

# Oracle® Solaris Cluster Data Service for DHCP Guide

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# Preface

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

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**Note** – This Oracle Solaris Cluster release supports systems that use the SPARC and x86 families of processor architectures. In this document, “x86” refers to the larger family of x86 compatible products. Information in this document pertains to all platforms unless otherwise specified.

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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% you have mail.</code>
<b>AaBbCc123</b>	What you type, contrasted with onscreen computer output	<code>machine_name% su</code> 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. <b>Note:</b> 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	machine_name%
C shell for superuser	machine_name#

## 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 4.0 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 4.0)

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.



# Installing and Configuring HA for DHCP

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This chapter explains how to install and configure HA for DHCP.

This chapter contains the following sections.

- “HA for DHCP Overview” on page 9
- “Overview of Installing and Configuring HA for DHCP” on page 10
- “Planning the HA for DHCP Installation and Configuration” on page 10
- “Installing and Configuring DHCP” on page 11
- “Verifying the Installation and Configuration of DHCP” on page 12
- “Installing the HA for DHCP Package” on page 13
- “Registering and Configuring HA for DHCP” on page 14
- “Verifying the HA for DHCP Installation and Configuration” on page 15
- “Upgrading HA for DHCP” on page 16
- “Understanding the HA for DHCP Fault Monitor” on page 17
- “Debug HA for DHCP” on page 18

## HA for DHCP Overview

The HA for DHCP data service provides a mechanism for the orderly startup and shutdown, fault monitoring, and automatic failover of the DHCP.

TABLE 1-1 Protection of Components

Component	Protected by
DHCP	HA for DHCP

## Overview of Installing and Configuring HA for DHCP

The following table summarizes the tasks for installing and configuring HA for DHCP 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 1-2 Tasks for Installing and Configuring HA for DHCP

Task	Instructions
Plan the installation	<a href="#">“Planning the HA for DHCP Installation and Configuration” on page 10</a>
Install and configure the DHCP software	<a href="#">“How to Install and Configure DHCP” on page 11</a>
Verify the installation and configuration	<a href="#">“How to Verify the Installation and Configuration of DHCP” on page 13</a>
Install HA for DHCP packages	<a href="#">“How to Install the HA for DHCP Package” on page 13</a>
Register and configure HA for DHCP resources	<a href="#">“How to Register and Configure HA for DHCP” on page 14</a>
Verify the HA for DHCP installation and configuration	<a href="#">“How to Verify the HA for DHCP Installation and Configuration” on page 15</a>
Upgrade the HA for DHCP data service	<a href="#">“How to Upgrade to the New Version of HA for DHCP” on page 16</a>
Tune the HA for DHCP fault monitor	<a href="#">“Understanding the HA for DHCP Fault Monitor” on page 17</a>
Debug HA for DHCP	<a href="#">“How to turn on debug for HA for DHCP” on page 18</a>

## Planning the HA for DHCP Installation and Configuration

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

### Configuration Restrictions

The configuration restrictions in the subsections that follow apply only to HA for DHCP.



**Caution** – Your data service configuration might not be supported if you do not observe these restrictions.

## Restriction for the supported configurations of HA for DHCP

The HA for DHCP data service can only be configured as a failover service.

DHCP must operate as a DHCP server and not as a relay host.

Only one DHCP instance can be configured within the cluster, however you can have multiple DHCP networks within that DHCP instance.

## Restriction for the location of DHCP files

The DHCP files is the network table that is created when you configure DHCP using the `/usr/sadm/admin/bin/dhcpmgr`.

The DHCP files must be placed on shared storage as either a cluster file system or a highly available local file system.

## Configuration Requirements

The configuration requirements in this section apply only to HA for DHCP.



**Caution** – If your data service configuration does not conform to these requirements, the data service configuration might not be supported.

### Required `/etc/inet/dhcpsvc.conf` parameters.

The following parameters must be set within `/etc/inet/dhcpsvc.conf`

- `DAEMON_ENABLED` is always set to `true`.
- `PATH` points to the DHCP network table.
- `RUN_MODE` is always set to `SERVER`.
- `RESOURCE` is set to either `SUNWbinfiles` or `SUNWfiles`.

