



Sun Cluster 3.1 Data Service for Oracle

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

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Preface

The Sun Cluster 3.1 Data Service for Oracle contains procedures to plan your Sun Cluster HA for Oracle installation and configuration.

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 environment and expertise with the volume manager software used with Sun Cluster.

UNIX Commands

This document contains information on commands specific to installing and configuring Sun Cluster data services. It might not contain information on basic UNIX® commands and procedures, such as shutting down the system, booting the system, and configuring devices. For that information, see one or more of the following:

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

Typographic Conventions

Typeface or Symbol	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type <code>rm filename</code> .

Shell Prompts

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

Related Documentation

Application	Title	Part Number
Installation	<i>Sun Cluster 3.1 Software Installation Guide</i>	816-3388
Hardware	<i>Sun Cluster 3.1 Hardware Administration Manual</i>	817-0168
	<i>Sun Cluster 3.1 With Sun StorEdge 3310 Array Installation and Service Manual</i>	817-0180
	<i>Sun Cluster 3.1 With Sun StorEdge 3900 or 6900 Series System Installation and Service Manual</i>	817-0179
	<i>Sun Cluster 3.1 With Sun StorEdge 9900 Series Storage Device Installation and Service Manual</i>	817-0177
	<i>Sun Cluster 3.1 With Sun StorEdge A1000 or Netra st A1000 Array Installation and Service Manual</i>	817-0171
	<i>Sun Cluster 3.1 With Sun StorEdge A3500/A3500FC System Installation and Service Manual</i>	817-0174
	<i>Sun Cluster 3.1 With Sun StorEdge A5x00 Array Installation and Service Manual</i>	817-0173
	<i>Sun Cluster 3.1 With Sun StorEdge D1000 or Netra st D1000 Disk Array Installation and Service Manual</i>	817-0170
	<i>Sun Cluster 3.1 With Sun StorEdge MultiPack Enclosure Installation and Service Manual</i>	817-0169
	<i>Sun Cluster 3.1 With Sun StorEdge Netra D130 or StorEdge S1 Enclosure Installation and Service Manual</i>	817-0178
	<i>Sun Cluster 3.1 With Sun StorEdge T3 or T3+ Array Partner-Group Configuration Installation and Service Manual</i>	817-0176
	<i>Sun Cluster 3.1 With Sun StorEdge T3 or T3+ Array Single-Controller Configuration Installation and Service Manual</i>	817-0175
	<i>Sun Cluster 3.1 With Sun StorEdge T3 or T3+ Array Single-Controller Configuration Installation and Service Manual</i>	817-0172

Application	Title	Part Number
API development	<i>Sun Cluster 3.1 Data Services Developer's Guide</i>	816-3385
Data Services	<i>Sun Cluster 3.1 Data Service 4/03 Planning and Administration Guide</i>	817-1526
	<i>Sun Cluster 3.1 Data Service 4/03 for Sun ONE Web Server</i>	817-1528
	<i>Sun Cluster 3.1 Data Service 4/03 for Sun ONE Directory Server</i>	817-1529
	<i>Sun Cluster 3.1 Data Service 4/03 for Sun ONE Application Server</i>	817-1530
	<i>Sun Cluster 3.1 Data Service 4/03 for Sun ONE Message Queue</i>	817-1531
	<i>Sun Cluster 3.1 Data Service 4/03 for Apache</i>	817-1532
	<i>Sun Cluster 3.1 Data Service 4/03 for Domain Name Service (DNS)</i>	817-1533
	<i>Sun Cluster 3.1 Data Service 4/03 for Network File System (NFS)</i>	817-1534
	<i>Sun Cluster 3.1 Data Service 4/03 for Oracle Parallel Server/Real Application Clusters</i>	817-1535
	<i>Sun Cluster 3.1 Data Service 4/03 for SAP</i>	817-1536
	<i>Sun Cluster 3.1 Data Service 4/03 for Sybase ASE</i>	817-1537
	<i>Sun Cluster 3.1 Data Service 4/03 for Netbackup</i>	817-1538
	<i>Sun Cluster 3.1 Data Service 4/03 for SAP liveCache</i>	817-1539
	<i>Sun Cluster 3.1 Data Service 4/03 for Siebel</i>	817-1540
	<i>Sun Cluster 3.1 Data Service 4/03 for WebLogic Server</i>	817-1541
	<i>Sun Cluster 3.1 Data Service 4/03 for BroadVision One-To-One Enterprise</i>	817-1542
	<i>Sun Cluster 3.1 Data Service 4/03 for WebSphere MQ</i>	817-1713
	<i>Sun Cluster 3.1 Data Service 4/03 for WebSphere MQ Integrator</i>	817-1714
	<i>Sun Cluster 3.1 Data Service 4/03 for Samba</i>	817-1715
	<i>Sun Cluster 3.1 Data Service 4/03 for DHCP</i>	817-1716
Administration	<i>Sun Cluster 3.1 System Administration Guide</i>	816-3384
Cluster concepts	<i>Sun Cluster 3.1 Concepts Guide</i>	816-3383

