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Installing and Configuring Oracle Web Tier Software ...............................................................10
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▼ How to Register and Configure HA for Oracle Web Tier by Using Solaris Cluster
  (CLI) .................................................................................................................................19
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Preface

Oracle Solaris Cluster Data Service for Oracle Web Tier Guide explains how to install and configure Oracle Solaris Cluster data services.

Note – This Oracle Solaris Cluster release supports systems that use the SPARC and x86 families of processor architectures: UltraSPARC, SPARC64, AMD64, and Intel 64. In this document, x86 refers to the larger family of 64-bit x86 compatible products. Information in this document pertains to all platforms unless otherwise specified.

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.

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

Shell Prompts in Command Examples

The following table shows UNIX system prompts and superuser prompts for shells that are included in the Oracle Solaris OS. In command examples, the shell prompt indicates whether the command should be executed by a regular user or a user with privileges.

<table>
<thead>
<tr>
<th>Shell</th>
<th>Prompt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bash shell, Korn shell, and Bourne shell</td>
<td><code>$</code></td>
</tr>
<tr>
<td>Bash shell, Korn shell, and Bourne shell for superuser</td>
<td><code>#</code></td>
</tr>
<tr>
<td>C shell</td>
<td><code>machine_name%</code></td>
</tr>
<tr>
<td>C shell for superuser</td>
<td><code>machine_name#</code></td>
</tr>
</tbody>
</table>
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#sys_sw.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts</td>
<td>Oracle Solaris Cluster Concepts Guide</td>
</tr>
<tr>
<td>Hardware installation and administration</td>
<td>Oracle Solaris Cluster 3.3 3/13 Hardware Administration Manual and individual hardware administration guides</td>
</tr>
<tr>
<td>Software installation</td>
<td>Oracle Solaris Cluster Software Installation Guide</td>
</tr>
<tr>
<td>Data service installation and administration</td>
<td>Oracle Solaris Cluster Data Services Planning and Administration Guide and individual data service guides</td>
</tr>
<tr>
<td>Data service development</td>
<td>Oracle Solaris Cluster Data Services Developer’s Guide</td>
</tr>
<tr>
<td>System administration</td>
<td>Oracle Solaris Cluster System Administration Guide</td>
</tr>
<tr>
<td></td>
<td>Oracle Solaris Cluster Quick Reference</td>
</tr>
<tr>
<td>Software upgrade</td>
<td>Oracle Solaris Cluster Upgrade Guide</td>
</tr>
<tr>
<td>Error messages</td>
<td>Oracle Solaris Cluster Error Messages Guide</td>
</tr>
<tr>
<td>Command and function references</td>
<td>Oracle Solaris Cluster Reference Manual</td>
</tr>
<tr>
<td></td>
<td>Oracle Solaris Cluster Data Services Reference Manual</td>
</tr>
</tbody>
</table>

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 10)
The release number of Oracle Solaris Cluster (for example, Oracle Solaris Cluster 3.3)

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>prtconf -v</code></td>
<td>Displays the size of the system memory and reports information about peripheral devices</td>
</tr>
<tr>
<td><code>psrinfo -v</code></td>
<td>Displays information about processors</td>
</tr>
<tr>
<td><code>showrev -p</code></td>
<td>Reports which patches are installed</td>
</tr>
<tr>
<td><code>prtdiag -v</code></td>
<td>Displays system diagnostic information</td>
</tr>
<tr>
<td><code>/usr/cluster/bin/clnode show-rev -v</code></td>
<td>Displays Oracle Solaris Cluster release and package version information for each node</td>
</tr>
</tbody>
</table>

Also have available the contents of the `/var/adm/messages` file.
Installing and Configuring HA for Oracle Web Tier

This chapter describes the steps to install and configure Oracle Solaris Cluster HA for Oracle Web Tier (HA for Oracle Web Tier) on your Oracle Solaris Cluster servers.

This chapter contains the following sections:

- “Planning the Installation and Configuration” on page 9
- “Overview of the Installation and Configuration Process for HA for Oracle Web Tier” on page 10
- “Installing and Configuring Oracle Web Tier Software” on page 10
- “Installing the HA for Oracle Web Tier Packages” on page 16
- “Registering and Configuring HA for Oracle Web Tier Components” on page 18
- “Tuning the HA for Oracle Web Tier Fault Monitors” on page 24
- “Upgrading the HA for Oracle Web Tier Resource Types” on page 27

You can configure HA for Oracle Web Tier as a failover data service. See Chapter 1, “Planning for Oracle Solaris Cluster Data Services,” in Oracle Solaris Cluster Data Services Planning and Administration Guide and the Oracle Solaris Cluster Concepts Guide document for an overview of failover and scalable data services.

