        512    4005 yes      yes   ready         up
gpfs10vsd    disk        512    4005 yes      yes   ready         up
```

Now that they are no longer listed in the GPFS configuration as being a part of /gpfs0, we can remove them from our VSD configuration using the **removevsd** command to remove the two VSDs from all the clients as shown in Example D-6.

Example: D-6 removevsd -f -v gpfs11vsd gpfs12vsd

```
root@sp6cws_en:/tmp-> removevsd -f -v gpfs11vsd,gpfs12vsd
removevsd: calls sysctl_lsucfgvsd.
It took about 2 seconds.
removevsd: calls sysctl_dellv.
FAIL:5:rmlv -f gpfs11lv
FAIL:5:rmlv -f gpfs12lv
It took about 1 seconds.
removevsd: calls undefvsd.
OK:0: undefvsd gpfs11vsd
OK:0: undefvsd gpfs12vsd
removevsd: calls rmundefvsddevs.
CALL:0:/usr/lpp/csd/bin/rmundefvsddevs  gpfs11vsd gpfs12vsd
It took about 1 seconds.
```

Using the **vsdatalst** command in Example D-7 shows that the disks are removed from the VSD configuration.

Example: D-7 vsdatalst -v shows that gpfs11vsd and gpfs12vsd are gone

```
root@sp6cws_en:/tmp-> vsdatalst -v
              VSD Table
VSD name               logical volume  Global Volume Group  minor# option   size_in_MB
---------------------- --------------- -------------------  ------ -------  ----------
gpfs10vsd               gpfs10lv        gpfs10gvg                10 nocache   9472
gpfs1vsd                gpfs1lv         gpfs1gvg                  1 nocache   9472
gpfs2vsd                gpfs2lv         gpfs2gvg                  2 nocache   9472
gpfs3vsd                gpfs3lv         gpfs3gvg                  3 nocache   9472
gpfs4vsd                gpfs4lv         gpfs4gvg                  4 nocache   9472
gpfs5vsd                gpfs5lv         gpfs5gvg                  5 nocache   9472
gpfs6vsd                gpfs6lv         gpfs6gvg                  6 nocache   9472
gpfs7vsd                gpfs7lv         gpfs7gvg                  7 nocache   9472
gpfs8vsd                gpfs8lv         gpfs8gvg                  8 nocache   9472
gpfs9vsd                gpfs9lv         gpfs9gvg                  9 nocache   9472
```

As mentioned earlier, our SAN configuration needs to be in a state that will allow the two systems (SP6 and p690) to see the same disks, as the idea is to move disks from one system to another (Refer to Figure D-2 on page 236).

The next step is to configure these two disks that we released from SP6 on p690 and create a new gpfs1.

> **Important:** We used **mmdeldisk** to remove data and rebalance it from gpfs11vsd and gpfs12vsd to the remaining disks in /gpfs0. This means that all data has been migrated to the remaining disks. Therefore, gpfs11vsd and gpfs12vsd can be safely removed.

Since VSD and GPFS both requires RSCT peer domain (RPD), we need to create a RPD cluster. On our new p690 system an RPD cluster is already configured and online. Use the **lsrpnode** command as shown in Example D-8 on page 241 to list the information about the nodes defined in the peer domain. However, it only lists those nodes that are added to that domain, using this command on a node which are not added to a domain will not list any information. For more detailed information about RSCT RPD please refer to the *GPFS for AIX 5L in an RSCT Peer Domain: Administration and Programming Reference*, SA22-7973.

Example: D-8 lsrpnode command to list already configured domains on p690

```
p690_LPAR1> lsrpnode
Name       OpState RSCTVersion
p690_LPAR2 Online  2.3.3.0
p690_LPAR1 Online  2.3.3.0
p690_LPAR4 Online  2.3.3.0
p690_LPAR3 Online  2.3.3.0
csm_server Online  2.3.3.0
```

The next step is to configure our GPFS cluster. At this point you should go back to your own planning material and follow the configuration type you have decided to use. In our case, we will add four nodes and create a GPFS cluster type RPD. The name of the GPFS file system will be /gpfs1. For more detailed information about GPFS commands please refer to the *GPFS for AIX 5L in an RSCT Peer Domain: Administration and Programming Reference*, SA22-7973.

To ease the configuration, we create a file "/tmp/gpfs.nodes". This file will have the required naming of the gigabit adapter which is configured on our p690 cluster and which is used on our nodes used for the GPFS configuration:

```
p690_LPAR1> cat /tmp/gpfs.nodes
p690_LP1_gigE
p690_LP2_gigE
p690_LP3_gigE
p690_LP4_gigE
```

We are now ready to define a GPFS configuration and define a nodeset. For this, we use the **mmconfig** command as shown in Example D-9.

Example: D-9 Using the mmconfig command to define a new nodeset on p690

```
p690_LPAR1> mmconfig -n /tmp/gpfs.nodes -C csm_gpfs -A

mmconfig: Command successfully completed
mmconfig: Propagating the changes to all affected nodes.
This is an asynchronous process.
```

You can use the **mmlsconfig** command to verify your GPFS config as shown in Example D-10 on page 242.

Example: D-10 Using the mmlsconfig to verify the GPFS config

```
p690_LPAR1> mmlsconfig
Configuration data for nodeset csm_gpfs:
----------------------------------------
clusterType rpd
comm_protocol TCP
multinode yes
autoload yes
useSingleNodeQuorum no
wait4RVSD no
group Gpfs.csm_gpfs
recgroup GpfsRec.csm_gpfs
maxFeatureLevelAllowed 700

