

Oracle® Solaris Cluster Data Service for DNS Guide

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Using This Documentation

- **Overview** – Explains how to install and configure the Oracle Solaris Cluster HA for DNS data service
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware

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Installing and Configuring Oracle Solaris Cluster HA for DNS

This chapter describes the steps to install and configure the HA for Domain Name Service (DNS) data service on your Oracle Solaris Cluster servers.

This chapter contains the following sections.

- [“Overview of the Installation and Configuration Process for Oracle Solaris Cluster HA for DNS” on page 13](#)
- [“Installing DNS” on page 14](#)
- [“Installing the Oracle Solaris Cluster HA for DNS Package” on page 17](#)
- [“Registering and Configuring Oracle Solaris Cluster HA for DNS” on page 18](#)
- [“Verifying Data Service Installation and Configuration” on page 23](#)
- [“Tuning the Oracle Solaris Cluster HA for DNS Fault Monitor” on page 23](#)

You must configure Oracle Solaris Cluster HA for DNS as a failover data service. See [Chapter 1, “Planning for Oracle Solaris Cluster Data Services,” in *Oracle Solaris Cluster 4.3 Data Services Planning and Administration Guide*](#) and the [Oracle Solaris Cluster 4.3 Concepts Guide](#) for general information about data services, resource groups, resources, and other related topics.

Overview of the Installation and Configuration Process for Oracle Solaris Cluster HA for DNS

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

TABLE 1 Task Map: Installing and Configuring Oracle Solaris Cluster HA for DNS

Task	Instructions
Install DNS	“Installing DNS” on page 14

Task	Instructions
Install Oracle Solaris Cluster HA for DNS packages	“How to Install the Oracle Solaris Cluster HA for DNS Package” on page 17
Configure and start Oracle Solaris Cluster HA for DNS	“Registering and Configuring Oracle Solaris Cluster HA for DNS” on page 18
Verify the data service installation and configuration	“Verifying Data Service Installation and Configuration” on page 23
Tune the Oracle Solaris Cluster HA for DNS fault monitor	“Tuning the Oracle Solaris Cluster HA for DNS Fault Monitor” on page 23

Installing DNS

This section describes the steps to install DNS and to enable DNS to run as Oracle Solaris Cluster HA for DNS.

Oracle Solaris Cluster HA for DNS uses the Internet Domain Name Server (`named`) software that is bundled with the Oracle Solaris operating system. See the [`named\(1M\)`](#) man page for information about how to set up DNS. The Oracle Solaris Cluster configuration involves the following differences.

- The DNS database is located on the cluster file system, not a local file system.
- A network resource (relocatable IP address), not the name of a physical host, identifies the name of a DNS server.

▼ How to Install DNS

This section describes how to install the DNS service.

1. **On a cluster member, become an administrator that provides `solaris.cluster.admin` authorization.**

2. **Decide on the network resource that will provide the DNS service.**

This name should be an IP address (logical hostname) that you set up when you install the Oracle Solaris Cluster software. See the [Oracle Solaris Cluster 4.3 Concepts Guide](#) document for details about network resources.

3. **Ensure that the DNS executable (`named`) is in the directory `/usr/sbin`.**

The DNS executable is bundled with the Oracle Solaris operating system. Ensure that this executable is located in the `/usr/sbin` directory before you begin the installation.

4. **Create directory structure `/global/dns/named` on the cluster file system to hold the DNS configuration files (at level `/global/dns`) and database files (at level `/global/dns/named`).**

See the [Oracle Solaris Cluster 4.3 Software Installation Guide](#) for information about configuring a cluster file systems.

```
# mkdir -p /global/dns/named
```

5. **Place the configuration file for DNS, `named.conf` or `named.boot`, under the `/global/dns` directory.**

If you have already installed DNS, you can copy the existing `named.conf` or `named.boot` file to the `/global/dns` directory. Otherwise, create a `named.conf` file in this directory. See the [named\(1M\)](#) man page for information on the types of entries to place in `named.conf` or `named.boot`. Either the `named.conf` file or the `named.boot` file must exist. Both files can exist.