Application	Title	Part Number
Error Messages	<i>Sun Cluster 3.1 Error Messages Guide</i>	816-3382
Man Pages	<i>Sun Cluster 3.1 Man Page Reference Manual</i>	816-5251
Release notes	<i>Sun Cluster 3.1 Data Service 5/03 Release Notes</i>	817-1790
	<i>Sun Cluster 3.1 Release Notes</i>	816-5317
	<i>Sun Cluster 3.1 Release Notes Supplement</i>	816-3381

Sun Documentation Online

The `docs.sun.comSM` Web site enables you to access Sun technical documentation on the Web. You can browse the `docs.sun.com` archive or search for a specific book title or subject at `http://docs.sun.com`.

Help

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

- Your name and E-mail address (if available)
- Your company name, address, and phone number
- The model and serial numbers of your systems
- The release number of the operating environment (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.

Command	Function
<code>showrev -p</code>	Reports which patches are installed.
<code>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

This chapter contains the following procedures.

- “How to Prepare the Nodes” on page 13
- “How to Configure Oracle Database Access with Solstice DiskSuite” on page 15
- “How to Configure Oracle Database Access With VERITAS Volume Manager” on page 16
- “How to Install the Oracle Software” on page 16
- “How to Verify the Oracle Installation” on page 17
- “How to Create an Oracle Database” on page 18
- “How to Set Up Oracle Database Permissions” on page 19
- “How to Install Sun Cluster HA for Oracle Packages” on page 22
- “How to Register and Configure Sun Cluster HA for Oracle” on page 27
- “How to Verify the Sun Cluster HA for Oracle Installation” on page 32

Note – You can use SunPlex Manager to install and configure this data service. See the SunPlex Manager online help for details.

Installing and Configuring Sun Cluster HA for Oracle

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

TABLE 1-1 Task Map: Installing and Configuring HA for Oracle

Task	For Instructions, Go To
Plan the Sun Cluster HA for Oracle installation and configuration.	"Planning the Sun Cluster HA for Oracle Installation and Configuration" on page 12
Prepare the nodes and disks	"Preparing the Nodes and Disks" on page 13
Install the Oracle software	"How to Install the Oracle Software" on page 16
Verify the Oracle installation	"How to Verify the Oracle Installation" on page 17
Create an Oracle database	"How to Create an Oracle Database" on page 18
Set up Oracle database permissions	"How to Set Up Oracle Database Permissions" on page 19
Install the Sun Cluster HA for Oracle packages	"How to Install Sun Cluster HA for Oracle Packages" on page 22
Register and configure Sun Cluster HA for Oracle	"How to Register and Configure Sun Cluster HA for Oracle" on page 27
Verify the Sun Cluster HA for Oracle installation	"How to Verify the Oracle Installation" on page 17
Understand Sun Cluster HA for Oracle fault monitor	"Understanding Sun Cluster HA for Oracle Fault Monitor" on page 33

Planning the Sun Cluster HA for Oracle Installation and Configuration

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

Configuration Requirements



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

Use the requirements in this section to plan the installation and configuration of Sun Cluster HA for Oracle. These requirements apply to Sun Cluster HA for Oracle only. You must meet these requirements before you proceed with your Sun Cluster HA for Oracle installation and configuration.

For requirements that apply to all data services, see “Identifying Data Service Special Requirements” on page 3.

- **Oracle application files** – These files include Oracle binaries, configuration files, and parameter files. You can install these files either on the local file system, the highly available local file system, or on the cluster file system.

See “Configuration Guidelines for Sun Cluster Data Services” in *Sun Cluster 3.1 Data Service Planning and Administration Guide* for the advantages and disadvantages of placing the Oracle binaries on the local file system, highly available local file system, and the cluster file system.

- **Database-related files** – These files include the control file, redo logs, and data files. You must install these files on the highly available local file system or the cluster file system as either raw devices or regular files.

Configuration Planning Questions

Use the questions in this section to plan the installation and configuration of Sun Cluster HA for Oracle. Insert the answers to these questions into the data service worksheets in the *Sun Cluster 3.1 Release Notes*.

- What resource groups will you use for network addresses and application resources and the dependencies between them?
- What is the logical hostname (for failover services) or shared address (for scalable services) for clients that will access the data service?
- Where will the system configuration files reside?

See “Determining the Location of the Application Binaries” on page 3 of the *Sun Cluster 3.1 Data Service for Oracle* for the advantages and disadvantages of placing the Oracle binaries on the local file system as opposed to the cluster file system.

Preparing the Nodes and Disks

This section contains the procedures you need to prepare the nodes and disks.

▼ How to Prepare the Nodes

Use this procedure to prepare for the installation and configuration of Oracle software.