File systems in nodeset csm_gpfs:
---------------------------------
(none)
```

Once the nodeset is defined, we can create the GPFS cluster as shown in Example D-11. In our configuration, we selected the cluster type RPD, however our recommendation is to use loose cluster (LC), since IBM is intending to only support loose clusters (LC) on newer GPFS releases. By creating an LC cluster you might spare yourself from a future GPFS cluster type RPD to a type LC migration scenario.

Example: D-11 Creating a GPFS cluster type RPD using mmcrcluster

```
mmcrcluster -t rpd -n /tmp/gpfs.nodes -p p690_LP1_gigE -s p690_LP>
Tue May  4 17:25:51 EDT 2004: mmcrcluster: Processing node p690_LP1_gigE
Tue May  4 17:25:52 EDT 2004: mmcrcluster: Processing node p690_LP2_gigE
Tue May  4 17:25:54 EDT 2004: mmcrcluster: Processing node p690_LP3_gigE
Tue May  4 17:25:55 EDT 2004: mmcrcluster: Processing node p690_LP4_gigE
mmcrcluster: Command successfully completed
mmcrcluster: Propagating the changes to all affected nodes.
This is an asynchronous process.
```

Again you can verify your cluster by using the **mmlscluster** command as shown in Example D-12.

Example: D-12 Using mmlscluster to verify our newly created GPFS RPD cluster

```
p690_LPAR1> mmlscluster

GPFS cluster information
========================
  GPFS cluster type:         rpd
  GPFS cluster id:           gpfs1083705950
  RSCT peer domain name:     LLdomain
  Remote shell command:      /usr/bin/rsh
  Remote file copy command:  /usr/bin/rcp

GPFS cluster data repository servers:
-------------------------------------
  Primary server:    p690_LP1_gigE
  Secondary server:  p690_LP2_gigE

Nodes in nodeset csm_gpfs:
--------------------------
   2  p690_LP1_gigE  10.10.100.1      p690_LP1_gigE
   3  p690_LP2_gigE  10.10.100.2      p690_LP2_gigE
   4  p690_LP3_gigE  10.10.100.3      p690_LP3_gigE
   5  p690_LP4_gigE  10.10.100.4      p690_LP4_gigE
```

At this point, we have configured our GPFS nodeset and defined our GPFS cluster. Now we need to find and identify the two disks that we released from the SP6 cluster as shown in Example D-2 on page 237.

Since the hdisk are just discovered on AIX by using the **cfgmgr -S** command, we need to read the PVID for each disk which can be achieved by using the **chdev** command:

chdev -l [hdiskX] -a pv=yes

where hdiskX represents the hdisk you want to acquire the PVID from.

> **Tip:** **cfgmgr -S** is a undocumented feature that allows **cfgmgr** to run in serial mode rather than parallel (there could be cases where the second adapter is configured earlier than the first), this could change the device naming a bit out of order, so if you want machines to look alike this is a useful feature. However this is only a work around and should not be used unless needed.

Once again to ease the configuration process, we create a disk descriptors file "/tmp/vsd.disk" using the correct format for GPFS input parameters:

```
#p690_LPAR1> cat /tmp/vsd.disk
hdisk12:p690_LP1_gigE:p690_LP2_gigE:dataAndMetadata:1
hdisk13:p690_LP1_gigE:p690_LP2_gigE:dataAndMetadata:2
```

You can either create the VSDs manually or by using the **mmcrvsd** command which will use the disk descriptors file to create the virtual shared disks for which then will be used by GPFS. We highly recommend to use the **mmcrvsd** command rather than create the VSD manually. To show how much extra work is required, please refer to “How to define VSDs manually” on page 255 which shows the steps you need to take in order to create the VSD manually. But once again, our recommendations is to use the **mmcrvsd** command as shown in Example D-13.

Example: D-13 Using mmcrvsd to create and configure VSDs on p690

```
#p690_LPAR1> mmcrvsd -F /tmp/vsd.disk

-------------------------------------------------------------------------------
Step 0:  Setting up environment.

-------------------------------------------------------------------------------
Step 1:  Making logical volumes for new virtual shared disks.

p690_LP1_gigE: gpfs0vg
p690_LP1_gigE: gpfs0lv
p690_LP1_gigE: gpfs1vg
p690_LP1_gigE: gpfs1lv

-------------------------------------------------------------------------------
Step 2:  Varying off volume groups on primary nodes.

-------------------------------------------------------------------------------
Step 3:  Importing volume groups for new virtual shared disks on backup nodes.

p690_LP2_gigE: gpfs0vg
p690_LP2_gigE: gpfs1vg

-------------------------------------------------------------------------------
Step 4:  Varying on volume groups on primary nodes.

-------------------------------------------------------------------------------
Step 5:  Making global volume groups for new virtual shared disks.

-------------------------------------------------------------------------------
Step 6:  Defining any new virtual shared disks.

Virtual shared disks have been successfully created.

-------------------------------------------------------------------------------
```

```
Step 7:  Writing new descriptor file for use by subsequent GPFS disk commands.

--------------------------------------------------------------------------------
Step 8:  Starting virtual shared disks on all nodes.