Planning the Installation and Configuration

Have available the following information before you install HA for Oracle Web Tier:

- The path to the application binaries. You can install the binaries on the local disks, on a highly available local file system, on the cluster file system, or on a Network Attached Storage (NAS) device. See “Configuration Guidelines for Oracle Solaris Cluster Data Services” in Oracle Solaris Cluster Data Services Planning and Administration Guide for a discussion of the advantages and disadvantages of each location.
- Whether to host the Oracle Web Tierhtdocs subdirectory on a highly available local file system, a cluster file system, or a NAS device.
- The names of the resource groups and resources you will create.
The names of the nodes that will master the data service. The nodes can be physical machines, non-global zones, or the nodes that form a zone cluster.

The logical hostname that clients use to access the data service. You typically set up this IP address when you install the cluster. See the Oracle Solaris Cluster Concepts Guide for details on network resources.

Overview of the Installation and Configuration Process for HA for Oracle Web Tier

The table below lists the sections that describe the installation and configuration tasks.

<table>
<thead>
<tr>
<th>Task</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install and configure the Oracle Web Tier software</td>
<td>“Installing and Configuring Oracle Web Tier Software” on page 10</td>
</tr>
<tr>
<td>Install the HA for Oracle Web Tier packages</td>
<td>“Installing the HA for Oracle Web Tier Packages” on page 16</td>
</tr>
<tr>
<td>Configure and start HA for Oracle Web Tier</td>
<td>“Registering and Configuring HA for Oracle Web Tier Components” on page 18</td>
</tr>
<tr>
<td>Tune the HA for Oracle Web Tier fault monitor</td>
<td>“Tuning the HA for Oracle Web Tier Fault Monitors” on page 24</td>
</tr>
</tbody>
</table>

Installing and Configuring Oracle Web Tier Software

To install the Oracle Web Tier software, perform the following procedure.

See Oracle Web Tier documentation for standard installation instructions. Contact your Oracle sales representative for a complete list of Oracle Web Tier versions that are supported with the Oracle Solaris Cluster software.

Note – HA for Oracle Web Tier can be configured to run in a whole root or a sparse root non-global zone, if required.
How to Install and Configure the Oracle Web Tier Software and Resources

To install the Oracle Web Tier software, you must first create your chosen shared storage and logical host resources. Once complete, you must install an Oracle Fusion Middleware (FMW) environment before you install and configure the Oracle Web Tier software.

When you configure the Oracle Web Tier components as a failover service, you place the Oracle Process Management and Notification Server (OPMN) resource, the Oracle HTTP Server resource, and the network resource in a single resource group.

When a highly available local file system is used to store either the htdocs, or the htdocs and Oracle Web Tier software, then an HAStoragePlus storage resource is also placed in the failover resource group. Alternatively, when a cluster file system is used in a zone cluster, or when a NAS device is used, then a storage resource is placed in a separate scalable resource group.

Before You Begin

- Verify that all the network addresses that you use have been added to your name-service database.

You should have performed this verification during your initial Oracle Solaris Cluster installation. See the planning chapter in the Oracle Solaris Cluster Software Installation Guide for details.

Note – To avoid failures because of name-service lookup, verify that all the network addresses are present in the /etc/inet/hosts file on all of the cluster nodes. Configure the name service mapping by using the svccfg -s svc:/system/name-service/switch command. Ensure that the config/host entry is configured to first check the local files before accessing NIS, NIS+, or DNS.

1 Create an Oracle Solaris user account to own the Oracle Fusion Middleware and Oracle Web Tier software.

Perform this step on all nodes that host the service. The user and group IDs for the account must be consistent on all nodes.

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

This resource group contains both network and failover application resources. If a highly available local file system is used to store the htdocs and application binaries directories, then the resource group also contains an HAStoragePlus storage resource.

Optionally, you can specify with the -n option the set of nodes on which the data service can run.

# clresourcegroup create [-n node-zone-list] resource-group
resource-group
  Specifies the name of the failover resource group to add. This name can be your choice but
  must be unique for the resource groups within the cluster.

[-n node-zone-list]
  Specifies a comma-separated, ordered list of nodes that can master this resource group. The
  format of each entry in the list is node. In this format, node specifies the node name and zone
  specifies the name of a non-global Oracle Solaris zone. To specify the global zone, or to
  specify a node without non-global zones, specify only node.

  This list is optional. If you omit this list, the global zone of each cluster node can master the
  resource group.

3  Bring the failover resource group online.
   # clresourcegroup online -M resource-group

resource-group
  Specifies the name of the failover resource group.

4  Add a logical hostname network resource to the failover resource group that you created in
    Step 2.
   This is the hostname that clients will use to connect to the Oracle HTTP Server component.
   # clreslogicalhostname create -g resource-group
    -h hostname[,...] [-N netiflist] resource
    -h hostname,...
      Specifies a comma-separated list of network resources to add.

resource-group
  Specifies the name of the failover resource group that you created in Step 2.

resource
  Specifies a resource name. If you do not supply your choice for a resource name, the name of
  the network resource defaults to the first name that is specified after the -h option.

