

Oracle® Solaris Cluster Data Service for Oracle VM Server for SPARC Guide

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Preface

Oracle Solaris Cluster Data Service for Oracle VM Server for SPARC Guide explains how to install and configure Oracle Solaris Cluster data services.

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

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

Bash is the default shell for Oracle Solaris 11. Machine names shown with the Bash shell prompt are displayed for clarity.

Using UNIX Commands

This document contains information about commands that are specific to installing and configuring Oracle Solaris 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 Oracle Solaris Operating System
- Oracle Solaris Operating System man pages
- Other software documentation that you received with your system

Typographic Conventions

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

TABLE P-1 Typographic Conventions

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

Shell Prompts in Command Examples

The following table shows the default UNIX system prompt and superuser prompt for shells that are included in the Oracle Solaris OS. Note that the default system prompt that is displayed in command examples varies, depending on the Oracle Solaris release.

TABLE P-2 Shell Prompts

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

Related Documentation

Information about related Oracle Solaris Cluster topics is available in the documentation that is listed in the following table. All Oracle Solaris Cluster documentation is available at <http://www.oracle.com/technetwork/indexes/documentation/index.html>.

Topic	Documentation
Hardware installation and administration	<i>Oracle Solaris Cluster Hardware Administration Manual</i> Individual hardware administration guides
Concepts	<i>Oracle Solaris Cluster Concepts Guide</i>
Software installation	<i>Oracle Solaris Cluster Software Installation Guide</i>
Data service installation and administration	<i>Oracle Solaris Cluster Data Services Planning and Administration Guide</i> and individual data service guides
Data service development	<i>Oracle Solaris Cluster Data Services Developer's Guide</i>
System administration	<i>Oracle Solaris Cluster System Administration Guide</i> <i>Oracle Solaris Cluster Quick Reference</i>
Software upgrade	<i>Oracle Solaris Cluster Upgrade Guide</i>
Error messages	<i>Oracle Solaris Cluster Error Messages Guide</i>
Command and function references	<i>Oracle Solaris Cluster Reference Manual</i> <i>Oracle Solaris Cluster Data Services Reference Manual</i> <i>Oracle Solaris Cluster Geographic Edition Reference Manual</i> <i>Oracle Solaris Cluster Quorum Server Reference Manual</i>

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

Getting Help

If you have problems installing or using Oracle Solaris Cluster, contact your service provider and provide the following information.

- Your name and email address (if available)
- Your company name, address, and phone number
- The model number and serial number of your systems
- The release number of the operating environment (for example, Oracle Solaris 11)
- The release number of Oracle Solaris Cluster (for example, Oracle Solaris Cluster 4.1)

Use the following commands to gather information about 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>pkg list</code>	Reports which packages are installed
<code>prtdiag -v</code>	Displays system diagnostic information
<code>/usr/cluster/bin/clnode show-rev</code>	Displays Oracle Solaris Cluster release and package version information for each node

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

SPARC: Installing and Configuring HA for Oracle VM Server

This chapter explains how to install and configure Oracle Solaris Cluster HA for Oracle VM Server for SPARC (HA for Oracle VM Server) and contains the following sections:

- “SPARC: Installing and Configuring HA for Oracle VM Server” on page 9
- “SPARC: HA for Oracle VM Server Overview” on page 10
- “SPARC: Planning the HA for Oracle VM Server Installation and Configuration” on page 10
- “SPARC: Installing and Configuring Oracle VM Server for SPARC” on page 12
- “Installing the HA for Oracle VM Server Package” on page 13
- “SPARC: Registering and Configuring HA for Oracle VM Server” on page 14
- “SPARC: Verifying the Installation and Configuration of Oracle VM Server for SPARC” on page 15
- “SPARC: Tuning the HA for Oracle VM Server Fault Monitor” on page 15
- “SPARC: Debugging HA for Oracle VM Server” on page 17

SPARC: Installing and Configuring HA for Oracle VM Server

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

TABLE 1 Tasks for Installing and Configuring HA for Oracle VM Server

Task	Instructions
Plan the installation	“SPARC: Planning the HA for Oracle VM Server Installation and Configuration” on page 10
Install and configure the Oracle VM Server for SPARC software	“SPARC: Installing and Configuring Oracle VM Server for SPARC” on page 12
Install HA for Oracle VM Server packages	“Installing the HA for Oracle VM Server Package” on page 13

TABLE 1 Tasks for Installing and Configuring HA for Oracle VM Server (Continued)