6. **Place all of the DNS database files (listed in the `named.conf` file) under the `/global/dns/named` directory.**

7. **On all of the clients of Oracle Solaris Cluster HA for DNS, create an entry for the network resource of the DNS service in the `/etc/resolv.conf` file.**

On all of the nodes, edit the `/etc/resolv.conf` file to contain the network resource. The following example shows the entries for a four-node configuration (`phys-schost-1`, `phys-schost-2`, `phys-schost-3`, and `phys-schost-4`) with the logical hostname `schost-1.example.com`.

```
domain example.com

; schost-1.example.com
Only entry to be added if the file is already present.
nameserver 192.29.72.90

; phys-schost-2.example
nameserver 129.146.1.151

; phys-schost-3.example
nameserver 129.146.1.152

; phys-schost-4.example
nameserver 129.144.134.19

; phys-schost-1.example
nameserver 129.144.1.57
```

Make the network resource the first entry after the domain name. DNS attempts to use the addresses in the order that they are listed in the `resolv.conf` file to access the server.

Note - If the `/etc/resolv.conf` is already present on the nodes, just add the first entry that shows the logical hostname in the preceding example. The order of the entries determines the order in which DNS tries to access the server.

8. On all of the cluster nodes, edit the `/etc/inet/hosts` file to create an entry for the network resource of the DNS service.

In the following example, perform these steps.

- Replace the `IPaddress` variable with your actual IP address, such as `129.146.87.53`.
- Replace the `logical-hostname` variable with your actual network resource (logical hostname).

```
127.0.0.1    localhost
IPaddress   logical-hostname
```

9. On all of the cluster nodes, ensure that the `hosts` entry in the `/etc/nsswitch.conf` file has the string `dns` after `cluster` and `files`.

Example:

```
hosts:    cluster files dns
```

10. On all of the cluster nodes, test DNS.

The following example shows how to test DNS.

```
# /usr/sbin/named -c /global/dns/named.conf
# nslookup phys-schost-1
```

11. On all of the cluster nodes, stop DNS.

Be sure to stop the `named` executable before you proceed.

```
# pkill -x named
```

Next Steps If you installed the Oracle Solaris Cluster HA for DNS packages during your Oracle Solaris Cluster installation, go to [“Registering and Configuring Oracle Solaris Cluster HA for DNS” on page 18](#). Otherwise, go to [“Installing the Oracle Solaris Cluster HA for DNS Package” on page 17](#).

Installing the Oracle Solaris Cluster HA for DNS Package

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

▼ How to Install the Oracle Solaris Cluster HA for DNS Package

Perform this procedure on each cluster node where you want the Oracle Solaris Cluster HA for DNS software to run.

1. **On the cluster node where you are installing the data service package, become an administrator.**
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/dns
# 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 Oracle Solaris Cluster HA for DNS software package.**

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

4. **Verify that the package installed successfully.**

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

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 4.3 System Administration Guide* .

Registering and Configuring Oracle Solaris Cluster HA for DNS

This procedure describes how to use the `clresource` command to register and configure Oracle Solaris Cluster HA for DNS.

Note - Other options also enable you to register and configure the data service. See [“Tools for Data Service Resource Administration”](#) in *Oracle Solaris Cluster 4.3 Data Services Planning and Administration Guide* for details about these options.

Setting Oracle Solaris Cluster HA for DNS Extension Properties

The sections that follow contain instructions for registering and configuring Oracle Solaris Cluster HA for DNS resources. For information about the extension properties, see [Appendix A, “Oracle Solaris Cluster HA for DNS Extension Properties”](#). The Tunable entry indicates when you can update a property.

See [“Standard Properties”](#) in *Oracle Solaris Cluster 4.3 Data Services Planning and Administration Guide* for details about all the Oracle Solaris Cluster properties.

