

Sun Cluster Data Service for SAP Web Application Server Guide for Solaris OS



Sun Microsystems, Inc.
4150 Network Circle
Santa Clara, CA 95054
U.S.A.

Part No: 820-2568-10
February 2008, Revision A

Copyright 2008 Sun Microsystems, Inc. 4150 Network Circle, Santa Clara, CA 95054 U.S.A. All rights reserved.

Sun Microsystems, Inc. has intellectual property rights relating to technology embodied in the product that is described in this document. In particular, and without limitation, these intellectual property rights may include one or more U.S. patents or pending patent applications in the U.S. and in other countries.

U.S. Government Rights – Commercial software. Government users are subject to the Sun Microsystems, Inc. standard license agreement and applicable provisions of the FAR and its supplements.

This distribution may include materials developed by third parties.

Parts of the product may be derived from Berkeley BSD systems, licensed from the University of California. UNIX is a registered trademark in the U.S. and other countries, exclusively licensed through X/Open Company, Ltd.

Sun, Sun Microsystems, the Sun logo, the Solaris logo, the Java Coffee Cup logo, docs.sun.com, Java, Java, and Solaris are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the U.S. and other countries. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc.

The OPEN LOOK and Sun Graphical User Interface was developed by Sun Microsystems, Inc. for its users and licensees. Sun acknowledges the pioneering efforts of Xerox in researching and developing the concept of visual or graphical user interfaces for the computer industry. Sun holds a non-exclusive license from Xerox to the Xerox Graphical User Interface, which license also covers Sun's licensees who implement OPEN LOOK GUIs and otherwise comply with Sun's written license agreements.

Products covered by and information contained in this publication are controlled by U.S. Export Control laws and may be subject to the export or import laws in other countries. Nuclear, missile, chemical or biological weapons or nuclear maritime end uses or end users, whether direct or indirect, are strictly prohibited. Export or reexport to countries subject to U.S. embargo or to entities identified on U.S. export exclusion lists, including, but not limited to, the denied persons and specially designated nationals lists is strictly prohibited.

DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

Copyright 2008 Sun Microsystems, Inc. 4150 Network Circle, Santa Clara, CA 95054 U.S.A. Tous droits réservés.

Sun Microsystems, Inc. détient les droits de propriété intellectuelle relatifs à la technologie incorporée dans le produit qui est décrit dans ce document. En particulier, et ce sans limitation, ces droits de propriété intellectuelle peuvent inclure un ou plusieurs brevets américains ou des applications de brevet en attente aux États-Unis et dans d'autres pays.

Cette distribution peut comprendre des composants développés par des tierces personnes.

Certains composants de ce produit peuvent être dérivées du logiciel Berkeley BSD, licenciés par l'Université de Californie. UNIX est une marque déposée aux États-Unis et dans d'autres pays; elle est licenciée exclusivement par X/Open Company, Ltd.

Sun, Sun Microsystems, le logo Sun, le logo Solaris, le logo Java Coffee Cup, docs.sun.com, Java, Java et Solaris sont des marques de fabrique ou des marques déposées de Sun Microsystems, Inc. aux États-Unis et dans d'autres pays. Toutes les marques SPARC sont utilisées sous licence et sont des marques de fabrique ou des marques déposées de SPARC International, Inc. aux États-Unis et dans d'autres pays. Les produits portant les marques SPARC sont basés sur une architecture développée par Sun Microsystems, Inc.

L'interface d'utilisation graphique OPEN LOOK et Sun a été développée par Sun Microsystems, Inc. pour ses utilisateurs et licenciés. Sun reconnaît les efforts de pionniers de Xerox pour la recherche et le développement du concept des interfaces d'utilisation visuelle ou graphique pour l'industrie de l'informatique. Sun détient une licence non exclusive de Xerox sur l'interface d'utilisation graphique Xerox, cette licence couvrant également les licenciés de Sun qui mettent en place l'interface d'utilisation graphique OPEN LOOK et qui, en outre, se conforment aux licences écrites de Sun.

Les produits qui font l'objet de cette publication et les informations qu'il contient sont régis par la législation américaine en matière de contrôle des exportations et peuvent être soumis au droit d'autres pays dans le domaine des exportations et importations. Les utilisations finales, ou utilisateurs finaux, pour des armes nucléaires, des missiles, des armes chimiques ou biologiques ou pour le nucléaire maritime, directement ou indirectement, sont strictement interdites. Les exportations ou réexportations vers des pays sous embargo des États-Unis, ou vers des entités figurant sur les listes d'exclusion d'exportation américaines, y compris, mais de manière non exclusive, la liste de personnes qui font objet d'un ordre de ne pas participer, d'une façon directe ou indirecte, aux exportations des produits ou des services qui sont régis par la législation américaine en matière de contrôle des exportations et la liste de ressortissants spécifiquement désignés, sont rigoureusement interdites.

LA DOCUMENTATION EST FOURNIE "EN L'ETAT" ET TOUTES AUTRES CONDITIONS, DECLARATIONS ET GARANTIES EXPRESSES OU TACITES SONT FORMELLEMENT EXCLUES, DANS LA MESURE AUTORISEE PAR LA LOI APPLICABLE, Y COMPRIS NOTAMMENT TOUTE GARANTIE IMPLICITE RELATIVE A LA QUALITE MARCHANDE, A L'APTITUDE A UNE UTILISATION PARTICULIERE OU A L'ABSENCE DE CONTREFACON.

Contents

Preface	7
Installing and Configuring Sun Cluster HA for SAP Web Application Server	11
Sun Cluster HA for SAP Web Application Server Overview	12
Overview of the Installation and Configuration Process for Sun Cluster HA for SAP Web Application Server	14
Planning the Sun Cluster HA for SAP Web Application Server Installation and Configuration	15
Configuration Restrictions	15
Configuration Requirements	16
Supported Data Service Configurations	16
Configuration Considerations	18
Configuration Planning Questions	19
Installing and Configuring SAP Web Application Server	20
Configuring Your Highly Available Database	20
▼ How to Install and Configure the SAP Web Application Server and the SAP J2EE Engine	20
▼ How to Modify the Installation for a Scalable SAP Web Application Server Component ..	28
▼ How to Enable the SAP Web Application Server to Run in a Cluster	30
▼ How to Enable the Stand-Alone SAP J2EE Engine to Run in a Cluster	35
Verifying the SAP Web Application Server Installation and Configuration	36
▼ How to Verify the Installation and Configuration of the SAP Enqueue Server and the SAP Replica Server	36
▼ How to Verify That the Configuration for the SAP Message Server Is Correct for the Data Service	40
▼ How to Verify That the Configuration for the SAP Web Application Server and SAP J2EE Engine Components Is Correct for the Data Service	41
Installing the Sun Cluster HA for SAP Web Application Server Packages	43
▼ How to Install the Sun Cluster HA for SAP Web Application Server Packages	44

Registering and Configuring Sun Cluster HA for SAP Web Application Server	45
Before You Begin	46
Setting Sun Cluster HA for SAP Web Application Server Extension Properties	46
Tools for Registering and Configuring Sun Cluster HA for SAP Web Application Server	47
▼ How to Register and Configure the Sun Cluster HA for SAP Web Application Server by Using <code>clsetup</code>	47
Setting Up the SAP Web Application Server on Non-Global Zones for HAStoragePlus Configuration	51
▼ How to Set Up the SAP Web Application Server on Non-Global Zones for HAStoragePlus Configuration	51
Registering and Configuring the Sun Cluster HA for SAP Web Application Server by using Sun Cluster Command Line Interface (CLI)	53
▼ How to Register and Configure HAStoragePlus Resources for the SAP Central Services Components	53
▼ How to Register and Configure an SAP Enqueue Server Resource	54
▼ How to Register and Configure an SAP Replica Server Resource	56
▼ How to Register and Configure an SAP Message Server Resource	57
▼ How to Register and Configure an SAP Web Application Server Component	59
Examples of Configuring the SAP Web Application Server	62
Using Alternate Project Identification	64
Tuning the Sun Cluster HA for SAP Web Application Server Fault Monitors	65
Operation of the Fault Monitor for the SAP Enqueue Server Resource Type	66
Operation of the Fault Monitor for the SAP Replica Server Resource Type	67
Operation of the Fault Monitor for the SAP Message Server Resource Type	67
Operation of the Fault Monitor for the SAP Web Application Server and SAP J2EE Engine Component Resource Type	68
Verifying the Sun Cluster HA for SAP Web Application Server Installation and Configuration	69
▼ How to Verify the Operation of the Fault Monitor for the SAP Enqueue Server	70
▼ How to Verify the Operation of the Fault Monitor for the SAP Replica Server	71
▼ How to Verify the Operation of the Fault Monitor for the SAP Message Server	73
▼ How to Verify the Operation of the Fault Monitor for the SAP Web Application Server and SAP J2EE Engine Components	74
Migrating Existing SAP Web Application Server and SAP J2EE Engine Resource Types to Sun Cluster 3.2	76

A Sun Cluster HA for SAP Web Application Server Extension Properties	77
SUNW.sapenq Extension Properties	77
SUNW.saprepl Extension Properties	80
SUNW.sapscs Extension Properties	82
SUNW.sapwebas Extension Properties	85
Index	89

Preface

Sun Cluster Data Service for SAP Web Application Server Guide for Solaris OS explains how to install and configure Sun™ Cluster HA for SAP Web Application Server on both SPARC® based systems and x86 based systems.

Note – This Sun Cluster release supports systems that use the SPARC™ and x86 families of processor architectures: UltraSPARC, SPARC64, and AMD64. In this document, the label x86 refers to systems that use the AMD64 family of processor architectures.

This document is intended for system administrators with extensive knowledge of Sun software and hardware. Do not use this document as a planning or presales guide. Before reading this document, you should have already determined your system requirements and purchased the appropriate equipment and software.

The instructions in this book assume knowledge of the Solaris™ Operating System (Solaris OS) and expertise with the volume-manager software that is used with Sun Cluster software.

Note – Sun Cluster software runs on two platforms, SPARC and x86. The information in this document pertains to both platforms unless otherwise specified in a special chapter, section, note, bulleted item, figure, table, or example.

Using UNIX Commands

This document contains information about commands that are specific to installing and configuring Sun Cluster data services. The document does *not* contain comprehensive information about basic UNIX® commands and procedures, such as shutting down the system, booting the system, and configuring devices. Information about basic UNIX commands and procedures is available from the following sources:

- Online documentation for the Solaris Operating System
- Solaris Operating System man pages
- Other software documentation that you received with your system

Typographic Conventions

The following table describes the typographic conventions that are used in this book.

TABLE P-1 Typographic Conventions

Typeface	Meaning	Example
AaBbCc123	The names of commands, files, and directories, and onscreen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name%</code> you have mail.
AaBbCc123	What you type, contrasted with onscreen computer output	<code>machine_name%</code> su Password:
<i>aabbcc123</i>	Placeholder: replace with a real name or value	The command to remove a file is <i>rm filename</i> .
<i>AaBbCc123</i>	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . <i>A cache</i> is a copy that is stored locally. Do <i>not</i> save the file. Note: Some emphasized items appear bold online.

Shell Prompts in Command Examples

The following table shows the default UNIX system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	<code>machine_name%</code>
C shell for superuser	<code>machine_name#</code>
Bourne shell and Korn shell	<code>\$</code>
Bourne shell and Korn shell for superuser	<code>#</code>

Related Documentation

Information about related Sun Cluster topics is available in the documentation that is listed in the following table. All Sun Cluster documentation is available at <http://docs.sun.com>.

Topic	Documentation
Data service administration	<i>Sun Cluster Data Services Planning and Administration Guide for Solaris OS</i> Individual data service guides
Concepts	<i>Sun Cluster Concepts Guide for Solaris OS</i>
Overview	<i>Sun Cluster Overview for Solaris OS</i>
Software installation	<i>Sun Cluster Software Installation Guide for Solaris OS</i>
System administration	<i>Sun Cluster System Administration Guide for Solaris OS</i>
Hardware administration	<i>Sun Cluster 3.1 - 3.2 Hardware Administration Manual for Solaris OS</i> Individual hardware administration guides
Data service development	<i>Sun Cluster Data Services Developer's Guide for Solaris OS</i>
Error messages	<i>Sun Cluster Error Messages Guide for Solaris OS</i>
Command and function reference	<i>Sun Cluster Reference Manual for Solaris OS</i>

For a complete list of Sun Cluster documentation, see the release notes for your release of Sun Cluster at <http://docs.sun.com>.

Related Third-Party Web Site References

Third-party URLs that are referenced in this document provide additional related information.

Note – Sun is not responsible for the availability of third-party web sites mentioned in this document. Sun does not endorse and is not responsible or liable for any content, advertising, products, or other materials that are available on or through such sites or resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused or alleged to be caused by or in connection with use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

Documentation, Support, and Training

The Sun web site provides information about the following additional resources:

- [Documentation](http://www.sun.com/documentation/) (<http://www.sun.com/documentation/>)
- [Support](http://www.sun.com/support/) (<http://www.sun.com/support/>)
- [Training](http://www.sun.com/training/) (<http://www.sun.com/training/>)

Getting Help

If you have problems installing or using Sun Cluster, contact your service provider and provide the following information:

- Your name and email address (if available)
- Your company name, address, and phone number
- The model number and serial number of your systems
- The release number of the Solaris Operating System (for example, Solaris 10)
- The release number of Sun Cluster (for example, Sun Cluster 3.2)

Use the following commands to gather information about each node on your system for your service provider.

Command	Function
<code>prtconf -v</code>	Displays the size of the system memory and reports information about peripheral devices
<code>psrinfo -v</code>	Displays information about processors
<code>showrev -p</code>	Reports which patches are installed
<code>prtdiag -v</code>	Displays system diagnostic information
<code>/usr/cluster/bin/clnode show-rev</code>	Displays Sun Cluster release and package version information

Also have available the contents of the `/var/adm/messages` file.

Installing and Configuring Sun Cluster HA for SAP Web Application Server

This chapter explains how to install and configure Sun Cluster HA for SAP Web Application Server.

Note – If you are using the Solaris 10 OS, you can install and configure this data service to run in the non-global zone. Sun Cluster HA for SAP Web Application Server is supported in non-global zones.

This chapter contains the following sections.

- “Sun Cluster HA for SAP Web Application Server Overview” on page 12
- “Overview of the Installation and Configuration Process for Sun Cluster HA for SAP Web Application Server” on page 14
- “Planning the Sun Cluster HA for SAP Web Application Server Installation and Configuration” on page 15
- “Installing and Configuring SAP Web Application Server” on page 20
- “Verifying the SAP Web Application Server Installation and Configuration” on page 36
- “Installing the Sun Cluster HA for SAP Web Application Server Packages” on page 43
- “Registering and Configuring Sun Cluster HA for SAP Web Application Server” on page 45
- “Using Alternate Project Identification” on page 64
- “Tuning the Sun Cluster HA for SAP Web Application Server Fault Monitors” on page 65
- “Verifying the Sun Cluster HA for SAP Web Application Server Installation and Configuration” on page 69
- “Migrating Existing SAP Web Application Server and SAP J2EE Engine Resource Types to Sun Cluster 3.2” on page 76

Sun Cluster HA for SAP Web Application Server Overview

The SAP Web Application Server platform consists of the following components:

- Relational database management system (RDBMS)
- SAP central services, which include these servers:
 - SAP enqueue server
 - SAP message server
 - SAP replica server

The SAP replica server is logically part of the SAP central services, although it always runs on a different node from the other servers in the SAP central services.
- SAP web application server component, in one the following configurations:
 - ABAP engine component
 - ABAP engine component and add-in SAP J2EE™ engine component
 - Standalone SAP J2EE engine component

If the configuration includes both the ABAP engine and the SAP J2EE engine, two SAP central services components exist.



Caution – For a detailed description of the SAP Web Application Server platform in the High Availability environment, see the SAP documentation at <http://service.sap.com/ha>. In particular, study the section that provides an overview of the architecture of the SAP Web Application Server to be certain that you understand the basic concepts of your version of the SAP Web Application Server.

The architecture of the SAP Web Application Server components (such as SAP enqueue server and SAP message server) changed significantly with SAP Netweaver 04. Therefore, when running in the Sun Cluster environment, these components must be configured differently from previous versions of the platform.

To eliminate potential single points of failure in an SAP Web Application Server platform, Sun Cluster HA for SAP Web Application Server provides fault monitoring, automatic restart, and automatic failover for the components of the SAP Web Application Server platform.

The SAP web application server component of the platform can be configured either as a failover or as a scalable data service. The SAP J2EE engine component can also be configured either as failover or as scalable. The other components must be configured as failover data services.

For conceptual information about failover services and scalable services, see the *Sun Cluster Concepts Guide for Solaris OS*.

Each component of the SAP Web Application Server platform has a data service that protects the component in a Sun Cluster configuration, as described in the following table.