-N netiflist
  Specifies an optional, comma-separated list that identifies the IPMP groups that are on each
  node or zone. The format of each entry in the list is netif@node. The replaceable items in this
  format are as follows:

  netif
    Specifies an IPMP group name, such as sc_ipmp0, or a public network interface card
    (NIC). If you specify a public NIC, Oracle Solaris Cluster attempts to create the required
    IPMP groups.

  node
    Specifies the name or ID of a node and, optionally, the name of a non-global Oracle
    Solaris zone. To specify the global zone, or to specify a node without non-global zones,
    specify only node.
5 Configure the storage resources.

- If you are storing the Oracle HTTP Server htdocs directory on a highly available local file system or on a cluster file system in the global zone, create a storage resource in the application failover resource group.

  ```bash
  # clresource create -g resource-group -t SUNW.HAStoragePlus
  {-p FileSystemMountPoints=mount-point,... | -p Zpools=zpool,...} \ resource
  resource
    resource-group
      Specifies the name of the failover resource group that you created in Step 2.
    -p FileSystemMountPoints mount-point-list
      Specifies a comma-separated list of file system mount points to add.
    -p Zpools zpool-list
      Specifies a comma-separated list of zpools to add.
  resource
    Specifies a resource name.

- If you are storing the Oracle HTTP Server htdocs and application binaries directories on a NAS mounted file system or on a cluster file system in a zone cluster, create a scalable resource group to contain the storage resource.

  a. Create a scalable resource group to contain the storage resource.

    ```bash
    # clresourcegroup create [-n node-list] \ resource-group
    resource-group
      Specifies the name of the scalable service resource group to add.
    -p Maximum_primaries=m
      Specifies the maximum number of active primary nodes allowed for this resource group. If you do not assign a value to this property, the default is 1.
-p Desired_primaries=n
  Specifies the desired number of active primary nodes allowed for this resource group.
  If you do not assign a value to this property, the default is 1.

-n node-zone-list
  Specifies a comma-separated, ordered list of nodes that can master this resource
  group. The format of each entry in the list is node. In this format, node specifies the
  node name and zone specifies the name of a non-global Oracle Solaris zone. To
  specify the global zone, or to specify a node without non-global zones, specify only
  node.

  This list is optional. If you omit this list, the global zone of each cluster node can
  master the resource group.

b. Add a storage resource to the scalable resource group that you created in Step a.

  For example, an HAStoragePlus resource to manage a cluster file system that is to be
  mounted in a zone cluster is added as follows:

  # clresource create -g resource-group
  -t SUNW.HAStoragePlus
  -p FileSystemMountPoints=mount-point

  resource

  resource-group
  Specifies the name of the scalable resource group that you created in Step a.

  -p FileSystemMountPoints mount-point
  Specifies a comma-separated list of file system mount points to add.

  resource
  Specifies a resource name.

c. Bring the scalable resource group online.

  # clresourcegroup online -M resource-group

  resource-group
  Specifies the name of the scalable resource group.

6 As the software owner created in Step 1, use the Oracle Fusion Middleware 11g installation
media to install the Oracle WebLogic Server software.

  Note – Do not yet run quickstart or configure the software.

7 As the software owner, use the Oracle Web Tier installation media to install the software only.

  a. When prompted, run the createCentralInventory.sh script to create the central
     inventory.
b. If the software has been installed centrally, do the following:

i. When the installation is complete, switch the resource group containing the software to the other nodes that can host the service.

ii. Rerun the `createCentralInventory.sh` script to create the required directories in the `/var` hierarchy on the other nodes.

If necessary, update the Oracle Web Tier software with the latest Service Repository Updates (SRUs) and security fixes.

As the software owner, create an Oracle WebLogic Administration Server component for the domain.

a. To ensure that the Enterprise Manager GUI uses the logical hostname, set the following environment variables.

   $ export LD_PRELOAD_32=$LD_PRELOAD_32:/usr/cluster/lib/libschost.so.1
   $ export LD_PRELOAD_64=$LD_PRELOAD_64:/usr/cluster/lib/64/libschost.so.1
   $ export SC_LHOSTNAME=logical-hostname

b. Create the component.

   $ cd /FMW-Home/Web-Tier-Home/common/bin
   $ ./config.sh

If you want to make the Oracle WebLogic Administration Server component highly available, create the necessary resource groups and resources to control it.

For more details on how to perform this step, see *Oracle Solaris Cluster Data Service for Oracle WebLogic Server Guide*.

As the software owner, create the Oracle HTTP Server component instance.

a. To ensure that the Enterprise Manager GUI uses the logical hostname, set the following environment variables.

   $ export LD_PRELOAD_32=$LD_PRELOAD_32:/usr/cluster/lib/libschost.so.1
   $ export LD_PRELOAD_64=$LD_PRELOAD_64:/usr/cluster/lib/64/libschost.so.1
   $ export SC_LHOSTNAME=logical-hostname

b. Create the component instance.

   $ cd /FMW-Home/Web-Tier-Home/bin
   $ ./config.sh
**Note** – You can create both HTTP and Web Cache instances, but the HA for Oracle Web Tier only currently supports the HTTP instances. Observe the following requirements for HTTP instances:

- When you are prompted to provide the instance name and the instance subdirectory, the instance name and the final component of the instance subdirectory must be the same. For example, if the Oracle Web Tier instance is named `myinst1`, then the corresponding directory for that instance must be of the form `/FMW-Home/Web-Tier-Home/instances/myinst1`.
- The Oracle HTTP Server instance name must be the same on all nodes.

Failure to meet these requirements will result in validation failures when attempting to create an Oracle HTTP Server resource.

12 **Manually stop the Oracle HTTP Server and Oracle Process Management and Notification Server instances.**

