



Sun Cluster Data Service for Oracle Application Server Guide for Solaris OS

SPARC Platform Edition

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Part No: 819-1248-10
August 2005, Revision A

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Preface

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

Note – In this document, the term “x86” refers to the Intel 32-bit family of microprocessor chips and compatible microprocessor chips made by AMD.

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 document assume knowledge of the Solaris™ Operating System and expertise with the volume manager software that is used with Sun Cluster.

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.

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 changes that are used in this book.

TABLE P-1 Typographic Conventions

Typeface or Symbol	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>	Command-line placeholder: replace with a real name or value	The command to remove a file is <code>rm filename</code> .
<i>AaBbCc123</i>	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . Perform a <i>patch analysis</i> . Do <i>not</i> save the file. [Note that some emphasized items appear bold online.]

Shell Prompts in Command Examples

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

TABLE P-2 Shell Prompts

Shell	Prompt
C shell prompt	machine_name%
C shell superuser prompt	machine_name#
Bourne shell and Korn shell prompt	\$
Bourne shell and Korn shell superuser prompt	#

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 3.0-3.1 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>

Topic	Documentation
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.

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Documentation, Support, and Training

Sun Function	URL	Description
Documentation	http://www.sun.com/documentation/	Download PDF and HTML documents, and order printed documents
Support and Training	http://www.sun.com/supporttraining/	Obtain technical support, download patches, and learn about Sun courses

Product Training

Sun Microsystems offers training in many Sun technologies through a variety of instructor-led courses and self-paced courses. For information about the training courses that Sun offers and to enroll in a class, visit Sun Microsystems Training at <http://training.sun.com/>.

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 and serial numbers of your systems
- The release number of the Solaris Operating System (for example, Solaris 8)
- The release number of Sun Cluster (for example, Sun Cluster 3.0)

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>SPARC: prtdiag -v</code>	Displays system diagnostic information
<code>scinstall -pv</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 Oracle Application Server

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

This chapter contains the following sections.

- “Installing and Configuring Sun Cluster HA for Oracle Application Server” on page 11
- “Sun Cluster HA for Oracle Application Server Overview” on page 12
- “Planning the Sun Cluster HA for Oracle Application Server Installation and Configuration” on page 14
- “Installing and Configuring Sun Cluster” on page 19
- “Verifying the Installation and Configuration of Sun Cluster” on page 26
- “Installing the Sun Cluster HA for Oracle Application Server Packages” on page 27
- “Registering and Configuring Sun Cluster HA for Oracle Application Server” on page 30
- “Verifying the Sun Cluster HA for Oracle Application Server Installation and Configuration” on page 35
- “Understanding the Sun Cluster HA for Oracle Application Server Fault Monitor” on page 36
- “Debug Sun Cluster HA for Oracle Application Server” on page 38

Installing and Configuring Sun Cluster HA for Oracle Application Server

Table 1 lists the tasks for installing and configuring Sun Cluster HA for Oracle Application Server. Perform these tasks in the order that they are listed.

TABLE 1 Task Map: Installing and Configuring Sun Cluster HA for Oracle Application Server

Task	For Instructions, Go To
Plan the installation.	"Sun Cluster HA for Oracle Application Server Overview" on page 12 "Planning the Sun Cluster HA for Oracle Application Server Installation and Configuration" on page 14
Install and configure Sun Cluster.	"How to Install and Configure Sun Cluster" on page 19
Verify installation and configuration.	"How to Verify the Installation and Configuration of Sun Cluster" on page 26
Install Sun Cluster HA for Oracle Application Server Packages.	"How to Install the Sun Cluster HA for Oracle Application Server Packages using the <code>scinstall</code> Utility" on page 29
Register and Configure Sun Cluster HA for Oracle Application Server.	"How to Register and Configure Sun Cluster HA for Oracle Application Server as a Failover Service" on page 30
Verify Sun Cluster HA for Oracle Application Server Installation and Configuration.	"How to Verify the Sun Cluster HA for Oracle Application Server Installation and Configuration" on page 35
Understand Sun Cluster HA for Oracle Application Server fault monitor.	"Understanding the Sun Cluster HA for Oracle Application Server Fault Monitor" on page 36
Debug Sun Cluster HA for Oracle Application Server.	"Debug Sun Cluster HA for Oracle Application Server" on page 38

Sun Cluster HA for Oracle Application Server Overview

The Sun Cluster HA for Oracle Application Server can be used to provide high availability for either the Oracle 9iAS Infrastructure or Oracle 10g AS Infrastructure.

Oracle 9iAS (version 9.0.2 and 9.0.3) and Oracle 10g AS (version 9.0.4) introduced a new component called "Oracle Infrastructure". This infrastructure component provides centralized product metadata, security and management services, configuration information, and data repositories for middle tier installations.

The Sun Cluster HA for Oracle Application Server data service provides high availability for either the Oracle 9iAS Infrastructure or the Oracle 10g AS Infrastructure components. Additionally the Sun Cluster HA for Oracle is also required to provide high availability for the Oracle Database.

TABLE 2 Sun Cluster Architecture

Middle Tier	Infrastructure Tier	Database Tier
Oracle HTTP Server (OHS)	Oracle HTTP Server (OHS)	Metadata Repository
J2EE Server (OC4J)	J2EE Server (OC4J)	
	LDAP Server (OID)	
	Enterprise Manager (EM)	

The middle tier may be installed on multiple nodes to achieve high availability, however the infrastructure tier and database tier are installed onto one node and require more than one Sun Cluster Data Service to manage the infrastructure (requires the Sun Cluster HA for Oracle Application Server data service) and database tier (requires the Sun Cluster HA for Oracle data service).

Note – The middle tier components listed in [Table 2](#) only refer to those components installed through an Oracle Application Server installation. There are other Oracle Applications that qualify as middle tier components, however these are not listed here.

[Table 3](#) lists the Oracle 9iAS Infrastructure services and how they are managed by the Oracle components, which are then managed by the Sun Cluster HA for Oracle Application Server.

TABLE 3 Oracle 9iAS Infrastructure Components

Services	Component
Oracle HTTP Server (OHS)	Oracle Process Management and Notification (OPMN)
J2EE Server (OC4J)	
LDAP Server (OID)	Oracle Internet Directory Monitor (OIDMON) and Process (OIDLDAP)
Enterprise Manager (EM)	Enterprise Manager (EM)

[Table 4](#) lists the Oracle 10g AS Infrastructure services and how they are managed by the Oracle components, which are then managed by the Sun Cluster HA for Oracle Application Server.