TABLE 1 Protection of SAP Web Application Server Components by Sun Cluster Data Services

SAP Web Application Server Component	Data Service
SAP enqueue server	Resource type for SAP enqueue server in Sun Cluster HA for SAP Web Application Server. The resource type is SUNW.sapenq.
SAP replica server	Resource type for SAP replica server in Sun Cluster HA for SAP Web Application Server. The resource type is SUNW.saprepl.
SAP message server	Resource type for SAP message server in Sun Cluster HA for SAP Web Application Server. The resource type is SUNW.sapsccs.
SAP web application server	Resource type for SAP web application server component in Sun Cluster HA for SAP Web Application Server. The resource type is SUNW.sapwebas.
Standalone SAP J2EE engine	The resource for the SAP Web Application Server stack that is designated for Java™ software only. The resource type is SUNW.sapwebas.
Database	The data service for the database that you are using, for example: <ul style="list-style-type: none"> ■ For the SAP DB database, the data service is Sun Cluster HA for MaxDB. See <i>Sun Cluster Data Service for MaxDB Guide for Solaris OS</i>. ■ For the Oracle database, the data service is Sun Cluster HA for Oracle. See <i>Sun Cluster Data Service for Oracle Guide for Solaris OS</i>.
NFS file system	Sun Cluster HA for NFS. For more information about this data service, see <i>Sun Cluster Data Service for NFS Guide for Solaris OS</i> .

Overview of the Installation and Configuration Process for Sun Cluster HA for SAP Web Application Server

The following table summarizes the tasks for installing and configuring Sun Cluster HA for SAP Web Application Server and provides cross-references to detailed instructions for performing these tasks. Perform the tasks in the order that they are listed in the table.

TABLE 2 Tasks for Installing and Configuring Sun Cluster HA for SAP Web Application Server

Task	For Instructions, Go To ...
Plan the SAP Web Application Server installation	Your SAP documentation <i>Sun Cluster Data Services Planning and Administration Guide for Solaris OS</i> “Planning the Sun Cluster HA for SAP Web Application Server Installation and Configuration” on page 15
Install SAP Web Application Server and configure the application to run in a cluster	“Installing and Configuring SAP Web Application Server” on page 20
Verify the SAP Web Application Server installation and configuration	“Verifying the SAP Web Application Server Installation and Configuration” on page 36
Install the Sun Cluster HA for SAP Web Application Server packages	“Installing the Sun Cluster HA for SAP Web Application Server Packages” on page 43
Register and configure the Sun Cluster HA for SAP Web Application Server data service	“Registering and Configuring Sun Cluster HA for SAP Web Application Server” on page 45
(Optional) Use alternate project identifier (ID)	“Using Alternate Project Identification” on page 64
(Optional) Tune the Sun Cluster HA for SAP Web Application Server fault monitors	“Tuning the Sun Cluster HA for SAP Web Application Server Fault Monitors” on page 65
Verify the Sun Cluster HA for SAP Web Application Server installation and configuration	“Verifying the Sun Cluster HA for SAP Web Application Server Installation and Configuration” on page 69

Planning the Sun Cluster HA for SAP Web Application Server Installation and Configuration

This section contains the information that you need to plan your Sun Cluster HA for SAP Web Application Server installation and configuration.

Note – Before you begin, consult your SAP documentation for configuration restrictions and requirements that are not stated in Sun Cluster documentation or imposed by Sun Cluster software.

Be sure to read all SAP notes that pertain to your release of SAP Web Application Server. For more information, see the SAP documentation at <http://service.sap.com/ha>.

Note – Sun Cluster HA for SAP Web Application Server can be configured to run in a whole root or a sparse root non-global zone, if required.

Configuration Restrictions



Caution – Your data service configuration might not be supported if you do not observe these restrictions.

For restrictions that apply to all data services, see the release notes for your release of Sun Cluster at <http://docs.sun.com>. The following configuration restriction applies only to Sun Cluster HA for SAP Web Application Server.

- The maximum length of the node names depends on the SAP release. Refer to the SAP installation guide for your release of SAP. This limitation is an SAP software restriction.
- Configure the database resource to be in a different resource group from the SAP enqueue server resource, if possible.

However, if you are using Oracle as the database, and if you must configure Oracle in the same resource group as the SAP enqueue server resource, you must ensure that the value of the `restart_type` extension property for Sun Cluster HA for Oracle is set to `RESOURCE_RESTART`. This property setting means that if the response to a fault in the Oracle database is to restart the Oracle resource, only the Oracle database is restarted. If this property is set to `RESOURCE_GROUP_RESTART`, and if the response to a fault in the Oracle database is to restart the Oracle resource, all the resources in the resource group are restarted. However, if the SAP replica server is configured and online on another node, the SAP enqueue server cannot be restarted locally. Therefore, the `restart_type` property must be set to `RESOURCE_RESTART`.

Configuration Requirements



Caution – Configuration requirements represent actions that you must perform. If your data service configuration does not satisfy these requirements, the data service configuration might not be supported.

For requirements that apply to all data services, see “Configuration Guidelines for Sun Cluster Data Services” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

The following configuration requirements apply only to Sun Cluster HA for SAP Web Application Server.

- The fault monitor probe for the resource type of the SAP message server requires the `msprot` program. You must download this binary from `http://service.sap.com`. Refer to the relevant SAP note for information about obtaining and using the `msprot` program.

Supported Data Service Configurations

Sun Cluster HA for SAP Web Application Server supports configurations that conform to the requirements that are specified in the previous section.

All configurations of Sun Cluster HA for SAP Web Application Server have the following requirements:

- The SAP enqueue server is configured as a failover resource.
- The SAP replica server is configured as a failover resource.
- The SAP message server is configured as a failover resource.
- The SAP web application server component can be configured either as a failover or as a scalable data service resource.
- The SAP J2EE engine can be configured either as a failover or as a scalable data service resource.
- The SAP enqueue server and the SAP message server are resources in the SAP central services resource group. The SAP replica server is a resource in the SAP replica server resource group.
- The SAP replica server resource is configured to depend on the SAP enqueue server resource. This dependency ensures that the SAP replica server does not attempt to start until the SAP enqueue server is online.

- The SAP central services resource group is configured to have weak *positive* affinity with the SAP replica server resource group. This affinity ensures that, if a hardware or software failure occurs on the node or zone that is mastering the SAP central services resource group, the SAP central services resource group fails over to the node or zone where the SAP replica server resource group is currently running.
- The SAP replica server resource group is configured to have strong *negative* affinity with the SAP central services resource group. This affinity ensures that, if the SAP central services resource group fails over, the SAP replica server resource group is off-loaded from the node where it is currently running before the SAP central services resource group is brought online on that same node. The SAP replica server resource group is started on another node, if one is available.

The following examples show the following supported configurations of Sun Cluster HA for SAP Web Application Server.

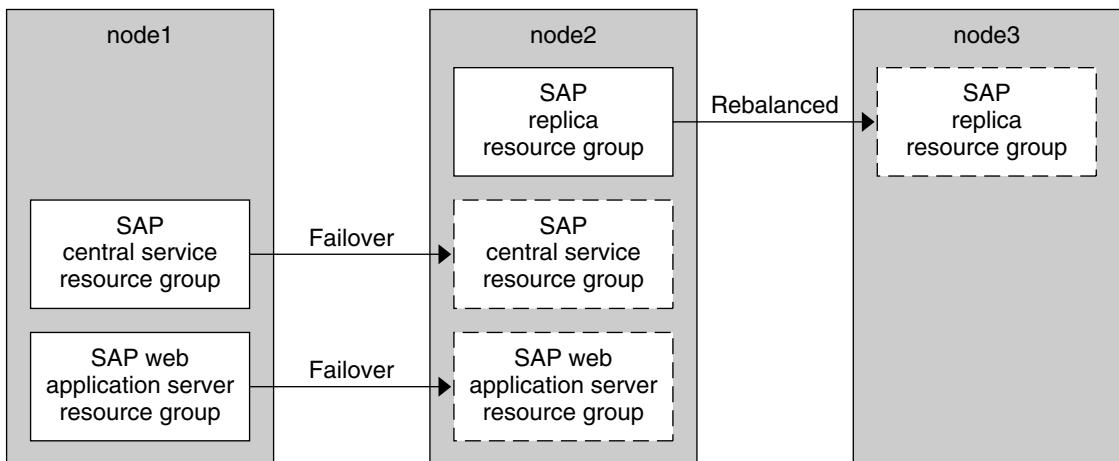
- The SAP web application server component is configured as a failover resource.
- The SAP web application server component is configured as a scalable resource.

EXAMPLE 1 SAP Web Application Server Component Configured as a Failover Resource

This example shows a standard configuration of Sun Cluster HA for SAP Web Application Server with the SAP web application server component that is configured as a failover resource.

The boxes that have a solid border represent the location of the resource groups before failover.

The boxes that have a dashed border represent the location of the resource groups after a failover because of a problem on the first node. The SAP central services resource group fails over, and the SAP replica server resource group consequently moves to another node. The SAP web application server component resource group also fails over.

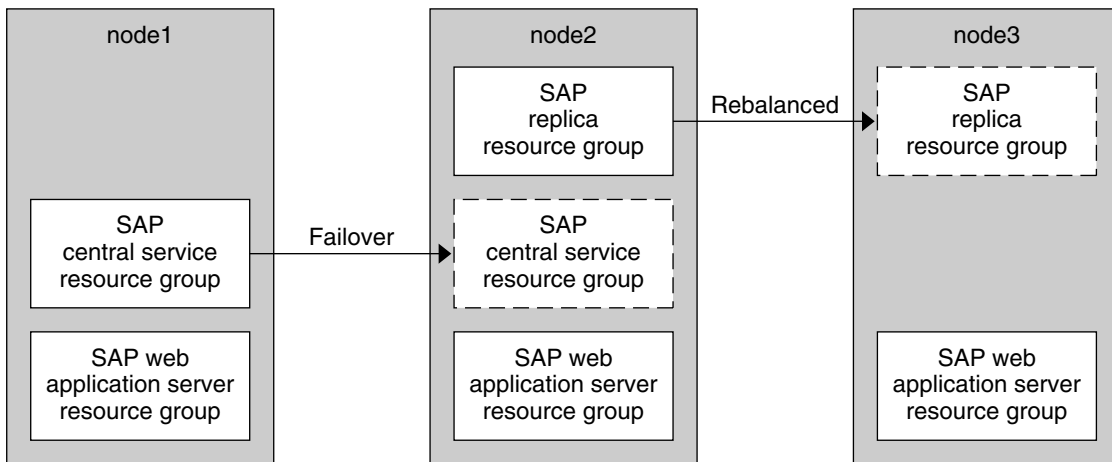


EXAMPLE 2 SAP Web Application Server Component Configured as a Scalable Resource

This example shows a standard configuration of Sun Cluster HA for SAP Web Application Server with the SAP web application server component that is configured as a scalable resource.

The boxes that have a solid border represent the location of the resource groups before failover.

The boxes that have a dashed border represent the location of the resource groups after a failover because of a problem on the first node. As in the previous example, the SAP central services resource group fails over, and the SAP replica server resource group consequently moves to another node. Because the SAP web application server component resource group is scalable, it does not fail over, but the corresponding resource groups on the other node continue running.



Configuration Considerations

The following configuration considerations affect the installation and configuration of Sun Cluster HA for SAP Web Application Server.

- The SAP enqueue server and SAP replica server run on different cluster nodes. Therefore, the SAP application files (binary files, configuration files, and parameter files) can be installed either on the global file system or on the local file system. However, the application files for each of these applications must be accessible at all times from the nodes on which these applications are running.

See “Configuration Guidelines for Sun Cluster Data Services” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*. This section details the advantages and disadvantages of placing the SAP binaries on the local file system or on the cluster file system.

- The default value of the `Retry_count` system property for the SAP enqueue server is 0. This value ensures that the SAP enqueue server fails over after the first failure. If replication is running, do *not* modify this default value because enqueue locks would be lost. When replication is in operation and the Enqueue server is restarted, even on the same node, the locks are no longer valid.
- The resource group for the SAP web application server component can be configured to be a failover resource group or a scalable resource group. If the SAP web application server component is configured to be a scalable resource group, the directory `/usr/sap/SAPSID/INSTANCE_NAME` must be local on each node where the SAP web application server component is installed, as explained in “[How to Modify the Installation for a Scalable SAP Web Application Server Component](#)” on page 28. Note that `SAPSID` represents the SAP system identification and `INSTANCE_NAME` represents the name of the SAP web application server instance.
- During the installation and configuration process, track any system files that you change, because you need to copy those files to all the nodes that are to run the application.
- For each new installation, the SAP start and stop scripts are overwritten. Therefore, be sure to modify these scripts as needed at each new installation.

Configuration Planning Questions

Use the questions in this section to plan the installation and configuration of Sun Cluster HA for SAP Web Application Server. Write the answers to these questions in the space that is provided on the data service worksheets in “Configuration Worksheets” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

- Will you run the SAP web application server component of the application as a failover resource or as a scalable resource?
- Will you run the SAP J2EE engine as a failover resource or as a scalable resource?
- What is the logical hostname for clients that will access the data service?
- Where will the system configuration files reside?

See “Configuration Guidelines for Sun Cluster Data Services” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for the advantages and disadvantages of placing the SAP binaries on the local file system or on the cluster file system.

Installing and Configuring SAP Web Application Server

To enable Sun Cluster HA for SAP Web Application Server to make SAP Web Application Server highly available, additional installation and configuration operations are required. These operations supplement the standard installation and standard configuration of the SAP Web Application Server.

The procedures in this section describe the installation and configuration of the following components of the SAP Web Application Server.

- SAP central services, which include these services:
 - SAP enqueue server
 - SAP replica server
 - SAP message server
- SAP web application server for one of the following engines:
 - ABAP
 - ABAP+J2EE
 - J2EE

Configuring Your Highly Available Database

SAP supports various databases. You must configure the resource type, the resource group, and the resources for the database that you plan to use so that the database will be highly available. See details in the appropriate Sun Cluster Data Services document for the database that you plan to use.

- If you plan to use SAP DB as the database, configure the Sun Cluster HA for MaxDB data service. See *Sun Cluster Data Service for MaxDB Guide for Solaris OS*.
- If you plan to use Oracle as the database, configure the Sun Cluster HA for Oracle data service. See *Sun Cluster Data Service for Oracle Guide for Solaris OS*.

▼ How to Install and Configure the SAP Web Application Server and the SAP J2EE Engine

- 1 **For failover resource only: On one node of the cluster, install the SAP Web Application Server software.**

Refer to the SAP installation documentation.

Note – If you are installing SAP 7.0 or NW2004 SR1, use the `SAPINST_USE_HOSTNAME` parameter to install the SAP application using the logical host. You can also use the High Availability install option to separate the SAP central services from the central instance automatically.

2 For scalable resource only: On each node on which you plan to run the scalable SAP web application server component resource group.

a. Create a local file system.

This file system can be defined as you choose, as in the following example.

```
# mkdir /usr/sap/local/SAPSID/INSTANCE_NAME
```

```
# chown sapsidadm:sapsys /usr/sap/local/SAPSID/INSTANCE_NAME
```

Note that `SAPSID` represents the SAP system identification and `INSTANCE_NAME` represents the name of the SAP web application server instance.

b. As user `sapsidadm`, create symbolic links to the dialog instance.

On each node, create a symbolic link to the local file system from the required directory path for the installation, as in the following example.

```
$ ln -s /usr/sap/local/SAPSID/INSTANCE_NAME \
/usr/sap/SAPSID/INSTANCE_NAME
```

3 For scalable resource only: On all the nodes or zones of the cluster install the SAP Web Application Server or SAP J2EE engine.

Install the same SAP Web Application Server or SAP J2EE engine software using the same `SAPSYSTEM` number separately on each node or zone that can potentially master the corresponding resource. This requirement is applicable only if you are creating the corresponding resource to be scalable.

Refer to the SAP installation documentation.

4 If profiles for the SAP enqueue server and the SAP replica server have not been created during installation, create them manually.

Refer to the SAP documentation at <http://service.sap.com/ha>.

Note – The `SAPSYSTEM` parameter in the SAP enqueue server profile and in the SAP replica server profile must have the same value.

5 Remove the startup of the SAP enqueue server from the SAP start profile.

In the Sun Cluster environment, the SAP enqueue server resource starts the SAP enqueue server application. Therefore, if the SAP start profile contains the startup of the SAP enqueue server, remove it. Otherwise, the SAP enqueue server will be started more than once.

6 Are you using SAP 6.4 or SAP 7.0 or NW2004 SR1?

- If no, skip to [Step 8](#).
- If yes, proceed to [Step 7](#).