Caution – Perform all of the steps described in this section on all of the nodes. If you do not perform all of the steps on all of the nodes, the Oracle installation will be incomplete, and Sun Cluster HA for Oracle will fail during startup.

Note – Consult the Oracle documentation before you perform this procedure.

The following steps prepare your nodes and install the Oracle software.

1. **Become superuser on all of the cluster members.**
2. **Configure the `/etc/nsswitch.conf` files as follows so that the data service starts and stops correctly if a switchover or failover occurs.**

On each node that can master the logical host that runs Sun Cluster HA for Oracle, include one of the following entries for `group` in the `/etc/nsswitch.conf` file.

```
group:          files
group:          files [NOTFOUND=return] nis
group:          files [NOTFOUND=return] nisplus
```

Sun Cluster HA for Oracle uses the `su user` command to start and stop the database node. The network information name service might become unavailable when a cluster node's public network fails. Adding one of the preceding entries for `group` ensures that the `su(1M)` command does not refer to the NIS/NIS+ name services if the network information name service is unavailable.

3. **Configure the cluster file system for Sun Cluster HA for Oracle.**

If raw devices contain the databases, configure the global devices for raw-device access. See the *Sun Cluster 3.1 Software Installation Guide* for information on how to configure global devices.

If you use the Solstice™ DiskSuite/Solaris Volume Manager, configure the Oracle software to use UNIX file system (UFS) logging on mirrored meta devices or raw-mirrored meta devices. See the Solstice DiskSuite/Solaris Volume Manager documentation for more information on how to configure raw-mirrored meta devices.

4. **Prepare the `$ORACLE_HOME` directory on a local or multihost disk.**

Note – If you install the Oracle binaries on a local disk, use a separate disk if possible. Installing the Oracle binaries on a separate disk prevents the binaries from overwrites during operating environment reinstallation.

5. **On each node, create an entry for the database administrator group (DBA) in the `/etc/group` file, and add potential users to the group.**

You typically name the DBA group *dba*. Verify that the *root* and *oracle* users are members of the *dba* group, and add entries as necessary for other DBA users. Ensure that the group IDs are the same on all of the nodes that run Sun Cluster HA for Oracle, as the following example illustrates.

```
dba:*:520:root,oracle
```

You can create group entries in a network name service (for example, NIS or NIS+). If you do so, add your entries to the local `/etc/inet/hosts` file to eliminate dependency on the network name service.

6. On each node, create an entry for the Oracle user ID (*oracle*).

You typically name the Oracle user ID *oracle*. The following command updates the `/etc/passwd` and `/etc/shadow` files with an entry for the Oracle user ID.

```
# useradd -u 120 -g dba -d /Oracle-home oracle
```

Ensure that the *oracle* user entry is the same on all of the nodes that run Sun Cluster HA for Oracle.

▼ How to Configure Oracle Database Access with Solstice DiskSuite™

Use this procedure to configure the Oracle database with Solstice DiskSuite volume manager.

1. Configure the disk devices for the Solstice DiskSuite software to use.

See the *Sun Cluster 3.1 Software Installation Guide* for information on how to configure the Solstice DiskSuite software.

2. If you use raw devices to contain the databases, run the following commands to change each raw-mirrored metadevice's owner, group, and mode.

If you do not use raw devices, do not perform this step.

a. If you create raw devices, run the following commands for each device on each node that can master the Oracle resource group.

```
# chown oracle /dev/md/metaset/rdisk/dn
# chgrp dba /dev/md/metaset/rdisk/dn
# chmod 600 /dev/md/metaset/rdisk/dn
```

metaset Specifies the name of the diskset.

/rdisk/dn Specifies the name of the raw disk device within the *metaset* diskset.

b. Verify that the changes are effective.

```
# ls -lL /dev/md/metaset/rdisk/dn
```

▼ How to Configure Oracle Database Access With VERITAS Volume Manager

Use this procedure to configure the Oracle database with VERITAS Volume Manager software.

1. Configure the disk devices for the VxVM software to use.

See the *Sun Cluster 3.1 Software Installation Guide* for information on how to configure VERITAS Volume Manager.

2. If you use raw devices to contain the databases, run the following commands on the current disk-group primary to change each device's owner, group, and mode.

If you do not use raw devices, do not perform this step.

a. If you create raw devices, run the following command for each raw device.

```
# vxedit -g diskgroup set user=oracle group=dba mode=600 volume
```

diskgroup Specifies the name of the disk group.

volume Specifies the name of the raw volume within the disk group.

b. Verify that the changes are effective.

```
# ls -lL /dev/vx/rdisk/diskgroup/volume
```

c. Reregister the disk device group with the cluster to keep the VxVM namespace consistent throughout the cluster.

```
# scconf -c -D name=diskgroup
```

Installing the Oracle Software

This section contains the procedures you need to install Oracle software.

▼ How to Install the Oracle Software

User this procedure to install the Oracle software.

1. Become superuser on a cluster member.

2. Note the Oracle installation requirements.

Install Oracle binaries on one of the following locations.

