Sun Cluster Data Service for Domain Name Service (DNS) Guide for Solaris OS

Contents

Preface

Sun Cluster Data Service for Domain Name Service (DNS) Guide for Solaris OS explains how to install and configure Sun™ Cluster HA for Domain Name Service (DNS) on both SPARC® and x86 based systems.

Note – In this document, the term "x86" refers to the Intel 32-bit family of microprocessor chips and compatible microprocessor chips made by AMD.

This document is intended for system administrators with extensive knowledge of Sun 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 document assume knowledge of the Solaris™ operating environment and expertise with the volume manager software that is used with Sun Cluster.

Note – Sun Cluster software runs on two platforms, SPARC and x86. The information in this document pertains to both platforms unless otherwise specified in a special chapter, section, note, bulleted item, figure, table, or example.

UNIX Commands

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

Typographic Conventions

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

TABLE P–1 Typographic Conventions

Typeface or Symbol	Meaning	Example
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	Command-line placeholder: replace with a real name or value	To delete a file, type **rm** *filename*.
AaBbCc123	Book titles, new terms, or terms to be emphasized	Read Chapter 6 in *User's Guide*. These are called *class* options. You must be *root* to do this.

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P–2 Shell Prompts

Shell	Prompt
C shell prompt	`machine_name%`
C shell superuser prompt	`machine_name#`
Bourne shell and Korn shell prompt	`$`
Bourne shell and Korn shell superuser prompt	`#`

Related Documentation

Information about related Sun Cluster topics is available in the documentation that is listed in the following table. All Sun Cluster documentation is available at `http://docs.sun.com`.

Topic	Documentation
Data service administration	*Sun Cluster Data Service Planning and Administration Guide*
	Individual data service guides
Concepts	*Sun Cluster Concepts Guide*
Overview	*Sun Cluster Overview for Solaris OS*
Software installation	*Sun Cluster Software Installation Guide*
System administration	*Sun Cluster System Administration Guide*
Hardware administration	*Sun Cluster Hardware Administration Manual*
	Individual hardware administration guides
Data service development	*Sun Cluster Data Services Developer's Guide*
Error messages	*Sun Cluster Error Messages Guide*

Topic	Documentation
Command and function reference	*Sun Cluster Reference Manual*

For a complete list of Sun Cluster documentation, see the release notes for your release of Sun Cluster at `http://docs.sun.com`.

Accessing Sun Documentation Online

The docs.sun.com^{SM} Web site enables you to access Sun technical documentation online. You can browse the docs.sun.com archive or search for a specific book title or subject. The URL is `http://docs.sun.com`.

Ordering Sun Documentation

Sun Microsystems offers select product documentation in print. For a list of documents and how to order them, see "Buy printed documentation" at http://docs.sun.com.

Help

If you have problems installing or using Sun 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 and serial numbers of your systems
- The release number of the Solaris Operating System (for example, Solaris 8)
- The release number of Sun Cluster (for example, Sun Cluster 3.0)

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

Command	Function
prtconf -v	Displays the size of the system memory and reports information about peripheral devices
psrinfo -v	Displays information about processors
showrev –p	Reports which patches are installed
SPARC: prtdiag -v	Displays system diagnostic information
scinstall -pv	Displays Sun Cluster release and package version information

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

Installing and Configuring Sun Cluster HA for Domain Name Service (DNS)

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

This chapter contains the following procedures.

- "How to Install DNS" on page 12
- "How to Install Sun Cluster HA for DNS Packages Using the Web Start Program" on page 15
- "How to Install Sun Cluster HA for DNS Packages Using the `scinstall` Utility" on page 16
- "How to Register and Configure Sun Cluster HA for DNS" on page 17
- "How to Configure `SUNW.HAStoragePlus` Resource Type" on page 21

You must configure Sun Cluster HA for DNS as a failover data service. See "Planning for Sun Cluster Data Services" in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* and the *Sun Cluster Concepts Guide for Solaris OS* document for general information on data services, resource groups, resources, and other related topics.

Note – You can use SunPlex Manager to install and configure this data service. See the SunPlex Manager online help for details.