05/04/04 17:56:51 cfgvsd:  cfgvsd:LoadDD: successful
05/04/04 17:56:51 cfgvsd:  cfgvsd:LoadDD: successful
05/04/04 17:56:51 cfgvsd:  cfgvsd:LoadDD: successful
05/04/04 17:56:51 cfgvsd:  cfgvsd:LoadDD: successful

--------------------------------------------------------------------------------
Finished.
```

When using the **mmcrvsd** command, the descriptor file is rewritten to contain the created virtual shared disk names in place of any disk descriptors containing physical disk or vpath names. This means that our "/tmp/vsd.disk" has changed:

```
#p690_LPAR1> cat /tmp/vsd.disk
gpfs0vsd:::dataAndMetadata:1
gpfs1vsd:::dataAndMetadata:2
```

With the "/tmp/vsd.disk" file, we can now finally create our file system,. First, we need to start GPFS on our nodes using the **mmstartup** command as shown in Example D-14.

Example: D-14 using the mmstartup command to start GPFS

```
#p690_LPAR1> mmstartup -C csm_gpfs
Tue May  4 18:01:00 EDT 2004: mmstartup: Starting GPFS ...
p690_LP1_gigE:  0513-059 The mmfs Subsystem has been started. Subsystem PID is 434256.
p690_LP2_gigE:  0513-059 The mmfs Subsystem has been started. Subsystem PID is 258186.
p690_LP3_gigE:  0513-059 The mmfs Subsystem has been started. Subsystem PID is 180442.
p690_LP4_gigE:  0513-059 The mmfs Subsystem has been started. Subsystem PID is 311364.
```

Using the **mmcrfs** command we can finally create our filesystem /gpfs1 as shown in Example D-15.

Example: D-15 Using mmcrfs to create /gpfs1 on p690

```
#p690_LPAR1> mmcrfs /gpfs1 /dev/gpfs1 -F /tmp/vsd.disk -B 256k -n 2 -M 2 -r 2 /
-R 2 -Q yes -A

The following disks of gpfs1 will be formatted on node p690_LPAR1:
    gpfs0vsd: size 9748480 KB
    gpfs1vsd: size 9748480 KB
Formatting file system ...
```

```
Creating Inode File
Creating Allocation Maps
Clearing Inode Allocation Map
Clearing Block Allocation Map
Flushing Allocation Maps
Completed creation of file system /dev/gpfs1.
mmcrfs: Propagating the changes to all affected nodes.
This is an asynchronous process.
```

Mount the file system using the **mount** command.

In order to come as close as possible to an actual system model, we implemented the test system in Figure D-2 on page 236 and included running LoadLeveler (LL) on both machines. We used a LL test script which generated CPU intensive jobs with random run times. The jobs generated floating point arrays which were written to GPFS. Because the jobs executed for random time, the size of the generated files is also random. Not only were the test jobs used to provide a partially filled GPFS system, but the model LL tasks were run during migration of the GPFS system to simulate a production environment while the system was undergoing migration. In Example D-16, a list of files totaling 186 MBytes on the existing system (in /gpfs0) is shown. the files are copied into the new GPFS system using the /transit mount point which will place the files in /gpfs1, defined on the pSeries machine. The data are transferred at about 7.2 MBytes/sec.

Example: D-16   Data copy from one production system (/gpfs0) to another (/gpfs1)

```
loadl@sp6node1:/u/loadl/robosubmit:  ls -l /gpfs0/robo_71*
-rw-r--r--   1 loadl    loadl      12320768 May  3 22:31 /gpfs0/robo_71.out
-rw-r--r--   1 loadl    loadl      25194496 May  4 08:57 /gpfs0/robo_710.out
-rw-r--r--   1 loadl    loadl      18866196 May  4 08:54 /gpfs0/robo_711.out
-rw-r--r--   1 loadl    loadl       8146964 May  4 08:52 /gpfs0/robo_712.out
-rw-r--r--   1 loadl    loadl      21573632 May  4 08:57 /gpfs0/robo_713.out
-rw-r--r--   1 loadl    loadl      29962260 May  4 08:57 /gpfs0/robo_714.out
-rw-r--r--   1 loadl    loadl       5664788 May  4 08:54 /gpfs0/robo_715.out
-rw-r--r--   1 loadl    loadl      18804756 May  4 08:57 /gpfs0/robo_716.out
-rw-r--r--   1 loadl    loadl      18608148 May  4 08:57 /gpfs0/robo_717.out
-rw-r--r--   1 loadl    loadl      16363520 May  4 08:59 /gpfs0/robo_718.out
-rw-r--r--   1 loadl    loadl      10694656 May  4 08:57 /gpfs0/robo_719.out

loadl@sp6node1:/u/loadl/robosubmit: time cp /gpfs0/robo_71* /transit

real    0m25.84s
user    0m0.13s
sys     0m11.15s
loadl@sp6node1:/u/loadl/robosubmit:
```

Simultaneously with the transfer, both machines were also running production jobs through LoadLeveler. Not only were the jobs CPU intensive, but they were also generating output files stored on the respective GPFS systems. Example D-17 on page 247 shows the jobs running on nodes sp6node3, sp6node5, and sp6node7 of the SP machine. Note that sp6node1 was acting as the LL negotiator, not as a compute node. In addition, the pSeries machine was also running jobs on nodes p690_lpar2, p690_lpar3, and p690_lpar4. Node p690_lpar1 was acting as the LL negotiator on this machine. These jobs consumed 100% of the cpu resources performing floating point computations. This workload simulates a production environment running during data transfer between the two GPFS systems.

Example: D-17 Jobs running on nodes of the SP system