- local disks of the cluster nodes
- highly available local file system
- cluster file system

Note – Before you install the Oracle software on the cluster file system, start the Sun Cluster software and become the owner of the disk device group.

See “Preparing the Nodes and Disks” on page 13 for more information about installation locations.

3. Install the Oracle software.

Regardless of where you install the Oracle software, modify each node’s `/etc/system` files as you would in standard Oracle installation procedures. Reboot afterward.

Log in as *oracle* to ensure ownership of the entire directory before you perform this step. See the appropriate Oracle installation and configuration guides for instructions on how to install Oracle software.

Verifying the Oracle Installation and Configuration

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

▼ How to Verify the Oracle Installation

Use this procedure to verify the Oracle installation. This procedure does not verify that your application is highly available because you have not installed your data service yet.

1. Verify that the *oracle* user and the *dba* group own the `$ORACLE_HOME/bin/oracle` directory.
2. Verify that the `$ORACLE_HOME/bin/oracle` permissions are set as follows.

```
-rwsr-s--x
```

3. Verify that the listener binaries exist in the `$ORACLE_HOME/bin` directory.

Where to Go From Here

When you have completed the work in this section, go to “Creating an Oracle Database” on page 18.

Creating an Oracle Database

This section contains the procedure to configure and create the initial Oracle database in a Sun Cluster environment. If you create and configure additional databases, omit the procedure “How to Create an Oracle Database” on page 18.

▼ How to Create an Oracle Database

1. **Prepare database configuration files.**

Place all of the database-related files (data files, redolog files, and control files) on either shared raw global devices or on the cluster file system. See “Preparing the Nodes and Disks” on page 13 for information on install locations.

Within the `init$ORACLE_SID.ora` or `config$ORACLE_SID.ora` file, you might need to modify the assignments for `control_files` and `background_dump_dest` to specify the locations of the control files and alert files.

Note – If you use Solaris authentication for database logins, set the `remote_os_authent` variable in the `init$ORACLE_SID.ora` file to `True`.

2. **Create the database.**

Start the Oracle installer and select the option to create a database. Alternatively, depending on your Oracle version, you can use the Oracle `svrmgr1(1M)` command to create the database.

During creation, ensure that all of the database-related files are placed in the appropriate location, either on shared global devices or on the cluster file system.

3. **Verify that the file names of your control files match the file names in your configuration files.**

4. Create the `v$sysstat` view.

Run the catalog scripts that create the `v$sysstat` view. The Sun Cluster fault monitoring scripts use this view.

Where to Go From Here

When you have completed the work in this section, go to “Setting Up Oracle Database Permissions” on page 19.

Setting Up Oracle Database Permissions

This section contains the procedure on how to set up Oracle database permissions.

▼ How to Set Up Oracle Database Permissions

Use this procedure to set up Oracle database permissions for Oracle 8i and Oracle 9i.

1. Enable access for the user and password to be used for fault monitoring.

- **To use the Oracle authentication method** – For all of the supported Oracle releases, enter the following script into the screen that the `sqlplus` command displays to enable access.

```
# sqlplus "/as sysdba"

grant connect, resource to user identified by passwd;
alter user user default tablespace system quota 1m on
system;
grant select on v_$sysstat to user;
grant create session to user;
grant create table to user;

exit;
```

- **To use the Solaris authentication method** – Grant permission for the database to use Solaris authentication.

Note – The user for which you enable Solaris authentication is the user who owns the files under the `$ORACLE_HOME` directory. The following code sample shows that the user `oracle` owns these files.

```
# sqlplus "/as sysdba"

create user ops$oracle identified by externally
    default tablespace system quota 1m on system;
grant connect, resource to ops$oracle;
    grant select on v_$sysstat to ops$oracle;
grant create session to ops$oracle;
grant create table to ops$oracle;

exit;
```

2. Configure NET8 for the Sun Cluster software.

The `listener.ora` file must be accessible from all of the nodes that are in the cluster. Place these files either under the cluster file system or in the local file system of each node that can potentially run the Oracle resources.

Note – If you place the `listener.ora` file in a location other than the `/var/opt/oracle` directory or the `$ORACLE_HOME/network/admin` directory, then you must specify `TNS_ADMIN` or an equivalent Oracle variable (see the Oracle documentation for details) in a user-environment file. You must also run the `scrgadm(1M)` command to set the resource extension parameter `User_env`, which will source the user-environment file. See Table 1–2 or Table 1–3 for format details.

Sun Cluster HA for Oracle imposes no restrictions on the listener name—it can be any valid Oracle listener name.