Installing and Configuring Sun Cluster HA for DNS

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

TABLE 1–1 Task Map: Installing and Configuring Sun Cluster HA for NFS

Task	For Instructions, Go To …
Install DNS	"Installing DNS" on page 12
Install Sun Cluster HA for DNS packages	"Installing Sun Cluster HA for DNS Packages" on page 15
Configure and start Sun Cluster HA for DNS	"Registering and Configuring Sun Cluster HA for DNS" on page 17
Configure resource extension properties	"Configuring Sun Cluster HA for DNS Extension Properties" on page 22
View fault monitor information	"Operation of Sun Cluster HA for DNS Fault Monitor" on page 24

Installing DNS

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

Sun Cluster HA for DNS uses the Internet Domain Name Server (`in.named`) software that is bundled with the Solaris 8 and Solaris 9 operating environments. See the `in.named`(1M) man page for information on how to set up DNS. The Sun 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.

1. **Become superuser on a cluster member.**

2. **Decide on the network resource that will provide the DNS service.**
   This name should be an IP address (logical hostname or shared address) that you set up when you install the Sun Cluster software. See the *Sun Cluster Concepts Guide for Solaris OS* document for details on network resources.

3. **Ensure that the DNS executable (`in.named`) is in the directory `/usr/sbin`.**
   The DNS executable is bundled with the Solaris 8 and Solaris 9 operating environments. 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 *Sun Cluster Software Installation Guide for Solaris OS* for information on how to set up 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 in.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 Sun 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.eng.sun.com.

   ```
   domain eng.sun.com

   ; schost-1.eng.sun.com
   ```

   (Only entry to be added if the file is already present.)