Task	Instructions
Register and configure HA for Oracle VM Server resources	“SPARC: Registering and Configuring HA for Oracle VM Server” on page 14
Verify the HA for Oracle VM Server installation and configuration	“SPARC: Verifying the Installation and Configuration of Oracle VM Server for SPARC” on page 15
Tune the HA for Oracle VM Server fault monitor	“SPARC: Tuning the HA for Oracle VM Server Fault Monitor” on page 15
Debug HA for Oracle VM Server	“SPARC: Debugging HA for Oracle VM Server” on page 17

SPARC: HA for Oracle VM Server Overview

Oracle VM Server for SPARC provides the ability to split a single physical system into multiple, independent virtual systems. This is achieved by an additional software application in the firmware layer, interposed between the operating system and the hardware platform called the hypervisor. It abstracts the hardware and can expose or hide various resources, allowing for the creation of resource partitions that can operate as discrete systems, complete with virtual CPU, memory, and I/O devices.

You create the logical domain on any one of the nodes of the cluster. However the services configuration must be identical on all the potential primary nodes. The domain configuration is retrieved by the `ldm list -constraints -x ldom` command and stored in the CCR. This globally accessible information is used by the HA for Oracle VM Server agent to create or destroy the domain on the node where the resource group is brought online or offline.

The Oracle Solaris Cluster HA for Oracle VM Server for SPARC (HA for Oracle VM Server) data service provides a mechanism for orderly startup and shutdown, fault monitoring, and automatic failover of the Oracle VM Server for SPARC guest domain service. The Oracle VM Server for SPARC component is protected by the HA for Oracle VM Server data service.

SPARC: Planning the HA for Oracle VM Server Installation and Configuration

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

Configuration Guidelines

Observe the following configuration guidelines that apply only to HA for Oracle VM Server.

For guidelines, requirements, and restrictions that apply to all data services, see the [Oracle Solaris Cluster 4.0 Release Notes](#).

- **HA for Oracle VM Server configuration** – Oracle VM Server for SPARC can be configured only as a failover data service and not as a scalable data service.
- **HA for Oracle VM Server virtual disks** – The Oracle VM Server for SPARC virtual disk back end can be of any storage or file system that is supported by Oracle Solaris Cluster software. This includes cluster file systems, NFS, iSCSI, and SAN LUNs. The back end is exported through the virtual disk server to a domain as a full disk and is visible to the Oracle Solaris installation software inside the guest domain.
- **Live migration and warm migration** – HA for Oracle VM Server software supports Oracle VM Server for SPARC live migration and warm migration. For more information, see your Oracle VM Server for SPARC documentation.

▼ SPARC: How to Configure Oracle VM Server for SPARC to Reset for Control Domain Failures

The failure policy settings on the primary domain determine the action to be taken on the guest domain when there is a primary domain failures. When configured to `failure-policy=reset`, the guest domain would panic when the primary domain fails. If the failure policy is not set to reset on all the primary domains, the resource creation would fail.

- **On the node where the `ldg0` guest domain is created, set the domain failure policy to reset.**

```
# ldm set-domain failure-policy=reset primary

# ldm list -o domain primary
NAME          STATE      FLAGS    UTIL
primary       active    -n-cv-   0.6%

SOFTSTATE
Solaris running

HOSTID
0x84d4a2ce

CONTROL
failure-policy=reset

DEPENDENCY
master=

# ldm set-domain master=primary ldg0
# ldm set-var auto-boot?=false ldg0
# ldm list -o domain ldg0
NAME          STATE      FLAGS    UTIL
ldg0          active    n---    0.1%

SOFTSTATE
```

```
Solaris running

HOSTID
  0x84f8a040

CONTROL
  failure-policy=reset

DEPENDENCY
  master=primary

VARIABLES
  auto-boot?=false
  boot-device=vdisk1
  keyboard-layout=US-English
```

SPARC: Installing and Configuring Oracle VM Server for SPARC

This section contains the procedures you need to install and configure an Oracle VM Server for SPARC guest domain.

▼ SPARC: How to Install the Oracle VM Server for SPARC Software

- 1 On a cluster member, become superuser or assume a role that provides `solaris.cluster.modify` RBAC authorization.
- 2 Go to <http://www.oracle.com/technetwork/server-storage/vm/downloads/index.html?ssSourceSiteId=ocomen>.
Follow instructions to download and install Oracle VM Server for SPARC software.