TABLE 4 Oracle 10g AS Infrastructure Components

Services	Component
Oracle HTTP Server (OHS) J2EE Server (OC4J)	Oracle Process Management and Notification (OPMN)
Oracle LDAP Server (OID)	
Enterprise Manager (EM)	Enterprise Manager (EM)

Planning the Sun Cluster HA for Oracle Application Server Installation and Configuration

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

Configuration Restrictions

This section provides a list of software and hardware configuration restrictions that apply to Sun Cluster HA for Oracle Application Server only.



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 *Sun Cluster Release Notes*.

- **Installing Sun Cluster onto Cluster File Systems** — The Sun Cluster can be installed onto a Global File System or Failover File System.

Note – It is considered best practice when mounting Global File Systems to mount them with the /global prefix and to mount Failover File Systems with the /local prefix.

Configuration Requirements

The requirements in this section apply to the Sun Cluster HA for Oracle Application Server only.

These requirements are setup in configuration and registration files within `/opt/SUNWsc9ias/util`. These files allow you to register the Sun Cluster components with Sun Cluster, with appropriate dependencies applied.

You must use these files to register the Sun Cluster HA for Oracle Application Server resources.

Files within `/opt/SUNWsc9ias/util` that are prefixed `9ias` should be used for the Oracle 9iAS Infrastructure components and files prefixed `10gas` should be used for the Oracle 10g AS Infrastructure components.



Caution – Your data service configuration might not be supported if you do not adhere to these requirements.

Sun Cluster components and their dependencies –

TABLE 5 Oracle 9iAS Infrastructure components and their dependencies (via → symbol)

Component	Description
Oracle Internet Directory Monitor (OIDMON)	→ <i>SUNW.HAStoragePlus</i> resource → <i>Oracle Database Server</i> resource → <i>Oracle Database Listener</i> resource
Oracle Internet Directory Process (OIDLDAP)	→ <i>Oracle Internet Directory Monitor (OIDMON)</i> resource
Oracle Process Management and Notification (OPMN)	→ <i>Oracle Internet Directory Process (OIDLDAP)</i> resource
Enterprise Manager (EM)	→ <i>Oracle Process Management and Notification (OPMN)</i> resource

TABLE 6 Oracle 10g AS Infrastructure components and their dependencies (via → symbol)

Component	Description
Oracle Process Management and Notification (OPMN)	→ <i>SUNW.HAStoragePlus</i> resource → <i>Oracle Database Server</i> resource → <i>Oracle Database Listener</i> resource
Enterprise Manager (EM)	→ <i>Oracle Process Management and Notification (OPMN)</i> resource

The Sun Cluster HA for Oracle Application Server configuration and registration files within /opt/SUNWsc9ias/util define these dependencies. [Example 1](#) lists the Oracle 10g AS configuration and registration files.

EXAMPLE 1 Oracle 10g AS Infrastructure configuration and registration files for Sun Cluster

```
# cd /opt/SUNWsc9ias/util
#
# ls -l
total 24
-rwxr-xr-x  1 root    sys      1516 Jul 14 12:33 10gas_config
-r-xr-xr-x  1 root    sys      2738 Jul 14 12:33 10gas_register
-rwxr-xr-x  1 root    sys      1671 Jul 14 12:33 9ias_config
-r-xr-xr-x  1 root    sys      4383 May 27 09:48 9ias_register
# more 10g*
:::::::::::::
10gas_config
:::::::::::::
#
# Copyright 2004 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# This file will be sourced in by 10gas_register and the parameters
# listed below will be used.
#
# These parameters can be customized in (key=value) form
#
#           RG - name of the SC resource group containing the resources
#           RS_OPMN - name of the SC Oracle Process Monitor Notification resource
#           RS_EM - name of the SC Enterprise Manager Web site resource
#
# ORACLE_HOME - name of the Oracle home directory
# ORACLE_SID - name of the Oracle SID
# OIAS_LHOST - name of the Oracle 10gAS Infrastructure logical hostname
# OIAS_USER - name of the Oracle 10gAS Infrastructure userid
# OIAS_ADMIN - name of the Oracle 10gAS Internet Directory Admin password
# OIAS_INFRA - name of the Oracle 10gAS Infrastructure /var/opt/oracle
# OIAS_FQDN - name of the Oracle 10gAS fully qualified domainname
# OIAS_OPMN - name of the Oracle 10gAS ias-components
#           e.g. OIAS_OPMN=OID/HTTP_Server/OC4J or OIAS_OPMN=all
#
#           ALL indicates all the installed ias-components
#
#           RS_LH - name of the SC Logical Hostname resource
#           RS_HAS - name of the SC Oracle 10gAS HASToragePlus resource
#           RS_ORACLE - name of the SC Oracle resource
#           RS_ORALSR - name of the SC Oracle Listener resource
#
RG=
RS_OPMN=
RS_EM=

ORACLE_HOME=
ORACLE_SID=
```


EXAMPLE 1 Oracle 10g AS Infrastructure configuration and registration files for Sun Cluster (Continued)

```
OIAS_LHOST=
OIAS_USER=
OIAS_ADMIN=
OIAS_INFRA=
OIAS_FQDN=
OIAS_OPMN=

RS_LH=
RS_HAS=
RS_ORACLE=
RS_ORALSR=

:::::::::::::
10gas_register
:::::::::::::
#
# Copyright 2004 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#

. `dirname $0`/10gas_config

PORT=10000
OIAS_ADMIN=dummy
OIAS_FQDN=dummy

validate_registration()
{
St=$?
RS=$1
RG=$2
ORACLE_HOME=$3
ORACLE_SID=$4
OIAS_LHOST=$5
OIAS_USER=$6
OIAS_ADMIN=$7
OIAS_INFRA=$8
OIAS_FQDN=$9

if [ "${St}" -ne 0 ]; then
    echo "Registration of resource ${RS} failed,\
        please correct the wrong parameters"
    exit 1
else
    echo "Registration of resource ${RS} succeeded"
fi

# VALIDATE RESOURCE

`dirname $0`/../bin/validate_9ias -R $RS -G $RG \
-O $ORACLE_HOME -S $ORACLE_SID -H $OIAS_LHOST \
-U $OIAS_USER -P $OIAS_ADMIN -E $OIAS_INFRA -D $OIAS_FQDN
```