```bash
$ cd /FMW-Home/Web-Tier-Home/instances/Instance-Name/bin
$ ./opmnctl stopall
```

13 **Edit the http.conf file.**

```bash
$ cd /FMW-Home/Web-Tier-Home/instances/Instance-Name/config/OHS/Component-Instance-Name
$ vi http.conf
```

Ensure that the file contains a line of the following form, where `Logical-Hostname` is the logical hostname resource that you created in Step 4:

```plaintext
Listen Logical-Hostname:Port
```

**See Also** The following sections provide examples of this procedure, as used in conjunction with the procedure to register and configure HA for Oracle Web Tier component resources:

- Example 1–1
- Example 1–2

## Installing the HA for Oracle Web Tier Packages

If you did not install the HA for Oracle Web Tier packages during your initial Oracle Solaris Cluster installation, perform this procedure to install the packages. To install the packages, use the installer program.
Note – You need to install the HA for Oracle Web Tier packages in the global cluster and not in the zone cluster.

How to Install the HA for Oracle Web Tier Packages

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

You can run the installer 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.

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

Before You Begin

Ensure that you have the Oracle Solaris Cluster installation media.

If you intend to run the installer program with a GUI, ensure that your DISPLAY environment variable is set.

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

2 Load the Oracle Solaris Cluster installation media into the DVD-ROM drive.
   If the Volume Management daemon `vold(1M)` is running and configured to manage DVD-ROM devices, the daemon automatically mounts the DVD-ROM on the `/cdrom` directory.

3 Change to the installation wizard directory of the DVD-ROM.
   - If you are installing the data service packages on the SPARC platform, type the following command:
     ```
     # cd /cdrom/cdrom0/Solaris_sparc
     ```
   - If you are installing the data service packages on the x86 platform, type the following command:
     ```
     # cd /cdrom/cdrom0/Solaris_x86
     ```

4 Start the installation wizard.
   ```
   # ./installer
   ```

5 When you are prompted, accept the license agreement.
6 From the list of Oracle Solaris Cluster agents under Availability Services, select the data service for Oracle Web Tier.

7 If you require support for languages other than English, select the option to install multilingual packages.
   English language support is always installed.

8 When prompted whether to configure the data service now or later, choose Configure Later.
   Choose Configure Later to perform the configuration after the installation.

9 Follow the instructions on the screen to install the data service packages on the node.
   The installation wizard displays the status of the installation. When the installation is complete, the wizard displays an installation summary and the installation logs.

10 (GUI only) If you do not want to register the product and receive product updates, deselect the Product Registration option.
   The Product Registration option is not available with the CLI. If you are running the installation wizard with the CLI, omit this step.

11 Exit the installation wizard.

12 Unload the installation media from the DVD-ROM drive.
   a. To ensure that the DVD-ROM is not being used, change to a directory that does not reside on the DVD-ROM.
   b. Eject the DVD-ROM.
      # eject cdrom

Registering and Configuring HA for Oracle Web Tier Components

The sections that follow contain instructions for registering and configuring the HA for Oracle Web Tier component resources. For information about the extension properties, see Appendix A, “HA for Oracle Web Tier Extension Properties.” The Tunable entry indicates when you can update a property.

See the rt_properties(5), r_properties(5), and rg_properties(5) man pages for details on all of the Oracle Solaris Cluster extension properties.

To set an extension property of a resource, include the following option in the clresource command that creates or modifies the resource:
Registering and Configuring HA for Oracle Web Tier Components

- `p property=value`
  - `-p property` Identifies the extension property that you are setting.
  - `value` Specifies the value to which you are setting the extension property.

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

This section contains the following information:
- “Tools for Registering and Configuring HA for Oracle Web Tier” on page 19
- “How to Register and Configure HA for Oracle Web Tier by Using Oracle Solaris Cluster (CLI)” on page 19
- “How to Verify Data Service Installation and Configuration” on page 24

**Tools for Registering and Configuring HA for Oracle Web Tier**

Oracle Solaris Cluster software provides the following tools for registering and configuring the HA for Oracle Web Tier components:

- **Oracle Solaris Cluster maintenance commands.** For more information, see “How to Register and Configure HA for Oracle Web Tier by Using Oracle Solaris Cluster (CLI)” on page 19.

**How to Register and Configure HA for Oracle Web Tier by Using Oracle Solaris Cluster (CLI)**

Complete the registration and configuration on any cluster member.

1. On a cluster member, become superuser or assume a role that provides `solaris.cluster.admin` and `solaris.cluster.modify` RBAC authorization.

2. Register the `ORCL.ohs` and `ORCL.opmn` resource types for the data service.

   
   ```
   # clresource type register ORCL.ohs ORCL.opmn
   ```
Create the application resources in the application failover resource group.

You must create two resources in the application failover resource group, one for the Oracle Process Management and Notification Server component and one for the Oracle HTTP Server component.