7 Become user *sapsidadm*.

In the home directory of *sapsidadm*, create a wrapper script that invokes the appropriate `startsap` and `stopsap` script generated by the SAP installer with necessary parameters.

```
# echo "/usr/sap/SID/SYS/exe/run/startsap r3 instance-name logical-host" \  
> $SAPSID_HOME/startsap_instance-number
```

```
# chmod 755 $SAPSID_HOME/startsap_instance-number
```

```
# echo "/usr/sap/SID/SYS/exe/run/stopsap r3 instance-name logical-host" \  
> $SAPSID_HOME/stopsap_instance-number
```

```
# chmod 755 $SAPSID_HOME/stopsap_instance-number
```

Proceed to [Step 11](#)

8 Create a script to return logical hostnames for the SAP message server and the SAP web application server components.

Create a script named `loghost`, which returns the logical hostnames for each instance of both the SAP message server and the SAP web application server components. The script must be located in the directory `$HOME`, where `$HOME` specifies the home directory of the SAP user. The following commands provide an example of the `loghost` script.

```
if [ "$1" = "DVEBMGS00" ]; then  
    echo loghost-1;  
fi  
if [ "$1" = "SCS01" ]; then  
    echo loghost-2;  
fi  
if [ "$1" = "D02" ]; then  
    echo loghost-3;  
fi
```

Note – If the SAP web application server component is configured as a scalable resource, you will modify this script in a later section, “[How to Modify the Installation for a Scalable SAP Web Application Server Component](#)” on page 28.

9 If you are using the SAP J2EE engine, modify the loghost script to return logical hostnames for the SAP J2EE engine.

Modify the script loghost, which was created in [Step 8](#), to return the logical hostnames for each instance of the SAP J2EE engine. The script is located in the directory \$HOME, where \$HOME specifies the home directory of the SAP user. The following commands provide an example of the modification of the loghost script.

```
if [ "$1" = "JC00" ]; then
    echo loghost-4;
fi
if [ "$1" = "SCS02" ]; then
    echo loghost-5;
fi
if [ "$1" = "J02" ]; then
    echo loghost-6;
fi
```

10 Set the file permissions for the script so that it is executable.

```
# chmod 755 $HOME/loghost
```

11 Modify the SAP start and stop scripts as follows:

Note – In the following steps you will be updating the SAP start and stop scripts. The initial set of updates pertain to all SAP instances being put under the control of Sun Cluster and the second set of updates depend on the instance being put under Sun Cluster.

a. Create copies of the original SAP start and stop scripts, as in the following example.

```
$ cp /sapmnt/SID/exe/startsap /sapmnt/SID/exe/startsap.orig
$ cp /sapmnt/SID/exe/stopsap /sapmnt/SID/exe/stopsap.orig
```

b. Ensure the uniqueness of the instance names.

Add a sort -u command to the end of the line that begins with INSTANCE= in the SAP start and stop scripts. This command sorts all the instance names that are found and retains only the unique names.

The original line is the following, where *arg* is the argument number, for example, 1 or 2.

```
INSTANCE='echo $arg | awk '/SCS[0-9][0-9]/{print $1}
/ASCS[0-9][0-9]/{print $1} /DVEBMGS[0-9][0-9]/{print $1}
/JC[0-9][0-9]/{print $1} /D[0-9][0-9]/{print $1}
/J[0-9][0-9]/{print $1} /G[0-9][0-9]/{print $1}''
```

After you add a pipe to a `sort -u` command at the end, the line is the following, where *arg* is the argument number, for example, 1 or 2.

```
INSTANCE='echo $arg | awk '/SCS[0-9][0-9]/{print $1}
/ASCS[0-9][0-9]/{print $1} /DVEBMGS[0-9][0-9]/{print $1}
/JC[0-9][0-9]/{print $1} /D[0-9][0-9]/{print $1}
/J[0-9][0-9]/{print $1} /G[0-9][0-9]/{print $1}' | sort -u'
```

- c. In order to source the user's profile and thus also source the SAP-specific environment files, add the following line as the second line of the SAP start and stop scripts.

```
. $HOME/.profile
```

Note – The preceding steps affect both SAP message server and SAP web application server.

- d. For SAP message server only — create a copy of the SAP start and stop scripts, as in the following example. This copy of the SAP start script will be used to start up the SAP message server resources.

```
$ cp /sapmnt/SID/exe/startsap /sapmnt/SID/exe/startsap_msg_server
```

```
$ cp /sapmnt/SID/exe/stopsap /sapmnt/SID/exe/stopsap_msg_server
```

- e. For SAP web application server only — create a copy of the SAP start and stop scripts, as in the following example. This copy of the SAP start script will be used to start up the SAP web application server resources.

```
$ cp /sapmnt/SID/exe/startsap /sapmnt/SID/exe/startsap_webas_server
```

```
$ cp /sapmnt/SID/exe/stopsap /sapmnt/SID/exe/stopsap_webas_server
```

- f. Update the SAP start and stop scripts to call the script that returns logical hostnames.

You need to run the following command for SAP central services and SAP Web Application Server resources.

Note – This step is not applicable for SAP 7.0 or NW2004 SR1.

In the section for setting `HOSTNAME`, insert the name of the script `$HOME/loghost`, which you created in [Step 8](#). This action is accomplished by replacing the line `HOSTNAME='hostname'` with the lines in the following example.

```
< remove
> add

# Set HOSTNAME
case 'uname' in
```



```

OS/390* | z/OS* | AIX* | BOS*)
  HOSTNAME='hostname -s'
  ;;
*)
<  HOSTNAME='hostname'
>  if [ $# -eq 2 ]; then
>    HOSTNAME='$HOME/loghost $2'
>  else
>    HOSTNAME='hostname'
>  fi
  ;;
esac

```

- 12 **If you are configuring a resource for SAP 7.0 or NW2004 SR1, add the following to the LD_LIBRARY_PATH to the end of the .profile filename in the home directory of user *sapsidadm*.**
/usr/sap/sapsid/SYS/exe/run:/oracle-client-dir/instantclient
- 13 **Remove the /net entry from /etc/auto_master to disable name service maps and to enable the SAP central services instance to failover in case of network failures.**
- 14 **If the Process Monitor Facility (PMF) will be used with the SAP web application server component, the *saposcol* program must be started outside of the cluster environment on all the nodes that will run the SAP Web Application Server.**

The SUNW.sapwebas resource type represents the SAP web application server component in a Sun Cluster configuration. The extension property *Webas_Use_Pmf* for this resource type determines if PMF will be used with the SAP web application server component.

If PMF is used, you must start the *saposcol* program outside of the cluster environment so that PMF does not stop the *saposcol* program when it stops the resource for the SAP web application server component.

The *saposcol* program must be available to all the nodes that are running the SAP Web Application Server. Therefore, the program must be either in a global file system or in the local file system of each node.

- a. **If the *saposcol* program is on the global file system and you want it to be on the local file systems, copy the program to the local file systems by performing the following actions on each node:**
 - On the installation node, if the *saposcol* program was started separately, stop the *saposcol* program.
 - If the SAP system is running, stop the SAP system.
 - If the file system is not mounted, mount it to the installation node.
 - Copy the *saposcol* executable file from the installation node to a local directory on the target node.

```
# cp /usr/sap/SAPSID/SYS/exe/saposcol destination-directory
```

Note that *SAPSID* is the SAP system identification.

- b. Remove the startup of the `saposcol` program from the SAP start script of the SAP web application server component that will be configured to use PMF. This action is also mentioned in [Step 11](#), together with other modifications to the SAP start and stop scripts.**
- c. Start the `saposcol` program.**
 - If the program is on the global file system, start the program from the global location.
 - If the program is on the local file system, start the program from the local directory on each node.

15 Modify the file names and contents to use logical hostnames instead of physical hostnames.

Note – This step is not applicable for SAP 7.0 or NW2004 SR1.

The standard SAP Web Application Server installation uses the physical hostname of the node on which the SAP system is installed. You must modify SAP Web Application Server to use a logical hostname so that SAP Web Application Server works in a Sun Cluster environment.

Note – If the SAP web application server component is configured as a scalable resource, you will make additional modifications in a later section, “[How to Modify the Installation for a Scalable SAP Web Application Server Component](#)” on page 28.

- a. Make sure that the names of the “.” files in the home directory of the SAP user do not contain the physical hostname.**

In the following example, the physical hostname is removed from the names of the “.” files.

```
for i in .*physical-hostname.*
do
mv $i echo $i | sed "s/_physical-hostname/"
done
```

- b. Make sure that the names and contents of the database “.” files refer to logical hostname that is used by the database and not to physical hostnames.**

Note – The following substeps (c, d, and e) are not applicable for scalable SAP web application server and SAP J2EE engine instances.

- c. **Change the file names and contents of the profile files to use the logical hostname corresponding to the individual component instead of physical hostnames.**

These files are located in `/usr/sap/SAPSID/SYS/profile`, where *SAPSID* is the SAP system identification.

- d. **Add the following logical hostname entries to each `SAPSID_INSTANCE_NAMESYSTEM_NUMBER_logical-hostname` file that is located in the SAP profile directory. Note that *SAPSID* is the SAP system identification, *INSTANCE_NAME* is the SAP instance name, and *SYSTEM_NUMBER* is the SAP system number.**

`SAPLOCALHOST=logical-hostname`

`SAPLOCALHOSTFULL=logical-hostname.domain`

- e. **Replace the physical hostname with the logical hostname in the file `/usr/sap/SAPSID/INSTANCE_NAME/igs/conf/igs.xml`. Note that *SAPSID* is the SAP system identification and *INSTANCE_NAME* is the SAP instance name.**

16 Add or modify the parameter `enq/serverhost` in the SAP instance profile.

Note – This step is not applicable for SAP 7.0 or NW2004 SR1.

After installation, the parameter `enq/serverhost` in the SAP instance profile is set to the physical hostname. Modify this parameter to contain the name of the logical host on which the SAP enqueue server will be running.

17 Make sure that the database is online and under the control of Sun Cluster.

For information about setting up the Sun Cluster HA for MaxDB database, see *Sun Cluster Data Service for MaxDB Guide for Solaris OS*.

18 If you are using the SAP J2EE engine, modify the SAP J2EE engine settings to reference the logical hostname.

Note – This step is not applicable for SAP 7.0 or NW2004 SR1.

a. Determine the location of the configuration scripts.

- If the ABAP engine component is installed without the SAP J2EE engine component, or if the SAP J2EE engine component is installed as a standalone component, the scripts are located in the directory `/usr/sap/SAPSID/JCINSTANCE_NUMBER/j2ee/configtool`.
- If The ABAP engine component is installed with the SAP J2EE engine, the scripts are located in the directory `/usr/sap/SAPSID/DVEBMGSINSTANCE_NUMBER/j2ee/configtool`.

- b. Run the `configtool.sh` script, which is located in the directory that was determined in [Step a](#). Use this script to change all occurrences of a physical hostname to the corresponding logical hostname. This action includes setting the instance host and the JDBC URL to point to the logical host for the database.
- c. Bring online the database with the logical host for the database.
- d. Use the SAP configuration tool to modify the settings in the remaining steps of this procedure.

To start the SAP configuration tool, you can use the script `offlinecfgeditor.sh`, which is located in the directory that was determined in [Step a](#).

- e. In the **LockingManager** section, modify `enqu.host` to refer to the logical hostname for the SAP enqueue server. Change this entry under all the settings (the general and the instance-specific).
- f. In the **LockingManager** section, modify all occurrences of `enq.profile.filename` to use the logical hostname. Change this entry under all the settings (the general and the instance-specific).

For example, change `SAPSID_JCINSTANCE_NUMBER_physicalhost` to `SAPSID_JCINSTANCE_NUMBER_logicalhost`. The new file name should be the same as the file name in the file `/sapmnt/SAPSID/profile`.

- g. In the **ClusterManager** section, change `instance.ms.host` to refer to the logical hostname for the SAP message server. Change this entry under all the settings (the general and the instance-specific).
- h. Modify the `instance.properties.IDxxxxxx` to refer to the logical host.
For each `instance.properties.IDxxxxxx`, modify all occurrences of a physical hostname to the corresponding logical hostname.
- i. Ensure that the `enqu.port` parameter and the URL in the `dbpool` parameter have the correct settings.

Note – For information about updates to SAP profiles, see the SAP documentation at <http://service.sap.com/ha>.

▼ How to Modify the Installation for a Scalable SAP Web Application Server Component

The SAP web application server component of the SAP Web Application Server platform can be configured either as a failover resource or as a scalable resource.

- If you configure the SAP web application server component as a failover resource, skip this section.
- If you configure the SAP web application server component as a scalable resource, you must perform the following steps.

1 Update the script `$HOME/loghost` to return the physical hostname or a string.

A scalable resource group does not contain a logical host. Therefore, if a resource group for the SAP web application server component is a scalable SAP J2EE engine resource, you must update the script `$HOME/loghost` to return the physical hostname. In the following example, `J85` is the full name of the dialog instance.

```
if [ "$1" = "J85" ]; then
    echo 'hostname';
fi
```

2 Create a copy of the SAP start and stop scripts, as in the following example.

```
$ cp /sapmnt/SID/exe/startsap_webas_server /sapmnt/SID/exe/startsap_webas_server_scal
```

```
$ cp /sapmnt/SID/exe/stopsap_webas_server /sapmnt/SID/exe/stopsap_webas_server_scal
```

3 Update the SAP start and stop scripts that you created in the previous step with unique names for the log files.

When the SAP web application server component resource group is configured to be scalable, multiple instances of the application can be running simultaneously on different nodes. If all instances write to the same log file, they overwrite previously written information. Therefore, change the names of the log files that are specified in the SAP start and stop scripts so that they have unique names. Renaming the log files ensures that each node writes to a unique file. In the following example, the node name is appended to the log file name.

Example of entry in script before updating:

```
LOGFILE=$R3S_LOGDIR/'basename ${0}_${INSTANCE}'.log'
```

Example of entry in script after updating:

```
LOGFILE=$R3S_LOGDIR/'basename ${0}_${INSTANCE}'_'uname -n'.log
```

For more information on how to update the SAP start and stop scripts, see [“How to Install and Configure the SAP Web Application Server and the SAP J2EE Engine”](#) on page 20

- 4 Make sure that the parameter `enq/serverhost` in the SAP instance profile contains the logical hostname of the SAP enqueue server.**
- 5 Verify the instance parameters.**

Note – This step is only applicable to SAP J2EE engine instances.

Start the configuration tool with the script of `flinescfgeditor.sh`, which is located in the directory `/usr/sap/SAPSID/JCINSTANCE_NUMBER/j2ee/configtool`.

- Ensure that the `cluster_data` instance parameter is set to `PropertySheet instance.properties.IDxxxxxx`.
- Ensure that `instance.ms.host` is set to the logical hostname.

▼ How to Enable the SAP Web Application Server to Run in a Cluster

The following resource groups are created in this procedure:

- SAP central services resource group, to contain the following resources:
 - SAP enqueue server resource
 - SAP message server resource
 - Logical hostname for these resources
- SAP replica server resource group, to contain the following resources:
 - SAP replica server resource
 - Logical hostname for this resource
- SAP web application server resource group, to contain the following resources:
 - SAP web application server component resource
 - Logical hostname for this resource, if the resource is configured as a failover resource

Note that the procedure to enable the SAP J2EE engine to run in a cluster is located in a separate section. See “[How to Enable the Stand-Alone SAP J2EE Engine to Run in a Cluster](#)” on page 35.

- 1 **Become superuser on a cluster node.**
- 2 **Create a resource group for the SAP central services.**

The SAP central services resource group is a failover resource group to contain the SAP enqueue server resource, the SAP message server resource, and the logical hostname for these resources.

```
# clresourcegroup create central-rg
central-rg
```

Specifies the name of the resource group to be created. Choose a unique name for each resource group within the cluster.

3 Add a logical hostname resource to the resource group that you created in Step 2.

```
# clreslogicalhostname create -g central-rg central-logical-hostname
```

```
-g central-rg
```

Specifies that the logical hostname resource is to be added to the resource group named *central-rg* that you created in [Step 2](#).

```
central-logical-hostname
```

Specifies that the logical hostname of the SAP central services resource is *central-logical-hostname*.

Note – If you require a fully qualified hostname, you must specify the fully qualified name with the `-h` option and you cannot use the fully qualified form in the resource name.

4 Bring online the SAP central services resource group.

```
# clresourcegroup online -M central-rg
```

```
-M
```

Specifies that the resource group is to be brought over into the managed state.

5 Create a resource group for the SAP replica server.

The SAP replica server resource group is a failover resource group to contain the SAP replica server resource and the logical hostname for this resource.

```
# clresourcegroup create repl-rg
```

6 Add a logical hostname resource to the resource group that you created in Step 5.

```
# clreslogicalhostname create -g repl-rg saprepl-logical-hostname
```

```
-g repl-rg
```

Specifies the name of the resource group.

```
saprepl-logical-hostname
```

Specifies the logical hostname of the SAP replica server resource.

Note – If you require a fully qualified hostname, you must specify the fully qualified name with the `-h` option and you cannot use the fully qualified form in the resource name.

7 Bring online the SAP replica server resource group.

```
# clresourcegroup online -M repl-rg
```

```
-M
```

Specifies that the resource group is to be brought into the managed state.

