



Sun Cluster Data Service for Sun Java System Application Server EE (HADB) Guide for Solaris OS



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Preface

Sun Cluster Data Service for Sun Java System Application Server EE (HADB) Guide for Solaris OS explains how to install and configure Sun™ Cluster HA for Sun Java System Application Server EE (HADB).

Note – This Sun 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 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 book assume knowledge of the Solaris™ Operating System (Solaris OS) and expertise with the volume-manager software that is used with Sun Cluster software.

Using 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 conventions that are used in this book.

TABLE P-1 Typographic Conventions

Typeface	Meaning	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>
AaBbCc123	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. Note: Some emphasized items appear bold online.

Shell Prompts in Command Examples

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

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	<code>machine_name%</code>
C shell for superuser	<code>machine_name#</code>
Bourne shell and Korn shell	<code>\$</code>
Bourne shell and Korn shell for superuser	<code>#</code>

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	<i>Sun Cluster Data Services Planning and Administration Guide for Solaris OS</i> Individual data service guides
Concepts	<i>Sun Cluster Concepts Guide for Solaris OS</i>
Overview	<i>Sun Cluster Overview for Solaris OS</i>
Software installation	<i>Sun Cluster Software Installation Guide for Solaris OS</i>
System administration	<i>Sun Cluster System Administration Guide for Solaris OS</i>
Hardware administration	<i>Sun Cluster 3.1 - 3.2 Hardware Administration Manual for Solaris OS</i> Individual hardware administration guides
Data service development	<i>Sun Cluster Data Services Developer's Guide for Solaris OS</i>
Error messages	<i>Sun Cluster Error Messages Guide for Solaris OS</i>
Command and function reference	<i>Sun Cluster Reference Manual for Solaris OS</i>

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

Related Third-Party Web Site References

Third-party URLs that are referenced in this document provide additional related information.

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Documentation, Support, and Training

The Sun web site provides information about the following additional resources:

- [Documentation](http://www.sun.com/documentation/) (<http://www.sun.com/documentation/>)
- [Support](http://www.sun.com/support/) (<http://www.sun.com/support/>)
- [Training](http://www.sun.com/training/) (<http://www.sun.com/training/>)

Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. To share your comments, go to <http://docs.sun.com> and click Feedback.

Getting 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 number and serial number of your systems
- The release number of the Solaris Operating System (for example, Solaris 10)
- The release number of Sun Cluster (for example, Sun Cluster 3.2)

Use the following commands to gather information about each node on 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>showrev -p</code>	Reports which patches are installed
<code>prtdiag -v</code>	Displays system diagnostic information
<code>/usr/cluster/bin/clnode show-rev</code>	Displays Sun Cluster release and package version information

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

Sun Cluster HA for Sun Java System Application Server EE (Supporting HADB Versions as of 4.4)

This document describes the procedures to install and configure the data service called Sun Cluster HA for Sun Java System Application Server EE (HADB).

This document contains two chapters.

- This chapter contains information for the data service when it makes highly available those versions of the Sun Java System Application Server EE (HADB) application *as of* version 4.4 that are supported by the Sun Cluster product and by this data service.
- [Chapter 2, “SPARC: Sun Cluster HA for Sun Java System Application Server EE \(HADB Versions Before 4.4\),”](#) contains information for the data service when it makes highly available those versions of the Sun Java System Application Server EE (HADB) application *before* version 4.4 that are supported by the Sun Cluster product and by this data service.

This chapter contains the following sections.

- [“Sun Cluster HA for Sun Java System Application Server EE \(HADB\) Overview”](#) on page 12
- [“Overview of the Installation and Configuration Process for Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 15
- [“Planning the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 16
- [“Installing and Configuring the Sun Java System Application Server EE \(HADB\) Software”](#) on page 17
- [“Creating a Sun Java System Application Server EE \(HADB\) Management Domain”](#) on page 18
- [“Installing the Sun Cluster HA for Sun Java System Application Server EE \(HADB\) Packages”](#) on page 18
- [“Registering and Configuring the Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 20
- [“Verifying the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 23
- [“Tuning the Fault Monitor for Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 24

Sun Cluster HA for Sun Java System Application Server EE (HADB) Overview

This section describes how the Sun Cluster HA for Sun Java System Application Server EE (HADB) data service enables the Management Agent component of Sun Java System Application Server EE (HADB) to be highly available in a Sun Cluster system. The data service must be configured to be mastered by multiple nodes.

See [Chapter 1, “Planning for Sun Cluster Data Services,” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*](#) for general information about data services. The data service must be configured

The Sun Java System Application Server EE (HADB) software is packaged with the Sun Java System Application Server Enterprise Edition installation. However, you can run Sun Java System Application Server EE (HADB) and Sun Java System Application Server on separate clusters if appropriate. This document describes how to install and configure the data service that enables you to use Sun Java System Application Server EE (HADB) in a cluster. First, enable Sun Java System Application Server EE (HADB) in your cluster to provide session and Enterprise Java Bean (EJB) persistence. See *Sun Java System Application Server Enterprise Edition 8.2 High Availability Administration Guide* for information about Sun Java System Application Server EE (HADB).

Implementation of the Sun Cluster HA for Sun Java System Application Server EE (HADB) does not assume the existence of applications on which your architecture depends, such as databases and web servers. However, such applications can be configured to be highly available and might run on a different cluster.