```
# clresource create -g resource-group
-t ORCL.opmn \n-p Oracle_home=ORACLE_HOME-path \n-p Instance_Name=instance-name \n- [p Debug_level=debug-level] \n- [p Resource_project_name=project-name] \n- [p Resource_dependencies_offline_restart=offline-restart-resource-dependencies[,...]] \n resource
resource-group
```

Speifies the name of the failover resource group created in Step 2 of How to Install and Configure the Oracle Web Tier Software and Resources.

- `p Oracle_home=ORACLE_HOME-path`
  
  Specifies the absolute path to the Oracle Web Tier software installation. This is normally a subdirectory of the Oracle Fusion Middleware installation.

- `p Instance_Name=instance-name`
  
  Specifies the OPMN instance name that was supplied when the Oracle Web Tier software was configured. The default value is `instance1`.

- `p Debug_level=debug-level`
  
  An optional property that specifies the amount of debugging information produced by the resource and fault probe. The default value is 0 which results in no debugging output.

- `p Resource_project_name=project-name`
  
  An optional property that specifies the project under which the OPMN resource should run. The default value is the project called `default`.

All processes that are started by the OPMN resource inherit this project setting. This includes any Oracle HTTP server that is started by OPMN. Consequently, for any OHS resource that is dependent on an OPMN resource, the value of the `Resource_project_name` property that is set for the OHS resource must be identical to the value that is set for the OPMN resource or left as the default.

- `p Resource_dependencies_offline_restart=resource-dependencies-offline-restart[,...]`
  
  An optional property that specifies a comma-separated list of resources on which this resource has an offline restart dependency. This list must include a dependency on the storage resource created in Step 5 of How to Install and Configure the Oracle Web Tier Software and Resources, with the exception of configurations where a cluster file system is used in the global zone. Furthermore, the storage resource dependency must have `{local_node}` scope.
b. Create the Oracle HTTP Server (OHS) resource.