EXAMPLE 1 Oracle 10g AS Infrastructure configuration and registration files for Sun Cluster (Continued)

```
St=$?

if [ "${St}" -ne 0 ]; then
    echo "Validation of resource ${RS} failed, \
please correct the wrong parameters"
    echo "Removing resource ${RS} from the cluster configuration"

    scrgadm -r -j ${RS}
    exit 1
else
    echo "Validation of resource ${RS} succeeded"
fi
}

scrgadm -a -j $RS_OPMN -g $RG -t SUNW.gds \
-x Start_command="/opt/SUNWsc9ias/bin/start-opmn \
-R $RS_OPMN -G $RG -O $ORACLE_HOME -S $ORACLE_SID -H $OIAS_LHOST \
-U $OIAS_USER -P $OIAS_ADMIN -E $OIAS_INFRA -D $OIAS_FQDN -C $OIAS_OPMN " \
-x Stop_command="/opt/SUNWsc9ias/bin/stop-opmn \
-R $RS_OPMN -G $RG -O $ORACLE_HOME -S $ORACLE_SID -H $OIAS_LHOST \
-U $OIAS_USER -P $OIAS_ADMIN -E $OIAS_INFRA -D $OIAS_FQDN -C $OIAS_OPMN " \
-x Probe_command="/opt/SUNWsc9ias/bin/probe-opmn \
-R $RS_OPMN -G $RG -O $ORACLE_HOME -S $ORACLE_SID -H $OIAS_LHOST \
-U $OIAS_USER -P $OIAS_ADMIN -E $OIAS_INFRA -D $OIAS_FQDN -C $OIAS_OPMN " \
-y Port_list=$PORT/tcp -y Network_resources_used=$RS_LH \
-x Stop_signal=9 -x Probe_timeout=90 \
-y Resource_dependencies=$RS_HAS,$RS_ORACLE,$RS_ORALSR

validate_registration $RS_OPMN $RG \
$ORACLE_HOME $ORACLE_SID $OIAS_LHOST \
$OIAS_USER $OIAS_ADMIN $OIAS_INFRA $OIAS_FQDN $OIAS_OPMN

if [ ! -z "$RS_EM" ]; then

scrgadm -a -j $RS_EM -g $RG -t SUNW.gds \
-x Start_command="/opt/SUNWsc9ias/bin/start-em \
-R $RS_EM -G $RG -O $ORACLE_HOME -S $ORACLE_SID -H $OIAS_LHOST \
-U $OIAS_USER -P $OIAS_ADMIN -E $OIAS_INFRA -D $OIAS_FQDN " \
-x Stop_command="/opt/SUNWsc9ias/bin/stop-em \
-R $RS_EM -G $RG -O $ORACLE_HOME -S $ORACLE_SID -H $OIAS_LHOST \
-U $OIAS_USER -P $OIAS_ADMIN -E $OIAS_INFRA -D $OIAS_FQDN " \
-x Probe_command="/opt/SUNWsc9ias/bin/probe-em \
-R $RS_EM -G $RG -O $ORACLE_HOME -S $ORACLE_SID -H $OIAS_LHOST \
-U $OIAS_USER -P $OIAS_ADMIN -E $OIAS_INFRA -D $OIAS_FQDN " \
-y Port_list=$PORT/tcp -y Network_resources_used=$RS_LH \
-x Stop_signal=9 \
-y Resource_dependencies=$RS_OPMN

validate_registration $RS_EM $RG \
$ORACLE_HOME $ORACLE_SID $OIAS_LHOST \
$OIAS_USER $OIAS_ADMIN $OIAS_INFRA $OIAS_FQDN
```

EXAMPLE 1 Oracle 10g AS Infrastructure configuration and registration files for Sun Cluster (Continued)

fi

Installing and Configuring Sun Cluster

This section contains the procedures you need to install and configure Sun Cluster.

▼ How to Install and Configure Sun Cluster



Caution – Oracle 9iAS (version 9.0.2 and 9.0.3) and Oracle 10g AS (version 9.0.4) does not support installation on a hardware cluster. So for the duration of the install and post install configuration, Sun Cluster must be stopped. You should have access to the console before the next step. Your data service configuration might not be supported if you do not adhere to these requirements.

Note – This sections assumes you have setup a Cluster File System to support either the Oracle 9iAS Infrastructure or Oracle 10g AS Infrastructure installation.

Steps 1. Edit /etc/vfstab to temporarily remove the global mount option

As the Infrastructure mount point will be mounted while the node is in non-cluster mode you must edit /etc/vfstab to temporarily remove the global mount option, if the Infrastructure mount point is a Global File System.

It is recommended that you repeat the line and comment out the original entry and amend the copied entry to omit the global option.

2. Stop the Cluster

```
# scshutdown -g0 -y
```

3. Boot each Cluster Node in Non-Cluster Mode

```
ok boot -x
```

4. Take ownership of the Infrastructure File System diskset/diskgroup

For Solaris Volume Manager

```
# metaset -s <diskset> -f -C take
# mount <Infrastructure mount point>
```

For Veritas Volume Manager

```
# vxdg -C import <diskgroup>
# vxdg -g <diskgroup> startall
# mount <Infrastructure mount point>
```

5. Plumb the Infrastructure logical IP address

```
# ifconfig <interface> addif <logical host> up
```

6. Install the Oracle 9iAS Infrastructure

Note – Refer to [Step 7](#) if you are installing the Oracle 10g AS Infrastructure

For this section, follow the *Oracle Application Server, Installation Guide* manual to install Sun Cluster .

a. Enable and test the interposed logical host

This step requires that the Sun Cluster HA for Oracle Application Server data service has been installed on all nodes that will be part of the Sun Cluster.

If you did not install the Sun Cluster HA for Oracle Application Server package during your initial Sun Cluster installation, proceed to “[Installing the Sun Cluster HA for Oracle Application Server Packages](#)” on page 27 before you continue with this step.

Note – Oracle 9iAS Infrastructure requires that the logical host is interposed for any `gethostname()` calls. You must carry out this step on all nodes that will be part of the Sun Cluster. The logical hostname being set in `LHOSTNAME` is the short name not the fully qualified name.

```
# cd /opt/SUNWsc9ias/lib
# cp libloghost_32.so.1 /usr/lib/libloghost_32.so.1
# cp libloghost_64.so.1 /usr/lib/sparcv9/libloghost_64.so.1
#
# cd /usr/lib/secure
# ln -s /usr/lib/libloghost_32.so.1 libloghost_32.so.1
#
# cd /usr/lib/secure/sparcv9
# ln -s /usr/lib/sparcv9/libloghost_64.so.1 libloghost_64.so.1
#
# su - <Oracle Application Server Userid>
$ LD_PRELOAD_32=libloghost_32.so.1
$ LHOSTNAME=<logical hostname>
$ export LHOSTNAME LD_PRELOAD_32
```

```
$  
$ uname -n  
<logical host>      <- The logical host should be returned
```

b. Setting ORACLE_HOME during the install

When prompted for the ORACLE_HOME variable during the install, point to a directory on the Infrastructure File System you mounted in [Step 4](#).