HADB Management Architecture

The following figure illustrates the architecture of a database with four active nodes in a management domain.

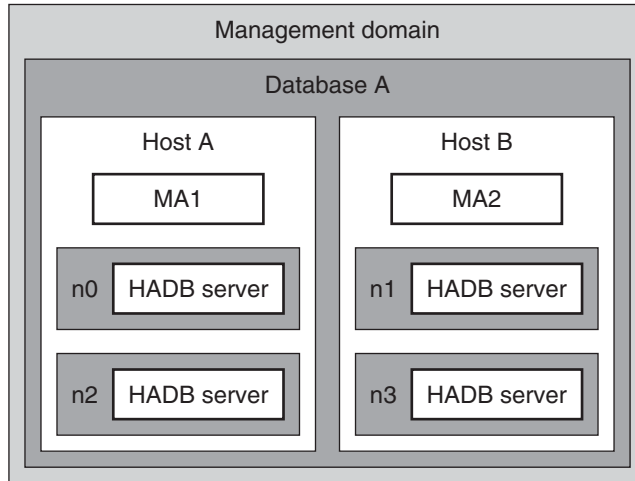


FIGURE 1-1 Management System Architecture

The figure illustrates a management domain that consists of a database and four HADB node processes in the database. These node processes are indicated by n0, n1, n2, and n3. Host A and Host B represent the cluster nodes and form the Data Redundancy Units, or DRUs (Host A:DRU0 and Host B:DRU1) for HADB.

Management agent MA1 manages n0 and n2, and management agent MA2 manages n1 and n3. The management agent is responsible for monitoring the health of the node and restarting the node when necessary. The management agent also handles the management operations requests from the clients.

If the management agent fails on the cluster node, the agent must be restarted on the same node so that the agent can continue to monitor the HADB nodes and to provide management operations. Therefore, the management agent must be made highly available.

Highly Available HADB Management Agent

The Management Agent component of Sun Java System Application Server EE (HADB) is made highly available by creating a data service resource in a resource group that is configured to be mastered by multiple nodes at the same time. In this resource group, the maximum number of primary nodes and the desired number of primary nodes must be the same. This configuration is described in detail in [“Registering and Configuring the Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 20.

The following figure illustrates a two-node configuration before any failure occurs on a node.

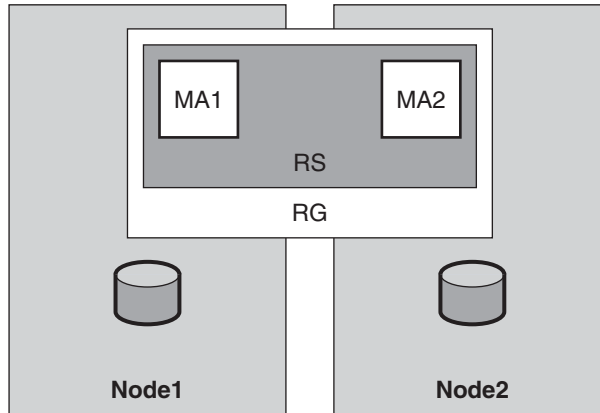


FIGURE 1-2 Management Agents Mastered on Multiple Nodes—Before Failure

The figure illustrates two management agents, indicated by MA1 and MA2, on different cluster nodes. The application is installed on the local file system on each node. With the Sun Cluster HA for Sun Java System Application Server EE (HADB) data service, the two management agents are configured in one resource, indicated by RS, and this resource is configured in one resource group, RG. The resource group is configured to be mastered on multiple cluster nodes at one time, in this case, Node1 and Node2.

The data service manages starting the management agents on all the nodes on which they are configured. The management agents in turn start the Node Supervisor (NSUP) process, which then starts the HADB node processes. If a management agent fails, the data service restarts it, based on user-defined parameters. If the HADB node processes fail, the management agent restarts them. If any databases have stopped, the user must restart these databases by issuing commands on the command line.

If the user-defined parameters determine that the data service does not restart the management agent after a failure, the processes remain down on that node. However, the management agent processes on the other managed nodes continue to execute. No failover occurs.

The following figure illustrates the two-node configuration after the failure of the first node. All the processes on the first node are down, and the second node continues to execute its processes.

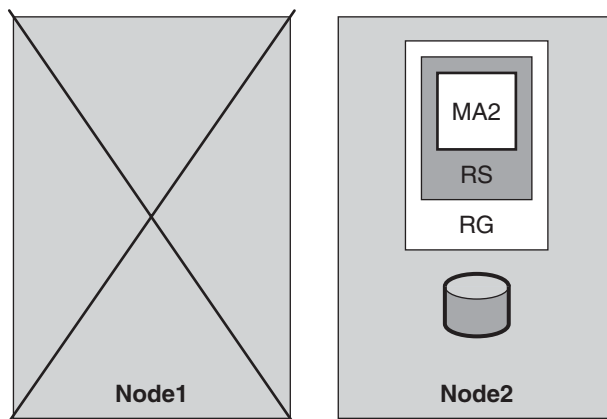


FIGURE 1-3 Management Agents Mastered on Multiple Nodes—After Failure

Overview of the Installation and Configuration Process for Sun Cluster HA for Sun Java System Application Server EE (HADB)

The following table summarizes the tasks for installing and configuring Sun Cluster HA for Sun Java System Application Server EE (HADB) and provides cross-references to detailed instructions for performing these tasks. Perform the tasks in the order that they are listed in the table.