```bash
# crresource create -g resource-group \
-t ORCL.ohs \
-p Component_instance=component-instance-name \
[-p Debug_level=debug-level] \
-p Resource_dependencies=ohs-lh \
-p Resource_dependencies_offline_restart=opmn-rs \
resource
```

- `resource-group` Specifies the name of the failover resource group created in Step 2 of How to Install and Configure the Oracle Web Tier Software and Resources.

- `p Component_instance=component-instance-name` Specifies the name of the Oracle HTTP Server component instance that is under the control of the Oracle Process Management and Notification Server component configured in Step a. The default value is ohs1.

- `p Debug_level=debug-level` An optional property that specifies the amount of debugging information produced by the resource and fault probe. The default value is 0 which results in no debugging output.

- `p Resource_dependencies=ohs-lh` Specifies the logical hostname resource created in Step 4 of How to Install and Configure the Oracle Web Tier Software and Resources, on which this resource has a dependency.

- `p Resource_dependencies_offline_restart=opmn-rs` Specifies a dependency with `{local_node}` scope on the Oracle Process Management and Notification Server resource created in Step a, on which this resource has an offline-restart dependency.

**Example 1–1  Registering HA for Oracle Web Tier on a Highly Available Local File System**

This example shows how to register an Oracle Web Tier service that uses a highly available local file system on a two-node cluster. The following are the sample names used in the commands:

Node names

- `phys-schost-1, phys-schost-2`

Zpool name (for highly available local file systems)

- `ohspool`

Logical hostname

- `schost-1`

Resource group (for all of the resources)

- `ohs-rg`

Logical hostname resource

- `ohs-lh-rs`
HAStoragePlus storage resource
   ohs-hasp-rs

Oracle HTTP Server component resource
   ohs-rs

Oracle Process Management and Notification Server component resource
   opmn-rs

Add a failover resource group to contain all of the resources
   # clresourcegroup create ohs-rg

Bring the failover resource group online
   # clresourcegroup online -M ohs-rg

Add the logical hostname resource to the failover resource group
   # clreslogicalhostname create -g ohs-rg -h schost-1 ohs-lh-rs

Register the HAStoragePlus resource type, if it is not already registered
   # clresourcetype register SUNW.HAStoragePlus

Register the Oracle HTTP Server resource type
   # clresourcetype register ORCL.ohs

Register the Oracle Process Management and Notification Server resource type
   # clresourcetype register ORCL.opmn

Add the HAStoragePlus resource to the failover resource group
   # clresource create -g ohs-rg \ 
      -t SUNW.HAStoragePlus -p Zpools=ohspool ohs-hasp-rs

Install and configure the Oracle Web Tier software

Add the Oracle Process Management and Notification Server component resource to the failover resource group
   # clresource create -g ohs-rg \ 
      -t ORCL.opmn -p Oracle_home=/ohspool/Oracle/Middleware/Oracle_WT1 \ 
      -p Instance_name=myinstance \ 
      -p Resource_dependencies_offline_restart=ohs-hasp-rs(local_node) opmn-rs

Add the Oracle HTTP Server component resource to the failover resource group
   # clresource create -g ohs-rg \ 
      -t ORCL.ohs -p Component_instance=myohs \ 
      -p Resource_dependencies=ohs-lh-rs \ 
      -p Resource_dependencies_offline_restart=opmn-rs(local_node) ohs-rs
Registering HA for Oracle Web Tier on a Cluster File System

This example shows how to register an Oracle Web Tier service that uses a cluster file system in a zone cluster on a two-node cluster. The commands are run in the zone cluster and the zone cluster has been granted access to the logical host and cluster file system required. The following are the sample names used in the commands:

Node names
   zchost-1, zchost-2

Cluster file system
   /global/ohs

Logical hostname
   zchost-lh-1

Resource group for the failover resources
   ohs-rg

Resource group for the cluster file system resource
   stor-rg

Logical hostname resource
   ohs-lh-rs

HAStoragePlus storage resource
   ohs-hasp-rs

Oracle HTTP Server component resource
   ohs-rs

Oracle Process Management and Notification Server component resource
   opmn-rs

Add a failover resource group to contain the failover resources

```
# clresourcegroup create ohs-rg
```

Bring the failover resource group online

```
# clresourcegroup online -M ohs-rg
```

Add a scalable resource group to contain the storage resource

```
# clresourcegroup create -S -p Maximum_primaries=2 -p Desired_primaries=2 stor-rg
```

Register the HAStoragePlus resource type, if it is not already registered

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

Add the HAStoragePlus resource to the scalable resource group

```
# clresource create -g stor-rg \\
-t SUNW.HAStoragePlus -p FileSystemMountPoints=/global/ohs ohs-hasp-rs
```

Bring the scalable resource group online