```
loadl@sp6node1:/u/loadl/robosubmit: llq | grep R
Id                       Owner      Submitted   ST PRI Class        Running On
sp6node1.1973.0          loadl       5/5  11:01 R  50  small        sp6node3
sp6node1.1975.0          loadl       5/5  11:01 R  50  small        sp6node5
sp6node1.1977.0          loadl       5/5  11:01 R  50  small        sp6node7
sp6node1.1978.0          loadl       5/5  11:01 R  50  small        sp6node5
sp6node1.1979.0          loadl       5/5  11:01 R  50  small        sp6node1
sp6node1.1980.0          loadl       5/5  11:01 R  50  small        sp6node1
sp6node1.1981.0          loadl       5/5  11:01 R  50  small        sp6node7
sp6node1.1982.0          loadl       5/5  11:01 R  50  small        sp6node3

loadl@p690_LPAR1:/auto/loadl/robosubmit: llq | grep R
Id                       Owner      Submitted   ST PRI Class        Running On
p690_lpar1.400.0         loadl       5/5  11:01 R  50  small        p690_lpar2
p690_lpar1.401.0         loadl       5/5  11:01 R  50  small        p690_lpar3
p690_lpar1.399.0         loadl       5/5  11:01 R  50  small        p690_lpar4
p690_lpar1.403.0         loadl       5/5  11:01 R  50  small        p690_lpar2
p690_lpar1.405.0         loadl       5/5  11:01 R  50  small        p690_lpar3
p690_lpar1.404.0         loadl       5/5  11:01 R  50  small        p690_lpar4
```

Once these files are transferred, they may be deleted from /gpfs0. The operation of file copy followed by file deletion simulates what an user community might do over time to transfer data between the existing and new GPFS systems.

An alternative transfer technique is illustrated in Example D-18. Here, instead of a data copy, an ftp of a 24 MByte data file is performed. The data transfer rate for the file move is 8.5 MBytes/sec.

Example: D-18 Alternate data transfer technique

```
loadl@sp6node1:/u/loadl/robosubmit: ls -l /gpfs0/robo_700.out
-rw-r--r--   1 loadl    loadl      23945216 May  4 08:51 /gpfs0/robo_700.out
loadl@sp6node1:/u/loadl/robosubmit: ftp p690_LPAR1
ftp> cd /gpfs1
```

```
ftp> put robo_700.out
150 Opening data connection for robo_700.out.
226 Transfer complete.
24501760 bytes sent in 2.804 seconds (8534 Kbytes/s)
```

VSD scripts, in conjunction with GPFS commands

In our “Shrink and grow” on page 234 we kept the system running while doing the shrink and grow from SP6 to p690. This could only be achieved because it was possible to shrink the file system and reduce the amount of used storage.

In this scenario, we have configured GPFS 1.5 on our SP6 with PSSP 3.4 and AIX 5.1, where as the Control Workstation (CWS) is at AIX 5.2 and PSSP 3.5.

The essence in this scenario is to export the GFFS file system using the **mmexportfs** command, running the **vsdPSSPCreateImportvgFile.perl -c**, and the **vsdClonePSSPcfg.perl**. However since the transition requires that the GPFS file system becomes unavailable, and the VSDs exported, downtime is required.

> **Important:** When using the **vsdPSSPCreateImportvgFile.perl** with **-c** option on a running system, it adds a potential risk of data corruption, since the **-c** blows away any persistent reserves at the device. However, **vsdPSSPCreateImportvgFile.perl** can be run **without** the **-c** option if you do not plan on cloning the system right away as shown in Example D-19.

First, we need to follow the VSD tasks mentioned in the transition manual *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989. On our system, node 5 and 7 are defined as VSD servers.

Example: D-19 Issuing the vsdPSSPCreateImportvgFile.perl on VSD server nodes

```
dsh -w sp6node5,sp6node7 /tmp/vsdPSSPCreateImportvgFile.perl
sp6node5: 0000331209edf8b2 gpfs1vg lvgpfs1n5
sp6node5: 0000331209edfaa4 gpfs2vg lvgpfs2n5
sp6node5: 0000331209edfc96 gpfs3vg lvgpfs3n5
sp6node5: 0000331209edfe88 gpfs4vg lvgpfs4n5
sp6node5:
sp6node5: /tmp/vsdCreateImportvgFile.sp6node5.node5
sp6node5:  created,   use this with the vsdImportvg.perl script
sp6node7: 0000331209edf8b2 gpfs1vg lvgpfs1n5
sp6node7: 0000331209edfaa4 gpfs2vg lvgpfs2n5
sp6node7: 0000331209edfc96 gpfs3vg lvgpfs3n5
sp6node7: 0000331209edfe88 gpfs4vg lvgpfs4n5
sp6node7:
sp6node7: /tmp/vsdCreateImportvgFile.sp6node7.node7
```

```
sp6node7:  created,   use this with the vsdImportvg.perl script
```

Example D-20 on page 249 clones the SP6 configuration so we can make use of it on the p690.

Example: D-20 `vsdClonePSSPcfg.perl to generate vsdCloneCfg.sp6cws_en.ksh`

```
/tmp/vsd/vsdClonePSSPcfg.perl
Enter the vsd_adapter to use on the vsdnode command: css0
### VSDNODE information ###
/opt/rsct/vsd/bin/vsdnode  1 css0 4096 131072 32 61440
/opt/rsct/vsd/bin/vsdnode  3 css0 4096 131072 32 61440
/opt/rsct/vsd/bin/vsdnode  5 css0 4096 131072 8 61440
/opt/rsct/vsd/bin/vsdnode  7 css0 4096 131072 8 61440
/opt/rsct/vsd/bin/vsdnode  9 css0 4096 131072 32 61440
/opt/rsct/vsd/bin/vsdnode  10 css0 4096 131072 32 61440