The following code sample identifies the lines in `listener.ora` that are updated.

```
LISTENER =
  (ADDRESS_LIST =
    (ADDRESS =
      (PROTOCOL = TCP)
        (HOST = logical-hostname) <- use logical hostname
        (PORT = 1527)
      )
    )
  )
.
.
SID_LIST_LISTENER =
.
.
  (SID_NAME = SID) <- Database name,
default is ORCL
```

The following code sample identifies the lines in `tnsnames.ora` that are updated on client machines.

```
service_name =
.
.
```

```

        (ADDRESS =
          (PROTOCOL = TCP)
          (HOST = logicalhostname)    <- logical hostname
          (PORT = 1527) <- must match port in LISTENER.ORA
        )
      )
    (CONNECT_DATA =
      (SID = <SID>)) <- database name, default is ORCL

```

The following example shows how to update the listener.ora and tnsnames.ora files given the following Oracle instances.

Instance	Logical Host	Listener
ora8	hadbms3	LISTENER-ora8
ora9	hadbms4	LISTENER-ora9

The corresponding listener.ora entries are the following entries.

```

LISTENER-ora9 =
  (ADDRESS_LIST =
    (ADDRESS =
      (PROTOCOL = TCP)
      (HOST = hadbms4)
      (PORT = 1530)
    )
  )
SID_LIST_LISTENER-ora9 =
  (SID_LIST =
    (SID_DESC =
      (SID_NAME = ora9)
    )
  )
LISTENER-ora8 =
  (ADDRESS_LIST =
    (ADDRESS= (PROTOCOL=TCP) (HOST=hadbms3) (PORT=1806))
  )
SID_LIST_LISTENER-ora8 =
  (SID_LIST =
    (SID_DESC =
      (SID_NAME = ora8)
    )
  )

```

The corresponding tnsnames.ora entries are the following entries.

```

ora8 =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP)
        (HOST = hadbms3)
        (PORT = 1806))
    )
  )

```

```

        (CONNECT_DATA = (SID = ora8))
    )
ora9 =
(DESCRIPTION =
  (ADDRESS_LIST =
    (ADDRESS =
      (PROTOCOL = TCP)
      (HOST = hadbms4)
      (PORT = 1530))
    )
  )
(CONNECT_DATA = (SID = ora9))
)

```

3. Verify that the Sun Cluster software is installed and running on all of the nodes.

```
# scstat
```

Where to Go From Here

Go to “Installing Sun Cluster HA for Oracle Packages” on page 22 to register and configure Sun Cluster HA for Oracle.

Installing Sun Cluster HA for Oracle Packages

Use the `scinstall(1M)` utility to install the `SUNWscor` package on your cluster. Do not use the `-s` option to non-interactive `scinstall` to install all of the data service packages.

If you installed the `SUNWscor` data service package as part of your initial Sun Cluster installation, proceed to “Registering and Configuring Sun Cluster HA for Oracle” on page 23. Otherwise, use the following procedure to install the `SUNWscor` package.

▼ How to Install Sun Cluster HA for Oracle Packages

You need the Sun Cluster Agents CD-ROM to complete this procedure. Perform this procedure on all of the cluster nodes that run Sun Cluster HA for Oracle.

- 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.**

Where to Go From Here

See “Registering and Configuring Sun Cluster HA for Oracle” on page 23 to register Sun Cluster HA for Oracle and to configure the cluster for the data service.

Registering and Configuring Sun Cluster HA for Oracle

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

Sun Cluster HA for Oracle Extension Properties

Use the extension properties in Table 1-2 to create your resources. Use the command line `scrgadm -x parameter=value` to configure extension properties when you create your resource. Use the procedure in “Administering Data Service Resources” in *Sun Cluster 3.1 Data Service Planning and Administration Guide* to configure the extension properties if you have already created your resources. You can update some extension properties dynamically. You can update others, however, only when you create or disable a resource. The Tunable entries indicate when you can update each property. See “Standard Properties” in *Sun Cluster 3.1 Data Service Planning and Administration Guide* for details on all Sun Cluster properties.

TABLE 1-2 Sun Cluster HA for Oracle Listener Extension Properties

Name/Data Type	Description
LISTENER_NAME (string)	The name of the Oracle listener. Default: LISTENER Range: None Tunable: When disabled
ORACLE_HOME (string)	The path to the Oracle home directory. Default: None Range: Minimum = 1 Tunable: When disabled
User_env (string)	A file that contains environment variables to be set before listener startup and shutdown. Those environment variables that have values that differ from Oracle defaults must be defined in this file (for example, if the user does not have a listener.ora file under /var/opt/oracle or \$ORACLE_HOME/network/admin, then the TNS_ADMIN environment variable should be defined). Also, the definition of each environment variable defined must follow the format VARIABLE_NAME=VARIABLE_VALUE. Each of these environment variables must be specified, one per line in the environment file. Default: "" Range: None Tunable: Any time

Table 1-3 describes the extension properties that you can set for the Oracle server. The only extension properties that you are required to set for the Oracle server are the ORACLE_HOME, ORACLE_SID, Alert_log_file, and Connect_string properties.