```
# clresourcegroup online -M stor-rg
```
Tuning the HA for Oracle Web Tier Fault Monitors

The HA for Oracle Web Tier fault monitors are contained in the resources whose resource types are ORCL.ohs and ORCL.opmn.

System properties and extension properties of the resource control the behavior of the fault monitor. The default values of these properties determine the default behavior of the fault monitor. The default behavior should be suitable for most Oracle Solaris Cluster installations. Therefore, you should tune the HA for Oracle Web Tier fault monitors only if you need to modify this default behavior.
Tuning the HA for Oracle Web Tier fault monitors involves the following tasks:

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

Information about the HA for Oracle Web Tier fault monitor that you need to perform these tasks is provided in the subsections that follow.

Tune the HA for Oracle Web Tier fault monitor when you register and configure HA for Oracle Web Tier or after initial configuration. For more information, see “Registering and Configuring HA for Oracle Web Tier Components” on page 18.

Updates to the probe_timeout, start_timeout, stop_timeout, and thorough_probe_interval properties result in comparable updates in the opmn.xml file.

For detailed information, see “Tuning Fault Monitors for Oracle Solaris Cluster Data Services” in Oracle Solaris Cluster Data Services Planning and Administration Guide.

This section contains the following information:

- “Operations by the HA for Oracle Web Tier Fault Monitors” on page 25
- “Actions in Response to Faults” on page 26

## Operations by the HA for Oracle Web Tier Fault Monitors

The two resource types, ORCL.ohs and ORCL.opmn, contain separate fault probes that query the health of the Oracle HTTP Server and Oracle Process Management and Notification Server components, respectively. Details are provided in the following sections:

- “Operations by the Oracle Process Management and Notification Server Fault Monitor” on page 25
- “Operations by the Oracle HTTP Server Fault Monitor” on page 26

## Operations by the Oracle Process Management and Notification Server Fault Monitor

The ORCL.opmn fault probe for the Oracle Process Management and Notification Server component performs the following steps:

- Checks that the opmnctl command exists in the /ORACLE-HOME/instances/INSTANCE-NAME/bin directory, and that the script is executable.
- Checks that the opmn.xml file is valid by using the following command:
Operations by the Oracle HTTP Server Fault Monitor

Because the Oracle HTTP Server component is under the control of Oracle Process Management and Notification Server component, the ORCL.opmn fault probe obtains the status of the Oracle HTTP Server component from the Oracle Process Management and Notification Server component. This is done in two stages:

- Checks that an Oracle HTTP Server component with type OHS is found in the output of the following command:
  
  ```
  $ opmnctl validate
  ```

- Checks that the Oracle HTTP Server component is reported as ALIVE by the following command:
  
  ```
  $ opmnctl ping
  ```

If the fault probe is successful, the resource status is set to OK and the probe returns with an exit code of 0. If the fault probe fails, the resource status is set to FAULTED and the probe returns with an exit code of 100, causing the resource to attempt to restart.

Note – If the Oracle HTTP Server component is used as a load-balancer through the mod_wl_ohs plugin, then the Oracle Process Management and Notification Server component can declare that the Oracle HTTP Server component is DOWN if none of the load-balancing targets are available. In these circumstances, the fault probe for the Oracle HTTP Server component attempts to restart the service. You can avoid such behavior by creating a dependency between the load-balancer resource and the target resources.

Actions in Response to Faults

Based on the history of failures, a failure can cause either a local restart or a failover of the data service. For detailed information, see “Tuning Fault Monitors for Oracle Solaris Cluster Data Services” in Oracle Solaris Cluster Data Services Planning and Administration Guide.
Upgrading the HA for Oracle Web Tier Resource Types

Upgrading the ORCL.ohs and ORCL.ohs resource types if the following conditions apply:

- You are upgrading from an earlier version of the HA for Oracle Web Tier data service.
- You need to use the new features of this data service.

For general instructions that explain how to upgrade a resource type, see "Upgrading a Resource Type" in Oracle Solaris Cluster Data Services Planning and Administration Guide. The information that you require to complete the upgrade of the ORCL.ohs and ORCL.ohs resource types is provided in the subsections that follow.

- "Information for Registering the New Resource Type Version" on page 27
- "Information for Migrating Existing Instances of the Resource Type" on page 27

Information for Registering the New Resource Type Version

The relationship between a resource type version and the release of Oracle Solaris Cluster data services is shown in the following table. The release of Oracle Solaris Cluster data services indicates the release in which the version of the resource type was introduced.

<table>
<thead>
<tr>
<th>Resource Type Version</th>
<th>Oracle Solaris Cluster Data Services Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3.3 3/13</td>
</tr>
<tr>
<td>1</td>
<td>4.0</td>
</tr>
</tbody>
</table>

To determine the version of the resource type that is registered, use the clresource-type show command.

The resource type registration (RTR) files for the ORCL.ohs and ORCL.opmn resource types are /opt/ORCLscohs/etc/ORCL.ohs and /opt/ORCLscopmn/etc/ORCL.opmn, respectively.

Information for Migrating Existing Instances of the Resource Type

The information that you require to edit each instance of the ORCL.ohs or ORCL.opmn resource type is as follows:

- You can perform the migration at any time.
If you need to use the features of a newer version of the HA for Oracle Web Tier data service, the required value of the Type_version property will be greater than that of the initial release, that is 1.

The following example shows a command for modifying an instance of the ORCL.ohs resource type.

**EXAMPLE 1–3  Migrating Instances of the ORCL.ohs Resource Type**