8 Set weak positive affinity between the SAP central services resource group and the SAP replica server resource group.

The weak positive affinity setting ensures that, in case of failover, the SAP central services resource group fails over to the node where the SAP replica server resource group has been running.

```
# clresourcegroup set -p RG_affinities==repl-rg central-rg
```

central-rg

Specifies the name of the resource group to be modified.

```
-p RG_affinities==repl-rg
```

Specifies that the *central-rg* resource group has weak positive affinity with the *repl-rg* resource group.

central-rg

Specifies the name of the resource group *central-rg* to be modified

9 If the SAP central services resource group and the SAP replica server resource group are online on the same node, switch one of them to another node.

The two resource groups must be mastered on different nodes or zones before the strong negative affinity can be set between the resource groups.

```
# clresourcegroup switch -n node repl-rg
```

-n node

Specifies the node to which the resource group is to be switched.

repl-rg

Specifies the name of the resource group to be switched. This resource group can be either the SAP central services resource group or the SAP replica server resource group.

10 Set strong negative affinity between the SAP replica server resource group and the SAP central services resource group.

The strong negative affinity setting ensures that node failover behavior is appropriate. The SAP central services resource group fails over to the node where the SAP replica server resource group has been running. The SAP replica server resource group then fails over to another available node.

The SAP replica server resource group is never brought online nor allowed to remain online on a node on which the SAP central services resource group is online.

```
# clresourcegroup set -p RG_affinities==central-rg repl-rg
```

```
-p RG_affinities==central-rg
```

Specifies that the *repl-rg* resource group has strong negative affinity with the *central-rg* resource group.

repl-rg

Specifies the name of the resource group to be modified.

11 Create a resource group for the SAP web application server component.

The SAP web application server resource group can be configured as a failover or scalable resource group to contain the resource for the SAP web application server component. If the SAP web application server is configured as a failover resource, the logical hostname for this resource is also contained in the SAP web application server resource group.

- To create a failover resource group, run the following command.

```
# clresourcegroup create webas-rg
```

- To create a scalable resource group, run the following command.

```
# clresourcegroup create \  
-p Maximum primaries=value -p Desired primaries=value webas-rg
```

```
-p Maximum primaries=value
```

Specifies the maximum number of primary nodes for this scalable resource group.

```
-p Desired primaries=value
```

Specifies the desired number of primary nodes for this scalable resource group.

```
webas-rg
```

Specifies the name of the failover resource group to be added. This name can be your choice but must be unique for the resource groups within the cluster.

12 If the resource group that you created in Step 11 is configured as a failover resource group, add a logical hostname resource to the resource group.

If the resource group that you created in Step 11 is configured as a scalable resource group, skip this step.

```
# clreslogicalhostname create -g webas-rg webas-logical-hostname
```

```
-g webas-rg
```

Specifies the name of the resource group.

```
webas-logical-hostname
```

Specifies the logical hostname *saprepl-logical-hostname* of the SAP replica server resource.

By default the name of the logical-host resource is set to the same name as this. If you wish to specify a separate name then place the name of the resource at the end of the command listing.

Note – If you require a fully qualified hostname, you must specify the fully qualified name with the -h option and you cannot use the fully qualified form in the resource name.

13 Bring online the SAP web application server resource group.

```
# clresourcegroup onLine -M webas-rg
```

-M

Specifies that the resource group is to be brought into the managed state.

webas-rg

Specifies the name of the resource group that needs to be brought online.

14 (Optional) Consider configuring your cluster to off-load noncritical resource groups.

You might plan to run a noncritical, lower-priority SAP web application server component resource on a node to which a critical, higher-priority SAP central services resource can fail over. In this situation, consider setting strong negative affinity between the resource groups. This setting ensures that, if a higher-priority SAP central services resource fails over to the node where a lower-priority SAP web application server component resource is running, the lower-priority resource is off-loaded, thereby automatically freeing the node's resources to be used for the critical SAP central services resource.

```
# clresourcegroup set -p RG_affinities=- -central-rg webas-rg
```

```
-p RG_affinities=- -central-rg
```

Specifies that the *webas-rg* resource group has strong negative affinity with the *central-rg* resource group. If the *central-rg* resource group fails over to the node where the *webas-rg* resource group is running, the *webas-rg* resource group is off-loaded.

webas-rg

Specifies the name of the resource group to be modified.

15 Copy all system files that were changed during the SAP Web Application Server installation and configuration process to all the nodes or zones that are to run the SAP Web Application Server resources. These files might include the following:

- /etc/hosts
- /etc/group
- /etc/passwd
- /etc/services

16 Become super user on all of the nodes or zones.

17 Configure the /etc/nsswitch.conf file so that SAP web application server starts and stops correctly if a switchover or a failover occurs.

On each node that can master the logical host that runs SAP web application server, include the following entries in the /etc/nsswitch.conf file.

```
passwd: files [NOTFOUND=return] nis [TRYAGAIN=0]
publickey: files [NOTFOUND=return] nis [TRYAGAIN=0]
project: files [NOTFOUND=return] nis [TRYAGAIN=0]
group: files [NOTFOUND=return] nis [TRYAGAIN=0]
```

SAP web application server uses the `su - user` command to start, stop, and probe the service.

The network information name service might become unavailable when a cluster node's public network fails. Adding the preceding entries ensures that the `dpmon -info` command does not refer to the NIS/NIS+ name services if the network information name service is unavailable.

▼ How to Enable the Stand-Alone SAP J2EE Engine to Run in a Cluster

1 Create a resource group for the SAP J2EE engine.

The SAP J2EE engine resource group can be configured as a failover or scalable resource group to contain the resource for the SAP J2EE engine. If the SAP J2EE engine is configured as a failover resource, the logical hostname for this resource is also contained in this resource group.

- To create a failover resource group, run the following command.

```
# clresourcegroup create j2ee-rg
```

- To create a scalable resource group, run the following command.

```
# clresourcegroup create \  
-p Maximum primaries=value -p Desired primaries=value j2ee-rg
```

-p Maximum primaries=*value*

Specifies the maximum number of primary nodes for the scalable resource group.

-p Desired primaries=*value*

Specifies the desired number of primary nodes for the scalable resource group.

j2ee-rg

Specifies the name of the resource group to be added. This name can be your choice but must be unique for the resource groups within the cluster. Use this name when configuring the SAP J2EE engine resource.

2 If the resource group that you created in [Step 1](#) is configured as a failover resource group, add a logical hostname resource to the resource group.

If the resource group that you created in [Step 1](#) is configured as a scalable resource group, skip this step.

```
# clreslogicalhostname create -g j2ee-rg j2ee-logical-hostname
```

-g *j2ee-rg*

Specifies the logical hostname resource to be added to the resource group that you created in [Step 1](#).

j2ee-logical-hostname

Specifies the logical hostname of the SAP J2EE engine resource. Use this name when configuring the SAP J2EE engine resource.

Note – If you require a fully qualified hostname, you must specify the fully qualified name with the `-h` option and you cannot use the fully qualified form in the resource name.

3 Bringing online the SAP J2EE engine resource group.

```
# clresourcegroup online -M j2ee-rg
```

`-M`

Specifies that the resource group is to be brought into the managed state.

`j2ee-rg`

Specifies the name of the resource group that needs to be brought online.

Verifying the SAP Web Application Server Installation and Configuration

Before you install the Sun Cluster HA for SAP Web Application Server packages, verify that the SAP Web Application Server software is correctly installed and configured to run in a cluster. These procedures do *not* verify that the SAP Web Application Server application is highly available because you have not yet installed your data service.

Note – For more information, see the SAP documentation at <http://service.sap.com/ha>.

The procedures in this section verify the installation and configuration of the following SAP Web Application Server components.

- SAP central services, which includes these servers:
 - SAP enqueue server
 - SAP replica server
 - SAP message server
- SAP web application server component
- SAP J2EE engine

▼ How to Verify the Installation and Configuration of the SAP Enqueue Server and the SAP Replica Server

Perform this procedure on each set of two nodes or zones that can master the SAP central services resource group and the SAP replica server resource group.

For a description of the extension properties for the SAP enqueue server resource type, SUNW.sapenq, see [“SUNW.sapenq Extension Properties” on page 77](#). For a description of the extension properties for the SAP replica server resource type, SUNW.saprepl, see [“SUNW.saprepl Extension Properties” on page 80](#).

1 Become the superuser on one node, Node1.

2 Bring the SAP central services resource group online on Node1.

```
# clresourcegroup switch -n node1 central-rg
```

```
-n node1
```

Specifies the name of the node or zone on which the resource group is to be brought online.

```
central-rg
```

Specifies the name of the resource group to be brought online.

3 Become the administration user for the SAP enqueue server on Node1.

The extension property SAP_User for the SUNW.sapenq resource type specifies the name of the administration user.

4 Start the SAP enqueue server manually on Node1.

```
# enq_server_cmd pf=enq_profile
```

```
enq_server_cmd
```

Specifies the full path to the SAP enqueue server executable. The extension property Enqueue_Server for the SUNW.sapenq resource type contains this value. The name of the SAP enqueue server executable file is enservr.

```
pf=enq_profile
```

Specifies the full path to the profile for the SAP enqueue server. The extension property Enqueue_Profile for SUNW.sapenq resource type contains this value.

5 Confirm that the SAP enqueue server is up on Node1.

The name of the SAP enqueue server executable file is enservr.

```
# ps -ef | grep enservr
```

6 As user sapsidadm, verify that the SAP enqueue server has started correctly.

You can verify that the SAP enqueue server has started correctly in two ways.

- Run the SAP utility ensmon.

```
$ ensmon -H localhost -S port 1
```

```
-H localhost
```

Specifies that the name of the host is localhost.

-S port
Specifies the enqueue port.

1
Specifies that the probe should check the SAP enqueue server only.

If this command is run on the command line, a return code is returned on the command line.

- Check the log files that are written to the directory that was current when the SAP enqueue server command was run.

7 On a different node, Node2, log in as superuser.

8 Bring the SAP replica server resource group online on Node2.

```
# clresourcegroup switch -n node2 repl-rg
```

switch
Specifies that a resource group is to be brought online on a different node or zone.

-n node2
Specifies the name of the node or zone on which the resource group is to be brought online.

repl-rg
Specifies the name of the resource group to be brought online.

9 Become the administration user for the SAP replica server on Node2.

The extension property `SAP_User` for `SUNW.saprepl` resource type specifies the name of the administration user.

10 As user *sapsidadm*, start the SAP replica server manually on Node2.

```
$ repl_server_cmd pf=repl_profile
```

repl_server_cmd
Specifies the full path to the SAP replica server executable. The extension property `Replica_Server` for the `SUNW.saprepl` resource type contains this value. The name of the SAP replica server executable file is `enrepsvr`.

pf=repl_profile
Specifies the full path to the profile for the SAP replica server. The extension property `Replica_Profile` for the `SUNW.saprepl` resource type contains this value.

11 Confirm that the SAP replica server is active on Node2.

The name of the SAP replica server executable file is `enrepsvr`.

```
# ps -ef | grep enrepsvr
```

12 As user *sapsidadm*, verify that the SAP replica server has started correctly.

You can verify that the SAP replica server has started correctly in two ways.

- Run the SAP utility `ensmon`.

```
$ ensmon -H localhost -S port 2
```

```
-H localhost
```

Specifies that the name of the host is `localhost`.

```
-S port
```

Specifies the enqueue port.

```
2
```

Specifies that the probe should check both the SAP enqueue server and the SAP replica server.

If this command is run on the command line, a return code is returned on the command line.

- Check the log files that are written to the directory that was current when the SAP replica server command was run.

13 Set up a test profile to be used with the `enqt` utility.

In order to create and check enqueue lock entries in [Step 14](#), you must prepare entries in a test SAP profile, including `SAPSYSTEM`, `SAPSYSTEMNAME`, and `INSTANCE_NAME`.

See the SAP document *The SAP Lock Concept (BC-CST-EQ)* for details about all profile parameters at <http://service.sap.com/ha>.

14 Confirm that enqueue replication is working by performing the following steps.**a. Create some enqueue lock entries.**

```
# /usr/sap/SAPSID/SYS/exe/run/enqt pf=app_server_profile 11
```

```
SAPSID
```

Specifies the SAP system ID.

```
app_server_profile
```

Specifies the full path to the test SAP profile that you set up in [Step 13](#)

b. Stop the SAP enqueue server on Node1.

```
# ps -ef | grep ensrserver
```

```
# kill -9 pid
```

c. Stop the SAP replica server on Node2.

```
# ps -ef | grep enrepserver
```

```
# kill -9 pid
```

- d. Bring the SAP central services resource group online on Node2.

```
# clresourcegroup switch -n node2 central-rg
```

- e. Become the administration user for the SAP enqueue server on Node2.

- f. Start the SAP enqueue server manually on Node2.

```
# enq_server_cmd pf=enq_profile
```

- g. Confirm that no enqueue entries are lost.

```
# /usr/sap/SAPSID/SYS/exe/run/enqt pf=app_server_profile 20
```

SAPSID

Specifies the SAP system ID.

app_server_profile

Specifies the full path to the test SAP profile that you set up in [Step 13](#).

▼ How to Verify That the Configuration for the SAP Message Server Is Correct for the Data Service

Perform this procedure on each node or zone that can master the SAP central services resource group.

For a description of the extension properties for the SAP message server resource type, SUNW.sapscs, see [“SUNW.sapscs Extension Properties” on page 82](#).

- 1 Bring the SAP central services resource group online on a node or zone.

```
# clresourcegroup switch -n node central-rg
```

-n node2

Specifies the name of the node or zone on which the resource group is to be brought online.

central-rg

Specifies the name of the resource group to be brought online.

- 2 Become superuser with superuser environment. Then become the *sapsidadm* user, while retaining the superuser environment.

Note that, in the first `su` command, the “dash” (-) argument causes the environment to be changed to the environment of superuser. The second `su` command, which is used *without* the “dash” argument, causes the environment to be retained.

```
# su - root
```

```
# su sapsidadm
```

- 3 Set the following environment variables:

- Set the LD_LIBRARY_PATH variable to /sapmnt/SAPSID/exe.
 - Set the SAPSYSTEMNAME variable to the appropriate SAP system identification.
 - Add the following paths to the PATH variable: /usr/sbin:/usr/bin:/usr/cluster/bin.
 - Set the SAPSYSTEM variable to the system number configured for the specific instance of SAP which should be handled by the resource.
 - Set the HOME environment variable to the home directory of the SAP administration user.
 - Set the LOGNAME variable to root.
- 4 Run the SAP start script for the SAP message server using the absolute path and the appropriate arguments, as in the following example.**

The following command is an example that runs the SAP start script for the SAP message server. You must run the equivalent command for your installation.

```
# /usr/sap/SC3/SYS/exe/run/startsap_msg_server r3 SCS01
```

- 5 After the SAP system starts successfully, run the fault monitor probe for the SAP message server.**

The full path to the probe is specified by the extension property `Msg_Server_Monitor` for the `SUNW.sapcs` resource type. For example, type the following command or the equivalent command.

```
# /usr/sap/SC3/SYS/exe/run/msprot -mshost host -msport port
```

- 6 Verify that the probe was successful.**

The probe is successful when the return code equals zero.

- 7 Run the SAP stop script for the SAP message server to verify that the SAP message server can be stopped, as in the following example.**

Verify that the SAP message server can be stopped correctly. Run the SAP stop script for the SAP message server with the full path and the appropriate arguments. The following command is an example that runs the SAP stop script. Run the equivalent command for your installation.

```
# /usr/sap/SC3/SYS/exe/run/stopsap_msg_server r3 SCS01
```

▼ How to Verify That the Configuration for the SAP Web Application Server and SAP J2EE Engine Components Is Correct for the Data Service

Perform the following procedure on each node or zone that can master the resource group for the SAP web application server or SAP J2EE Engine component.

If the SAP web application server or SAP J2EE Engine component is configured as a scalable resource, the resource runs on all these nodes or zones simultaneously. Therefore, you must

execute this procedure on all nodes or zones that can simultaneously master the scalable SAP web application server or SAP J2EE Engine component resource.

- 1 If you have configured the resource group for the SAP web application server or SAP J2EE Engine component as a failover resource group, enable the logical hostname resource for the resource group.**

- 2 On the node where the logical hostname resource is enabled, become superuser, then the *sapsidadm* user with superuser environment.**

```
# su - root
# su sapsidadm
```

- 3 Set the following environment variables:**

- Set the LD_LIBRARY_PATH variable to /sapmnt/SAPSID/exe.
- Set the SAPSYSTEMNAME variable to the appropriate SAP system identification.
- Add the following paths to the PATH variable: /usr/sbin:/usr/bin:/usr/cluster/bin.
- Set the SAPSYSTEM variable to the system number configured for the specific instance of SAP which should be handled by the resource.
- Set the HOME environment variable to the home directory of the SAP administration user.
- Set the LOGNAME variable to root.

- 4 Start the database.**

Before running the SAP start script in the next step, you must start the database.