TABLE 1-1 Tasks for Installing and Configuring Sun Cluster HA for Sun Java System Application Server EE (HADB)

Task	For Instructions
Plan the installation and configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)	“Planning the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)” on page 16
Install and configure the Sun Java System Application Server EE (HADB) software	“Installing and Configuring the Sun Java System Application Server EE (HADB) Software” on page 17
Create a Sun Java System Application Server EE (HADB) management domain	“Creating a Sun Java System Application Server EE (HADB) Management Domain” on page 18
Install the Sun Cluster HA for Sun Java System Application Server EE (HADB) package	“How to Install the Sun Cluster HA for Sun Java System Application Server EE (HADB) Packages” on page 18

TABLE 1-1 Tasks for Installing and Configuring Sun Cluster HA for Sun Java System Application Server EE (HADB) (Continued)

Task	For Instructions
Register and configure Sun Cluster HA for Sun Java System Application Server EE (HADB) as a data service mastered on multiple nodes at one time	“ Registering and Configuring the Sun Cluster HA for Sun Java System Application Server EE (HADB) ” on page 20
Verify the installation and configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)	“ Verifying the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB) ” on page 23
Tune the fault monitor for Sun Cluster HA for Sun Java System Application Server EE (HADB)	“ Tuning the Fault Monitor for Sun Cluster HA for Sun Java System Application Server EE (HADB) ” on page 24

Note – If you run multiple data services in your Sun Cluster configuration, you can set up the data services in any order, with the following exception. If Sun Cluster HA for Sun Java System Application Server EE (HADB) depends on the Sun Cluster HA for DNS, you must set up DNS first. For details, see [Sun Cluster Data Service for DNS Guide for Solaris OS](#). DNS software is included in the Solaris software. If the cluster is to obtain the DNS service from another server, configure the cluster to be a DNS client first.

Planning the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)

This section contains the information that you need to plan your installation and configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB).

Configuration Restrictions and Requirements

Store static files and data on the local file system of each cluster node. The Sun Java System Application Server EE (HADB) software is installed when you install the Sun Java System Application Server Enterprise Edition software. See [Sun Cluster Data Service for Sun Java System Application Server Guide for Solaris OS](#) documentation for instructions. When the database is created, the configuration and data files are created by default on the local file system of each cluster node. For details, see the Sun Java System Application Server documentation.

If you are using Solaris 5.8, you must perform the following procedure.

1. Edit the file `/etc/init.d/ma-initd`.
2. Add the following entry at the beginning of the file.


```
_JAVA_OPTIONS="-Djava.net.preferIPv4Stack=true"  
export _JAVA_OPTIONS
```

3. Save the file.

Configuration Planning Considerations

For information to help you plan the installation and configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB), see [“Considerations for Installing and Configuring a Data Service”](#) in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*. See also the worksheets in [Appendix D, “Data Service Configuration Worksheets and Examples,”](#) in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

If you choose to use your HADB data service with another highly available application, resource dependencies might exist. See [Appendix B, “Standard Properties,”](#) in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for a description of the `Resource_dependencies` property.

Installing and Configuring the Sun Java System Application Server EE (HADB) Software

The Sun Java System Application Server EE (HADB) software is a Java 2 Enterprise Edition (J2EE™) 1.3 compliant relational database. The Sun Cluster HA for Sun Java System Application Server EE (HADB) data service is designed to meet the needs of enterprise customers and run under the control of Sun Cluster software. The Sun Java System Application Server provides a transactional session-state persistence infrastructure that is highly available and highly scalable. Application Server uses the HADB to store session information. The HADB management client is the command-line interface for the HADB. A full set of utilities are available for performing HADB configuration, runtime management, and monitoring.

Instructions for using these utilities are contained in the Sun Java System Application Server documentation, the `hadbm` man pages, and the `asadmin` command session-persistence man pages. For information about installing and configuring HADB with Sun Java System Application Server, see the Sun Java System Application Server documentation. For information about configuring Sun Cluster HA for Sun Java System Application Server, see [Sun Cluster Data Service for Sun Java System Application Server Guide for Solaris OS](#).

Note – If you are using the Solaris 10 OS, install and configure this data service to run only in the global zone. At publication of this document, this data service is not supported in non-global zones. For updated information about supported configurations of this data service, contact your Sun service representative.

Creating a Sun Java System Application Server EE (HADB) Management Domain

Before putting the HADB management agents under control of the data service, you must create a Sun Java System Application Server EE (HADB) management domain.

▼ Creating a Sun Java System Application Server EE (HADB) Management Domain

Use the example in the following procedure to create, start, and verify a management domain.

For details, see the Sun Java System Application Server documentation.

1 Create the management domain.

Use the `hadbm` command with the `createdomain` option. This command automatically starts the domain.

2 Verify that the domain is created and is running.

Use the `hadbm` command with the `listdomain` option.

Installing the Sun Cluster HA for Sun Java System Application Server EE (HADB) Packages

If you did not install the Sun Cluster HA for Sun Java System Application Server EE (HADB) packages during your initial Sun Cluster installation, perform this procedure to install the packages. To install the packages, use the Sun Java Enterprise System Common Installer.

Note – You need to install the Sun Cluster HA for Sun Java System Application Server EE (HADB) packages in the global cluster and not in the zone cluster.