```
# clresource set -p Type_version=2 ohs-rs
```

This command modifies the ORCL.ohs resource named ohs-rs as follows:

- The Type_version property of this resource is set to the value of a (hypothetical) newer release 2.
HA for Oracle Web Tier Extension Properties

The following sections describe the extension properties for the following resource types:

- “ORCL.ohs Extension Properties” on page 29
- “ORCL.opmn Extension Properties” on page 31

These resource types represent the two components of the Oracle Web Tier application in an Oracle Solaris Cluster configuration.

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

**ORCL.ohs Extension Properties**

The extension properties of the ORCL.ohs resource type are as follows:

- **Child_mon_level**
  - Child monitoring level for the process monitoring facility (PMF). This property is inherited from the SUNW.gds resource type and should not be changed.
  - **Data type**: Integer
  - **Default**: –1
  - **Tunable**: When disabled.

- **Component_instance**
  - The name of the Oracle HTTP Server instance listed in the opmnctl output.
  - **Data type**: String
  - **Default**: ohs1
  - **Tunable**: When disabled.
Debug_level
Determines the amount of debug information produced.

Data type Integer
Default 0
Per node True
Range 0 – 2
Tunable At any time.

Failover_enabled
Determines whether to failover when retry_count is exceeded during retry_interval.

Data type Boolean
Default True
Tunable When disabled.

Log_level
Determines the log level for event based traces.

Data type Enum
Default NONE
Range NONE, INFO, or ERR
Tunable At any time.

Monitor_retry_count
The number of times that the process monitor facility (PMF) restarts the fault monitor during the time window that the Monitor_retry_interval property specifies. This property refers to restarts of the fault monitor itself rather than to the resource. The system-defined properties Retry_interval and Retry_count control restarting of the resource.

Data type Integer
Default 4
Range 0 - 2147483647

-1 indicates an infinite number of retry attempts.

Tunable At any time

Monitor_retry_interval
The time (in minutes) over which failures of the fault monitor are counted. If the number of times that the fault monitor fails exceeds the value that is specified in the extension property Monitor_retry_count within this period, the PMF does not restart the fault monitor.

Data type Integer
Default 2
Range 0 – 2147483647
-1 indicates an infinite retry interval.
Tunable At any time

Network_aware
Determines whether the application uses network. This property is inherited from the SUNW.gds resource type and should not be changed.
Data type Boolean
Default False
Tunable At creation.

Probe_timeout
The timeout value (in seconds) that the fault monitor uses to probe the resource.
Data type Integer
Default 90
Range 0 – 2147483641
Tunable At any time.

Stop_signal
The signal sent to the application for being stopped.
Data type Integer
Default 15 (SIGTERM)
Range 1 (SIGHUP) to 37 (SIGLOST)
Tunable When disabled.

ORCL.opmn Extension Properties

Child_mon_level
Child monitoring level for the process monitoring facility (PMF). This property is inherited from the SUNW.gds resource type and should not be changed.
Data type Integer
Default -1
Tunable When disabled.
Debug_level
Determines the amount of debug information produced.

- **Data type**: Integer
- **Default**: 0
- **Per-node**: True
- **Range**: 0 - 2
- **Tunable**: At any time.

Failover_enabled
Determines whether to failover when retry_count is exceeded during retry_interval.

- **Data type**: Boolean
- **Default**: True
- **Tunable**: When disabled.

Instance_name
The instance name. A directory of this name must exist within the ORACLE_HOME/instances subdirectory.

- **Data type**: String
- **Default**: instance1
- **Tunable**: When disabled.

Log_level
Determines the log level for event based traces.

- **Data type**: Enum
- **Default**: NONE
- **Range**: NONE, INFO, or ERR
- **Tunable**: At any time.

Monitor_retry_count
The number of times that the process monitor facility (PMF) restarts the fault monitor during the time window that the Monitor_retry_interval property specifies. This property refers to restarts of the fault monitor itself rather than to the resource. The system-defined properties Retry_interval and Retry_count control restarting of the resource.

- **Data type**: Integer
- **Default**: 4
- **Range**: 0 - 2147483647
–1 indicates an infinite number of retry attempts.

**Tunable** At any time

**Monitor_retry_interval**
The time (in minutes) over which failures of the fault monitor are counted. If the number of times that the fault monitor fails exceeds the value that is specified in the extension property **Monitor_retry_count** within this period, the PMF does not restart the fault monitor.

**Data type** Integer

**Default** 2

**Range** 0 – 2147483647

-1 indicates an infinite retry interval.

**Tunable** At any time

**Network_aware**
Determines whether the application uses network. This property is inherited from the **SUNW.gds** resource type and should not be changed.

**Data type** Boolean

**Default** False

**Tunable** At creation.

**Oracle_home**
The absolute path of the **ORACLE_HOME** of the Oracle Web Tier component of Oracle Fusion Middleware.

**Data type** String

**Default** No default value.

**Tunable** When disabled.

**Probe_timeout**
The timeout value (in seconds) that the fault monitor uses to probe the resource.

**Data type** Integer

**Default** 90

**Range** 0 – 2147483641

**Tunable** At any time.

**Stop_signal**
The signal sent to the application for being stopped.

**Data type** Integer
### ORCLopmn Extension Properties

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Default</strong></td>
<td>15 (SIGTERM)</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>1 (SIGHUP) to 37 (SIGLOST)</td>
</tr>
<tr>
<td><strong>Tunable</strong></td>
<td>When disabled.</td>
</tr>
</tbody>
</table>
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