- 5 Run the SAP start script for the SAP web application server or SAP J2EE Engine component using the absolute path and the appropriate arguments.**

The following command is an example that runs the SAP start script for the SAP web application server component. You must run the equivalent command for your installation.

```
# /usr/sap/SC3/SYS/exe/run/startsap_webas_server r3 D01
```

The following command is an example that runs the SAP start script for the SAP J2EE Engine component. You must run the equivalent command for your installation.

```
# /usr/sap/SC3/SYS/exe/run/startsap_webas_server r3 JC01
```

- 6 Change to the home directory of the SAP administration user.**

For SAP web application server component only:

The dpmon utility writes files to the current directory, and this directory must be writable by the SAP administration user. In [Step 3](#) you set the HOME environment variable to the home directory of the SAP administration user.

```
# cd $HOME
```

For SAP J2EE Enginecomponent only:

The probe utility writes files to the current directory, and this directory must be writable by the SAP administration user. In [Step 3](#) you set the HOME environment variable to the home directory of the SAP administration user.

```
# cd $HOME
```

- 7 For SAP web application server component only — after the SAP system starts successfully, run the probe command for the dispatcher of the SAP instance. The following command is an example:**

```
# /usr/sap/SC3/SYS/exe/run/dpmon -info
```

- 8 For SAP J2EE Enginecomponent only — after the SAP J2EE engine starts successfully, verify it by deploying and running some examples. See the SAP Web Application Server Installation Guide for instructions.**

- 9 Verify that the probe was successful.**

The probe is successful when the return code equals zero.

- 10 Run the SAP stop script for the SAP web application server or SAP J2EE engine component to verify that the SAP Web Application Server or SAP J2EE engine can be stopped.**

Verify that the SAP Web Application Server or SAP J2EE engine can be stopped correctly. Run the SAP stop script for the SAP web application server or SAP J2EE engine component with the full path and the appropriate arguments. The following command is an example that runs the SAP stop script. Run the equivalent command for your installation.

For SAP web application server component only:

```
# /usr/sap/SC3/SYS/exe/run/stopsap_webas_server r3 D01
```

For SAP J2EE Enginecomponent only:

```
# /usr/sap/SC3/SYS/exe/run/stopsap_webas_server r3 JC01
```

Installing the Sun Cluster HA for SAP Web Application Server Packages

If you did not install the Sun Cluster HA for SAP Web Application Server packages during your initial Sun Cluster installation, perform this procedure to install the packages. To install the packages, use the Sun Java™ Enterprise System Installation Wizard.

▼ How to Install the Sun Cluster HA for SAP Web Application Server Packages

Perform this procedure on each cluster node where you are installing the Sun Cluster HA for SAP Web Application Server packages.

You can run the Sun Java Enterprise System Installation Wizard with a command-line interface (CLI) or with a graphical user interface (GUI). The content and sequence of instructions in the CLI and the GUI are similar.

Note – Even if you plan to configure this data service to run in non-global zones, install the packages for this data service in the global zone. The packages are propagated to any existing non-global zones and to any non-global zones that are created after you install the packages.

Before You Begin Ensure that you have the Sun Java Availability Suite DVD-ROM.

If you intend to run the Sun Java Enterprise System Installation Wizard with a GUI, ensure that your DISPLAY environment variable is set.

1 On the cluster node where you are installing the data service packages, become superuser.

2 Load the Sun Java Availability Suite DVD-ROM into the DVD-ROM drive.

If the Volume Management daemon `volm(1M)` is running and configured to manage DVD-ROM devices, the daemon automatically mounts the DVD-ROM on the `/cdrom` directory.

3 Change to the Sun Java Enterprise System Installation Wizard directory of the DVD-ROM.

- **If you are installing the data service packages on the SPARC® platform, type the following command:**

```
# cd /cdrom/cdrom0/Solaris_sparc
```

- **If you are installing the data service packages on the x86 platform, type the following command:**

```
# cd /cdrom/cdrom0/Solaris_x86
```

4 Start the Sun Java Enterprise System Installation Wizard.

```
# ./installer
```

5 When you are prompted, accept the license agreement.

If any Sun Java Enterprise System components are installed, you are prompted to select whether to upgrade the components or install new software.

- 6 From the list of Sun Cluster agents in Availability Services, select the data service for SAP Web Application Server.
- 7 If you require support for languages other than English, select the option to install multilingual packages.
English language support is always installed.
- 8 When prompted whether to configure the data service now or later, choose **Configure Later**.
Choose Configure Later to perform the configuration after the installation.
- 9 Follow the instructions on the screen to install the data service packages on the node.
The Sun Java Enterprise System Installation Wizard displays the status of the installation. When the installation is complete, the wizard displays an installation summary and the installation logs.
- 10 (GUI only) If you do not want to register the product and receive product updates, deselect the **Product Registration** option.
The Product Registration option is not available with the CLI. If you are running the Sun Java Enterprise System Installation Wizard with the CLI, omit this step.
- 11 Exit the Sun Java Enterprise System Installation Wizard.
- 12 Unload the Sun Java Availability Suite DVD-ROM from the DVD-ROM drive.
 - a. To ensure that the DVD-ROM is not being used, change to a directory that does *not* reside on the DVD-ROM.
 - b. Eject the DVD-ROM.

```
# eject cdrom
```

Next Steps After You Finish

See “[Registering and Configuring Sun Cluster HA for SAP Web Application Server](#)” on page 45 to register Sun Cluster HA for SAP and to configure the cluster for the data service.

Registering and Configuring Sun Cluster HA for SAP Web Application Server

To enable the Sun Cluster HA for SAP Web Application Server data service to make SAP Web Application Server applications highly available, configure the data service as described in the procedures in this section. These procedures perform the following tasks.

- Register and configure the HASToragePlus resources.
- Register and configure the SAP central services resources. The SAP central services consist of the following components:
 - SAP enqueue server
 - SAP replica server
 - SAP message server
- Register and configure resources for the SAP web application server component.
- Register and configure the SAP J2EE engine.

The resource groups were created in [“How to Enable the SAP Web Application Server to Run in a Cluster”](#) on page 30 and in [“How to Enable the Stand-Alone SAP J2EE Engine to Run in a Cluster”](#) on page 35.

Before You Begin

Before performing these procedures, ensure that the Sun Cluster HA for SAP Web Application Server data service packages are installed.

The procedures in this section assume that the database resources have been previously created and that these resources are online.

- If you are using SAP DB as the database, configure the Sun Cluster HA for MaxDB data service before continuing. See *Sun Cluster Data Service for MaxDB Guide for Solaris OS*.
- If you are using Oracle as the database, configure the Sun Cluster HA for Oracle data service before continuing. See *Sun Cluster Data Service for Oracle Guide for Solaris OS*.

Perform these procedures as superuser on a cluster node.

Setting Sun Cluster HA for SAP Web Application Server Extension Properties

The extension properties for Sun Cluster HA for SAP Web Application Server are described in [Appendix A, “Sun Cluster HA for SAP Web Application Server Extension Properties”](#).

You can update some extension properties dynamically. You can update other properties, however, only when you create or disable a resource. The Tunable entry indicates when you can update a property.

The instructions for registering and configuring resources explain how to set *only* extension properties that Sun Cluster HA for SAP Web Application Server requires you to set.

To set an extension property of a resource, include the following option in the `clresource(1CL)` command that creates or modifies the resource:

-p *property=value*

-p *property*

Identifies the extension property that you are setting.

value

Specifies the value to which you are setting the extension property.

You can also use the procedures in Chapter 2, “Administering Data Service Resources,” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* to configure resources after the resources are created.

Tools for Registering and Configuring Sun Cluster HA for SAP Web Application Server

Sun Cluster provides the following tools for registering and configuring Sun Cluster HA for SAP Web Application Server:

- **The `clsetup(1CL)` utility.** For more information, see “[How to Register and Configure the Sun Cluster HA for SAP Web Application Server by Using `clsetup`](#)” on page 47.
- **Sun Cluster Manager.** For more information, see the Sun Cluster Manager online help.
- **Sun Cluster maintenance commands.** For more information, see “[Registering and Configuring the Sun Cluster HA for SAP Web Application Server by using Sun Cluster Command Line Interface \(CLI\)](#)” on page 53.

The `clsetup` utility and Sun Cluster Manager each provide a wizard for configuring Sun Cluster HA for SAP Web Application Server. The wizards reduce the possibility for configuration errors that might result from command syntax errors or omissions. These wizards also ensure that all required resources are created and that all required dependencies between resources are set.

▼ How to Register and Configure the Sun Cluster HA for SAP Web Application Server by Using `clsetup`

The procedures in this section describe the registration and configuration of the following components of the SAP Web Application Server by using `clsetup` utility.

- SAP central services, which include these services:
 - SAP enqueue server
 - SAP replica server
 - SAP message server

Note – If you have already created the logical hosts for the SAP central services and SAP replica server resource groups, select those logical hosts when you run `clsetup`. The `clsetup` utility will then add SAP central services and SAP replica server resources to the existing resource groups containing these logical hosts.

Perform this procedure during your initial set up of Sun Cluster HA for SAP Web Application Server. Perform this procedure from one node only.

Note – The following instructions explain how to perform this operation by using the `clsetup` utility.

Before You Begin Before you start the Sun Cluster HA for SAP Web Application Server wizard, ensure that the following prerequisites are met:

- The prerequisites for configuring a logical hostname resource are met.
- The prerequisites for configuring a highly available storage resource are met.
- All the required SAP components are installed, configured, and able to run under the control of Sun Cluster.
- A highly available database for SAP is configured.
- The Sun Cluster HA for SAP Web Application Server packages are installed.

1 Become superuser on any cluster node.

2 Start the `clsetup` utility.

```
# clsetup
```

The `clsetup` main menu is displayed.

3 Type the number that corresponds to the option for data services and press Return.

The Data Services menu is displayed.

4 Type the number that corresponds to the option for configuring Sun Cluster HA for SAP Web Application Server and press Return.

The `clsetup` utility displays the list of prerequisites for Sun Cluster HA for SAP Web Application Server.

5 Press Return to continue.

The `clsetup` utility displays a list of available nodes.

6 Select the nodes where you require SAP Web Application Server to run.

- **To accept the default selection of all listed nodes in an arbitrary order, type a and press Return.**
- **To select a subset of the listed nodes, type a comma-separated or space-separated list of the numbers that correspond to the nodes and press Return.**

Ensure that the nodes are listed in the order in which the nodes are to appear in the resource group's node list. The first node in the list is the primary node of this resource group.
- **To select all nodes in a particular order, type a comma-separated or space-separated ordered list of the numbers that correspond to the nodes and press Return.**

Ensure that the nodes are listed in the order in which the nodes are to appear in the resource group's node list. The first node in the list is the primary node of this resource group.

7 To confirm your selection of nodes, type d and press Return.

The `clsetup` utility displays a screen where you can specify the SAP system identifier.

8 Type the numbers that correspond to required identifier and press Return.

The `clsetup` utility displays a screen where you can configure additional SAP components.

9 Select the required option.

- **To configure SAP replica server component with the help of the wizard, type yes and press Return.**
- **To configure SAP replica server component manually, type no and press Return.**

The `clsetup` utility displays a screen where you can configure the SAP enqueue server and prompts you for the SAP user name.

10 Type the SAP user name and press Return.

The `clsetup` utility prompts you for the SAP enqueue server executable filename.

11 Type the SAP enqueue server executable filename and press Return.

The `clsetup` utility prompts you for the instance number of the SAP enqueue server.

12 Type the instance number of the SAP enqueue server and press Return.

The `clsetup` utility prompts you for the SAP enqueue server profile information.

13 Type the SAP enqueue server profile information and press Return.

The `clsetup` utility displays a screen where you can configure the SAP message server and prompts you for the instance number of the SAP message server.

14 Type the instance number of the SAP message server and press Return.

The `clsetup` utility prompts you for the instance name of the SAP message server.

15 Type the instance name of the SAP message server and press Return.

The `clsetup` utility displays a screen where you can configure the `HAStorage` resources.

16 To confirm your selection of the existing `HAStorage` resource, type `d` and press Return.

Note – You can also create the required `HAStorage` resource on your own.

The `clsetup` utility displays a screen where you can configure the logical hostname resource.

17 To confirm your selection of the logical hostname resource, type `d` and press Return.

Note – You can also create the required logical hostname resource on your own.

18 If you want to configure the SAP replica server component go to the next step else go to [Step 22](#).

19 Type the SAP replica server executable filename and press Return.

The `clsetup` utility prompts you for the SAP replica server profile information.

20 Type the SAP replica server profile information and press Return.

The `clsetup` utility displays a screen where you can configure the `HAStorage` resources.

21 To confirm your selection of the configuration, type `d` and press Return.

The `clsetup` utility displays a screen where you can configure the logical hostname resource.

22 To confirm your selection of the configuration, type `d` and press Return.

The `clsetup` utility displays a list of database resources.

23 Select the required database resource and press Return.

The `clsetup` utility displays information about the Sun Cluster objects that the utility will create.

24 To confirm your selection of the configuration, type `c` and press Return.

25 To create the configuration, press Return.

The `clsetup` utility displays a progress message to indicate that the utility is running commands to create the configuration. When configuration is complete, the `clsetup` utility displays the commands that the utility ran to create the configuration.

Note – The `clsetup` utility will rollback the changes if it fails to complete the SAP web application server configuration process.

26 Press Return to continue.

The `clsetup` utility returns you to the main menu.

27 (Optional) Type `q` and press Return repeatedly until you quit the `clsetup` utility.

Setting Up the SAP Web Application Server on Non-Global Zones for HASStoragePlus Configuration

Use the following procedure to configure a HASStoragePlus resource for non-global zones.

Note –

- The entries in the `/etc/vfstab` file for cluster file systems should contain the global keyword in the mount options.
 - The SAP binaries that will be made highly available using the HASStoragePlus resource should be accessible from the non-global zones.
 - In non-global zones, file systems that are used by different resources in different resource groups must reside in a single HASStoragePlus resource that resides in a scalable resource group. The `nodelist` of the scalable HASStoragePlus resource group must be a superset of the `nodelists` of the application resource groups that have resources which depend on the file systems. These application resources that depend on the file systems must have a strong resource dependency set to the HASStoragePlus resource. In addition, the dependent application resource group must have a strong positive resource group affinity set to the scalable HASStoragePlus resource group.
-

▼ How to Set Up the SAP Web Application Server on Non-Global Zones for HASStoragePlus Configuration

- 1 On any node in the cluster, become superuser or assume a role that provides `solaris.cluster.modify` RBAC authorization.**
- 2 Create the scalable resource group with non-global zones that contain the HASStoragePlus resource.**

```
# clresourcegroup create \  
-p Maximum primaries=m \  
-p Desired primaries=n \  
[-n node-zone-list] hasp-resource-group
```

<code>-p Maximum primaries=<i>m</i></code>	Specifies the maximum number of active primaries for the resource group.
<code>-p Desired primaries=<i>n</i></code>	Specifies the number of active primaries on which the resource group should attempt to start.
<code>-n node-zone-list</code>	In the node list of a HAStoragePlus resource group, specifies the list of <code>nodename : zonename</code> pairs as the node list of the HAStoragePlus resource group, where the SAP instances can come online.
<code>hasp-resource-group</code>	Specifies the name of the scalable resource group to be added. This name must begin with an ASCII character.

3 Register the resource type for the HAStoragePlus resource.

```
# clresourcetype register HAStoragePlus
```

4 Create the HAStoragePlus resource `hasp-resource` and define the SAP filesystem mount points and global device paths.

```
# clresource create -g hasp-resource-group -t SUNW.HAStoragePlus \
-p GlobalDevicePaths=/dev/global/dsk/d5s2,dsk/d6 -p affinityon=false \
-p FilesystemMountPoints=/sapmnt/JSC,/usr/sap/trans,/usr/sap/JSC hasp-resource
```

`-g hasp-resource-group` Specifies the resource group name.

`GlobalDevicePaths` Contains the following values:

- Global device group names, such as `sap-dg`, `dsk/d5`
- Paths to global devices, such as `/dev/global/dsk/d5s2`, `/dev/md/sap-dg/dsk/d6`

`FilesystemMountPoints` Contains the following values:

- Mount points of local or cluster file systems, such as `/local/mirrlogA`, `/local/mirrlogB`, `/sapmnt/JSC`, `/usr/sap/JSC`

The HAStoragePlus resource is created in the enabled state.

5 Register the resource type for the SAP application.

```
# clresourcetype register resource-type
```

`resource-type` Specifies the name of the resource type to be added. For more information, see the release notes for your release of Sun Cluster.

6 Create a SAP resource group.

```
# clresourcegroup create [-n node-zone-list] -p
RG_affinities=++hastorageplus-rg resource-group-1
```

`resource-group-1` Specifies the SAP services resource group.

- 7 **Add the SAP application resource to *resource-group-1* and set the dependency to *hastorageplus-1*.**

```
# clresource create -g resource-group-1 -t SUNW.application \
[-p "extension-property[{node-specifier}]"=value, ?] \
-p Resource_dependencies=hastorageplus-1 resource
```

- 8 **Bring the failover resource group online.**

```
# clresourcegroup online resource-group-1
```

Registering and Configuring the Sun Cluster HA for SAP Web Application Server by using Sun Cluster Command Line Interface (CLI)

The procedures in this section describe the registration and configuration of the following components of the SAP Web Application Server by using Sun Cluster CLI.