▼ How to Install the Sun Cluster HA for Sun Java System Application Server EE (HADB) Packages

Perform this procedure on each cluster node where you are installing the Sun Cluster HA for Sun Java System Application Server EE (HADB) packages.

You can run the Sun Java Enterprise System Common Installer 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.

Before You Begin Ensure that you have the Sun Java™ Availability Suite DVD-ROM.

If you intend to run the Sun Java Enterprise System Common Installer 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 Sun Java Availability Suite DVD-ROM into the DVD-ROM drive.**

If the Volume Management daemon `volfd(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 Sun Java Enterprise System Common Installer 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 Sun Java Enterprise System Common Installer.**

```
# ./installer
```
- 5 When you are prompted, accept the license agreement.**

If any Sun Java Enterprise System components are installed, you are prompted to select whether to upgrade the components or install new software.
- 6 From the list of Sun Cluster agents under Availability Services, select the data service for Sun Java System Application Server EE (HADB).**
- 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 Sun Java Enterprise System Common Installer 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 Sun Java Enterprise System Common Installer with the CLI, omit this step.

- 11 Exit the Sun Java Enterprise System Common Installer.
- 12 Unload the Sun Java Availability Suite DVD-ROM 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
```

Next Steps See “Registering and Configuring Sun Cluster HA for Sun Java System Application Server EE (HADB)” on page 32 to register Sun Cluster HA for Sun Java System Application Server EE (HADB) and to configure the cluster for the data service.

Registering and Configuring the Sun Cluster HA for Sun Java System Application Server EE (HADB)

This procedure describes how to use the Sun Cluster maintenance commands to register and configure Sun Cluster HA for Sun Java System Application Server EE (HADB) as a resource mastered on multiple nodes at one time.

Note – See “Tools for Data Service Resource Administration” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for details about additional options that enable you to register and configure the data service.

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

- The name of the resource type for Sun Cluster HA for Sun Java System Application Server EE (supporting HADB versions as of 4.4), which is `SUNW.hadb_ma`.
- The names of the cluster nodes that can master the data service.

Setting Extension Properties for Sun Cluster HA for Sun Java System Application Server EE (HADB)

The sections that follow contain instructions for registering and configuring Sun Cluster HA for Sun Java System Application Server EE (HADB) resources. For information about the extension properties, see [Appendix A, “Properties for Sun Cluster HA for Sun Java System Application Server EE \(Supporting HADB Versions as of 4.4\).”](#) The Tunable entry indicates when you can update a property.

See [Appendix B, “Standard Properties,”](#) in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for details about all of the Sun Cluster properties.

To set an extension property of a resource, include the following option in the `clresource(1CL)` 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 *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* to configure resources after the resources are created.

▼ How to Register and Configure Sun Cluster HA for Sun Java System Application Server EE (HADB)

Perform the following steps to complete your configuration.

- 1 **On a cluster member, become superuser or assume a role that provides `solaris.cluster.admin` RBAC authorization.**
- 2 **Register the resource type for Sun Java System Application Server EE (HADB).**
- 3 **Create the resource group for the Sun Java System Application Server EE (HADB) software.**

This resource group is configured to be mastered by multiple nodes at the same time.

```
# clresourcegroup create -n nodelist \  
-p Maximum primaries=nodes_in_rg \  
-p Desired primaries=nodes_in_rg resource_group
```

-n *nodelist*

Specifies a comma-separated subset of cluster nodes to run the Sun Java System Application Server EE (HADB) software. If this option is omitted, all cluster nodes run Sun Java System Application Server EE (HADB). Use the command to find the node list names.

-p *Maximum primaries=nodes_in_rg*

Specifies the maximum number of nodes on which the resource can start. You must specify the same number as the value of the *Desired primaries* property.

-p *Desired primaries=nodes_in_rg*

Specifies the desired number of nodes on which the resource can start. You must specify the same number as the value of the *Maximum primaries* property.

resource_group

Specifies the name of the resource group that is to be created.

4 Create a resource for Sun Java System Application Server EE (HADB).

See [Appendix A, “Properties for Sun Cluster HA for Sun Java System Application Server EE \(Supporting HADB Versions as of 4.4\),”](#) for a detailed description of the extension properties for this resource type.

```
# clresource create -g resource_group -t SUNW.hadb_ma \  
-p HADB_PASSWORDFILE=path_to_pw_file resource
```

-g *resource_group*

Specifies the name of the resource group to which the resource is to be added.

-t SUNW.hadb_ma

Specifies the predefined resource type name.

-p HADB_PASSWORDFILE=*path_to_pw_file*

Specifies the full path to the file containing the HADB administrative password.

For details about the contents of the password file, see the Sun Java System Application Server documentation.

resource

Specifies the name of the resource that you are creating.

The resource is created in the enabled state.

5 Bring the resource group online.

```
# clresourcegroup online resource_group
```

6 Verify that the resource group and HADB resource are online.

```
# cluster status
```

```
# ps -ef
```

- 7 To verify that you have correctly installed and configured Sun Cluster HA for HADB, run the following command.

```
# hadbm status database_name --nodes
```

The output should indicate that the database that you specified is running.

Example 1-1 Creating a SUNW.hadb_ma Resource

This example shows the creation of a SUNW.hadb_ma resource.

In this example the default values for the extension properties are used. The resource has the following characteristics:

- The resource is named hadb-rs.
- The resource is a member of a resource group named hadb-rg.
- The resource is an instance of the SUNW.hadb_ma resource type. The registration of the resource type is not shown in this example.