TABLE 1-3 Sun Cluster HA for Oracle Server Extension Properties

Name/Data Type	Description
Alert_log_file (string)	Oracle alert log file. Default: None Range: Minimum = 1 Tunable: Any time

TABLE 1-3 Sun Cluster HA for Oracle Server Extension Properties (Continued)

Name/Data Type	Description
Auto_End_Bkp (Boolean)	<p>A feature that performs the following recovery actions in the event of an interrupted Oracle RDRMS hot backup.</p> <ul style="list-style-type: none"> ■ Recognizes when a database fails to open because of files left in hot backup mode. This verification process occurs when Sun Cluster HA for Oracle starts up. ■ Identifies and releases all files left in hot backup mode. ■ Opens the database for use. <p>You can turn this feature ON and OFF. The default state is OFF (False).</p> <p>Default: False</p> <p>Range: None</p> <p>Tunable: Any time</p>
Connect_cycle (integer)	<p>The number of fault monitor probe cycles before disconnecting from the database.</p> <p>Default: 5</p> <p>Range: 0 – 99,999</p> <p>Tunable: Any time</p>
Connect_string (string)	<p>The Oracle user and password that the fault monitor uses to connect to the database.</p> <p>Default: None</p> <p>Range: Minimum = 1</p> <p>Tunable: Any time</p>
ORACLE_HOME (string)	<p>The path to the Oracle home directory.</p> <p>Default: None</p> <p>Range: Minimum = 1</p> <p>Tunable: When disabled</p>
ORACLE_SID (string)	<p>The Oracle system identifier.</p> <p>Default: None</p> <p>Range: Minimum = 1</p> <p>Tunable: When disabled</p>

TABLE 1-3 Sun Cluster HA for Oracle Server Extension Properties (Continued)

Name/Data Type	Description
Parameter_file (string)	<p>The Oracle parameter file. If the Oracle parameter file is not specified, this property defaults to Oracle's default.</p> <p>Default: ""</p> <p>Range:Minimum = 0</p> <p>Tunable: Any time</p>
Probe_timeout (integer)	<p>The time-out value (in seconds) that the fault monitor uses to probe an Oracle server instance.</p> <p>Default: 60</p> <p>Range:0 – 99,999</p> <p>Tunable: Any time</p>
Restart_type (string)	<p>When a fault with this resource is detected, a value of RESOURCE_RESTART will ensure only this resource restarts. A value of RESOURCE_GROUP_RESTART will ensure all resources in the resource group restart.</p> <p>Default: RESOURCE_GROUP_RESTART</p> <p>Range: None</p> <p>Tunable: Any time</p>
User_env (string)	<p>A file that contains environment variables to be set before server startup and shutdown.</p> <p>Those environment variables that have values that differ from Oracle defaults must be defined in this file (for example, if the user does not have a listener.ora file under /var/opt/oracle or \$ORACLE_HOME/network/admin, then the TNS_ADMIN environment variable should be defined). Also, the definition of each environment variable defined must follow the format VARIABLE_NAME=VARIABLE_VALUE. Each of these environment variables must be specified, one per line in the environment file.</p> <p>Default: ""</p> <p>Range: None</p> <p>Tunable: Any time</p>
Wait_for_online (Boolean)	<p>Wait in the START method until the database is online.</p> <p>Default: True</p> <p>Range: None</p> <p>Tunable: Any time</p>

▼ How to Register and Configure Sun Cluster HA for Oracle

Use this procedure to configure Sun Cluster HA for Oracle as a failover data 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 packages as part of your initial Sun Cluster installation, go to “How to Install Sun Cluster HA for Oracle Packages” on page 22 to install the data service packages. Otherwise, use this procedure to configure the Sun Cluster HA for Oracle.

You must have the following information to perform this procedure.

- The names of the cluster nodes that master the data service.
- The network resource that clients use to access the data service. Normally, you set up this IP address when you install the cluster. See the *Sun Cluster 3.1 Concepts Guide* document for details on network resources.
- The path to the Oracle application binaries for the resources that you plan to configure.

1. Become superuser on a cluster member.

2. Run the `scrgadm` command to register the resource types for the data service.

For Sun Cluster HA for Oracle, you register two resource types, `SUNW.oracle_server` and `SUNW.oracle_listener`, as follows.

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

`-a` Adds the data service resource type.

`-t SUNW.oracle_type` Specifies the predefined resource type name for your data service.

3. Create a failover resource group to hold the network and application resources.

You can optionally select the set of nodes on which the data service can run with the `-h` option, as follows.

```
# scrgadm -a -g resource-group [-h nodelist]
```

`-g resource-group` Specifies the name of the resource group. This name can be your choice but must be unique for resource groups within the cluster.

`-h nodelist` Specifies an optional comma-separated list of physical node names or IDs that identify potential masters. The order here determines the order in which the nodes are considered as primary during failover.

Note – Use the `-h` option to specify the order of the node list. If all of the nodes that are in the cluster are potential masters, you do not need to use the `-h` option.

4. Verify that all of the network resources that you use have been added to your name service database.

You should have performed this verification during the Sun Cluster installation.