- SAP central services, which include these services:
 - SAP enqueue server
 - SAP replica server
 - SAP message server
- SAP web application server component
- SAP J2EE engine

▼ How to Register and Configure HASStoragePlus Resources for the SAP Central Services Components

An HASStoragePlus resource is created to ensure the high availability of the global device groups where the components are installed.

- 1 **Register the SUNW.HASStoragePlus resource type.**

```
# clresourcetype register SUNW.HASStoragePlus
```

- 2 **Create an HASStoragePlus resource for the global device group on which the SAP enqueue server and the SAP message server are installed.**

Create this resource in the SAP central services resource group, which is the resource group to which the SAP enqueue server and the SAP message server resources belong.

```
# clresource create -g central-rg -t SUNW.HASStoragePlus \
-p filesystemmountpoints="mountpoint-list" \
-p affinityon=false hsp-central-rs
```

- g *central-rg*
Specifies that the resource is to be added to the SAP central services resource group.
- t SUNW.HASStoragePlus
Specifies that the resource is an instance of the SUNW.HASStoragePlus resource type.
- p filesystemmountpoints="*mountpoint-list*"
Specifies a list of valid mount points for the file system. For more information, see the SUNW.HASStoragePlus(5) man page.

hsp-central-rs

Specifies the name of the resource that you are creating.

The resource is created in the enabled state.

3 Create an HASStoragePlus resource for the global device group on which SAP replica server is installed.

Create this resource in the SAP replica server resource group.

```
# clresource create -g repl-rg -t SUNW.HASStoragePlus \  
-p filesystemmountpoints="mountpoint-list" \  
-p affinityon=false hsp-repl-rs
```

- g *repl-rg*
Specifies that the resource is to be added to the SAP replica server resource group.
- t SUNW.HASStoragePlus
Specifies that the resource is an instance of the SUNW.HASStoragePlus resource type.
- p filesystemmountpoints="*mountpoint-list*"
Specifies a list of valid mount points for the file system. For more information, see the SUNW.HASStoragePlus(5) man page.

hsp-repl-rs

Specifies the name of the resource that you are creating.

The resource is created in the enabled state.

▼ How to Register and Configure an SAP Enqueue Server Resource

The SAP enqueue server resource and the SAP message server resource must be in the same failover resource group because they fail over together.

The SAP enqueue server resource is configured to depend on its associated HASStoragePlus resource. This dependency ensures that the SAP enqueue server does not attempt to start until its associated HASStoragePlus resource is online.

1 Register SUNW.sapenq, the resource type for the SAP enqueue server.

```
# clresourcetype register SUNW.sapenq
```

`register`

Specifies that a new resource type is to be added.

`SUNW.sapenq`

Specifies the name of the resource type to be added. This name is predefined for the SAP enqueue server.

2 Create an SAP enqueue server resource in the SAP central services resource group.

```
# clresource create -d -g central-rg -t SUNW.sapenq \
-p enqueue_profile=path-to-enq-profile \
-p enqueue_server=path-to-enq-server-binary \
-p sap_user=enq-user \
-p enqueue_instance_number=enq-instance \
-p resource_dependencies=hsp-central-rs,db-resource enq-rs
```

`-g central-rg`

Specifies the resource group to which the resource is to be added. The SAP central services resource group is configured as a failover resource group.

`-t SUNW.sapenq`

Specifies that the resource is an instance of the `SUNW.sapenq` resource type.

`-p enqueue_profile=path-to-enq-profile`

Specifies the full path to the SAP enqueue server profile.

`-p enqueue_server=path-to-enq-server-binary`

Specifies the full path to the SAP enqueue server executable.

`-p sap_user=enq-user`

Specifies the administration user for the SAP enqueue server.

`-p enqueue_instance_number=enq-instance`

Specifies the two-digit instance number for the SAP enqueue server. This number is the value of `SAPSYSTEM` in the SAP profile for SAP enqueue server.

`-p resource_dependencies=hsp-central-rs,db-resource`

Specifies that the `HASStoragePlus` resource for the global device group on which the SAP enqueue server is installed and the database resource must be online in order for the SAP enqueue server to be online.

`enq-rs`

Specifies the name of the resource to be added.

The resource is created in the enabled state.

3 Verify that the default values for the SAP enqueue server extension properties are acceptable.

Refer to “`SUNW.sapenq` Extension Properties” on page 77.

4 Ensure that SAP enqueue server is *not* already running on the cluster.

If SAP enqueue server is already running on any node of the cluster, you risk the simultaneous running of multiple SAP enqueue server processes.

5 Enable the SAP enqueue server resource.

```
# clresource enable enq-rs
```

enable

Specifies that the specified resource is to be enabled.

enq-rs

Specifies the name of the resource to be enabled.

▼ How to Register and Configure an SAP Replica Server Resource

The SAP replica server resource must be in a *different* failover resource group from the SAP enqueue server resource, because the SAP replica server resource must *not* fail over with the SAP enqueue server resource.

The SAP replica server resource is configured to depend on its associated HAStoragePlus resource being online. The SAP replica server resource also depends on the SAP enqueue server resource. These dependencies ensure that the SAP replica server does not attempt to start until both its associated HAStoragePlus resource and the SAP enqueue server are online.

1 Register SUNW.saprepl, the resource type for the SAP replica server.

```
# clresourcetype register SUNW.saprepl
```

register

Specifies that a new resource type is to be registered.

SUNW.saprepl

Specifies the name of the resource type to be added. This name is predefined for the SAP replica server.

2 Create an SAP replica server resource in the SAP replica server resource group.

```
# clresource create -d -g repl-rg -t SUNW.saprepl \
```

```
-p replica_profile=path-to-repl-profile \
```

```
-p replica_server=path-to-repl-server-binary \
```

```
-p sap_user=repl-user \
```

```
-p resource_dependencies=enq-rs,hsp-repl-rs repl-rs
```

```
-g repl-rg
```

Specifies the resource group to which the resource is to be added. The SAP replica server resource group is configured as a failover resource group.

```
-t SUNW.saprepl
```

Specifies that the resource is an instance of the SUNW.saprepl resource type.

- p `replica_profile=`*path-to-repl-profile*
Specifies the full path to the SAP replica server profile.
- p `replica_server=`*path-to-repl-server-binary*
Specifies the full path to the SAP replica server executable.
- p `sap_user=`*repl-user*
Specifies the administration user for the SAP replica server.
- p `resource_dependencies=`*enq-rs, hsp-repl-rs*
Specifies that the following resources must be online before the SAP replica server resource can be online:
 - SAP enqueue server resource
 - HAStoragePlus resource for the global device group on which the SAP replica server is installed

repl-rs

Specifies the name of the resource to be added.

The resource is created in the enabled state.

3 Verify that the default values for the SAP replica server extension properties are acceptable.

Refer to “[SUNW.saprepl Extension Properties](#)” on page 80.

4 Enable the SAP replica server resource.

```
# clresource enable repl-rs
```

enable

Specifies that the specified resource is to be enabled.

repl-rs

Specifies the name of the resource to be enabled.

▼ How to Register and Configure an SAP Message Server Resource

The SAP enqueue server resource and the SAP message server resource must be in the same failover resource group because they fail over together.

The SAP message server resource is configured to depend on its associated HAStoragePlus resource. This dependency ensures that the SAP message server does not attempt to start until its associated HAStoragePlus resource is online.

1 Register SUNW.sapscs, the resource type for the SAP message server.

```
# clresourcetype register SUNW.sapscs
```

register

Specifies that a new resource type is to be added.

`SUNW.sapscs`

Specifies the name of the resource type to be added. This name is predefined for the SAP message server.

2 Create an SAP message server resource in the SAP central services resource group.

```
# clresource create -d -g central-rg -t SUNW.sapscs \
-p sap_sid=scs-system-ID \
-p sap_instance_number=scs-instance-number \
-p sap_instance_name=scs-instance-name \
-p msg_server_port=msg-server-port \
-p scs_startup_script=scs-server-startup-script \
-p scs_shutdown_script=scs-server-shutdown-script \
-p resource_dependencies=hsp-central-rs,db-resource msg-rs
```

`-g central-rg`

Specifies the resource group to which the resource is to be added. The SAP central services resource group is configured as a failover resource group.

`-t SUNW.sapscs`

Specifies that the SAP message server resource is an instance of the resource type that is named `SUNW.sapscs`.

`-p sap_sid=scs-system-ID`

Specifies the SAP system ID for the SAP message server. This ID is `SAPSYSTEMNAME` in the SAP profile.

`-p sap_instance_number=scs-instance-number`

Specifies the instance number for the SAP message server. This number is `SAPSYSTEM` in the SAP profile.

`-p sap_instance_name=scs-instance-name`

Specifies the instance name for the SAP message server. This name is `INSTANCE_NAME` in the SAP profile.

`-p msg_server_port=msg-server-port`

Specifies the listen port for the SAP message server.

`-p scs_startup_script=scs-server-startup-script`

Specifies the full path to the startup script for the SAP message server instance.

`-p scs_shutdown_script=scs-server-shutdown-script`

Specifies the full path to the shutdown script for the SAP message server instance.

`-p resource_dependencies=hsp-central-rs,db-resource`

Specifies that the `HAStoragePlus` resource for the global device group on which the SAP message server is installed and the database resource must be online in order for the SAP message server to be online.

`msg-rs`

Specifies the name of the resource to be added.

The resource is created in the enabled state.

3 Verify that the default values for the SAP message server extension properties are acceptable.

Refer to “[SUNW.sapscs Extension Properties](#)” on page 82.

4 Enable the SAP message server resource.

```
# clresource enable msg-rs
```

enable

Specifies that the specified resource is to be enabled.

msg-rs

Specifies the name of the resource to be enabled.

▼ How to Register and Configure an SAP Web Application Server Component

An `HASStoragePlus` resource is created to ensure the high availability of the global device groups where the components are installed.

The resource for the SAP web application server component is configured to depend on its associated `HASStoragePlus` resource. The resource for the SAP web application server component also depends on the database resource, as well as the SAP message server resource. These dependencies ensure that the resource for the SAP web application server component does not attempt to start until its associated `HASStoragePlus` resource, the database, and the SAP message server resource are all online.

Note – The SAP web application server component can be configured to run under PMF or not to run under PMF. See the extension property `Webas_Use_Pmf` in “[SUNW.sapwebas Extension Properties](#)” on page 85. If the component is configured to run under PMF control, and if the network is not available, PMF stops the resource in such a way that no data is lost. However, if the component is configured *not* to run under PMF, and if the network is not available, the resource and the resource group for the SAP web application server component are in the `stop_failed` state and user intervention is required. Because no SAP utility is available to stop all SAP processes, in order to prevent possible data corruption, the data service does not automatically restart the processes.

The following procedure applies to both failover and scalable configurations of SAP web application server component.

1 Create an HAStoragePlus resource for the global device group on which SAP web application server component is installed.

Create this resource in the SAP web application server resource group.

```
# clresource create -g webas-rg -t SUNW.HAStoragePlus \  
-p filesystemmountpoints="mountpoint-list" \  
-p affinityon=false hsp-webas-rs
```

-g webas-rg

Specifies that the resource is to be added to the SAP web application server resource group. This resource group can be failover or scalable.

-t SUNW.HAStoragePlus

Specifies that the resource is an instance of the SUNW.HAStoragePlus resource type.

-p filesystemmountpoints="mountpoint-list"

Specifies a list of valid mount points for the file system. For more information, see the SUNW.HAStoragePlus(5) man page.

hsp-webas-rs

Specifies the name of the resource that you are creating.

The resource is created in the enabled state.

2 Register SUNW.sapwebas, the resource type for the SAP web application server component.

```
# clresourcetype register SUNW.sapwebas
```

register

Specifies that a new resource type is to be added.

SUNW.sapwebas

Specifies the name of the resource type to be added. This name is predefined for the SAP web application server component.

3 Create a resource for the SAP web application server component.

The SAP web application server component can be configured either as a failover resource or as a scalable resource by adding the resource to a resource group that was created as a failover or a scalable resource group.

```
# clresource create -d -g webas-rg -t SUNW.sapwebas \  
-p sap_sid=webas-system-ID \  
-p sap_instance_number=webas-instance-number \  
-p sap_instance_name=webas-instance-name \  
-p sap_instance_type=ABAP_J2EE \  
-p webas_startup_script=sap_startup_script \  
-p webas_shutdown_script=sap_shutdown_script \  
-p resource_dependencies=hsp-webas-rs,db-webas-rs,msg-rs webas-rs
```

- g *webas-rg*
Specifies the resource group to which the resource is to be added. The SAP web application server resource group can be configured as a failover or a scalable resource group.
- t *SUNW.sapwebas*
Specifies that the resource is an instance of the *SUNW.sapwebas* resource type.
- p *sap_sid=webas-system-ID*
Specifies the SAP system ID for the SAP web application server component. This ID is *SAPSYSTEMNAME* in the SAP profile.
- p *sap_instance_number=webas-instance-number*
Specifies the two-digit SAP system number for the SAP web application server component instance. This number is *SAPSYSTEM* in the SAP profile.
- p *sap_instance_name=webas-instance-name*
Specifies the instance name for the SAP web application server component. This name is *INSTANCE_NAME* in the SAP profile.
- p *sap_instance_type=ABAP_J2EE*
Specifies that both the ABAP and J2EE components are included. This property must be set to *ABAP_J2EE* when both the ABAP central instance and SAP J2EE engine are present. The default value is *ABAP*. It takes the value *J2EE* when only a standalone SAP J2EE engine is configured.
- p *webas_startup_script=sap_startup_script*
Specifies the startup script for the SAP web application server instance.
- p *webas_shutdown_script=sap_shutdown_script*
Specifies the shutdown script for the SAP web application server instance.
- p *resource_dependencies=hsp-webas-rs,db-webas-rs,msg-rs*
Specifies that the following resources must be online before the resource for the SAP web application server component can be online:
 - *HASStoragePlus* resource for the global device group on which the SAP web application server component is installed.
 - Database resource. The database resource is created by the relevant data service.
 - SAP message server resource.

webas-rs

Specifies the name of the resource to be added.

The resource is created in the enabled state.

4 Verify that the default values for the SAP web application server component extension properties are acceptable.

Refer to “[SUNW.sapwebas Extension Properties](#)” on page 85.

5 Enable the SAP web application server component resource.

```
# clresource enable webas-rs
```

enable

Specifies that the specified resource is to be enabled.

webas-rs

Specifies the name of the resource to be enabled.

Examples of Configuring the SAP Web Application Server

The following examples show how the SAP Web Application Server can be configured to be highly available in Sun Cluster. The examples assume that the resource groups have been created, the resource groups are online, and the resource types have been registered.

- Configuring the SAP central services, which consist of the following components:
 - SAP enqueue server
 - SAP replica server
 - SAP message server
- Configuring the SAP web application server component

EXAMPLE 3 Configuring the SAP Central Services Components

In this example the SAP central services resource group is called `centralrg`, and the SAP replica server resource group is called `replrg`.

1. To create an `HASStoragePlus` resource called `hspcentralrs` for the global device group `enqdg` in the resource group `centralrg`, the following command is run. The group `centraldg` is the global device group on which the SAP enqueue server is installed, and `centralrg` is the resource group to which the SAP enqueue server resource and the SAP message server resource belong.

```
# clresource create -g centralrg -t SUNW.HASStoragePlus \
-p filesystemmountpoints="/global/sapdata" \
-p affinityon=false hspcentralrs
```

2. To create an `HASStoragePlus` resource called `hspreplrs` for the global device group `repldg` in the resource group `replrg`, the following command is run. The group `repldg` is the global device group on which SAP replica server is installed, and `replrg` is the resource group to which the SAP replica server resource belongs.

```
# clresource create -g replrg -t SUNW.HASStoragePlus \
-p filesystemmountpoints="/global/sapdata" \
-p affinityon=false hspreplrs
```

EXAMPLE 3 Configuring the SAP Central Services Components *(Continued)*

The resource is created in the enabled state.

3. To create an SAP enqueue server resource called `enqrs` in the resource group `centralrg`, the following command is run. This resource is dependent on the `hspcentralrs` and `dbwebasrs` resource.

```
# clresource create -g centralrg -t SUNW.sapenq \
-p enqueue_profile=/usr/sap/SC3/SYS/profile/SC3_ASCS07_central-lh \
-p enqueue_server=/sapmnt/SC3/exe/enserver \
-p sap_user=sc3adm \
-p enqueue_instance_number=07 \
-p resource_dependencies=hspcentralrs,db-resource enqrs
```

The resource is created in the enabled state.