```
clresource create -g hadb-rg -t SUNW.hadb_ma \
-p HADB_M_PASSWORDFILE=/global/disk1/hadbm-pwfile hadb-rs
```

Verifying the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)

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

▼ How to Verify the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)

- 1 Ensure that the Sun Java System Application Server EE (HADB) software is started under the control of Sun Cluster software.

```
# clresourcegroup online -M resource_group
```

- 2 Verify that the resource group and Sun Java System Application Server EE (HADB) resource are online.

```
# clresourcegroup status
# ps -ef
```

3 Verify that you have correctly installed and configured Sun Cluster HA for Sun Java System Application Server EE (HADB).

```
# hadbm status database_name --nodes
```

The output should indicate that the database that you specified is running.

Tuning the Fault Monitor for Sun Cluster HA for Sun Java System Application Server EE (HADB)

The fault monitor for Sun Cluster HA for Sun Java System Application Server EE (HADB) is contained in the resource that represents Sun Java System Application Server EE (HADB). You create this resource when you register and configure Sun Cluster HA for Sun Java System Application Server EE (HADB). For more information, see [“Registering and Configuring the Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 20.

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 Sun Cluster installations. Therefore, you should tune the fault monitor *only* if you need to modify this preset behavior.

For more information, see the following sections.

- [“Tuning Fault Monitors for Sun Cluster Data Services”](#) in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*
- [“Changing Resource Type, Resource Group, and Resource Properties”](#) in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*
- [Appendix B, “Standard Properties,”](#) in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*
- [Appendix A, “Properties for Sun Cluster HA for Sun Java System Application Server EE \(Supporting HADB Versions as of 4.4\),”](#) in this guide for a detailed description of the extension properties for the `SUNW.hadb_ma` resource type

SPARC: Sun Cluster HA for Sun Java System Application Server EE (HADB Versions Before 4.4)

This document describes the procedures to install and configure the data service called Sun Cluster HA for Sun Java System Application Server EE (HADB).

This document contains two chapters.

- This chapter contains information for the data service when it makes highly available those versions of the Sun Java System Application Server EE (HADB) application *before* version 4.4 that are supported by the Sun Cluster product and by this data service.
- [Chapter 1, “Sun Cluster HA for Sun Java System Application Server EE \(Supporting HADB Versions as of 4.4\)”](#) contains information for the data service when it makes highly available those versions of the Sun Java System Application Server EE (HADB) application *as of* version 4.4 that are supported by the Sun Cluster product and by this data service.

This chapter contains the following sections.

- [“Sun Cluster HA for Sun Java System Application Server EE \(HADB\) Overview”](#) on page 26
- [“Overview of the Installation and Configuration Process for Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 26
- [“Planning the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 28
- [“Installing and Configuring the Sun Java System Application Server EE \(HADB\) Software”](#) on page 30
- [“Creating a Sun Java System Application Server EE \(HADB\) Database”](#) on page 30
- [“Installing the Sun Cluster HA for Sun Java System Application Server EE \(HADB\) Packages”](#) on page 31
- [“Registering and Configuring Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 32
- [“Verifying the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 35
- [“Maintaining the HADB Database”](#) on page 36
- [“Tuning the Fault Monitor for Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 37

Sun Cluster HA for Sun Java System Application Server EE (HADB) Overview

This section describes how the Sun Cluster HA for Sun Java System Application Server EE (HADB) data service enables the Sun Java System Application Server EE (HADB) software for high availability.

The Sun Cluster HA for Sun Java System Application Server EE (HADB) is a data service with appropriate extension properties to configure a database that is mastered on multiple nodes at one time.

See [Chapter 1, “Planning for Sun Cluster Data Services,” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*](#) for general information about data services.

The Sun Java System Application Server EE (HADB) software is packaged with the Sun Java System Application Server Enterprise Edition installation. However, you can run Sun Java System Application Server EE (HADB) and Sun Java System Application Server on separate clusters if appropriate. This document describes how to install and configure the data service that enables you to use Sun Java System Application Server EE (HADB) in a cluster. First, enable Sun Java System Application Server EE (HADB) in your cluster to provide session and Enterprise Java Bean (EJB) persistence. See *Sun Java System Application Server Enterprise Edition 8.2 High Availability Administration Guide* for information about the Sun Java System Application Server EE (HADB) software.

Implementation of the Sun Cluster HA for Sun Java System Application Server EE (HADB) does not assume the existence of applications on which your architecture depends, such as databases and web servers. However, such applications can be configured to be highly available and might run on a different cluster.

Overview of the Installation and Configuration Process for Sun Cluster HA for Sun Java System Application Server EE (HADB)

The following table summarizes the tasks for installing and configuring Sun Cluster HA for Sun Java System Application Server EE (HADB) 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 2-1 Tasks for Installing and Configuring Sun Cluster HA for Sun Java System Application Server EE (HADB)

Task	For Instructions
Plan the installation and configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)	“Planning the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)” on page 28
Install and configure the Sun Java System Application Server EE (HADB) software	“Installing and Configuring the Sun Java System Application Server EE (HADB) Software” on page 30
Create a Sun Java System Application Server EE (HADB) database	“How to Create a Sun Java System Application Server EE (HADB) Database” on page 31
Install the Sun Cluster HA for Sun Java System Application Server EE (HADB) package	“Installing the Sun Cluster HA for Sun Java System Application Server EE (HADB) Packages” on page 31
Register and configure Sun Cluster HA for Sun Java System Application Server EE (HADB) as a data service mastered on multiple nodes at one time	“How to Register and Configure Sun Cluster HA for Sun Java System Application Server EE (HADB)” on page 33
Verify the installation and configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)	“Verifying the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)” on page 35