▼ SPARC: How to Enable the Oracle VM Server for SPARC Instances to Run in a Cluster

- 1 Become superuser or assume a role that provides `solaris.cluster.admin` RBAC authorization on one of the nodes in the cluster that will host the Oracle VM Server for SPARC guest domain.
- 2 Register the `SUNW.HASStoragePlus` resource type.

```
# clresourcetype register SUNW.HASStoragePlus
```
- 3 Create a failover resource group.

```
# clresourcegroup create LDom-failover-rg
```

- 4 (If using a cluster file system or a highly available local file system) Create an HAStoragePlus resource for the guest domain Virtual Disk Storage.

```
# clresource create -g LDom-failover-rg \  
-t SUNW.HAStoragePlus \  
-p FilesystemMountPoints=LDom-mount-points \  
LDom-has-resource
```

- 5 Enable the failover resource group that now includes the guest domain disk storage resources.

```
# clresourcegroup online -M -n current-node LDom-failover-rg
```

Installing the HA for Oracle VM Server Package

If you did not install the HA for Oracle VM Server package during your initial Oracle Solaris Cluster installation, perform this procedure to install the package.

▼ How to Install the HA for Oracle VM Server Package

Perform this procedure on each cluster node where you want the HA for Oracle VM Server software to run.

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

- 2 Ensure that the solaris and ha-cluster publishers are valid.

```
# pkg publisher
PUBLISHER          TYPE    STATUS  URI
solaris            origin online  solaris-repository
ha-cluster         origin online  ha-cluster-repository
```

For information about setting the solaris publisher, see [“Set the Publisher Origin To the File Repository URI” in Copying and Creating Oracle Solaris 11 Package Repositories.](#)

- 3 Install the HA for Oracle VM Server software package.

```
# pkg install ha-cluster/data-service/ha-ldom
```

- 4 Verify that the package installed successfully.

```
$ pkg info ha-cluster/data-service/ha-ldom
```

Installation is successful if output shows that State is Installed.

- 5 Perform any necessary updates to the Oracle Solaris Cluster software.

For instructions on updating single or multiple packages, see [Chapter 11, “Updating Your Software,” in Oracle Solaris Cluster System Administration Guide.](#)

SPARC: Registering and Configuring HA for Oracle VM Server

▼ SPARC: How to Configure HA for Oracle VM Server

Before You Begin Install the data service packages during your initial Oracle Solaris Cluster installation.

If you did not install the HA for Oracle VM Server packages as part of your initial Oracle Solaris Cluster installation, go to “[Installing the HA for Oracle VM Server Package](#)” on page 13.

- 1 **Become superuser or assume a role that provides `solaris.cluster.modify` and `solaris.cluster.admin` RBAC authorization on the node in the cluster that hosts the Oracle VM Server for SPARC guest domain.**

- 2 **Register the `SUNW.ldom` resource type.**

```
# clresourcetype register SUNW.ldom
```

- 3 **Create an Oracle VM Server for SPARC guest domain resource in the failover resource group.**

If you plan to use warm migration (see [Step 4](#)), a `password_file` property is required. For warm migration, specify the complete path to the file that contains the target host password that is required for guest domain migration.

```
# clresource create -g LDom-failover-rg -t SUNW.ldom \
-p password_file=path-to-file-with-target-host-password \
-p Domain_name=LDom-guest-domain-instance LDom-guest-domain-resource
```

- 4 **If you plan to use warm migration, enable warm migration to be performed on a guest domain during logical domain resource failovers.**

Warm migration requires that the `migration_type` property be set to `MIGRATE`, which is the default value. For a value of `MIGRATE`, the `password_file` is required (see [Step 3](#)).

If the `migration_type` property is instead set to `NORMAL`, change the property value to `MIGRATE`:

```
# clresource set -p Migration_type=MIGRATE LDom-guest-domain-resource
```

- 5 **Enable each guest domain resource.**

Repeat this step for each guest domain instance, if multiple instances were created.

```
# clresource status
# clresource enable LDom-guest-domain-resource
```

▼ SPARC: How to Remove an HA for Oracle VM Server Resource From a Failover Resource Group

- 1 Become superuser or assume a role that provides `solaris.cluster.modify` and `solaris.cluster.admin` RBAC authorizations.
- 2 Disable and remove the resource that is used by the HA for Oracle VM Server data service.

```
# clresource disable resource
# clresource delete resource
```

SPARC: Verifying the Installation and Configuration of Oracle VM Server for SPARC

▼ SPARC: How to Verify the HA for Oracle VM Server Installation and Configuration

- 1 As superuser, log in to the node that currently hosts the resource group that contains the Oracle VM Server for SPARC guest domain resource.
- 2 Switch the guest domain resource group to another cluster member.

```
# clresourcegroup switch -n node LDom-guest-domain
```

- 3 Verify the status of the guest domain instance.

```
# ldm list-domain LDom-guest-domain
NAME          STATE    FLAGS  CONS  VCPU  MEMORY  UTIL  UPTIME
ldg           active  n---  5000   4     2G     25%  2s
```

- 4 Repeat the preceding steps until you have tested all the potential nodes on which the guest domain can run.