Note – Ensure that all of the network resources are present in the server's and client's `/etc/inet/hosts` file to avoid any failures because of name service lookup.

5. Add a network resource to the failover resource group.

```
# scrgadm -a -L -g resource-group -l logical-hostname [-n netiflist]
```

`-l logical-hostname` Specifies a network resource. The network resource is the logical hostname or shared address (IP address) that clients use to access Sun Cluster HA for Oracle.

`[-n netiflist]` Specifies an optional, comma-separated list that identifies the IP Networking Multipathing groups that are on each node. Each element in `netiflist` must be in the form of `netif@node`. `netif` can be given as an IP Networking Multipathing group name, such as `sc_ipmp0`. The node can be identified by the node name or node ID, such as `sc_ipmp0@1` or `sc_ipmp@phys-schost-1`.

Note – Sun Cluster does not currently support using the adapter name for `netif`.

6. Register the SUNW.HAStoragePlus resource type with the cluster.

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

7. Create the resource `oracle-hastp-rs` of type SUNW.HAStoragePlus.

```
# scrgadm -a -j oracle-hastp-rs -g oracle-rg -t SUNW.HAStoragePlus \
```

[If your database is on a raw device, specify the global device path.]

```
-x GlobalDevicePaths=ora-set1,/dev/global/dsk/d1 \
```

[If your database is on a Cluster File Service, specify

the global filesystem and local filesystem mount points.]

```
-x FilesystemMountPoints=/global/ora-inst,/global/ora-data/logs,/local/ora-data \
```

```
[Set AffinityOn to true.]  
-x AffinityOn=TRUE
```

Note – AffinityOn must be set to TRUE and the local file system must reside on global disk groups to be failover.

8. Run the `scswitch` command to complete the following tasks and bring the resource group `oracle-rg` online on a cluster node.



Caution – Be sure to switch only at the resource group level. Switching at the device group level will confuse the resource group causing it to failover.

- Move the resource group into a MANAGED state.
- Bring the resource group online.

This node will be made the primary for device group `ora-set1` and raw device `/dev/global/dsk/d1`. Device groups associated with file systems such as `/global/ora-inst` and `/global/ora-data/logs` will also be made primaries on this node.

```
# scswitch -Z -g oracle-rg
```

9. Create Oracle application resources in the failover resource group.

- Oracle server resource:

```
# scrgadm -a -j resource -g resource-group \  
-t SUNW.oracle_server \  
-x Connect_string=user/passwd \  
-x ORACLE_SID=instance \  
-x ORACLE_HOME=Oracle-home \  
-x Alert_log_file=path-to-log  
-y resource_dependencies=<storageplus-resource>
```

- Oracle listener resource:

```
# scrgadm -a -j resource -g resource-group \  
-t SUNW.oracle_listener \  
-x LISTENER_NAME=listener \  
-x ORACLE_HOME=Oracle-home  
-y resource_dependencies=<storageplus-resource>
```

`-j resource`

Specifies the name of the resource to add.

`-g resource-group`

Specifies the name of the resource group into which the resources are to be placed.

- t *SUNW.oracle_server/listener*
Specifies the type of the resource to add.
- x *Alert_log_file=path-to-log*
Sets the path under \$ORACLE_HOME for the server message log.
- x *Connect_string=user/passwd*
Specifies the user and password that the fault monitor uses to connect to the database. These settings must agree with the permissions that you set up in “How to Set Up Oracle Database Permissions” on page 19. If you use Solaris authorization, type a slash (/) instead of the user name and password.
- x *ORACLE_SID=instance*
Sets the Oracle system identifier.
- x *LISTENER_NAME=listener*
Sets the name of the Oracle listener instance. This name must match the corresponding entry in *listener.ora*.
- x *ORACLE_HOME=Oracle-home*
Sets the path to the Oracle home directory.

Note – When a fault occurs in an Oracle server resource and causes a restart, the whole resource group is restarted. Any other resources (such as Apache or DNS) in the resource group are restarted, even if they did not have a fault. To prevent other resources from being restarted along with an Oracle server resource, put them in a separate resource group.

Optionally, you can set additional extension properties that belong to the Oracle data service to override their default values. See “Sun Cluster HA for Oracle Extension Properties” on page 23 for a list of extension properties.

10. Run the *scswitch* command to complete the following task.

- Enable the resource and fault monitoring.

```
# scswitch -Z -g resource-group
```

- Z Enables the resource and monitor, moves the resource group to the *MANAGED* state, and brings it online.
- g *resource-group* Specifies the name of the resource group.

Example – Registering Sun Cluster HA for Oracle

The following example shows how to register Sun Cluster HA for Oracle on a two-node cluster.