Maintain the HADB database	“Maintaining the HADB Database” on page 36
Tune the fault monitor for Sun Cluster HA for Sun Java System Application Server EE (HADB)	“Tuning the Fault Monitor for Sun Cluster HA for Sun Java System Application Server EE (HADB)” on page 37

Note – If you run multiple data services in your Sun Cluster configuration, you can set up the data services in any order, with the following exception. If the Sun Cluster HA for Sun Java System Application Server EE (HADB) data service depends on the Sun Cluster HA for DNS data service, you must set up DNS first. For details, see *Sun Cluster Data Service for DNS Guide for Solaris OS*. The DNS software is included in the Solaris software. If the cluster is to obtain the DNS service from another server, you should first configure the cluster to be a DNS client.

Planning the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)

This section contains the information that you need to plan your installation and configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB).

Store static files and data on the local file system of each cluster node. The Sun Java System Application Server EE (HADB) software is installed when you install the Sun Java System Application Server Enterprise Edition software. See *Sun Cluster Data Service for Sun Java System Application Server Guide for Solaris OS* documentation for instructions. When the database is created, the configuration and data files are created by default on the local file system of each cluster node. For details, see the Sun Java System Application Server documentation.

Configuration Overview

Use the multiple masters configuration in this section to plan the installation and configuration of the Sun Cluster HA for Sun Java System Application Server EE (HADB) data service. This data service might support additional configurations. However, you must contact your Enterprise Services representative for information about additional configurations.

HADB configurations are defined by data nodes, or a collection of processes. Each node is a dedicated area of main memory with one or more secondary storage devices. These storage devices are not shared storage. Each HADB data node must have exclusive access to an area of main memory and several areas of disk space. HADB data nodes are active or spare.

The recommended minimum requirement for a cluster running the Sun Java System Application Server EE (HADB) and the Sun Java System Application Server is four active data nodes plus two spare nodes. See “[Creating a Sun Java System Application Server EE \(HADB\) Database](#)” on page 30 for an example of how to create a Sun Java System Application Server EE (HADB) with four active nodes and two spare nodes by using the `hadbm` command-line utility. For high availability, you configure the HADB data redundancy unit (DRU) to use the Sun Cluster interconnect. See the Sun Java System Application Server documentation for detailed information about DRUs. The HADB JDBC driver in the client application handles highly available access to the database.

The following figure illustrates the recommended minimum configuration for the Sun Java System Application Server EE (HADB) and the Sun Java System Application Server.

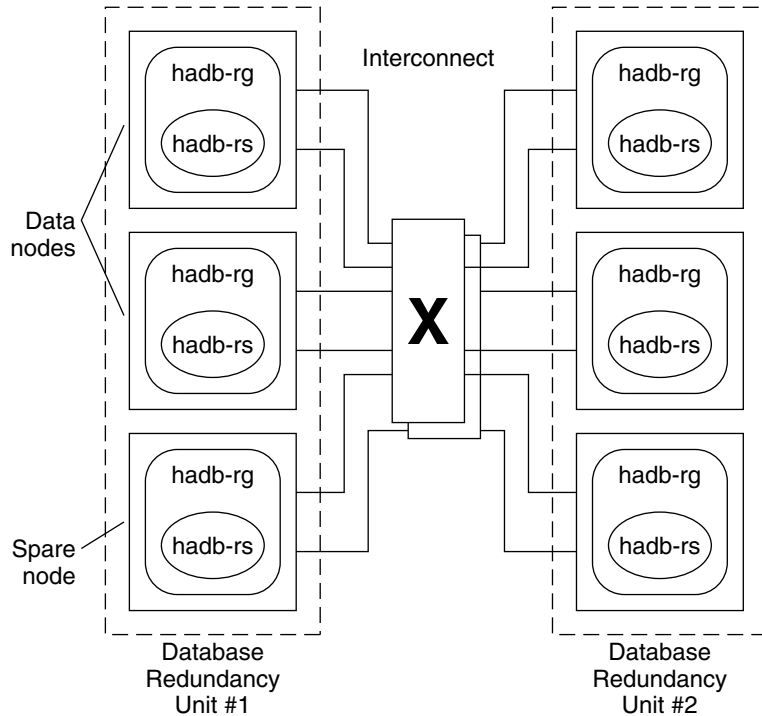


FIGURE 2-1 Recommended Minimum Configuration

Configuration Planning Questions

Use the questions in this section to plan the installation and configuration of the Sun Cluster HA for Sun Java System Application Server EE (HADB) data service. See “[Considerations for Installing and Configuring a Data Service](#)” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for information that might apply to these questions. See also the worksheets in Appendix D, “[Data Service Configuration Worksheets and Examples](#),” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*.

If you choose to use your HADB data service with another highly available application, resource dependencies might exist. See Appendix B, “[Standard Properties](#),” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for a description of the `Resource_dependencies` property.

- Will all history files, data and log devices, and the database configuration files reside on local file systems?
- What are the Sun Cluster private interconnect hostnames that you will use?

Installing and Configuring the Sun Java System Application Server EE (HADB) Software

The Sun Java System Application Server EE (HADB) software is a Java 2 Enterprise Edition (J2EE™) 1.3 compliant relational database. The Sun Cluster HA for Sun Java System Application Server EE (HADB) data service is designed to meet the needs of enterprise customers and run under the control of Sun Cluster software. The Sun Java System Application Server provides a transactional session-state persistence infrastructure that is highly available and highly scalable. Application Server uses the HADB to store session information. The HADB management client is the command-line interface (CLI) for the HADB. A full set of utilities are available for performing HADB configuration, runtime management, and monitoring.

Instructions for using these utilities are contained in the Sun Java System Application Server documentation, the `hadbm` man pages, and the `asadmin` command session-persistence man pages. The Sun Java System Application Server EE (HADB) software is co-packaged with the Sun Java System Application Server Enterprise Edition. For information about installing and configuring HADB with Sun Java System Application Server, see *Sun Java System Application Server Enterprise Edition 8.2 High Availability Administration Guide*. For information about configuring Sun Cluster HA for Sun Java System Application Server, see *Sun Cluster Data Service for Sun Java System Application Server Guide for Solaris OS*.

Creating a Sun Java System Application Server EE (HADB) Database

This section contains the procedure to configure and create the initial HADB database in a Sun Cluster environment. Consider the following restrictions before creating your database.

- You must specify an even number of Sun Cluster hosts by using the `--hosts` option during database creation.
- You must specify the Sun Cluster hosts by using the Sun Cluster private interconnect hostnames. An example of a private interconnect hostname is `clusternode1-priv`.
- Sun Java System Application Server EE (HADB) mirror nodes must be located on different Sun Cluster nodes.
- Do not use the `--inetd` option.
- All history files, data and log devices, and the database configuration files must reside on local file systems.
- If more than one Sun Cluster node is stopped, the entire database is shut down. You must either stop only one node at a time or stop all nodes. You can stop all nodes with the `clresourcegroup offline` command.
- The HADB resource group must not be used with HA Storage Plus.

▼ How to Create a Sun Java System Application Server EE (HADB) Database

Use the example in the following procedure to create, start, and verify the database.

- 1 **Create the database. This command automatically starts the database.**