4. To create an SAP replica server resource called `replrs` in the resource group `replrg`, the following command is run. This resource is dependent on the `hspreplrs` resource and the `enqrs` resource.

```
# clresource create -g replrg -t SUNW.saprepl \
-p replica_profile=/usr/sap/SC3/SYS/profile/SC3_REP07 \
-p replica_server=/sapmnt/SC3/exe/enrepserver \
-p sap_user=sc3adm \
-p resource_dependencies=hspreplrs,enqrs replrs
```

The resource is created in the enabled state.

5. To create an SAP message server resource called `msgrs` in the resource group `centralrg`, the following command is run. This resource is dependent on the `hspcentralrs` resource. The SAP message server resource is an instance of the resource type that is named `SUNW.sapscs`.

```
# clresource create -g centralrg -t SUNW.sapscs \
-p sap_sid=SC3 \
-p sap_instance_number=07 \
-p sap_instance_name=ASCS07 \
-p msg_server_port=3607 \
-p scs_startup_script=/usr/sap/SC3/SYS/exe/run/my_startsap \
-p scs_shutdown_script=/usr/sap/SC3/SYS/exe/run/my_stopsap \
-p resource_dependencies=hspcentralrs,db-resource msgrs
```

The resource is created in the enabled state.

EXAMPLE 4 Configuring the SAP Web Application Server Component

In this example the resource group for the SAP web application server component is called `webasrg`.

EXAMPLE 4 Configuring the SAP Web Application Server Component (Continued)

1. To create an HASStoragePlus resource called hspwebasrs for the global device group webasdg in the resource group webasrg, the following command is run. The group webasdg is the device group on which the SAP web application server component is installed, and webasrg is the resource group to which the SAP web application server resource belongs.

```
# clresource create -g webasrg -t SUNW.HASStoragePlus \  
-p filesystemmountpoints="/global/sapdata" \  
-p affinityon=false hspwebasrs
```

The resource is created in the enabled state.

2. To create a resource called webasrs for the SAP web application server component, the following command is run. This resource is created in the failover resource group webasrg. This resource is dependent on the hspwebasrs resource. The webasrs resource is also dependent on the database resource dbwebasrs, which has already been created by the relevant data service. In addition, this resource is dependent on the SAP message server resource, which is called msgrs in the previous example.

```
# clresource create -g webasrg -t SUNW.sapwebas \  
-p sap_sid=SC3 \  
-p sap_instance_number=08 \  
-p sap_instance_name=D08 \  
-p sap_instance_type=ABAP \  
-p resource_dependencies=hspwebasrs,dbwebasrs,msgrs webasrs
```

The resource is created in the enabled state.

Using Alternate Project Identification

You can create a specific project, that is, an alternate project identification (ID), for the application. Set either `RG_project_name` or `Resource_project_name` or both, for the resource group and/or the resource, so that the application is started up under the specified project. Refer to the RGM doc for how to set these system properties.

See Cluster Administration and Application Development in *Sun Cluster Concepts Guide for Solaris OS*.

Tuning the Sun Cluster HA for SAP Web Application Server Fault Monitors

Fault monitoring for the Sun Cluster HA for SAP Web Application Server data service is provided by the following fault monitors:

- The fault monitor for the SAP enqueue server
- The fault monitor for the SAP replica server
- The fault monitor for the SAP message server
- The fault monitor for the SAP web application server component
- The fault monitor for the SAP J2EE engine

Each fault monitor is contained in a resource whose resource type is shown in the following table.

TABLE 3 Resource Types for the Fault Monitors of Sun Cluster HA for SAP Web Application Server

Component	Resource Type
SAP enqueue server	SUNW.sapenq
SAP replica server	SUNW.saprep1
SAP message server	SUNW.sapses
SAP web application server component	SUNW.sapwebas
SAP J2EE engine	SUNW.sapwebas

System properties and extension properties of the resource types control the behavior of the fault monitors. The default values of these properties determine the preset behavior of the fault monitors. The preset behavior should be suitable for most Sun Cluster installations. Therefore, you should tune the fault monitors *only* if you need to modify this preset behavior.

Tuning these fault monitors involves the following tasks:

- Setting the interval between fault monitor probes
- Setting the timeout for fault monitor probes
- Defining the criteria for persistent faults
- Specifying the failover behavior of a resource

Perform these tasks when you register and configure Sun Cluster HA for SAP Web Application Server, as described in [“Registering and Configuring Sun Cluster HA for SAP Web Application Server”](#) on page 45.

For detailed information about these tasks, see “Tuning Fault Monitors for Sun Cluster Data Services” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

Operation of the Fault Monitor for the SAP Enqueue Server Resource Type

To determine whether the SAP enqueue server and the SAP replica server are operating correctly, the fault monitor for the SAP enqueue server resource type probes these resources periodically.

The probe uses the SAP utility `ensmon` to check the health of the SAP enqueue server and the SAP replica server.

```
# ensmon -H localhost -S port option
```

`-H localhost`

Specifies that the name of the host is `localhost`.

`-S port`

Specifies the enqueue port.

option

Specifies the resources that the probe should check. The possible values of this option are as follows:

- 1 – Check the SAP enqueue server only.
- 2 – Check both the SAP enqueue server and the SAP replica server.

If this command is run on the command line, a return code is returned on the command line.

During a probe, the fault monitor first determines whether both the SAP enqueue server and the SAP replica server are online by running the `ensmon` command with the `option` argument set to 2.

```
# ensmon -H localhost -S port 2
```

The result of this command determines the action of the probe, as follows:

1. If the command times out, the SAP enqueue server fault monitor checks whether only the SAP enqueue server is online by running the `ensmon` command with the `option` set to 1.

```
# ensmon -H localhost -S port 1
```

- If this command times out, the SAP enqueue server issues a partial failure. If this timeout occurs one more time within the probe interval period, a failover occurs.
- If this command succeeds, the SAP enqueue server fault monitor logs a warning message to explain that the SAP enqueue server is online but the status of the SAP replica server is unknown.
- If this command causes a system error, the SAP enqueue server issues a less serious partial failure. If a system error occurs three more times within the probe interval period, a failover occurs.

- For all other unsuccessful conditions, the SAP enqueue server triggers a failover.
2. If the command does not time out, the probe checks the value of the return code from the `ensmon` command, as follows:
 - A return code value of 0 indicates that the command is successful, and no further action is taken until the next probe.
 - A return code value of 4 indicates that the enqueue is running, and the replica is configured, but the replica is not running. The probe logs a warning message to indicate that the replica is not running.
 - A return code value of 8 indicates that the enqueue server is not running, and the probe triggers a failover.
 - A return code of 12 indicates an invalid parameter for the command, and the probe triggers a failover.
 - All other return codes are treated as a partial failure. If such a failure occurs three more times within the probe interval period, a failover occurs.

Note that the values for the number of timeouts and the probe interval period are assigned by the SAP enqueue server fault monitor. You cannot change these values.

Operation of the Fault Monitor for the SAP Replica Server Resource Type

Fault monitor responsibility for the SAP replica server resource type is currently handled by the Process Monitor Facility (PMF) in Sun Cluster.

Operation of the Fault Monitor for the SAP Message Server Resource Type

To determine whether the SAP Message Server is operating correctly, the fault monitor for the SAP Message Server resource type probes these resources periodically.

The probe uses the SAP utility `msprot` to check the health of the SAP Message Server.

```
# msprot -mshost localhost -msserv port -r probe_timeout/2
```

```
-mshost localhost
```

Specifies that the name of the host is `localhost`.

```
-msserv port
```

Specifies the message server port.

`-r probe_timeout/2`

Specifies the time within which the `msprot` command should be executed. This value should be set to the `probe_timeout` value of the resource.

If this command is run on the command line, a return code is returned on the command line.

During a probe, the fault monitor determines whether the SAP Message Server is online by running the `msprot` command.

```
# msprot -mshost localhost -msserv port -r probe_timeout/2
```

The result of this command determines the action of the probe, as follows:

1. If the command times out, the SAP Message Server issues a partial failure. If this time-out occurs one more time within the probe interval period, a failover occurs.
2. If the command does not time out, the probe checks the value of the return code from the `msprot` command, as follows:
 - A return code value of 0 indicates that the command is successful, and no further action is taken until the next probe.
 - A return code value of 7 indicates that the message server is not responding, and the probe triggers a failover.
 - All other return codes are treated as a partial failure. If such a failure occurs three more times within the probe interval period, a failover occurs.

Note that the values for the number of timeouts and the probe interval period are assigned by the SAP Message Server fault monitor. You cannot change these values.

Operation of the Fault Monitor for the SAP Web Application Server and SAP J2EE Engine Component Resource Type

To determine whether the SAP Web Application Server and the SAP J2EE Engine are operating correctly, the fault monitor for the SAP Web Application Server resource type probes these resources periodically.

The probe uses the SAP utility `dpmon` to check the health of the SAP Web Application Server and sends an XML/HTTP request to the SAP J2EE Engine.

```
# dpmon -info
```

`-info`

Specifies the dispatcher info that needs to be retrieved.

If this command is run on the command line, a return code is returned on the command line.

During a probe, the fault monitor determines whether both the SAP Web Application Server is online by running the `dpmon` command with the `-info` option.

```
# dpmon -info
```

The result of this command determines the action of the probe, as follows:

1. If the command times out, the SAP Web Application Server issues a partial failure. If this time-out occurs one more time within the probe interval period, a failover occurs.
2. If the command does not time out, the probe checks the value of the return code from the `dpmon` command, as follows:
 - A return code value of 0 indicates that the command is successful, and no further action is taken until the next probe.
 - All other return codes are treated as a partial failure. If such a failure occurs three more times within the probe interval period, a failover occurs.

The fault monitor probe for the SAP J2EE Engine instance is not configurable.

Note that the values for the number of timeouts and the probe interval period are assigned by the SAP Web Application Server fault monitor. You cannot change these values.

Verifying the Sun Cluster HA for SAP Web Application Server Installation and Configuration

You have installed, registered, and configured the data service for SAP Web Application Server. Now verify that the data service makes the SAP Web Application Server highly available by performing the following tasks.

- Verify the operation of the fault monitor for the SAP enqueue server
- Verify the operation of the fault monitor for the SAP replica server
- Verify the operation of the fault monitor for the SAP message server
- Verify the operation of the fault monitor for the SAP web application server component
- Verify the installation and configuration of the SAP J2EE engine

See [“Tuning the Sun Cluster HA for SAP Web Application Server Fault Monitors”](#) on page 65 for a description of the fault monitors.

▼ How to Verify the Operation of the Fault Monitor for the SAP Enqueue Server

Perform this procedure on each set of two nodes where the SAP enqueue server and the SAP replica server can run.

1 Log in to a node as superuser.

2 Ensure that the SAP replica server resource group is offline on all nodes.

At this point in this procedure you are testing the behavior of the SAP enqueue server resource group *without* the SAP replica server resource group. Therefore, the SAP replica server resource group must be offline on all nodes. Further in this procedure you will test the behavior of the SAP enqueue server *with* the SAP replica server resource group.

3 Bring online the resource group to which the SAP enqueue server belongs.

```
# clresourcegroup online -n node central-rg
```

-n node

Specifies the name of the node or zone on which the resource group is to be brought online. This node is the node that you have just logged in to.

central-rg

Specifies the name of the resource group to be brought online. This group is the resource group to which the SAP enqueue server belongs.

4 Abnormally terminate the SAP enqueue server.

a. Determine the process ID of the SAP enqueue server, where the name of the SAP enqueue server executable file is `enserver`.

```
# ps -ef | grep enserver
```

b. Kill the process for the SAP enqueue server.

```
# kill -9 pid
```

pid

Specifies the process ID of the SAP enqueue server. This ID is the process ID that you determined with the `ps` and `grep` commands.

5 Confirm that the SAP enqueue server fails over to the node where SAP replica server is online, if configured.

Run the `clresource status` command to confirm that the SAP enqueue server resource is offline on the first node or zone and online on the second node or zone.

6 Again, bring online the resource group to which the SAP enqueue server belongs.

```
# clresourcegroup online -n node central-rg
```

```
-n node
```

Specifies the name of the node or zone on which the resource group is to be brought online.

```
central-rg
```

Specifies the name of the resource group to be brought online. This group is the resource group to which the SAP enqueue server belongs.

7 Log in to a different node or zone as superuser. On this node or zone, bring online the resource group to which the SAP replica server belongs.

```
# clresourcegroup online -n node repl-rg
```

```
-n node
```

Specifies the name of the node or zone on which resource group is to be brought online. This node is the node that you have just logged in to.

```
repl-rg
```

Specifies the name of the resource group to be brought online. This group is the resource group to which the SAP replica server belongs.

8 Again, abnormally terminate the SAP enqueue server, as in [Step 4](#).**9 Confirm that the SAP enqueue server resource group fails over to the node on which the SAP replica server resource group is running.**

As the SAP enqueue server resource group starts on the node on which the SAP replica server resource group is running, the SAP replica server resource group fails over to another available node. If no node is available, the SAP replica server resource group is offline.

Run the `clresource status` command to confirm that the SAP enqueue server resource group is offline on the first node or zone and online on the second node or zone. Confirm also that the SAP replica server resource group is offline on the second node. The SAP replica server resource group can be either online on another available node or zone or be offline.

▼ How to Verify the Operation of the Fault Monitor for the SAP Replica Server

Perform this procedure on each set of two nodes where the SAP replica server and the SAP enqueue server can run.

1 Log in to a node as superuser.

2 Bring online the resource group to which the SAP enqueue server belongs.

The SAP replica server resource is configured to be dependent on the SAP enqueue server resource.

```
# clresourcegroup online -n node central-rg
```

-n node

Specifies the name of the node or zone on which the resource group is to be brought online. This is the node or zone that you have just logged in to.

central-rg

Specifies the name of the resource group to be brought online. This group is the resource group to which the SAP enqueue server belongs.

3 Log in to a different node as superuser.**4 Bring online the resource group to which the SAP replica server belongs.**

```
# clresourcegroup online -n node repl-rg
```

-n node

Specifies the name of the node or zone on which the resource group is to be brought online. This node is the node that you have just logged in to.

repl-rg

Specifies the name of the resource group to be brought online. This group is the resource group to which the SAP replica server belongs.

5 Abnormally terminate the SAP replica server.**a. Determine the process ID of the SAP replica server, where the name of the SAP replica server executable file is `enrepserver`.**

```
# ps -ef | grep enrepserver
```

b. Kill the process for the SAP replica server.

```
# kill -9 pid
```

pid

Specifies the process ID of the SAP replica server. This ID is the process ID that you determined with the `ps` and `grep` commands.

6 Confirm that the SAP replica server either restarts or fails over.

If the abnormal termination action in [Step 5](#) is repeated a specified number of times within a specified time interval, the SAP replica server fails over to an available node that is not running the SAP enqueue server. If no node is available, the SAP replica server is offline.

If the abnormal termination action is *not* repeated a specified number of times within a specified time interval, the SAP replica server restarts on the same node.

Run the `clresource status` command to determine the status of the SAP replica server.

The maximum number of times that the application can be abnormally terminated before failing over is specified with the standard property `Retry_count`. The time interval is specified with the standard property `Retry_interval`. These properties are described in “Resource Properties” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

▼ How to Verify the Operation of the Fault Monitor for the SAP Message Server

Perform this procedure on each node where the SAP message server can run.

1 Log in to a node as superuser.

2 Bring online the resource group to which the SAP message server belongs.

```
# clresourcegroup switch -n node central-rg
```

```
-n node
```

Specifies the name of the node or zone on which the resource group is to be brought online. This node is the node that you have just logged in to.

```
central-rg
```

Specifies the name of the resource group to be brought online. This group is the resource group to which the SAP message server belongs.

3 Specify that failover is to be enabled for the resource group.

```
# clresourcegroup set -p Failover_Enabled=True central-rg
```

```
-p Failover_Enabled=True
```

Specifies that the resource group is to fail over when `Retry_count` is exceeded during `Retry_interval`.

```
central-rg
```

Specifies the name of the resource group to be modified.

4 Terminate the SAP message server.

5 Confirm that the SAP message server either restarts or fails over.

If the abnormal termination action in [Step 4](#) is repeated a specified number of times within a specified time interval, the SAP message server fails over to an available node. If no node is available, the SAP message server is offline.

If the abnormal termination action is *not* repeated a specified number of times within a specified time interval, the SAP message server restarts on the same node.

Run the `clresource status` command to determine the status of the SAP message server.

Note that the maximum number of times that the application can be abnormally terminated before failing over is specified with the standard property `Retry_count`, and the time interval is specified with the standard property `Retry_interval`. These properties are described in “Resource Properties” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

6 Again, bring online the resource group to which the SAP message server belongs, as described in Step 2.

7 Specify that failover is to be disabled for the resource group.

```
# clresourcegroup set -p Failover_Enabled=False central-rg
```

```
-p Failover_Enabled=False
```

Specifies that the resource group is *not* to fail over when `Retry_count` is exceeded during `Retry_interval`.

```
central-rg
```

Specifies the name of the resource group to be modified.

8 Terminate the SAP message server.

9 Confirm that the SAP message server restarts.

Because the `Failover_Enabled` is set to `False`, the SAP message server always restarts.