### VSD Global Volume Group information ###
/opt/rsct/vsd/bin/vsdvg -g gpfs1gvg gpfs1vg 5 7 1
/opt/rsct/vsd/bin/vsdvg -g gpfs2gvg gpfs2vg 5 7 1
/opt/rsct/vsd/bin/vsdvg -g gpfs3gvg gpfs3vg 5 7 1
/opt/rsct/vsd/bin/vsdvg -g gpfs4gvg gpfs4vg 5 7 1

### VSD Definitions ###
/opt/rsct/vsd/bin/defvsd  gpfs1lv  gpfs1gvg  gpfs1vsd
/opt/rsct/vsd/bin/defvsd  gpfs2lv  gpfs2gvg  gpfs2vsd
/opt/rsct/vsd/bin/defvsd  gpfs3lv  gpfs3gvg  gpfs3vsd
/opt/rsct/vsd/bin/defvsd  gpfs4lv  gpfs4gvg  gpfs4vsd

/tmp/vsdCloneCfg.sp6cws_en.ksh contains a script of VSD commands to clone this
configuration.
1. Copy /tmp/vsdCloneCfg.sp6cws_en.ksh to the new RPD domain.
2. Edit the file and make any necessary changes.
3. Execute the script.
```

Exporting a GPFS filesystem using mmexportfs

Next step is to use the **mmexportfs** command. Since our CWS is the only machine installed with GPFS 2.2, it is the only machine that has the migration binaries available so we need to run the command from the CWS as shown in Example D-21here.

Example: D-21 Using the mmexportfs command on gpfs0

```
mmexportfs gpfs0 -o /tmp/sp6_gpfs0_export

mmexportfs: Processing file system gpfs0 ...
mmexportfs: Propagating the changes to all affected nodes.
This is an asynchronous process.
```

In our case we placed the output of the command in `/tmp/sp6_gpfs0_export`.

Using the VSD scripts to clone VSDs

On our p690 system, we have defined that LPAR1 and LPAR2 should be assigned the VSD server role. The reason for this was that each of the LPAR are using different PCI drawers, In the unlikely event of a hardware failure, this will prevent both servers to get same failure. Since the two hardware configurations are very different we need to edit the **vsdCloneCfg.sp6cws_en.ksh** to reflect the new node numbering scheme that is used on the p690, as well as for the adapter used. In our scenario LPAR1 and LPAR2 are defined as node 2 and 3, as where the output in Example D-20 on page 249 list node 5 and 7.

Since the p690 currently only have 4 configured nodes where as SP6 had 6 nodes configured, we need to reduce the amount of nodes that get configured with the **vsdnode** command in the **vsdCloneCfg.sp6cws_en.ksh** script. Again the updates need to reflect the node numbering scheme used on the p690. Example D-22 shows the edited **vsdCloneCfg.sp6cws_en.ksh** script compared to the original output from Example D-20 on page 249.

Example: D-22 vsdCloneCfg.sp6cws_en.ksh after editing

```
#!/bin/ksh -x
### VSDNODE information ###
/opt/rsct/vsd/bin/vsdnode 2 en2 4096 131072 32 61440
/opt/rsct/vsd/bin/vsdnode 3 en2 4096 131072 32 61440
/opt/rsct/vsd/bin/vsdnode 4 en2 4096 131072 8 61440
/opt/rsct/vsd/bin/vsdnode 5 en2 4096 131072 8 61440

### VSD Global Volume Group information ###
/opt/rsct/vsd/bin/vsdvg -g gpfs1gvg gpfs1vg 2 3 1
/opt/rsct/vsd/bin/vsdvg -g gpfs2gvg gpfs2vg 2 3 1
/opt/rsct/vsd/bin/vsdvg -g gpfs3gvg gpfs3vg 2 3 1
/opt/rsct/vsd/bin/vsdvg -g gpfs4gvg gpfs4vg 2 3 1

### VSD Definitions ###
/opt/rsct/vsd/bin/defvsd  gpfs1lv  gpfs1gvg  gpfs1vsd
/opt/rsct/vsd/bin/defvsd  gpfs2lv  gpfs2gvg  gpfs2vsd
/opt/rsct/vsd/bin/defvsd  gpfs3lv  gpfs3gvg  gpfs3vsd
```

```
/opt/rsct/vsd/bin/defvsd  gpfs4lv  gpfs4gvg  gpfs4vsd
```

Besides these changes we follow the same steps as documented in the *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989.

Importing a GPFS file system using mmimportfs

We used the Network Installation Manager (NIM) to define an lppsource for GPFS 2.2. Now that GPFS is installed on our CSM managed cluster, the next step is to configure a GPFS cluster using the **mmcrcluster** command as shown in Example D-23.

Example: D-23   Create a GPFS cluster using cluster type LC

```
root@p690_LPAR1: mmcrcluster -t lc -n /tmp/gpfs_nodes -p p690_LPAR1 -s
p690_LPAR2