To set an extension property of a resource, include the following option in the `clresource` command that creates or modifies the resource:

```
-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 4.3 Data Services Planning and Administration Guide*](#) to configure resources after the resources are created.

▼ How to Register and Configure Oracle Solaris Cluster HA for DNS

This section describes how to register and configure Oracle Solaris Cluster HA for DNS.

To perform this procedure, you need the following information about your configuration.

- The name of the resource type for Oracle Solaris Cluster HA for DNS. This name is `SUNW.dns`.
- The names of the cluster nodes that master the data service.
- The network resource that clients use to access the data service. You normally set up this IP address when you install the cluster. See the [Oracle Solaris Cluster 4.3 Concepts Guide](#) for details about network resources.
- The path to the DNS configuration files, which you must install on a cluster file system. This path maps to the `Config_dir` resource property that is configured in this procedure.

Note - Perform this procedure on any cluster member.

1. **On a cluster member, become an administrator that provides `solaris.cluster.admin` authorization.**

2. **Disable the SMF service `/network/dns/server:default`.**

Perform this step before starting any Oracle Solaris Cluster HA for DNS resource.

In the event of any failure in the initial primary node, failover is possible only if the Service Management Facility (SMF) service `/network/dns/server:default` is disabled. On all potential primary nodes, disable this service by running the following command.

```
# svcadm disable /network/dns/server:default
```

For more information on SMF, see [“SMF Capabilities” in *Managing System Services in Oracle Solaris 11.3*](#).

3. **Register the resource type for the data service.**

```
# clresourcetype register SUNW.dns
```

SUNW.dns

Specifies the predefined resource type name for your data service.

4. Create a resource group for network and DNS resources to use.

You can use the `-n` option to optionally select the set of nodes on which the data service can run.

```
# clresourcegroup create [-n node-list] resource-group
```

`[-n node-list]`

Specifies a comma-separated, ordered list of nodes that can master this resource group. This list is optional. If you omit this list, the global zone of each cluster node can master the resource group.

`resource-group`

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

5. Add network resources to the resource group.

For example, run the following command to add a logical hostname to a resource group.

```
# clreslogicalhostname create -g resource-group -h logical-hostname [logical-hostname] \  
[-N netiflist] logical-hostname
```

`-h logical-hostname`

Specifies a comma-separated list of network resources (logical hostname). If you require a fully qualified hostname, you must specify the fully qualified name with the `-h` option and you cannot use the fully qualified form in the resource name.

`-N netiflist`

Specifies an optional, comma-separated list that identifies the IPMP groups that are on each node. 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.

Note - Oracle Solaris Cluster does not currently support the use of the adapter name for `netif`.

node Specifies the name or ID of a node.

6. Add a DNS application resource to the resource group.

```
# clresource create -g resource-group \  
-t SUNW.dns -p Resource_Dependencies=network-resource,... \  
-p Port_list=port-number/protocol -p DNS_mode=config-file \  
-p Confdir_list=config-directory resource
```

The resource is created in the enabled state.

-t *SUNW.dns*

Specifies the name of the resource type to which this resource belongs. This entry is required.

-p *Resource_Dependencies=network-resource,...*

Specifies a comma-separated list of network resources (logical hostnames) that DNS will use. If you do not specify this property, the value defaults to all the network resources that are contained in the resource group.

-p *Port_list=port-number/protocol*

Specifies a port number and the protocol to be used. If you do not specify this property, the value defaults to 53/udp.

-p *DNS_mode=config-file*

Specifies the configuration file to use, either *conf* (which specifies the file named *.conf*) or *boot* (which specifies the file named *.boot*). If you do not specify this property, the value defaults to *conf*.

-p *Confdir_list=config-directory*

Specifies the DNS configuration directory, which must be on the cluster file system. Oracle Solaris Cluster HA for DNS requires this extension property. The *'directory'* directive in the global portion (options) of the *named.conf* should match this value.

resource

Specifies the DNS application resource name.

7. Run the `clresourcegroup` command to complete the following tasks.

- Enable the resource and fault monitoring.
- Move the resource group into a managed state.
- Bring the resource group online.