   ```
   nameserver 192.29.72.90

   ; phys-schost-2.eng
   nameserver 129.146.1.151

   ; phys-schost-3.eng
   nameserver 129.146.1.152

   ; phys-schost-4.eng
   nameserver 129.144.134.19

   ; phys-schost-1.eng
   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 or shared address).

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

9. **On all of the cluster nodes, edit the `/etc/nsswitch.conf` file to add the string `dns` after `cluster` and `files` to the `hosts` entry.**

   Example:

   ```
   hosts:          cluster files dns
   ```

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

    The following example shows how to test DNS.

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

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

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

    ```
    # pkill -x in.named
    ```

Where to Go From Here

If you installed the Sun Cluster HA for DNS packages during your Sun Cluster installation, go to "Registering and Configuring Sun Cluster HA for DNS" on page 17. Otherwise, go to "Installing Sun Cluster HA for DNS Packages" on page 15.

Installing Sun Cluster HA for DNS Packages

If you did not install the Sun Cluster HA for Domain Name Service (DNS) packages during your initial Sun Cluster installation, perform this procedure to install the packages. Perform this procedure on each cluster node where you are installing the Sun Cluster HA for Domain Name Service (DNS) packages. To complete this procedure, you need the Sun Java Enterprise System Accessory CD Volume 3.

If you are installing more than one data service simultaneously, perform the procedure in "Installing the Software" in *Sun Cluster Software Installation Guide for Solaris OS*.

Install the Sun Cluster HA for Domain Name Service (DNS) packages by using one of the following installation tools:

- The Web Start program
- The `scinstall` utility

Note – The Web Start program is *not* available in releases earlier than Sun Cluster 3.1 Data Services 10/03.

▼ How to Install Sun Cluster HA for DNS Packages Using the Web Start Program

You can run the Web Start 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. For more information about the Web Start program, see the `installer`(1M) man page.

1. **On the cluster node where you are installing the Sun Cluster HA for Domain Name Service (DNS) packages, become superuser.**

2. **(Optional) If you intend to run the Web Start program with a GUI, ensure that your `DISPLAY` environment variable is set.**

3. **Load the Sun Java Enterprise System Accessory CD Volume 3 into the CD-ROM drive.**

   If the Volume Management daemon `vold`(1M) is running and configured to manage CD-ROM devices, it automatically mounts the CD-ROM on the `/cdrom/cdrom0` directory.

4. **Change to the Sun Cluster HA for Domain Name Service (DNS) component directory of the CD-ROM.**

   The Web Start program for the Sun Cluster HA for Domain Name Service (DNS) data service resides in this directory.

   ```
   # cd /cdrom/cdrom0/\
   components/SunCluster_HA_DNS_3.1
   ```

5. **Start the Web Start program.**

   ```
   # ./installer
   ```

6. **When you are prompted, select the type of installation.**

   - To install only the C locale, select Typical.
   - To install other locales, select Custom.

7. **Follow instructions on the screen to install the Sun Cluster HA for Domain Name Service (DNS) packages on the node.**

   After the installation is finished, the Web Start program provides an installation summary. This summary enables you to view logs that the Web Start program created during the installation. These logs are located in the `/var/sadm/install/logs` directory.

8. **Exit the Web Start program.**

9. **Unload the Sun Java Enterprise System Accessory CD Volume 3 from the CD-ROM drive.**

   a. **To ensure that the CD-ROM is not being used, change to a directory that does *not* reside on the CD-ROM.**

   b. **Eject the CD-ROM.**

   ```
   # eject cdrom
   ```

Where to Go From Here

See "Registering and Configuring Sun Cluster HA for DNS" on page 17 to register Sun Cluster HA for DNS and to configure the cluster for the data service.

▼ How to Install Sun Cluster HA for DNS Packages Using the `scinstall` Utility

This section describes how to install Sun Cluster HA for DNS packages by using the `scinstall` utility.

1. **Load the Sun Java Enterprise System Accessory CD Volume 3 into the CD-ROM drive.**

2. **Run the `scinstall` utility with no options.**

   This step starts the `scinstall` utility in interactive mode.

3. **Choose the menu option, Add Support for New Data Service to This Cluster Node.**

   The `scinstall` utility prompts you for additional information.

4. **Provide the path to the Sun Java Enterprise System Accessory CD Volume 3.**

   The utility refers to the data services "cd."

5. **Specify the data service to install.**

   The `scinstall` utility lists the data service that you selected and asks you to confirm your choice.

6. **Exit the `scinstall` utility.**

7. **Unload the CD from the drive.**

Where to Go From Here

See "Registering and Configuring Sun Cluster HA for DNS" on page 17 to register Sun Cluster HA for DNS and to configure the cluster for the data service.

Registering and Configuring Sun Cluster HA for DNS

This procedure describes how to use the `scrgadm`(1M) command to register and configure Sun 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 *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for details about these options.

▼ How to Register and Configure Sun Cluster HA for DNS

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

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

- The name of the resource type for Sun 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 *Sun Cluster Concepts Guide for Solaris OS* document for details on 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. **Become superuser on a cluster member.**

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

   # **scrgadm -a -t SUNW.dns**

   -a   Adds the data service resource type.

   -t SUNW.dns   Specifies the predefined resource type name for your data service.

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

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

   # **scrgadm -a -g** *resource-group* [-**h** *nodelist*]

   -g *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.

   [-h *nodelist*]   Specifies an optional comma-separated list of physical node names or IDs that identify potential masters. The order here determines the order in which the nodes are considered as primary during failover.

Note – Use the -h option to specify the order of the node list. If all of the cluster nodes are potential masters, you do not need to use the -h option.

---

4. **Verify that all of the network resources that you will use have been added to your name service database.**

   You should have performed this verification during the Sun Cluster installation. See the planning chapter in the *Sun Cluster Software Installation Guide for Solaris OS* for details.

   Note – To avoid any failures because of name service lookup, verify that all of the network resources are present in the server's and client's `/etc/inet/hosts` file. Configure name service mapping in the `/etc/nsswitch.conf` file on the servers to first check the local files before trying to access NIS or NIS+.

   ---

5. **Add network resources to the resource group.**

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

   ```
   # scrgadm -a -L -g resource-group -l logical-hostname [logical-hostname] \
   [-n netiflist]
   ```

-l *logical-hostname*	Specifies a comma-separated list of network resources (logical hostname or shared address).
-n *netiflist*	Specifies an optional, comma-separated list that identifies the IP Networking Multipathing groups that are on each node. Each element in *netiflist* must be in the form of `netif@node`. `netif` can be given as an IP Networking Multipathing group name, such as `sc_ipmp0`. The node can be identified by the node name or node ID, such as `sc_ipmp0@1` or `sc_ipmp@phys-schost-1`.

   Note – Sun Cluster does not currently support using the adapter name for `netif`.

   ---

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

   ```
   # scrgadm -a -j [resource] -g resource-group \
   -t SUNW.dns -y Network_resources_used=network-resource, ...\
   -y Port_list=port-number/protocol -x DNS_mode=config-file \
   -x Confdir_list=config-directory
   ```

   -j *resource*
   Specifies the DNS application resource name.

   -t SUNW.dns
   Specifies the name of the resource type to which this resource belongs. This entry is required.

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

-y 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.

-x 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.

-x Confdir_list=*config-directory*
    Specifies the DNS configuration directory, which must be on the cluster file
    system. Sun Cluster HA for DNS requires this extension property.

7. **Run the `scswitch`(1M) 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.

    # **scswitch -Z -g** *resource-group*

    -Z   Enables the resource and monitor, moves the resource group
                        to the managed state, and brings the resource group online.

    -g *resource-group*   Specifies the name of the resource group.

Example – Registering Failover Sun Cluster HA for DNS

The following example shows how to register Sun Cluster HA for DNS on a two-node
cluster. Note that at the end, the scswitch command starts Sun 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 of the resources),
Resources: schost-1 (logical hostname), dns-1 (DNS application
      resource)

(Register the DNS resource type.)
scrgadm -a -t SUNW.dns

(Add the resource group to contain all of the resources.)
scrgadm -a -g resource-group-1

(Add the logical hostname resource to the resource group.)
scrgadm -a -L -g resource-group-1 -l schost-1

(Add DNS application resources to the resource group.)
```
# scrgadm -a -j dns-1 -g resource-group-1 -t SUNW.dns \
-y Network_resources_used=schost-1 -y Port_list=53/udp \
-x DNS_mode=conf -x Confdir_list=/global/dns
```

(Bring the failover resource group online.)
```
# scswitch -Z -g resource-group-1
```

How to Configure `SUNW.HAStoragePlus` Resource Type

The `SUNW.HAStoragePlus` resource type was introduced in Sun Cluster 3.0 5/02. This new resource type performs the same functions as `SUNW.HAStorage`, and synchronizes actions between HA storage and Sun Cluster HA for NFS. `SUNW.HAStoragePlus` also has an additional feature to make a local file system highly available. Sun Cluster HA for DNS is not disk-intensive and is not scalable, and therefore, setting up the `SUNW.HAStoragePlus` resource type is optional.

See the `SUNW.HAStoragePlus(5)` man page and "Relationship Between Resource Groups and Disk Device Groups" in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for background information. See "Synchronizing the Startups Between Resource Groups and Disk Device Groups" in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for the procedure. (If you are using a Sun Cluster 3.0 version prior to 5/02, you must set up `SUNW.HAStorage` instead of `SUNW.HAStoragePlus`. See "Synchronizing the Startups Between Resource Groups and Disk Device Groups" in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for the procedure.)

Verifying Data Service Installation and Configuration

To verify that you have correctly installed and configured Sun Cluster HA for DNS, run the following command after you complete the procedure "How to Register and Configure Sun Cluster HA for DNS" on page 17.