Tue Apr 27 14:38:45 EDT 2004: mmcrcluster: Processing node
p690_LPAR1.itso.ibm.com
Tue Apr 27 14:38:47 EDT 2004: mmcrcluster: Processing node
p690_LPAR2.itso.ibm.com
Tue Apr 27 14:38:48 EDT 2004: mmcrcluster: Processing node
p690_LPAR3.itso.ibm.com
Tue Apr 27 14:38:49 EDT 2004: mmcrcluster: Processing node
p690_LPAR4.itso.ibm.com
mmcrcluster: Command successfully completed
mmcrcluster: Propagating the changes to all affected nodes.
This is an asynchronous process.
```

Now, why did we want to create a LC cluster when the recommendations are RDP? One of the reasons was to show how simple the change was. Another reason was to introduce the use of the newest cluster type LC which allows a mixed node configuration. In general that means that you can have a mixture of AIX and Linux in the same cluster accessing the same filesystem. Although, there is a slight change of how the cluster is configured, for more detailed information please refer to the *General Parallel File System for Clusters: Concepts, Planning, and Installation Guide*, GA22-7968.

You can use the **mmlscluster** command to verify your GPFS cluster information, (see Example D-12 on page 243) since we previously configured an RSCT RPD for our VSD 4.1 configuration. GPFS will detect this domain.

As the output of the **mmlscluster** command showed none of our existing nodes has been assigned to any nodeset, we need to create a nodeset first in order to assign them. For this, we use the **mmconfig** command as shown in Example D-24. In our scenario, we choose to assign all the nodes by using the **-a** flag, however on considerably larger system it should be different.

Example: D-24 Using mmconfig to create gpfs cluster and mmlsconfig to list it

```
root@p690_LPAR1:mmconfig -a -C transit

root@p690_LPAR1:mmlsconfig
\Configuration data for nodeset transit:
----------------------------------------
clusterType lc
comm_protocol TCP
multinode yes
autoload no
useSingleNodeQuorum no
useDiskLease yes
group Gpfs.transit
recgroup GpfsRec.transit
maxFeatureLevelAllowed 700

File systems in nodeset transit:
---------------------------------
(none)
```

Important: Since this is a transition *and we are not* creating a new filesystem, we are bound to use VSDs due to the fact that our data relies on VSDs. However we can configure NSDs on top of VSDs.

We have now configured and verified our GPFS cluster on the p690. The most critical part is still left to be done. By using the **mmimportfs** command with the output generated from the **mmexportfs** command, we simply load our newly created GPFS cluster with the entire configuration stanza from the old GPFS file system. One of the huge benefits is that no data is move, copied or removed since the data stays on the physical disks. However, if you are importing file systems into a cluster that already contains GPFS file systems, it is possible to encounter naming conflicts. You will have to resolve and manually change such conflicts before the **mmimportfs** command can succeed.

Example D-25 shows the use of the **mmimportfs** in conjunction with the **mmexportfs** command output

Example: D-25 Using mmimport to import GPFS file system configuration

```
root@p690_LPAR1: mmimportfs all -i /tmp/sp6_gpfs0_export -C transit
mmimportfs: Processing file system gpfs0 ...
```

```
mmimportfs: Processing disk gpfs1vsd
mmimportfs: Processing disk gpfs2vsd
mmimportfs: Processing disk gpfs3vsd
mmimportfs: Processing disk gpfs4vsd

mmimportfs: Committing the changes ...
mmimportfs: The following file systems were successfully imported:
        gpfs0
mmimportfs: The NSD servers for the following disks from file system gpfs0 were
reset or not defined:
        gpfs1vsd
        gpfs2vsd
        gpfs3vsd
        gpfs4vsd
mmimportfs: Use the mmchnsd command to assign NSD servers as needed.
mmimportfs: Propagating the changes to all affected nodes.
This is an asynchronous process.
```

Now, this is the first sign of the differences between RDP and LC. Example D-25 on page 252 warns us about missing NSD servers. Although you do not really have assign NSD servers in a strict VSD environment - unless you have real good reasons not to do it, it is advisable that you assign NSD servers to your VSD disks using the **mmchnsd** command and it is recommended to use the VSD servers as NSD servers.

This is actually the purpose of this message - to warn you that NSD servers are missing for one or more of the disks. It used to be the case that if an NSD server is specified, then the I/O would always be sent to the server. This is not true any more. Now, when the daemon starts, we go through a local disk discovery process.

At the end, the GPFS daemon on each node knows whether it can perform an I/O request directly to the local attached storage or not.

Since VSDs appear as local disks, the request is sent directly to the VSD subsystem and which process it and then waits for the next request (and not really care what happens to the first). Now imagine that something goes wrong with the VSD subsystem on a given node that prevents VSD to ship the I/O to the VSD server. For example, the switch adapter fails.

If that is the case then VSD fails the I/O and, if nothing else is done, GPFS has no other choice but to fail the I/O as well. But if you have defined an NSD server for the disk, GPFS will ship the request to the NSD server which conceivably will be able to complete the request. And if the primary NSD server fails, you get yet another chance with the backup NSD server.

Strictly speaking, the NSD servers have nothing in common with the VSD servers. Although it will make sense to make them the same, you do not really have to do that. All of this may take a little time getting used to.

Another importing thing to point out is that in our senario we are still using VSD disks, however if we where about to create a entire new filesystem and not make use of the GPFS migration commands **mmexportfs** and **mmimportfs,** we could created an NSD disk using the **mmcrnsd** command, and not made used of VSDs.

However as for the time being IBM have not created a mapping tool that can convert VSD disks into NSD disks, it may come in the future as we see a great need for it.

For more information please refer to *General Parallel File System for Clusters: Concepts, Planning, and Installation Guide*, GA22-7968**.**

The bottom line is that specifying NSD servers in a strictly VSD environment cannot hurt you. It can only help. However if you plan to attach Linux nodes to the same filesystem, NSD clients are needed.

The GPFS configuration is now successfully updated with the configuration data, generated by the **mmexportfs** command you can use the **mmlsconfig** command as shown in Example D-26 to verify the configuration update, the added filesystem /gpfs0 is the one that we successfully imported used in Example D-25 on page 252.

Example: D-26 mmlsconfig