```
# clresourcegroup online -M resource-group
```

-M

Moves all resources within the resource group to the MANAGED state.

resource-group

Specifies the name of the resource group.

Example 1 Registering Failover Oracle Solaris Cluster HA for DNS

The following example shows how to register Oracle Solaris Cluster HA for DNS on a two-node cluster. Note that at the end, the `clresourcegroup` command starts Oracle Solaris Cluster HA for DNS.

Cluster Information

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

Logical hostname: schost-1

Resource group: resource-group-1 (for all the resources)

Resources: schost-1 (logical hostname), dns-1 (DNS application resource)

Disable the SMF service /network/dns/server:default

```
# svcadm disable /network/dns/server:default
```

Register the DNS resource type

```
# clresourcetype register SUNW.dns
```

Add the resource group to contain all the resources

```
# clresourcegroup create resource-group-1
```

Add the logical hostname resource to the resource group

```
# clreslogicalhostname create -g resource-group-1 -h schost-1 schost-1
```

Add DNS application resources to the resource group

```
# clresource create -g resource-group-1 -t SUNW.dns \  
-p Resource_Dependencies=schost-1 -p Port_list=53/udp \  
-p DNS_mode=conf -p Confdir_list=/global/dns dns-1
```

Bring the failover resource group online

```
# clresourcegroup online -M resource-group-1
```

Verifying Data Service Installation and Configuration

To verify that you have correctly installed and configured Oracle Solaris Cluster HA for DNS, run the following command after you complete the procedure [“How to Register and Configure Oracle Solaris Cluster HA for DNS”](#) on page 19.

```
# nslookup logical-hostname
```

In this example, *logical-hostname* is the name of the network resource that you have configured to service DNS requests. For example, *schost - 1* is shown in the previous registration example. The output should indicate that the network resource that you specified answered (served) the query.

Tuning the Oracle Solaris Cluster HA for DNS Fault Monitor

The Oracle Solaris Cluster HA for DNS fault monitor is contained in the resource that represents DNS. You create this resource when you register and configure Oracle Solaris Cluster HA for DNS. For more information, see [“Registering and Configuring Oracle Solaris Cluster HA for DNS”](#) on page 18.

System properties and extension properties of this resource control the behavior of the fault monitor. 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 Oracle Solaris Cluster HA for DNS fault monitor *only* if you need to modify this preset behavior.

For more information, see the following sections.

- [“Tuning Fault Monitors for Oracle Solaris Cluster Data Services”](#) in *Oracle Solaris Cluster 4.3 Data Services Planning and Administration Guide*
- [“Changing Resource Type, Resource Group, and Resource Properties”](#) in *Oracle Solaris Cluster 4.3 Data Services Planning and Administration Guide*
- [“Standard Properties”](#) in *Oracle Solaris Cluster 4.3 Data Services Planning and Administration Guide*

Operations by the Fault Monitor During a Probe

The fault monitor probe uses the `nslookup` command to query the health of DNS. Before the probe actually queries the DNS server, a check is made to confirm that network resources are

configured in the same resource group as the DNS data service. If no network resources are configured, an error message is logged, and the probe exits with failure.

The result of the `nslookup` command can be either failure or success. If DNS successfully replied to the `nslookup` query, the probe returns to its infinite loop, waiting for the next probe time.

If the `nslookup` fails, the probe considers this scenario a failure of the DNS data service and records the failure in its history. The DNS probe considers every failure a complete failure.

Based on the success or failure history, a failure can cause a local restart or a data service failover. [“Tuning Fault Monitors for Oracle Solaris Cluster Data Services”](#) in *Oracle Solaris Cluster 4.3 Data Services Planning and Administration Guide* further describes this action.

Oracle Solaris Cluster HA for DNS Extension Properties

This section describes the extension properties for the resource type `SUNW.dns`. This resource type represents the DNS 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.

The extension properties of the `SUNW.dns` resource type are as follows:

`Confdir_list`

The DNS configuration directory, which contains the configuration file for a DNS instance.

Data type	String
Default	No default defined
Range	Not applicable
Tunable	At creation

`DNS_mode`

The DNS configuration file to use, either `conf` (which specifies the file named `.conf`) or `boot` (which specifies the file named `.boot`).

Data type	String
Default	<code>conf</code>
Range	Not applicable
Tunable	At creation

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 resource restarts.

Data type	Integer
Default	4
Range	0 - 2,147,483,641 -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 - 2,147,483,641 -1 indicates an infinite retry interval.
Tunable	At any time

Probe_timeout

The timeout value (in seconds) that the fault monitor uses to probe a DNS instance.

Data type	Integer
Default	120
Range	0 - 2,147,483,641
Tunable	At any time

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