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

Part No: E39658
July 2014, E39658-01

ORACLE

Contents

Using This Documentation

- **Overview** – Introduces the Oracle Solaris Cluster HA for Oracle VM Server for SPARC software.
- **Audience** – Experienced system administrators with extensive knowledge of Oracle software and hardware.
- **Required knowledge** – Knowledge of the Oracle Solaris operating system, of Oracle Solaris Cluster software, and expertise with the volume manager software that is used with Oracle Solaris Cluster software.

This document is not to be used as a planning or presales guide.

Product Documentation Library

Late-breaking information and known issues for this product are included in the documentation library at http://www.oracle.com/pls/topic/lookup?ctx=E39579.

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.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program web site at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Feedback

Provide feedback about this documentation at http://www.oracle.com/goto/docfeedback.

♦ ♦ ♦ CHAPTER 1

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) software and contains the following sections:

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

Task	Instructions
Plan the installation.	"Planning the HA for Oracle VM Server Installation and Configuration" on page 11
Install and configure the Oracle VM Server for SPARC software.	"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
Register and configure HA for Oracle VM Server resources.	"Registering and Configuring HA for Oracle VM Server" on page 15

Task	Instructions
Verify the HA for Oracle VM Server installation and configuration.	"Verifying the Installation and Configuration of Oracle VM Server for SPARC" on page 17
Tune the HA for Oracle VM Server fault monitor.	"Tuning the HA for Oracle VM Server Fault Monitor" on page 17
Debug HA for Oracle VM Server.	"Debugging HA for Oracle VM Server" on page 19

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 archived 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.

Note the following points regarding support for the SR-IOV device in the HA for Oracle VM Server data service:

- An SR-IOV device is not supported for live migration of the HA for Oracle VM Server data service. This restriction exists as of initial release of the Oracle Solaris Cluster 4.2 software. Contact your Oracle support representative to learn whether support for the SR-IOV feature becomes available.
- An SR-IOV device is supported for normal migration of the HA for Oracle VM Server data service. This support requires that the SR-IOV device path is identical on all potential primaries of the data service's resource group.

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 4.2 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. It can be configured only in the global zone.
- **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.

  In some cases where the cluster cannot determine the target node to which the HA for Oracle VM Server resource group is migrating, it uses an ordinary resource group switchover instead of using live migration. In such cases, the guest domain shuts down on its current node and then boots on its new node. To achieve live migration, relocate the HA for Oracle VM Server resource group by using the `clresourcegroup switch` command explicitly on the resource group, rather than depending on node evacuation or strong resource group affinities to move the resource group.

▼ 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, assume the `root` role 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.HAStoragePlus` resource type.**

   ```
   # clresourcetype register SUNW.HAStoragePlus
   ```

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, assume the `root` role.**

2. **Ensure that the data service package is available from the configured publisher and that the `solaris` and `ha-cluster` publishers are valid.**

```
# pkg list -a ha-cluster/data-service/ha-ldom
# pkg publisher
PUBLISHER                             TYPE     STATUS   P  LOCATION
solaris                               origin   online   F  solaris-repository
ha-cluster                            origin   online   F  ha-cluster-repository
```

For information about setting the `solaris` publisher, see "Adding, Modifying, or Removing Package Publishers" in "Adding and Updating Software in Oracle Solaris 11.2".

Tip - Use the `-nv` options whenever you install or update to see what changes will be made, such as which versions of which packages will be installed or updated and whether a new BE will be created.

If you do not get any error messages when you use the `-nv` options, run the command again without the `-n` option to actually perform the installation or update. If you do get error messages, run the command again with more `-v` options (for example, `-nvv`) or more of the package FMRI pattern to get more information to help you diagnose and fix the problem. For troubleshooting information, see Appendix A, "Troubleshooting Package Installation and Update," in "Adding and Updating Software in Oracle Solaris 11.2".

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 your software, 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. **Assume the `root` role 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 5), 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 an encrypted password is required for the logical domain migration, you must do the following:**

   a. **Insert the word `encrypted` into the file you specify with the `Password_file` extension property when creating the resource.**

      ```
      # echo "encrypted" > /var/cluster/.ldg1_passwd
      ```

   b. **Assume the `root` role and create an encrypted password.**

      In the following example, the root password for the primary domain, *encrypted_password*, is being encrypted and `ldg1` reflects the logical domain name.

      ```
      node1# dd if=/dev/urandom of=/var/cluster/ldom_key bs=16 count=1
      ```

```
node1# chmod 400 /var/cluster/ldom_key
node1# echo encrypted_password | /usr/sfw/bin/openssl enc -aes128 -e \
-pass file:/var/cluster/ldom_key -out /opt/SUNWscxvm/.ldg1_passwd
node1# chmod 400 /opt/SUNWscxvm/.ldg1_passwd
```

c. Verify that the encrypted password can be decrypted.

```
node1# /usr/sfw/bin/openssl enc -aes128 -d -pass file:/var/cluster/ldom_key \
-in /opt/SUNWscxvm/.ldg1_passwd
```

d. Repeat the preceding steps on all other Oracle Solaris Cluster nodes that will host the logical domain service.

e. Create or update the resource and set the `Password_file` property to the path provided in Step 4.a.

Note - You can perform this step only when the resource is disabled.

```
# clresource set -p Password_file=/var/cluster/.ldg1_passwd LDom-guest-domain-resource
```

5. 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
```

6. 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. Assume the `root` role 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.ldom`. Refer to the `SUNW.ldom(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 a 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.

Index

V

W