## Installing and Configuring DHCP

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

### ▼ How to Install and Configure DHCP

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

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

**2 Create a cluster file system or highly available local file system for the DHCP files.**

Refer to *Oracle Solaris Cluster Software Installation Guide* for information about creating a cluster file system and to *Oracle Solaris Cluster Data Services Planning and Administration Guide* for information about creating a highly available local file system.

**3 Mount the highly available local file system if used.**

**4 Configure DHCP.**

As root, execute `/usr/sadm/admin/bin/dhcpmgr`.

```
# /usr/sadm/admin/bin/dhcpmgr
```

- Choose `Configure` as DHCP Server.
- Choose `Text files` or `Binary files`.
- Enter a path for the DHCP network table.
- Choose which name services to use to store host records.
- Choose `Length of Lease` and whether clients can renew their leases.
- If used, supply a DNS configuration for the DHCP client of this server.
- Add which network and network mask should provide IP Addresses.
- Choose `LAN` as Network Type.
- If used, supply a NIS configuration for the DHCP clients of this server.
- If used, supply a NIS+ configuration for the DHCP clients of this server.
- Create your addresses and macros.

**5 Ensure `/etc/inet/dhcpsvc.conf` is the same on all cluster nodes.**

This can be done using one of the following actions:

- Copying `/etc/inet/dhcpsvc.conf` to each cluster node.
- Moving your edited `/etc/inet/dhcpsvc.conf` to a cluster file system and create a symbolic link from `/etc/inet/dhcpsvc.conf` to `dhcpsvc.conf` on the cluster file system.

**6 Ensure DHCP is stopped on all nodes.**

```
# /usr/sadm/admin/bin/dhcpmgr  
# svcadm disable dhcp-server
```

## Verifying the Installation and Configuration of DHCP

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

## ▼ How to Verify the Installation and Configuration of DHCP

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

- 1 **Verify `/etc/inet/dhcpsvc.conf`.**  
Ensure that the parameters are set to your requirements.
- 2 **Check `/etc/inet/dhcpsvc.conf` is consistent on all cluster nodes.**
- 3 **Check that DHCP startup on boot has been disabled.**  
`# svcadm disable dhcp-server`

## Installing the HA for DHCP Package

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

## ▼ How to Install the HA for DHCP Package

Perform this procedure on each cluster node where you want the HA for DHCP 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 DHCP software package.**  
`# pkg install ha-cluster/data-service/dhcp`
- 4 **Verify that the package installed successfully.**  
`$ pkg info ha-cluster/data-service/dhcp`  
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*.

# Registering and Configuring HA for DHCP

This section contains the procedures you need to configure HA for DHCP.

Some procedures within this section require you to use certain Oracle Solaris Cluster commands. Refer to the relevant Oracle Solaris Cluster command man page for more information about these command and their parameters.

## ▼ How to Register and Configure HA for DHCP

Perform this procedure on one node of the cluster only.

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

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

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

### 2 Register the following resource types.

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

### 3 Create a failover resource group for DHCP.

```
# clresourcegroup create -n nodelist dhcp-resource-group
```

### 4 Create a resource for the DHCP Logical Hostname.

```
# clreslogicalhostname create -g dhcp-resource-group \
> -h logical-hostname \
> logical-hostname-resource
```

### 5 Create a resource for the DHCP Disk Storage.

#### a. If a ZFS highly available local file system is being used.

```
# clresource create -g dhcp-resource-group \
> -t SUNW.HAStoragePlus \
> -p ZpoolS=dhcp-zspool \
> dhcp-hastorage-resource
```

**b. If a cluster file system or a non ZFS highly available local file system is being used.**

```
# clresource create -g dhcp-resource-group \
> -t SUNW.HASStoragePlus \
> -p FilesystemMountPoints=dhcp-filesystem-mountpoint \
> dhcp-hastorage-resource
```

**6 Enable the Resource Group.**

```
# clresourcegroup online -emM dhcp-resource-group
```

**7 Create and register a resource for DHCP.**

Edit `/opt/SUNWscdhc/util/dhcp_config` and follow the comments within that file. After you have edited `dhcp_config`, you must register the resource.

```
# cd /opt/SUNWscdhc/util
# vi dhcp_config
# ./dhcp_register
```