SPARC: Tuning the HA for Oracle VM Server Fault Monitor

This section describes the HA for Oracle VM Server fault monitor's probing algorithm or functionality, and states the conditions, messages, and recovery actions associated with unsuccessful probing.

Note – For any maintenance or modification activities on the domain, you must disable monitoring, perform maintenance tasks, and then re-enable the resource monitor.

For conceptual information about fault monitors, see the *Oracle Solaris Cluster Concepts Guide*.

Resource Properties

The HA for Oracle VM Server guest domain fault monitor uses the resource properties specified in the resource type `SUNW.lldm`. Refer to the `SUNW.lldm(5)` man page for a complete list of resource properties used.

Probing Algorithm and Functionality

HA for Oracle VM Server is controlled by the extension properties that control the probing frequency. The default values of these properties determine the preset behavior of the fault monitor and are suitable for most Oracle Solaris Cluster installations. You can modify this preset behavior by performing the following actions:

- Setting the interval between fault monitor probes (`Thorough_probe_interval`)
- Setting the timeout for fault monitor probes (`Probe_timeout`)
- Setting the number of times the fault monitor attempts to restart the resource (`Retry_count`)

The HA for Oracle VM Server fault monitor checks the domain status within an infinite loop. During each cycle, the fault monitor checks the domain state and reports either a failure or success.

If the fault monitor is successful, it returns to its infinite loop and continues the next cycle of probing and sleeping.

If the fault monitor reports a failure, a request is made to the cluster to restart the resource. If the fault monitor reports another failure, another request is made to the cluster to restart the resource. This behavior continues whenever the fault monitor reports a failure. If successive restarts exceed the `Retry_count` within the `Thorough_probe_interval`, a request is made to fail over the resource group onto a different node.

Operations of the Oracle VM Server for SPARC Probe

- The probe checks the domain state every 60 seconds by using the `ldm list -domain` command.

- The `ldm list-domain` command produces a status line for the domain and is accurate at the instant that the command executes.
- The status modes that are considered to be normal operational modes are as follows: active, suspending, resuming, suspended, and starting. Whenever the `ldm` command reports these status modes, the probe considers that the domain is operating in an acceptable mode.
- The status modes that are considered to be restartable modes are as follows: inactive and stopping. These modes are not considered acceptable and if one of these modes is encountered, the probe requests a restart of the resource.
- The probe also requests a resource to restart if any unknown status modes are reported by the `ldm` command.
- If the guest domain configuration has changed, the probe will update this information to the CCR.
- The probe runs the user-supplied script or binary provided for `plugin_probe`. If this process fails, then the probe will restart the guest domain resource.
- If the guest domain 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 if `Failover_enabled` is set to `TRUE`.

SPARC: Debugging HA for Oracle VM Server

HA for Oracle VM Server has an extension property named `Debug_level` that enables you to activate debugging for Oracle VM Server for SPARC guest domain resources.

▼ SPARC: How to Activate Debugging for HA for Oracle VM Server

- 1 Determine whether debugging for HA for Oracle VM Server is active.

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

If debugging is active, `daemon.debug` is set in the file `/etc/syslog.conf`.

If debugging is inactive, `daemon.notice` is set in the file `/etc/syslog.conf` of the appropriate node.

- 2 If debugging is inactive, edit the `/etc/syslog.conf` file in the appropriate node to change `daemon.notice` to `daemon.debug`.

3 Confirm that debugging for HA for Oracle VM Server is active.

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

4 Restart the syslogd daemon in the global zone.

```
# svcadm refresh svc:/system/system-log:default
```

5 Set the property Debug_level to level 2.

```
# clresource set -p Debug_level=2 LDom-guest-domain-resource
```

Note – To deactivate debugging, repeat these steps, changing `daemon.debug` to `daemon.notice` and changing the `Debug_level` property to 0.

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