```
root@p690_LPAR1: mmlsconfig
\Configuration data for nodeset transit:
----------------------------------------
clusterType lc
comm_protocol TCP
multinode yes
autoload no
useSingleNodeQuorum no
useDiskLease yes
group Gpfs.transit
recgroup GpfsRec.transit
maxFeatureLevelAllowed 700

File systems in nodeset transit:
---------------------------------
/dev/gpfs0
```

All there is left to do is to start the GPFS daemons on our nodes using the **mmstartup** command as shown in Example D-27.

Example: D-27 Using mmstartup to start the GPFs demons

```
root@p690_LPAR1: mmstartup -C transit
Tue Apr 27 18:12:09 EDT 2004: mmstartup: Starting GPFS ...
p690_LPAR1:  0513-059 The mmfs Subsystem has been started. Subsystem PID is
323732.
p690_LPAR2:  0513-059 The mmfs Subsystem has been started. Subsystem PID is
327880.
p690_LPAR3:  0513-059 The mmfs Subsystem has been started. Subsystem PID is
376922.
p690_LPAR4:  0513-059 The mmfs Subsystem has been started. Subsystem PID is
319532.
```

Now that your system is up and running, you can use commands like **mmlsdisk** as shown in Example D-28 to verify the state of your disks. If there are any problems, it is most likely to be a VSD issue rather than an issue with GPFS. If this happens please refer to the *General Parallel File System for Clusters: Problem Determination Guide*, GA22-7969 for problem determination information.

Example: D-28 Using mmlsdisk to check disk state after GPFS import

```
root@p690_LPAR1: mmlsdisk gpfs0
disk         driver   sector failure holds    holds
name         type       size   group metadata data  status        availability
------------ -------- ------ ------- -------- ----- ------------- ------------
gpfs1vsd     nsd         512    4005 yes      yes   ready         up
gpfs2vsd     nsd         512    4005 yes      yes   ready         up
gpfs3vsd     nsd         512    4005 yes      yes   ready         up
gpfs4vsd     nsd         512    4005 yes      yes   ready         up
```

How to define VSDs manually

Recommended steps to define VSDs:

1. Use the **createvsd** command to create a set of virtual shared disks with their associated logical volumes, and put information about them into the System Data Repository (SDR) as shown in Example D-29.

Example: D-29 Using createvsd to manuall create VSDs

```
root@sp6cws:/-> createvsd -n 5/7:hdisk2,hdisk3,hdisk4/ -s 28416 -g gpfs1vg -v
gpfs -T 64
createvsd: calls Getopts.
createvsd: parsing node_list.
createvsd: call vsd_rollback.
It took about 1 seconds in vsd_rollback.
createvsd: creates task tables.
createvsd: calls sysctl_checkclvm on the nodes  -h sp6node5
createvsd: calls sysctl_mkvglv.
OK:5:mkvg -f -y gpfs1vg -s 64 hdisk2 hdisk3 hdisk4
OK:5:mklv -a c -y gpfslv2n5 -e x gpfs1vg 7 hdisk2 hdisk3 hdisk4
It took about 8 seconds in mkvglv.
createvsd: calls sysctl_varyoffvg gpfs1vg on the primary node sp6node5
OK:5:chvg -a n gpfs1vg
OK:5:varyoffvg gpfs1vg
createvsd: calls sysctl_importvg gpfs1vg on the nodes -h sp6node7      with
0000331209eb9299
importvg : gpfs1vg
importvg : OK:7:importvg -y gpfs1vg hdisk2
importvg : OK:7:chvg -a n gpfs1vg
importvg : timestamp 7 gpfs1vg 4086fec51bc26621
importvg : OK:7:varyoffvg gpfs1vg
importvg : It took about 4 seconds.
It took about 5 seconds in importvg.
createvsd: calls sysctl_varyonvg gpfs1vg on pri nodes sp6node5
OK:5:varyonvg  gpfs1vg
createvsd: calls vsdvg.
createvsd: calls defvsd.
OK:0:defvsd gpfslv2n5 gpfs1vgn5b7 gpfs2n5 nocache
It took about 1 seconds in defvsd.
```

Repeat for every VSD disks that needs to get created..For example, in our scenario we additionally added:

```
createvsd -n 5/7:hdisk5,hdisk6,hdisk7/ -s 28416 -g gpfs2vg -v gpfs -T 64
createvsd -n 5/7:hdisk8,hdisk9,hdisk10/ -s 28416 -g gpfs3vg -v gpfs -T 64
createvsd -n 5/7:hdisk11,hdisk12,hdisk13/ -s 28416 -g gpfs4vg -v gpfs -T 64
```

2. Use the **vsdvg** command to define a virtual shared disk global volume group.

```
vsdvg -g gpfs1gvg gpfs1vg 5 7
```

Repeat for every VSD disks that needs to be defined. For example, in our scenario we aditionally added:

```
vsdvg -g gpfs2gvg gpfs2vg 5 7
vsdvg -g gpfs3gvg gpfs3vg 5 7
vsdvg -g gpfs4gvg gpfs4vg 5 7
```

3. Use the **defvsd** command to designate a node as either having or using a Virtual Shared Disk.