The hostname picked up by runInstaller will be the logical hostname you plumbed in [Step 5](#)

c. Pre-task before running the configuration assistants

After installing the software, the Oracle 9iAS installer runs the configuration assistants for the various Oracle 9iAS Infrastructure components. Prior to starting the configuration assistants, the installer will prompt to execute a script — root.sh. Before running the root.sh script, the following needs to be done in another window. This is because OHS uses configuration information defined in apachectl and does not inherit the variable values LD_PRELOAD_32 and LHOSTNAME.

Add the following three lines to the CONFIGURATION section in apachectl (you can add these three lines just before the PIDFILE= setting in the file).

```
$ cd $ORACLE_HOME/Apache/Apache/bin  
$  
$ vi apachectl
```

and add the following three lines to the CONFIGURATION section in apachectl (you can add these three lines just before the PIDFILE= setting)

```
LD_PRELOAD_32=libloghost_32.so.1  
LHOSTNAME=<logical hostname>  
export LHOSTNAME LD_PRELOAD_32
```

d. Install Patches

Note – It is important that you follow the patch installations very carefully within the patch README files. Failure to do so will mean that certain functions within the Sun Cluster HA for Oracle Application Server will not work correctly.

Issues have been traced back to patches not being installed correctly. Oracle 9iAS version 9.0.2 requires that it is patched correctly before being used within Sun Cluster, including any post patch installation steps. Time spent here will be worthwhile in the end.

Tip – When installing patches it is worthwhile checking `$ORACLE_HOME/opmn/conf/opmn.xml` to see if any more sections have been added by the patch. You should perform this check only if you are requested to run a `root.sh` script.

If you are requested to run a `root.sh` script, then before you hit OK for that script, you should check `$ORACLE_HOME/opmn/conf/opmn.xml`. If any new sections have been added please include `LD_LIBRARY_PATH`, `LD_PRELOAD_32`, `LHOSTNAME` and `DISPLAY` as listed within the next step, before hitting enter to the OK message.

Check the latest release notes for any post install patches.

e. Edit `opmn.xml`

Stop `opmn` by issuing the following command

```
$ $ORACLE_HOME/opmn/bin/opmnctl stopall
```

Edit the `$ORACLE_HOME/opmn/conf/opmn.xml` file and add entries for the `LD_PRELOAD_32` and `LHOSTNAME` environment variables in the environment section for `OC4J_DAS`, `home`, `OC4J_Demos`, `CUSTOM`, etc. For example

Note – In the example below, the `LD_LIBRARY_PATH` value should be replaced by your `$ORACLE_HOME/lib`, the `DISPLAY` value replaced with your logical hostname and the `LHOSTNAME` replaced by the fully qualified logical hostname.

```
$ cat /global/ora9ias/infra/opmn/config/opmn.xml
<ias-instance xmlns="http://www.oracle.com/ias-instance">
  <notification-server>
    <port local="6100" remote="6200" request="6003"/>
    <log-file path="/global/ora9ias/infra/opmn/logs/ons.log" level="3"/>
  </notification-server>
  <process-manager>
    <ohs gid="HTTP Server" maxRetry="3">
      <start-mode mode="ssl"/>
    </ohs>
    <oc4j maxRetry="3" instanceName="home" numProcs="1">
      <config-file path="/global/ora9ias/infra/j2ee/home/config/server.xml"/>
      <oc4j-option value="-properties"/>
      <port ajp="3000-3100" jms="3201-3300" rmi="3101-3200"/>
      <environment>
        <prop name="DISPLAY" value="ora9ias:0.0"/>
        <prop name="LD_LIBRARY_PATH" value="/global/ora9ias/infra/lib"/>
        <prop name="LHOSTNAME" value="ora9ias.com"/>
        <prop name="LD_PRELOAD_32" value="libloghost_32.so.1"/>
      </environment>
    </oc4j>
    <oc4j maxRetry="3" instanceName="OC4J_DAS" gid="OC4J_DAS" numProcs="1">
```

```

        <config-file path="/global/ora9ias/infra/j2ee/OC4J_DAS/config/server.xml"/>
        <java-option value="-server -Xincgc -Xnoclassgc -Xmx256m"/>
        <oc4j-option value="-properties"/>
        <port ajp="3001-3100" jms="3201-3300" rmi="3101-3200"/>
        <environment>
        <prop name="DISPLAY" value="ora9ias:0.0"/>
        <prop name="LD_LIBRARY_PATH" value="/global/ora9ias/infra/lib"/>
        <prop name="LHOSTNAME" value="ora9ias.com"/>
        <prop name="LD_PRELOAD_32" value="libloghost_32.so.1"/>
        </environment>
    </oc4j>
    <oc4j maxRetry="3" instanceName="OC4J_Demos" gid="OC4J_Demos" numProcs="1">
        <config-file path="/global/ora9ias/infra/j2ee/OC4J_Demos/config/server.xml"/>
        <java-option value="-Xmx512M"/>
        <oc4j-option value="-userThreads -properties"/>
        <port ajp="3001-3100" jms="3201-3300" rmi="3101-3200"/>
        <environment>
        <prop name="%LIB_PATH_ENV%" value="%LIB_PATH_VALUE%"/>
        <prop name="DISPLAY" value="ora9ias:0.0"/>
        <prop name="LD_LIBRARY_PATH" value="/global/ora9ias/infra/lib"/>
        <prop name="LHOSTNAME" value="ora9ias.com"/>
        <prop name="LD_PRELOAD_32" value="libloghost_32.so.1"/>
        </environment>
    </oc4j>
    <custom gid="dcm-daemon" numProcs="1" noGidWildcard="true">
        <start path="/global/ora9ias/infra/dcm/bin/dcmctl daemon -logdir
/global/ora9ias/infra/dcm/logs/daemon_logs"/>
        <stop path="/global/ora9ias/infra/dcm/bin/dcmctl shutdowndaemon"/>
        <environment>
        <prop name="DISPLAY" value="ora9ias:0.0"/>
        <prop name="LD_LIBRARY_PATH" value="/global/ora9ias/infra/lib"/>
        <prop name="LHOSTNAME" value="ora9ias.com"/>
        <prop name="LD_PRELOAD_32" value="libloghost_32.so.1"/>
        </environment>
    </custom>
    <log-file path="/global/ora9ias/infra/opmn/logs/ipm.log" level="3"/>
</process-manager>
</ias-instance>

```

f. Restart OPMN

```
$ $ORACLE_HOME/opmn/bin/opmnctl startall
```

g. Update the OPMN configuration

```
$ $ORACLE_HOME/dcm/bin/dcmctl updateConfig -ct opmn
```

h. Stop all the Infrastructure processes

After the install, all the Infrastructure processes will be started. These need to be stopped so that they can be started under the control of Sun Cluster.