Cluster Information

Node names: *phys-schost-1, phys-schost-2*

Logical Hostname: *schost-1*

Resource group: *resource-group-1 (failover resource group)*

Oracle Resources: *oracle-server-1, oracle-listener-1*

Oracle Instances: *ora-lsnr (listener), ora-srvr (server)*

(Add the failover resource group to contain all of the resources.)

```
# scrgadm -a -g resource-group-1
```

(Add the logical hostname resource to the resource group.)

```
# scrgadm -a -L -g resource-group-1 -l schost-1
```

(Register the Oracle resource types)

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

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

(Add the Oracle application resources to the resource group.)

```
# scrgadm -a -j oracle-server-1 -g resource-group-1 \  
-t SUNW.oracle_server -x ORACLE_HOME=/global/oracle \  
-x Alert_log_file=/global/oracle/message-log \  
-x ORACLE_SID=ora-srvr -x Connect_string=scott/tiger
```

```
# scrgadm -a -j oracle-listener-1 -g resource-group-1 \  
-t SUNW.oracle_listener -x ORACLE_HOME=/global/oracle \  
-x LISTENER_NAME=ora-lsnr
```

(Bring the resource group online.)

```
# scswitch -Z -g resource-group-1
```

Where to Go From Here

Go to “Verifying the Sun Cluster HA for Oracle Installation” on page 31 after you register and configure Sun Cluster HA for Oracle.

Verifying the Sun Cluster HA for Oracle Installation

Perform the following verification tests to make sure that you have correctly installed Sun Cluster HA for Oracle.

These sanity checks ensure that all of the nodes that run Sun Cluster HA for Oracle can start the Oracle instance and that the other nodes in the configuration can access the Oracle instance. Perform these sanity checks to isolate any problems starting the Oracle software from Sun Cluster HA for Oracle.

▼ How to Verify the Sun Cluster HA for Oracle Installation

1. **Log in as *oracle* to the node that currently masters the Oracle resource group.**
2. **Set the environment variables `ORACLE_SID` and `ORACLE_HOME`.**
3. **Confirm that you can start the Oracle instance from this node.**
4. **Confirm that you can connect to the Oracle instance.**

Use the `sqlplus` command with the `user/password` variable defined in the `connect_string` property.

```
# sqlplus user/password@tns_service
```

5. **Shut down the Oracle instance.**

The Sun Cluster software will restart the Oracle instance because the Oracle instance is under Sun Cluster control.

6. **Switch the resource group that contains the Oracle database resource to another cluster member.**

The following example shows how to complete this step.

```
# scswitch -z -g resource-group -h node
```

7. **Log in as *oracle* to the node that now contains the resource group.**
8. **Repeat Step 3 and Step 4 to confirm interactions with the Oracle instance.**

Oracle Clients

Clients must always refer to the database by using the network resource (an IP address that can move between physical nodes during failover), not the physical hostname (a machine name).

For example, in the `tnsnames.ora` file, you must specify the network resource (logical hostname or shared address) as the host on which the database instance is running. See “How to Set Up Oracle Database Permissions” on page 19.

Note – Oracle client-server connections cannot survive a Sun Cluster HA for Oracle switchover. The client application must be prepared to handle disconnection and reconnection or recovery as appropriate. A transaction monitor might simplify the application. Further, Sun Cluster HA for Oracle node recovery time is application dependent.

Understanding Sun Cluster HA for Oracle Fault Monitor

The two fault monitors for Sun Cluster HA for Oracle are a server and a listener monitor.

Oracle Server Fault Monitor

The fault monitor for the Oracle server uses a request to the server to query the health of the server.

The server fault monitor consists of the following two processes.

- a main fault monitor process, which performs error lookup and `scha_control` actions
- a database client fault probe, which performs database transactions

All of the database connections from the probe are performed as user *oracle*. The main fault monitor determines that the operation is successful if the database is online and no errors are returned during the transaction.

If the database transaction fails, the main process checks the internal action table for an action to be performed and performs the predetermined action. If the action executes an external program, it is executed as a separate process in the background. Possible actions include the following.

- switchover
- stopping the server
- restarting the server
- stopping the resource group
- restarting the resource group

The probe uses the time-out value that is set in the resource property `Probe_timeout` to determine how much time to spend to successfully probe Oracle.

The server fault monitor also scans Oracle's `alert_log_file` and takes action based on any errors that the fault monitor finds.

The server fault monitor is started through `pmfadm` to make the monitor highly available. If the monitor is killed for any reason, the Process Monitor Facility (PMF) automatically restarts the monitor.

Oracle Listener Fault Monitor

The Oracle listener fault monitor checks the status of an Oracle listener.

If the listener is running, the Oracle listener fault monitor considers a probe successful. If the fault monitor detects an error, the listener is restarted.

The listener probe is started through `pmfadm` to make the probe highly available. If the probe is killed, PMF automatically restarts the probe.

If a problem occurs with the listener during a probe, the probe tries to restart the listener. The value set in the resource property `Retry_count` determines the maximum number of times that the probe attempts the restart. If, after trying for the maximum number of times, the probe is still unsuccessful, the probe stops the fault monitor and does not switch over the resource group.

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