The following example shows `dhcp_config` that has been edited for a two node cluster with IPMP. The entries for Oracle Solaris Cluster Carrier-Grade Edition can be ignored.

```
RS=dhcp
RG=dhcp-rg
PORT=23
LH=dhcp-lh
NETWORK=192.168.100.0@sc_ipmp0@1/192.168.100.0@sc_ipmp0@2
HAS_RS=dhcp-has

# Options to Oracle Solaris Cluster Carrier-Grade Edition

USE_CGTP=FALSE
USE_STATIC_DHCP=FALSE
TEST_CLIENTID=
TFTPTESTFILE=
```

**8 Enable the DHCP resource.**

```
# clresource enable dhcp-resource
```

## Verifying the HA for DHCP Installation and Configuration

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

### ▼ How to Verify the HA for DHCP Installation and Configuration

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

- 2 **Ensure the DHCP resource is online.**

```
# cluster status
```

Enable the DHCP resource if it is not online.

```
# clresource enable dhcp-resource
```

- 3 **Switch the DHCP resource group to another cluster node or node.**

```
# clresourcegroup switch -n node dhcp-resource-group
```

## Upgrading HA for DHCP

Upgrade the HA for DHCP data service if you are upgrading from an earlier version of the HA for DHCP data service.

### ▼ How to Upgrade to the New Version of HA for DHCP

---

**Note** – Before performing this procedure you should consider if your current DHCP resource has been modified to have specific timeout values that suit your deployment. If timeout values were previously adjusted you should reapply those timeout values to your new DHCP resource.

---

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

- 2 **Disable the DHCP resource.**

```
# clresource disable dhcp-resource
```

- 3 **Install the new version of HA for DHCP to each cluster.**

Refer to [“How to Install the HA for DHCP Package” on page 13](#) for more information.

- 4 **Delete the DHCP resource.**

```
# clresource delete dhcp-resource
```

- 5 **Reregister the DHCP resource.**

Refer to [“How to Register and Configure HA for DHCP” on page 14](#) for more information.

- 6 **Enable the DHCP resource.**

```
# clresource enable dhcp-resource
```



# Understanding the HA for DHCP Fault Monitor

This section describes the HA for DHCP fault monitor probing algorithm or functionality, states the conditions, and recovery actions associated with unsuccessful probing.

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

## Resource Properties

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

## Probing Algorithm and Functionality

The HA for DHCP fault monitor 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. The preset behavior should be suitable for most Oracle Solaris Cluster installations. Therefore, you should tune the HA for DHCP fault monitor *only* if you need to modify this preset behavior.

- 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 DHCP fault monitor checks within an infinite loop. During each cycle the fault monitor will perform a check and report 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 will continue whenever the fault monitor reports a failure.

If successive restarts exceed the `Retry_count` within the `Thorough_probe_interval` a request to failover the resource group onto a different node is made.

## DHCP Probe

Test whether PNM (Public Network Monitoring) has changed the active interface for the network that DHCP is using. If this fails, then the probe will restart the DHCP resource.

# Debug HA for DHCP

## ▼ How to turn on debug for HA for DHCP

The `/opt/SUNWscdhc/etc/config` file allows you to turn on debug for a DHCP instance on a particular node within the cluster. If you require debug to be turned on for HA for DHCP across the whole cluster, repeat this step on all nodes within the cluster.

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

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

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

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

Restart the `syslog` daemon.

```
# svcadm disable system-log
# svcadm enable system-log
```

### 2 Edit `/opt/SUNWscdhc/etc/config`.

Perform this step on each node of cluster as required.

Edit `/opt/SUNWscdhc/etc/config` and change `DEBUG=` to `DEBUG=ALL` or `DEBUG=sun-cluster-resource`.

```
# cat /opt/SUNWscdhc/etc/config
#
# Copyright 2012 Oracle and/or its affiliates. All rights reserved.
#
# ident "@(#)config 1.1 01/03/12 Oracle"
#
# Usage:
#     DEBUG=<RESOURCE_NAME> or ALL
#
DEBUG=ALL
```

---

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

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