7. Install the Oracle 10g AS Infrastructure

Note – Refer to [Step 6](#) if you are installing the Oracle 9iAS Infrastructure

For this section, follow the *Oracle Application Server, Installation Guide* manual to install Sun Cluster.

a. Setting ORACLE_HOME during the install

When prompted for the ORACLE_HOME during the install, point to a directory on the Infrastructure File System you mounted in [Step 4](#).

b. Install Patches

Check the latest release notes for any post install patches.

c. Stop all the Infrastructure processes

After the install, all the Infrastructure processes will be started. These need to be stopped so that they can be started under the control of Sun Cluster.

8. Prepare the other Cluster Nodes

Since the ORACLE_HOME is on shared storage, there is no need to install the software again on the other nodes within the cluster. Once the Oracle 9iAS or Oracle 10g AS Infrastructure file system is under the control of Sun Cluster, either as a Global File System or Failover File System, the Infrastructure files can be made available to other nodes within Sun Cluster.

It is however necessary to update the oratab and emtab files in `/var/opt/oracle` on the other nodes within the cluster. If there are no other Oracle database instances on the other nodes, simply copy the two files from the first node to the second node etc. If there are other Oracle database instances, then add the `iasdb` entries from the oratab and emtab files on node 1 to the same files on node 2 etc. Create the files on node 2 if necessary.

9. Preparation if installing the Middle Tier on the same nodes as the Infrastructure.

Unlike the Oracle 9iAS or Oracle 10g AS Infrastructure, the middle tier may be installed on multiple active nodes to achieve high availability. Typically the middle tier and infrastructure are installed on separate nodes. However, you may wish to install the middle tier on the node(s) where the clustered infrastructure has been installed. This can be done by installing the middle tier on local disks of the nodes that could host the infrastructure.

However, whenever the middle tier and infrastructure share a cluster node, two `/var/opt/oracle` areas must be maintained. One for the infrastructure where the `oraInst.loc` points to the `oraInventory` directory on the shared disk and another for the middle tier instance installed on local disk on each cluster node where it's `oraInst.loc` points to another `oraInventory` directory on local disk of that node. These directories are needed for applying patches and performing other upgrades or maintenance tasks and therefore must be saved.

Note – When applying patches or upgrades on the infrastructure or middle tiers, the corresponding original copy of "/var/opt/oracle" must be reinstated and made available before the Oracle installer is invoked.

Save /var/opt/oracle on each cluster node where the middle tier and infrastructure are installed together.

```
# cp -rp /var/opt/oracle /var/opt/oracle_infra
```

Note – You will need to supply the directory for the Oracle 9iAS Infrastructure "/var/opt/oracle" location when you register the Sun Cluster HA for Oracle Application Server data service later on. In this case we have copied this to /var/opt/oracle_infra.

10. Stop the Sun Cluster Infrastructure

For Oracle 9iAS Infrastructure

```
# su - <Oracle Application Server Userid>
$ <Oracle Home>/bin/emctl stop
$ <Oracle Home>/opmn/bin/opmnctl stopall
$ <Oracle Home>/bin/oidctl server=oidldapd configset=0 instance=1 stop
$ <Oracle Home>/bin/oidmon stop
```

For Oracle 10g AS Infrastructure

```
# su - <Oracle Application Server Userid>
$ <Oracle Home>/bin/emctl stop iasconsole
$ <Oracle Home>/opmn/bin/opmnctl stopall
```

11. Stop the Oracle Database and Listener

```
# su - <Oracle Database Userid>
$ <Oracle Home>/bin/lsnrctl stop
$ <Oracle Home>/bin/sqlplus "/ as sysdba"
$ shutdown normal
$ quit
```

12. Edit /etc/vfstab to reinstate the global mount option

If the Infrastructure mount point is a Global File System and you temporarily removed the global option in [Step 1](#) you must now reinstate the global mount option.

You must edit /etc/vfstab to reinstate the global mount option. If you commented out the original entry just remove just that comment and comment out the copied entry you made in [Step 1](#).

13. Boot each Node in Cluster Mode

```
# reboot
```

Verifying the Installation and Configuration of Sun Cluster

This section contains the procedure you need to verify the installation and configuration.

▼ How to Verify the Installation and Configuration of Sun Cluster

This procedure does not verify that your application is highly available because you have not yet installed your data service.

Before verifying the Installation and Configuration of Sun Cluster, ensure that the installation has been completed by following the steps in ["Installing and Configuring Sun Cluster"](#) on page 19.

Steps 1. Start the Oracle Database and Listener

```
# su - <Oracle Database Userid>
$ <Oracle Home>/bin/lsnrctl start
$ <Oracle Home>/bin/sqlplus "/" as sysdba
$ startup
$ quit
```

2. Start the Sun Cluster Infrastructure

For Oracle 9iAS Infrastructure

```
# su - <Oracle Application Server Userid>
$ <Oracle Home>/bin/oidmon start
$ <Oracle Home>/bin/oidctl server=oidldapd configset=0 instance=1 start
$ <Oracle Home>/opmn/bin/opmnctl startall
$ <Oracle Home>/bin/emctl start
```

For Oracle 10g AS Infrastructure

```
# su - <Oracle Application Server Userid>
$ <Oracle Home>/opmn/bin/opmnctl startall
$ <Oracle Home>/bin/emctl start iasconsole
```

3. Verifying the Oracle 9iAS Infrastructure

```
# su - <Oracle Application Server Userid>
$
$ <Oracle Home>/bin/emctl status
EMD is up and running : 200 OK
$
```

```
$ <Oracle Home>/dcm/bin/dcmctl getstate -v
```

```
Current State for Instance:iasdb1.psemeal4.uk.sun.com
```

	Component	Type	Up Status	In Sync Status
1	HTTP Server	ohs	Up	True
2	OC4J_DAS	oc4j	Up	True
3	OC4J_Demos	oc4j	Down	True
4	home	oc4j	Down	True

4. Verifying the Oracle 10g AS Infrastructure

```
# su - <Oracle Application Server Userid>
```

```
$
```

```
$ <Oracle Home>/bin/emctl status iasconsole
```

```
Oracle Enterprise Manager 10g Application Server Control 9.0.4.0.0  
Copyright (c) 2002, 2003 Oracle Corporation. All rights reserved.  
Oracle 10g Application Server Control is running.
```

```
$
```

```
$ <Oracle Home>/opmn/bin/opmnctl status
```

```
Processes in Instance: 10g_inst1.psemeal2
```

ias-component	process-type	pid	status
OID	OID	17961	Alive
HTTP_Server	HTTP_Server	18065	Alive
OC4J	OC4J_SECURITY	18318	Alive
dcm-daemon	dcm-daemon	19324	Alive
LogLoader	logloaderd	N/A	Down

Installing the Sun Cluster HA for Oracle Application Server Packages

If you did not install the Sun Cluster HA for Oracle Application Server packages during your Sun Cluster installation, perform this procedure to install the packages. Perform this procedure on each cluster node where you are installing the Sun Cluster HA for Oracle Application Server packages. To complete this procedure, you need the Sun Cluster Agents CD-ROM.