```
# nslookup logical-hostname 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`—as shown in the previous registration example. The output should indicate that the network resource that you specified answered (served) the query.

Configuring Sun Cluster HA for DNS Extension Properties

The only required extension property for creating a DNS resource is the `Confdir_list` property. Typically, you use the command line `scrgadm -x` *parameter=value* to configure extension properties when you create the DNS resource. You can also use the procedures in "Administering Data Service Resources" in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* to configure them later.

See "Standard Properties" in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for details on all of the Sun Cluster properties.

Table 1–2 describes the Sun Cluster HA for DNS extension properties. You can update some extension properties dynamically. You can update others, however, only when you create the resource. The Tunable entries indicate when you can update the property.

TABLE 1–2 Sun Cluster HA for DNS Extension Properties

Name/Data Type	Description
`Confdir_list` (string array)	The DNS configuration directory, which contains the configuration file for a DNS instance. **Default:** None **Range:** None **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`). **Default:** `conf` **Range:** None **Tunable:** At creation

TABLE 1–2 Sun Cluster HA for DNS Extension Properties   *(Continued)*

Name/Data Type	Description
Monitor_retry_count (integer)	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 restarts of the resource. **Default:** 4 **Range:**0 − 2,147,483,641 −1 indicates an infinite number of retry attempts. **Tunable:** Any time
Monitor_retry_interval (integer)	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. **Default:** 2 **Range:** 0 − 2,147,483,641 −1 indicates an infinite retry interval. **Tunable:** Any time
Probe_timeout (integer)	The time-out value (in seconds) that the fault monitor uses to probe a DNS instance. **Default:** 120 **Range:** 0 − 2,147,483,641 **Tunable:** Any time

Operation of Sun Cluster HA for DNS Fault Monitor

The 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 probe executes the following steps.

1. Run the `nslookup` command using the time-out value that the resource property `Probe_timeout` specifies.

   The result of this `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.

2. Based on the success/failure history, a failure can cause a local restart or a data service failover. "Sun Cluster Data Service Fault Monitors" in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* further describes this action.

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