```
# hadbm create \
-H clusternode1-priv,clusternode2-priv,clusternode3-priv, \
clusternode4-priv,clusternode5-priv,clusternode6-priv \
--devicesize=2048 \
-a 4 --set ManagementProtocol=rsh --dbpassword=secret12 \
-s 2 hadb
```

For details, see the Sun Java System Application Server documentation.

Note – You must specify the hosts by using the Sun Cluster private interconnect hostnames. To find these hostnames, run the `clnode show` command from the primary Sun Cluster node.

Note – If you are using the recommended SSH setup, you do not need to specify the `ManagementProtocol` property.

- 2 **Verify that the database is running.**

```
# hadbm status hadb --nodes
```

- 3 **Stop the database.**

```
# hadbm stop hadb
```

- 4 **Create the session store and the JDBC connection pool.**

For details, see the Sun Java System Application Server documentation.

Installing the Sun Cluster HA for Sun Java System Application Server EE (HADB) Packages

See [“Installing the Sun Cluster HA for Sun Java System Application Server EE \(HADB\) Packages” on page 18](#) to install Sun Cluster HA for Sun Java System Application Server EE (HADB) package.

Registering and Configuring Sun Cluster HA for Sun Java System Application Server EE (HADB)

This procedure describes how to use the Sun Cluster maintenance commands to register and configure the Sun Cluster HA for Sun Java System Application Server EE (HADB) data service as a resource mastered on multiple nodes at one time.

Note – See “Tools for Data Service Resource Administration” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for details about additional options that enable you to register and configure the data service.

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

- The name of the resource type for Sun Cluster HA for Sun Java System Application Server EE (supporting HADB versions before 4.4), which is `SUNW.hadb`
- The names of the cluster nodes that can master the data service

Setting Extension Properties for Sun Cluster HA for Sun Java System Application Server EE (HADB)

The sections that follow contain instructions for registering and configuring resources for Sun Cluster HA for Sun Java System Application Server EE (HADB). For information about the extension properties, see [Appendix B, “Properties for Sun Cluster HA for Sun Java System Application Server EE \(HADB Versions Before 4.4\)”](#). The Tunable entry indicates when you can update a property.

See [Appendix B, “Standard Properties,”](#) in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* for details about all of the Sun Cluster properties.

To set an extension property of a resource, include the following option in the `clresource(1CL)` 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 *Sun Cluster Data Services Planning and Administration Guide for Solaris OS* to configure resources after the resources are created.

▼ How to Register and Configure Sun Cluster HA for Sun Java System Application Server EE (HADB)

Perform the following steps to complete your configuration.

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

- 2 Register the resource type for the Sun Java System Application Server EE (HADB).

```
# clresourcetype register SUNW.hadb
```

- 3 Create the resource group for the Sun Java System Application Server EE (HADB).

```
# clresourcegroup create -n nodelist \
```

```
-p Maximum primaries=nodes_in_rg \
```

```
-p Desired primaries=nodes_in_rg resource_group
```

```
-n nodelist
```

Specifies a comma-separated subset of cluster nodes to run Sun Java System Application Server EE (HADB). If this option is omitted, all cluster nodes run Sun Java System Application Server EE (HADB). Use the `clnode list` command to find the node list names.