If you are installing more than one data service simultaneously, perform the procedure in “Installing the Software” in *Sun Cluster Software Installation Guide for Solaris OS*.

Install the Sun Cluster HA for Oracle Application Server packages by using one of the following installation tools:

- Web Start program

- `scinstall` utility

Note – If you are using Solaris 10, install these packages *only* in the global zone. To ensure that these packages are not propagated to any local zones that are created after you install the packages, use the `scinstall` utility to install these packages. Do *not* use the Web Start program.

▼ How to Install the Sun Cluster HA for Oracle Application Server Packages Using the Web Start Program

You can run the Web Start program 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. For more information about the Web Start program, see the `installer(1M)` man page.

- Steps**
1. **On the cluster node where you are installing the Sun Cluster HA for Oracle Application Server packages, become superuser.**
 2. **(Optional) If you intend to run the Web Start program with a GUI, ensure that your `DISPLAY` environment variable is set.**
 3. **Insert the Sun Cluster Agents CD-ROM into the CD-ROM drive.**
If the Volume Management daemon `vold(1M)` is running and configured to manage CD-ROM devices, it automatically mounts the CD-ROM on the `/cdrom/cdrom0` directory.
 4. **Change to the Sun Cluster HA for Oracle Application Server component directory of the CD-ROM.**
The Web Start program for the Sun Cluster HA for Oracle Application Server data service resides in this directory.

```
# cd /cdrom/cdrom0/components/SunCluster_HA_ORACLE9I_AS_3.1
```
 5. **Start the Web Start program.**

```
# ./installer
```
 6. **When you are prompted, select the type of installation.**
 - To install only the C locale, select Typical.
 - To install other locales, select Custom.
 7. **Follow the instructions on the screen to install the Sun Cluster HA for Oracle Application Server packages on the node.**

After the installation is finished, the Web Start program provides an installation summary. This summary enables you to view logs that the Web Start program created during the installation. These logs are located in the `/var/sadm/install/logs` directory.

8. **Exit the Web Start program.**
9. **Remove the Sun Cluster Agents CD-ROM from the CD-ROM drive.**
 - a. **To ensure that the CD-ROM is not being used, change to a directory that does *not* reside on the CD-ROM.**
 - b. **Eject the CD-ROM.**

```
# eject cdrom
```

▼ How to Install the Sun Cluster HA for Oracle Application Server Packages using the `scinstall` Utility

Use this procedure to install the Sun Cluster HA for Oracle Application Server packages by using the `scinstall` utility. You need the Sun Cluster Agents CD-ROM to perform this procedure. This procedure assumes that you did not install the data service packages during your initial Sun Cluster installation.

If you installed the Sun Cluster HA for Oracle Application Server packages as part of your initial Sun Cluster installation, proceed to [“Registering and Configuring Sun Cluster HA for Oracle Application Server”](#) on page 30.

Otherwise, use this procedure to install the Sun Cluster HA for Oracle Application Server packages. Perform this procedure on all nodes that can run Sun Cluster HA for Oracle Application Server data service.

- Steps**
1. **Load the Sun Cluster Agents CD-ROM into the CD-ROM drive.**
 2. **Run the `scinstall` utility with no options.**

This step starts the `scinstall` utility in interactive mode.
 3. **Choose the menu option, Add Support for New Data Service to This Cluster Node.**

The `scinstall` utility prompts you for additional information.
 4. **Provide the path to the Sun Cluster Agents CD-ROM.**

The utility refers to the CD as the “data services cd.”
 5. **Specify the data service to install.**

The `scinstall` utility lists the data service that you selected and asks you to confirm your choice.

6. Exit the `scinstall` utility.
7. Unload the CD from the drive.

Registering and Configuring Sun Cluster HA for Oracle Application Server

This section contains the procedures you need to configure Sun Cluster HA for Oracle Application Server.

▼ How to Register and Configure Sun Cluster HA for Oracle Application Server as a Failover Service

This procedure assumes that you installed the data service packages during your initial Sun Cluster installation.

If you did not install the Sun Cluster HA for Oracle Application Server packages as part of your initial Sun Cluster installation, go to [“How to Install the Sun Cluster HA for Oracle Application Server Packages using the `scinstall` Utility”](#) on page 29.

Steps 1. Become superuser on one of the nodes in the cluster that will host Sun Cluster.

2. Register the `SUNW.gds` resource type.

```
# scrgadm -a -t SUNW.gds
```

3. Register the `SUNW.HAStoragePlus` resource type.

```
# scrgadm -a -t SUNW.HAStoragePlus
```

4. Register the `SUNW.oracle_server` and `SUNW.oracle_listener` resource type.

```
# scrgadm -a -t SUNW.oracle_server
# scrgadm -a -t SUNW.oracle_listener
```

5. Create a failover resource group.

```
# scrgadm -a -g Sun Cluster-failover-resource-group
```

6. Create a resource for the Sun Cluster Disk Storage.

```
# scrgadm -a -j Sun Cluster-has-resource \
-g Sun Cluster-failover-resource-group \
```

```
-t SUNW.HAStoragePlus \
-x FilesystemMountPoints=Sun Cluster -Infrastructure instance-mount-points
```

7. Create a resource for the Sun Cluster Logical Hostname.

```
# scrgadm -a -L -j Sun Cluster-lh-resource \
-g Sun Cluster-failover-resource-group \
-l Sun Cluster-logical-hostname
```

8. Enable the failover resource group that now includes the Sun Cluster Disk Storage and Logical Hostname resources.

```
# scswitch -z -g Sun Cluster-failover-resource-group
```

9. Create a resource for the Sun Cluster Oracle Database.

Note – For detailed information about Sun Cluster HA for Oracle, refer to the *Sun Cluster Data Services Installation and Configuration Guide*.

```
#
scrgadm -a -j Sun Cluster-ORACLE-resource \
-t SUNW.oracle_server \
-g Sun Cluster-failover-resource-group\
-x Connect_string=<user/passwd>\
-x ORACLE_SID=<Oracle 9iAS instance>\
-x ORACLE_HOME=<Oracle 9iAS Infrastructure directory> \
-x Alert_log_file=<${ORACLE_HOME} alert log file>

#
# scswitch -e -j Sun Cluster-ORACLE-resource
```