```
defvsd lvgpfs1n5 gpfs1gvg gpfs1vsd
```

Repeat for every VSD disks that needs to be designated. For example, in our scenario we additionally added:

```
defvsd lvgpfs2n5 gpfs2gvg gpfs2vsd
defvsd lvgpfs3n5 gpfs3gvg gpfs3vsd
defvsd lvgpfs4n5 gpfs4gvg gpfs4vsd
```

4. Use the **ha_vsd** command to configure a Virtual Shared Disk. Start and restart the Recoverable Virtual Shared Disk subsystem. This includes configuring virtual shared disks and hashed shared disks as well.

```
ha_vsd
```

Abbreviations and acronyms

BIS	Boot/Install Server
CFM	Configuration File Management
CSM	Cluster Systems Management
CtSec	Cluster Security Services
CWS	Control Workstation
EM	Event Management
ESSL	Engineering and Scientific Subroutine Library
GPFS	General Parallel File System
HACMP	High Availability Cluster Multi-Processing
HACWS	High Availability Control Workstation
HMC	Hardware Management Console
HPC	High Performance Computing
HPS	High Performance Switch
IBM	International Business Machines Corporation
IBM.FSRM	IBM.Filesystem Resource Manager
IBM.HWCTRLRM	IBM.Hardware Control Resource Manager
ITSO	International Technical Support Organization
K4	Kerberos Version4
K5	Kerberos Version5
LAPI	Low-level Application Programming Interface
LC	Loose Cluster
LL	LoadLeveler
LPPs	Licensed Program Products
MPI	Message Passing Interface
MPI	Message Passing Interface
MS	Management Server
NIM	Network Install Manager
NIS	Network Information Service
NSD	Network Storage Devices
NTP	Network Time Protocol
Parallel ESSL	Parallel Engineering and Scientific Software Library
PE	Parallel Environment
PET	Platform Evolution and Test
PMAN	Problem Management
PSSP	Parallel System Support Programs
RM	Resource Managers
RMC	Resource Monitoring and Control
RPD	RSCT Peer Domain
RSCT	Reliable Scalable Clustering Technology
SDR	System Data Repository
SPOT	Share Object Product Tree
SR	System Register
VSD	Virtual Shared Disks

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

IBM Redbooks

For information on ordering these publications, see "How to get IBM Redbooks" on page 263. Note that some of the documents referenced here may be available in softcopy only.

- *IBM (e)server Cluster 1600 Managed by PSSP 3.5: What's New,* SG24-6617
- *CSM Guide for the PSSP System Administrator,* SG24-6953
- *An Introduction to CSM 1.3 for AIX 5L,* SG24-6859
- *An Introduction to Security in a CSM 1.3 for AIX 5L Environment,* SG24-6873
- *A Practical Guide for Resource Monitoring and Control (RMC),* SG24-6615
- *AIX Version 4.3 to 5L Migration Guide, SG24-6924*

Other publications

These publications are also relevant as further information sources:

- *PSSP Installation and Migration Guide,* GA22-7347
- *PSSP Administration Guide,* SA22-7348
- *PSSP for AIX V3.5 Read This First*, GI10-0641
- *Managing IBM (e)server Cluster 1600 - Power Recipes for PSSP 3.4,* SG24-6603
- *CSM for AIX 5L: Administration Guide,* SA22-7918
- *CSM for AIX 5L: Software Planning and Installation Guide,* SA22-7919
- *CSM for AIX 5L: Hardware Control Guide,* SA22-7920
- *CSM for AIX 5L: Command and Technical Reference,* SA22-7934
- *IBM Reliable Scalable Cluster Technology Administration Guide,* SA22-7889
- *RSCT for AIX 5L: Technical Reference,* SA22-7890
- *RSCT for AIX 5L: Messages,* GA22-7891

- *AIX 5L V 5.2 Installation Guide and Reference,* SC23-4389
- *Network Installation Management Guide and Reference*, SC23-4385
- *NIM: From A to Z in AIX 4.3*, SG24-5524NIM A-Z
- *HACMP for AIX: Planning and Installation Guide*, SC23-4861
- *IBM Reliable Scalable Cluster Technology (RSCT) for AIX 5L: Managing Shared Disks*, SA22-7937
- *GPFS for AIX 5L in an RSCT Peer Domain: Administration and Programming Reference*, SA22-7973
- *GPFS for AIX 5L in an RSCT Peer Domain: Concepts, Planning, and Installation*, SA22-7974
- *LoadLeveler Version 3 Release 2: Using and Administering*, SA22-7881
- *IBM PSSP to Cluster Systems Management for AIX 5L: Transition Guide*, GA22-7989

Online resources

These Web sites and URLs are also relevant as further information sources:

- Download OpenCIMOM from the following Web site:

  `http://www.ibm.com/servers/aix/products/aixos/linux/download.html`
- Download the CSM updates from the following Web site:

  `http://techsupport.service.ibm.com/server/cluster/fixes`
- IBM offers an extensive education curriculum on AIX, NIM, Linux, PSSP and CSM:

  `http://www.ibm.com/education`
- AIX 5.2 Installation Guide and Reference, Migration Installation, “Pre_migration and Post_migration Checking“

  `http://publib16.boulder.ibm.com/doc_link/en_US/a_doc_lib/aixins/insgdrf/migration_install.htm#migration_scripts`

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SG24-6967-00 ISBN 0738490350