▼ How to Verify the Operation of the Fault Monitor for the SAP Web Application Server and SAP J2EE Engine Components

Perform this procedure on each node where the SAP web application server or SAP J2EE Engine component can run.

1 Log in to a node as superuser.

2 Bring online the resource group to which the SAP message server belongs.

The SAP web application server component resource is configured to be dependent on the SAP message server resource.

```
# clresourcegroup switch -n node central-rg
```

```
-n node
```

Specifies the name of the node or zone on which resource group is to be brought online. This node is the node that you have just logged in to.

central-rg

Specifies the name of the resource group to be brought online. This group is the resource group to which the SAP message server belongs.

3 Bring online the resource group to which the SAP web application server or SAP J2EE Enginecomponent belongs.

For SAP web application server component only:

```
# clresourcegroup switch -n node webas-rg
```

-n *node*

Specifies the name of the node or zone on which the resource group is to be brought online. This node is the node that you have just logged in to.

webas-rg

Specifies the name of the resource group to be brought online. This group is the resource group to which the SAP web application server component belongs.

For SAP J2EE Engine component only:

```
# clresourcegroup switch -n node j2ee-rg
```

-n *node*

Specifies the name of the node or zone on which the resource group is to be brought online. This node is the node that you have just logged in to.

j2ee-rg

Specifies the name of the resource group to be brought online. This group is the resource group to which the SAP J2EE Engine component belongs.

4 Terminate the SAP web application server or SAP J2EE Engine component.

5 Confirm that the SAP web application server or SAP J2EE Engine component is restarted locally.

If the abnormal termination action in [Step 4](#) is repeated a specified number of times within a specified time interval, the resulting behavior depends on whether the SAP web application server or SAP J2EE Engine component resource was configured as a failover or a scalable resource.

- If the SAP web application server or SAP J2EE Engine component resource was configured as a failover resource, the resource fails over to an available node. If no node is available, the SAP web application server or SAP J2EE Engine component is offline.
- If the SAP web application server or SAP J2EE Engine component resource was configured as a scalable resource, the resource is offline on this node.

Run the `clresource status` command to determine the status of the SAP web application server or SAP J2EE Engine component.

Note that the maximum number of times that the application can be abnormally terminated before failing over or becoming offline is specified with the standard property `Retry_count`,

and the time interval is specified with the standard property `Retry_interval`. These properties are described in “Resource Properties” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

Migrating Existing SAP Web Application Server and SAP J2EE Engine Resource Types to Sun Cluster 3.2

If you are upgrading the resource types from an earlier version of Sun Cluster to Sun Cluster 3.2, you need to remove the existing resource types for SAP Web Application Server and SAP J2EE Engine and recreate them with Sun Cluster 3.2 resource types. For more information on how to migrate existing resource types to Sun Cluster 3.2 resource type, see “How to Migrate Existing Resources to a New Version of the Resource Type” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

Sun Cluster HA for SAP Web Application Server Extension Properties

Extension properties for Sun Cluster HA for SAP Web Application Server resource types are described in the following sections:

- “`SUNW.sapenq` Extension Properties” on page 77
- “`SUNW.saprep1` Extension Properties” on page 80
- “`SUNW.saps cs` Extension Properties” on page 82
- “`SUNW.sapwebas` Extension Properties” on page 85

For details about system-defined properties, see the `r_properties(5)` man page and the `rg_properties(5)` man page.

`SUNW.sapenq` **Extension Properties**

The `SUNW.sapenq` resource type represents the SAP enqueue server in a Sun Cluster configuration. The extension properties of this resource type are as follows:

`Child_mon_level`

The child process monitoring level for the Process Monitor Facility (PMF). This property is equivalent to the `-C` option of `pmfadm`.

The default value of `-1` indicates that child process monitoring is not to be performed. Positive values indicate the desired level of child process monitoring.

Data type	Integer
Default	-1
Range	No range defined
Tunable	Any time

`Enqueue_Instance_Number`

The two-digit instance number for the SAP enqueue server. This number is the value of `SAPSYSTEM` in the SAP profile for SAP enqueue server.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	When disabled

Enqueue_Profile

The full path to the SAP enqueue server profile.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	When disabled

Enqueue_Server

The full path to the SAP enqueue server executable.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	When disabled

Enqueue_Server_Monitor

The full path to the SAP enqueue server monitor executable.

Data type	String
Default	<i>directory</i> /ensmon, where <i>directory</i> is the full path to the directory where the SAP enqueue server executable is stored, as specified by the extension property Enqueue_Server.
Range	Not applicable
Tunable	When disabled

Log_Directory

The directory for the startup and monitor log files.

Data type	String
Default	The home directory of the administration user, as specified by the extension property SAP_User.
Range	Not applicable
Tunable	When disabled

Monitor_retry_count

The maximum number of restarts by the Process Monitor Facility (PMF) that are allowed for the SAP enqueue server fault monitor.

Data type	Integer
Default	4
Range	No range defined
Tunable	Any time

Monitor_retry_interval

The interval in minutes between restarts of the SAP enqueue server fault monitor.

Data type	Integer
Default	2
Range	No range defined
Tunable	Any time

Probe_timeout

The timeout value in seconds that the SAP enqueue server fault monitor uses to probe an SAP enqueue server instance.

Data type	Integer
Default	120
Range	Minimum = 2; no maximum defined
Tunable	Any time

SAP_User

The administration user for the SAP enqueue server.

Data type	String, where letters are in lowercase
Default	No default defined
Range	Not applicable
Tunable	When disabled

Stop_signal

The signal that is sent to the application to stop the SAP enqueue server application.

Data type	Integer
Default	2 (equivalent to SIGINT)
Range	1-37
Tunable	When disabled

SUNW.saprepl Extension Properties

The SUNW.saprepl resource type represents the SAP replica server in a Sun Cluster configuration. The extension properties of this resource type are as follows:

Child_mon_level

The child process monitoring level for the Process Monitor Facility (PMF). This property is equivalent to the -C option of pmfadm.

The default value of -1 indicates that child process monitoring is not to be performed. Positive values indicate the desired level of child process monitoring.

Data type	Integer
Default	-1
Range	No range defined
Tunable	Any time

Log_Directory

The directory for the startup and monitor log files that are created by the SAP replica server application.

Data type	String
Default	The home directory of the administration user, as specified by the extension property SAP_User.
Range	Not applicable
Tunable	When disabled

Monitor_retry_count

The maximum number of restarts by PMF that are allowed for the SAP replica server fault monitor.

Data type	Integer
Default	4
Range	No range defined
Tunable	Any time

Monitor_retry_interval

The interval in minutes between restarts of the SAP replica server fault monitor.

Data type	Integer
Default	2
Range	No range defined

Tunable Any time

Probe_timeout

Currently unused. The timeout value in seconds that the SAP replica server fault monitor uses to probe an SAP replica server instance. The SAP replica server is started by PMF and monitored by PMF. No additional probing is currently performed by the fault monitor.

Data type Integer

Default 30

Range Minimum = 2; no maximum defined

Tunable Any time

Replica_Profile

The full path to the SAP replica server profile.

Data type String

Default No default defined

Range Not applicable

Tunable When disabled

Replica_Server

The full path to the SAP replica server executable.

Data type String

Default No default defined

Range Not applicable

Tunable When disabled

SAP_User

The administration user for the SAP replica server.

Data type String, where letters are in lowercase

Default No default defined

Range Not applicable

Tunable When disabled

Stop_signal

The signal that is sent to the application to stop the SAP replica server application.

Data type Integer

Default 2 (equivalent to SIGINT)

Range 1-37

Tunable Any time

SUNW.sapscs **Extension Properties**

The SUNW.sapscs resource type represents the SAP message server, as well as some associated utilities, in a Sun Cluster configuration. The extension properties of this resource type are as follows:

Failover_Enabled

Specifies whether to fail over when `Retry_count` is exceeded during `Retry_interval`. The possible values of this extension property are as follows:

- `True` – Specifies that the resource group is to fail over when `Retry_count` is exceeded during `Retry_interval`
- `False` – Specifies that the resource group is *not* to fail over when `Retry_count` is exceeded during `Retry_interval`

Data type Boolean
Default TRUE
Range Not applicable
Tunable Any time

Monitor_retry_count

The maximum number of restarts by the Process Monitor Facility (PMF) that are allowed for the SAP message server fault monitor.

Data type Integer
Default 4
Range No range defined
Tunable Any time

Monitor_retry_interval

The interval in minutes between restarts of the SAP message server fault monitor.

Data type Integer
Default 2
Range No range defined
Tunable Any time

Msg_Server_Monitor

The SAP message server probe executable.

Data type	String
Default	/usr/sap/SAPSID/SYS/exe/run/msprot, where <i>SAPSID</i> is the SAP system identification
Range	Not applicable
Tunable	When disabled

Msg_Server_Port

The listen port of the SAP message server.

If no value is specified for this property, the initial default value is 0, and a derived default value is calculated to be $3600 + \text{SAP_Instance_Number}$. Specify a value for this property if the listen port of the SAP message server to be probed is not equivalent to $3600 + \text{SAP_Instance_Number}$. For example, if two SAP message servers exist, specify a value for this property.

Data type	Integer
Default	0
Range	0 — 65535
Tunable	When disabled

Probe_timeout

The timeout value in seconds that the SAP message server fault monitor uses to probe an SAP message server instance.

Data type	Integer
Default	120
Range	Minimum 2
Tunable	Any time

SAP_Instance_Name

The name of the SAP message server instance. This name is `INSTANCE_NAME` in the SAP profile.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	When disabled

SAP_Instance_Number

The two-digit SAP system number for the SAP message server instance. This number is `SAPSYSTEM` in the SAP profile.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	When disabled

SAP_SID

The SAP system ID. This ID is SAPSYSTEMNAME in the SAP profile.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	When disabled

SAP_User

The administration user for the SAP message server.

Data type	String, where letters are in lowercase
Default	<i>SAPSID</i> adm, where <i>SAPSID</i> is the SAP system identification, converted to lowercase
Range	Not applicable
Tunable	When disabled

Scs_Shutdown_Script

The full path to the shutdown script for the instance.

Data type	String
Default	<i>/usr/sap/SAPSID/SYS/exe/run/stopsap</i>
Range	Not applicable
Tunable	When disabled

Scs_Startup_Script

The full path to the startup script for the instance.

Data type	String
Default	<i>/usr/sap/SAPSID/SYS/exe/run/startsap</i>
Range	Not applicable
Tunable	When disabled

SUNW.sapwebas Extension Properties

The SUNW.sapwebas resource type represents the SAP web application server component in a Sun Cluster configuration. The extension properties of this resource type are as follows:

Monitor_retry_count

The maximum number of restarts by the Process Monitor Facility (PMF) that are allowed for the SAP web application server component fault monitor.

Data type	Integer
Default	4
Range	No range defined
Tunable	Any time

Monitor_retry_interval

The interval in minutes between restarts of the SAP web application server component fault monitor.

Data type	Integer
Default	2
Range	No range defined
Tunable	Any time

Probe_timeout

The timeout value in seconds that the SAP web application server component fault monitor uses to probe an SAP web application server component instance.

Data type	Integer
Default	120
Range	Minimum 2
Tunable	Any time

SAP_Instance_Name

The name of the SAP web application server component instance. This name is INSTANCE_NAME in the SAP profile.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	When disabled

SAP_Instance_Number

The two-digit SAP system number for the SAP web application server component instance. This number is SAPSYSTEM in the SAP profile.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	When disabled

SAP_SID

The SAP system ID. This ID is SAPSYSTEMNAME in the SAP profile.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	When disabled

SAP_User

The administration user for the SAP web application server component.

Data type	String, where letters are in lowercase
Default	<i>SAPSID</i> adm, where <i>SAPSID</i> is the SAP system identification, converted to lowercase
Range	Not applicable
Tunable	When disabled

SAP_Instance_Type

The Instance type on the specified host. The possible values of this extension property are as follows:

- ABAP - specifies that SAP Web Application Server ABAP central instance is installed on the host.
- J2EE - specifies that SAP Web Application Server Java engine is installed on the host.
- ABAP_J2EE - specifies that SAP Web Application Server ABAP and SAP Web Application Server Java engine are installed on the host.

Data type	Enum
Default	ABAP
Range	Not applicable
Tunable	When disabled

SAP_Logdir

The SAP log files directory.

Data type	String
Default	Null
Range	Not applicable
Tunable	Any time

Webas_Shutdown_Script

The full path to the shutdown script for the instance.

Data type	String
Default	/usr/sap/SAPSID/SYS/exe/run/stopsap
Range	Not applicable
Tunable	When disabled

Webas_Startup_Script

The full path to the startup script for the instance.

Data type	String
Default	/usr/sap/SAPSID/SYS/exe/run/startsap
Range	Not applicable
Tunable	When disabled

Webas_Use_Pmf

Determines if the startup script process tree is run under PMF. The possible values of this extension property are as follows:

- True – Specifies that the startup script process tree is run under PMF
- False – Specifies that the startup script process tree is *not* run under PMF

Data type	Boolean
Default	TRUE
Range	Not applicable
Tunable	When disabled

Index

A

ABAP engine, 12

C

Child_mon_level extension property
 SUNW.sapenq resource type, 77
 SUNW.saprepl resource type, 80
clnode command, 10
commands, node information, 10

D

database, 20

E

Enqueue_Instance_Number extension property,
 SUNW.sapenq resource type, 77
Enqueue_Profile extension property, SUNW.sapenq
 resource type, 78
Enqueue_Server extension property, SUNW.sapenq
 resource type, 78
Enqueue_Server_Monitor extension property,
 SUNW.sapenq resource type, 78
error messages, cluster, 10
extension properties
 SUNW.sapenq resource type, 77-79
 SUNW.saprepl resource type, 80-82
 SUNW.sapsocs resource type, 82-84

extension properties (*Continued*)

 SUNW.sapwebas resource type, 85-87

F

Failover_Enabled extension property, SUNW.sapsocs
 resource type, 82
fault monitors, 65

G

global zone, 44

H

help, 10

I

installing, Sun Cluster HA for SAP Web Application
 Server, 43-45

L

local zones, *See* non-global zones
Log_Directory extension property
 SUNW.sapenq resource type, 78
 SUNW.saprepl resource type, 80

M

messages file, 10

Monitor_retry_count extension property

SUNW.sapenq resource type, 78

SUNW.saprepl resource type, 80

SUNW.sapscs resource type, 82

SUNW.sapwebas resource type, 85

Monitor_retry_interval extension property

SUNW.sapenq resource type, 79

SUNW.saprepl resource type, 80

SUNW.sapscs resource type, 82

SUNW.sapwebas resource type, 85

Msg_Server_Monitor extension property, SUNW.sapscs resource type, 82

Msg_Server_Port extension property, SUNW.sapscs resource type, 83

N

non-global zones, 11, 44

P

packages, 43-45

Probe_timeout extension property

SUNW.sapenq resource type, 79

SUNW.saprepl resource type, 81

SUNW.sapscs resource type, 83

SUNW.sapwebas resource type, 85

prtconf -v command, 10

prtdiag -v command, 10

psrinfo -v command, 10

R

Replica_Profile extension property, SUNW.saprepl resource type, 81

Replica_Server extension property, SUNW.saprepl resource type, 81

restrictions, zones, 44

S

SAP central services, 12

SAP enqueue server, 12

SAP_Instance_Name extension property

SUNW.sapscs resource type, 83

SUNW.sapwebas resource type, 85

SAP_Instance_Number extension property

SUNW.sapscs resource type, 83

SUNW.sapwebas resource type, 85

SAP J2EE engine, 12

SAP message server, 12

SAP replica server, 12

SAP_SID extension property

SUNW.sapscs resource type, 84

SUNW.sapwebas resource type, 86

SAP_User extension property

SUNW.sapenq resource type, 79

SUNW.saprepl resource type, 81

SUNW.sapscs resource type, 84

SUNW.sapwebas resource type, 86

SAP web application server component, 12

SAP Web Application Server platform, 12

Scs_Shutdown_Script extension property,

SUNW.sapscs resource type, 84

Scs_Startup_Script extension property, SUNW.sapscs resource type, 84

show-rev subcommand, 10

showrev -p command, 10

software packages, 43-45

Stop_signal extension property

SUNW.sapenq resource type, 79

SUNW.saprepl resource type, 81

Sun Cluster HA for SAP Web Application Server

fault monitor, 65

installing, 43-45

software packages

installing, 43-45

SUNW.sapenq resource type, extension properties, 77-79

SUNW.saprepl resource type, extension properties, 80-82

SUNW.sapscs resource type, extension properties, 82-84

SUNW.sapwebas resource type, extension
properties, 85-87

T

technical support, 10

V

/var/adm/messages file, 10

W

Webas_Shutdown_Script extension property,
SUNW.sapwebas resource type, 87

Webas_Startup_Script extension property,
SUNW.sapwebas resource type, 87

Webas_Use_Pmf extension property, SUNW.sapwebas
resource type, 87

Z

zones, 11, 44