10. Create a resource for the Sun Cluster Oracle Listener.

Note – For detailed information about Sun Cluster HA for Oracle, refer to the *Sun Cluster Data Services Installation and Configuration Guide*.

```
# scrgadm -a -j Sun Cluster-ORALSr-resource \
-t SUNW.oracle_listener \
-g Sun Cluster-failover-resource-group\
-x Listener_name=<Instance>\
-x ORACLE_HOME=<Oracle 9iAS Infrastructure directory>\

#
# scswitch -e -j Sun Cluster-ORALSr-resource
```

11. Create the Oracle 9iAS Infrastructure resources.

Note – Refer to [Step 13](#) for Oracle 10g AS Infrastructure

Edit the `9ias_config` file and follow the comments with that file, for example

```
#
# Copyright 2004 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# This file will be sourced in by 9ias_register and the parameters
# listed below will be used.
#
# These parameters can be customized in (key=value) form
#
#         RG - name of the SC resource group containing the resources
#     RS_OIDMON - name of the SC Oracle Internet Directory Monitor resource
#     RS_OIDLDAP - name of the SC Oracle Internet Directory resource
#         RS_OPMN - name of the SC Oracle Process Monitor Notification resource
#         RS_EM - name of the SC Enterprise Manager Web site resource
#
#     Note: Only one Enterprise Manager is required if multiple
#           infrastructure instances are being deployed.
#
#           Omit the value to RS_EM if you do not require a SC resource
#           for the Enterprise Manager.
#
#     ORACLE_HOME - name of the Oracle home directory
#     ORACLE_SID - name of the Oracle SID
#     OIAS_LHOST - name of the Oracle 9iAS Infrastructure logical hostname
#     OIAS_USER - name of the Oracle 9iAS Infrastructure userid
#     OIAS_ADMIN - name of the Oracle 9iAS Internet Directory Admin password
#     OIAS_INFRA - name of the Oracle 9iAS Infrastructure /var/opt/oracle
#     OIAS_FQDN - name of the Oracle 9iAS fully qualified domainname
#     OIAS_OPMN - name of the Oracle 9iAS OPMN instance names to start
#                 e.g. OIAS_OPMN=ohs,OC4J_DAS or ALL
#     ALL indicates all instance names in $ORACLE_HOME/opmn/conf/opmn.xml
#
#         RS_LH - name of the SC Logical Hostname resource
#         RS_HAS - name of the SC Oracle 9iAS HAStoragePlus resource
#     RS_ORACLE - name of the SC Oracle resource
#     RS_ORALSR - name of the SC Oracle Listener resource
#
#
RG=
RS_OIDMON=
RS_OIDLDAP=
RS_OPMN=
RS_EM=

ORACLE_HOME=
ORACLE_SID=
OIAS_LHOST=
OIAS_USER=
```



```
OIAS_ADMIN=  
OIAS_INFRA=  
OIAS_FQDN=  
OIAS_OPMN=
```

```
RS_LH=  
RS_HAS=  
RS_ORACLE=  
RS_ORALSR=
```

The following is an example for Sun Cluster for Oracle 9iAS Infrastructure.

```
RG=9ias-infra-rg  
RS_OIDMON=9ias-oidmon-res  
RS_OIDLDAP=9ias-oidldap-res  
RS_OPMN=9ias-opmn-res  
RS_EM=9ias-em-res  
  
ORACLE_HOME=/global/ora9ias/infra  
ORACLE_SID=iasdb  
OIAS_LHOST=ora9ias  
OIAS_USER=oraprod  
OIAS_ADMIN=ias_admin  
OIAS_INFRA=/var/opt/oracle or  
    /var/opt/oracle_infra if the middle tier is also installed and  
    /var/opt/oracle was renamed to /var/opt/oracle_infra  
OIAS_FQDN=ora9ias.com  
OIAS_OPMN=ohs/oc4j_das or  
    all if all components are required  
RS_LH=9ias-lhs-res  
RS_HAS=9ias-has-res  
RS_ORACLE=9ias-oracle-res  
RS_ORALSR=9ias-oralsr-res  
  
# ./9ias_register
```

12. Enable each Oracle 9iAS Infrastructure resource.

```
# scstat  
#  
# scswitch -e -j Sun Cluster-OIDMON-resource  
# scswitch -e -j Sun Cluster-OIDLDAP-resource  
# scswitch -e -j Sun Cluster-OPMN-resource  
# scswitch -e -j Sun Cluster-EM-resource
```

13. Create the Oracle 10g AS Infrastructure resources.

Note – Refer to [Step 11](#) for Oracle 9iAS Infrastructure

Edit the 10gas_config file and follow the comments with that file, for example

```
#  
# Copyright 2004 Sun Microsystems, Inc. All rights reserved.  
# Use is subject to license terms.
```

```

#
# This file will be sourced in by 10gas_register and the parameters
# listed below will be used.
#
# These parameters can be customized in (key=value) form
#
#         RG - name of the SC resource group containing the resources
#         RS_OPMN - name of the SC Oracle Process Monitor Notification resource
#         RS_EM - name of the SC Enterprise Manager Web site resource
#
# ORACLE_HOME - name of the Oracle home directory
# ORACLE_SID - name of the Oracle SID
# OIAS_LHOST - name of the Oracle 10gAS Infrastructure logical hostname
# OIAS_USER - name of the Oracle 10gAS Infrastructure userid
# OIAS_ADMIN - name of the Oracle 10gAS Internet Directory Admin password
# OIAS_INFRA - name of the Oracle 10gAS Infrastructure /var/opt/oracle
# OIAS_FQDN - name of the Oracle 10gAS fully qualified domainname
# OIAS_OPMN - name of the Oracle 10gAS ias-components
#             e.g. OIAS_OPMN=OID/HTTP_Server/OC4J or OIAS_OPMN=all
#
#         ALL indicates all the installed ias-components
#
#         RS_LH - name of the SC Logical Hostname resource
#         RS_HAS - name of the SC Oracle 10gAS HAStoragePlus resource
#         RS_ORACLE - name of the SC Oracle resource
#         RS_ORALSR - name of the SC Oracle Listener resource
#

```

```

RG=
RS_OPMN=
RS_EM=

```

```

ORACLE_HOME=
ORACLE_SID=
OIAS_LHOST=
OIAS_USER=
OIAS_ADMIN=
OIAS_INFRA=
OIAS_FQDN=
OIAS_OPMN=

```

```

RS_LH=
RS_HAS=
RS_ORACLE=
RS_ORALSR=

```

The following is an example for Sun Cluster for Oracle 10g AS Infrastructure.

Note – The values for OIAS_ADMIN and OIAS_FQDN are not used within the Sun Cluster HA for Oracle Application Server for Oracle 10g AS, however you need to supply a value for the registration script and therefore can supply the value dummy.

```

RG=10gas-infra-rg
RS_OPMN=10gas-opmn-res

```

```

RS_EM=10gas-em-res

ORACLE_HOME=/global/ora10gas/infra
ORACLE_SID=iasdb
OIAS_LHOST=ora10gas
OIAS_USER=oraprod
OIAS_ADMIN=dummy
OIAS_INFRA=/var/opt/oracle or
            /var/opt/oracle_infra if the middle tier is also installed and
            /var/opt/oracle was renamed to /var/opt/oracle_infra

OIAS_FQDN=dummy
OIAS_OPMN=OID/HTTP_Server/OC4J or
            all if all components are required

RS_LH=10gas-lhs-res
RS_HAS=10gas-has-res
RS_ORACLE=10gas-oracle-res
RS_ORALSR=10gas-oralsr-res

# ./10gas_register

```

14. Enable each Oracle 10g AS Infrastructure resource.

```

# scstat
#
# scswitch -e -j Sun Cluster-OPMN-resource
# scswitch -e -j Sun Cluster-EM-resource

```

Verifying the Sun Cluster HA for Oracle Application Server Installation and Configuration

This section contains the procedure you need to verify that you installed and configured your data service correctly.

▼ How to Verify the Sun Cluster HA for Oracle Application Server Installation and Configuration

- Steps**
1. Become superuser on one of the nodes in the cluster that will host Sun Cluster.
 2. Ensure all the Sun Cluster resources are online with `scstat`.

```
# scstat
```

For each Sun Cluster resource that is not online, use the `scswitch` command as follows.

```
# scswitch -e -j Sun Cluster- resource
```

3. Run the `scswitch` command to switch the Sun Cluster resource group to another cluster node, such as `node2`.

```
# scswitch -z -g Sun Cluster-failover-resource-group -h node2
```

Understanding the Sun Cluster HA for Oracle Application Server Fault Monitor

This section describes the Sun Cluster HA for Oracle Application Server fault monitor's probing algorithm or functionality.

For conceptual information on fault monitors, see the *Sun Cluster Concepts Guide*.

Resource Properties

The Sun Cluster HA for Oracle Application Server fault monitor uses the same resource properties as resource type `SUNW.gds`. Refer to the `SUNW.gds(5)` man page for a complete list of resource properties used.

Probing Algorithm and Functionality

- **Oracle Internet Directory Monitor (OIDMON)**

Note – This test is only performed for the Oracle 9iAS Infrastructure.

- Sleeps for `Thorough_probe_interval`
 - Test whether the `OIDMON` process is running. If this fails, then the probe will restart the `OIDMON` resource.
 - If the `OIDMON` resource is repeatedly restarted and subsequently exhausts the `Retry_count` within the `Retry_interval` then a failover is initiated for the Resource Group onto another node.
- **Oracle Internet Directory Process (OIDLDAP)**

Note – This test is only performed for the Oracle 9iAS Infrastructure.

- Sleeps for `Thorough_probe_interval`
- Test whether the directory service is available by running `$ORACLE_HOME/bin/ldapsearch`. If this fails, then the probe will issue a half failure as usually the Oracle Internet Directory Monitor (OIDMON) process will restart the Oracle Internet Directory Process (OIDLDAP). If at the next probe cycle the test fails again then another half failure is issued. If two half failures are issued by successive probes, then the probe will restart the OIDLDAP resource.
- If the OIDLDAP resource is repeatedly restarted and subsequently exhausts the `Retry_count` within the `Retry_interval` then a failover is initiated for the Resource Group onto another node. However, in reality because the OIDLDAP probe reports a half failure every time the test fails and that usually the OIDMON process is responsible for restarting the OIDLDAP process, it is very unlikely that a failover will be initiated.
- **Oracle Process Management and Notification (OPMN)**
 - Sleeps for `Thorough_probe_interval`
 - Test whether the OPMN process is running. If this fails, then the probe will restart the OPMN resource.
 - For Oracle 9iAS, test whether each managed OPMN component reported by `$ORACLE_HOME/dcm/bin/dcmctl getstate -v` is Up. If this fails, then the probe will try to (re)start the OPMN component. However, in reality the OPMN process is responsible for restarting these components. If the OPMN probe tries to (re)start the OPMN component and the OPMN process has already tried to start the OPMN component then the duplicate (re)start will simply be ignored.
 - For Oracle 10g AS, test whether OPMN is working by `$ORACLE_HOME/opmn/bin/opmnctl status`. If this fails, then the probe will report an error and request a restart.
 - If the OPMN resource is repeatedly restarted and subsequently exhausts the `Retry_count` within the `Retry_interval` then a failover is initiated for the Resource Group onto another node.
- **Enterprise Manager (EM)**
 - Sleeps for `Thorough_probe_interval`
 - Test whether the EM process is running. If this fails, then the probe will restart the EM resource.
 - Test whether the EM status is `EMD is up and running`. If this fails, then the probe will restart the EM resource.
 - If the EM resource is repeatedly restarted and subsequently exhausts the `Retry_count` within the `Retry_interval` then a failover is initiated for the Resource Group onto another node.

Debug Sun Cluster HA for Oracle Application Server

Sun Cluster HA for Oracle Application Server can be used by multiple Sun Cluster instances. However, it is possible to turn on debug for all Sun Cluster instances or a particular Sun Cluster instance.

Each Sun Cluster component has a DEBUG file in `/opt/SUNWsc9ias/etc`.

This files allows you to turn on debug for all Sun Cluster resources or for a specific Sun Cluster resource on a particular node with Sun Cluster. If you require debug to be turned on for Sun Cluster HA for Oracle Application Server across the whole Sun Cluster, repeat this step on all nodes within Sun Cluster.

▼ How to turn on debug for Sun Cluster HA for Oracle Application Server

Steps 1. Edit `/etc/syslog.conf` and change `daemon.notice` to `daemon.debug`.

```
# grep daemon /etc/syslog.conf
*.err;kern.debug;daemon.notice;mail.crit      /var/adm/messages
*.alert;kern.err;daemon.err                  operator
#
```

Change the `daemon.notice` to `daemon.debug` and restart `syslogd`. The output below, from the command `grep daemon /etc/syslog.conf`, shows that `daemon.debug` has now been set.

```
# grep daemon /etc/syslog.conf
*.err;kern.debug;daemon.debug;mail.crit      /var/adm/messages
*.alert;kern.err;daemon.err                  operator
#
# pkill -1 syslogd
#
```

2. Edit `/opt/SUNWsc9ias/etc/config`

Edit `/opt/SUNWsc9ias/etc/config` and change `DEBUG=` to `DEBUG=ALL` or `DEBUG=resource`

```
# cat /opt/SUNWsc9ias/etc/config
#
# Copyright 2003 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# Usage:
```

```
#          DEBUG=<RESOURCE_NAME> or ALL
#
DEBUG=ALL
#
```

Note – To turn off debug, reverse the steps above.

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