```
-p Maximum primaries=nodes_in_rg
```

Specifies the maximum number of nodes on which the resource can start. You must specify the same number as the value of the `Desired primaries` property.

```
-p Desired primaries=nodes_in_rg
```

Specifies the desired number of nodes on which the resource can start. You must specify the same number as the value of the `Maximum primaries` property.

- 4 Create a resource for Sun Java System Application Server EE (HADB), either with or without auto-recovery.

- If you do not require the auto-recovery feature, execute the following command.

```
# clresource create -g resource_group -t SUNW.hadb \
```

```
-p Confdir_list=config_directory_list \
```

```
-p HADB_ROOT=install_directory \
```

```
-p DB_name=database_name resource
```

```
-g resource_group
```

Specifies that the resource is to be added to the resource group named *resource_group*.

```
-t SUNW.hadb
```

Specifies the predefined resource type name.

```
-p Confdir_list=config_directory_list
```

Specifies the path to the configuration directory.

-p HADB_ROOT=*install_directory*
 Specifies the installation directory.

-p DB_name=*database_name*
 Specifies the name of the HADB database.

The resource is created in the enabled state.

- If you *do* want to use the auto-recovery feature, execute the following command.

```
# clresource create -g resource_group -t SUNW.hadb \  
-p Confdir_list=config_directory_list \  
-p HADB_ROOT=install_directory \  
-p DB_name=database_name \  
-p Auto_recovery=TRUE \  
-p Auto_recovery_command=command \  
-p DB_password_file=password_file resource
```

-p Auto_recovery=TRUE
 Specifies that you are using the auto-recovery feature.

-p Auto_recovery_command=*command*
 Specifies the command to execute after the database recovery. This extension property is optional, regardless of the value of the Auto_recovery property.

-p DB_password_file=*password_file*
 Specifies the file from which HADB reads the database password. See the Sun Java System Application Server documentation for the format and content of the password file.

The resource is created in the enabled state.

Note – The auto-recovery command and the database password file must both exist in the local file system on each node.

5 Bring the resource group online.

```
# clresourcegroup online resource_group
```

resource_group

Specifies the name of the application resource group that is being enabled.

6 Verify that the resource group and HADB resource are online.

```
# cluster status  
# ps -ef
```

7 To verify that you have correctly installed and configured Sun Cluster HA for Sun Java System Application Server EE (HADB), run the following command.

```
# hadbm status database_name --nodes
```

The output should indicate that the database that you specified is running.

Example 2-1 Creating a SUNW.hadb Resource With Auto-Recovery

This example shows the creation of a SUNW.hadb resource with auto-recovery.

In this example the resource has the following characteristics:

- The resource is named `hadb - rs`.
- The resource is a member of a resource group named `hadb - rg`.
- The resource is an instance of the SUNW.hadb resource type. The registration of the resource type is not shown in this example.
- The configuration directory is located at `/etc/opt/SUNWhadb/dbdef/hadb`.
- The installation directory is located at `/opt/SUNWappserver7/SUNWhadb/4`.
- The HADB database instance associated with this resource is named `hadb`.
- Auto-recovery is on.
- The full path to the command to execute after auto-recovery is `/usr/local/etc/create-session-store`.
- The HADB password file is `/usr/local/etc/hadb-password-file`.

```
clresource create -g hadb-rg -t SUNW.hadb \
-p Confdir_list=/etc/opt/SUNWhadb/dbdef/hadb \
-p HADB_ROOT=/opt/SUNWappserver7/SUNWhadb/4 \
-p DB_name=hadb \
-p Auto_recovery=true \
-p Auto_recovery_command=/usr/local/etc/create-session-store \
-p DB_password_file=/usr/local/etc/hadb-password-file hadb-rs
```

Verifying the Installation and Configuration of Sun Cluster HA for Sun Java System Application Server EE (HADB)

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

▼ How to Verify the Installation and Configuration for Sun Cluster HA for Sun Java System Application Server EE (HADB)

- 1 Ensure that the HADB is started under the control of Sun Cluster software.

```
# clresourcegroup online -M resource_group
```

- 2 Verify that the resource group and HADB resource are online.

```
# cluster status  
# ps -ef
```

- 3 Verify that you have correctly installed and configured Sun Cluster HA for Sun Java System Application Server EE (HADB).

```
# hadbm status database_name --nodes
```

The output should indicate that the database that you specified is running.

Maintaining the HADB Database

This section explains how to maintain the HADB database within the Sun Cluster HA for Sun Java System Application Server EE (HADB) data service.

▼ How to Maintain the HADB Database

When you want to run HADB maintenance commands that initiate a rolling restart of the HADB nodes, the HADB resource probe in the fault monitor must be disabled before the maintenance commands are executed and then enabled after the commands and the rolling restart have been completed.

- 1 Disable the fault monitor.

```
# clresource unmonitor resource
```

- 2 Run the commands that might initiate a rolling restart.

The hadbm subcommands that might result in a rolling restart include set, restart, and addnodes.

- 3 Reenable the fault monitor.

```
# clresource monitor resource
```

More Information Alternative Method of Maintaining the Database

Alternatively, the HADB resource can be disabled and HADB started outside Sun Cluster control while maintenance commands are being performed.

Tuning the Fault Monitor for Sun Cluster HA for Sun Java System Application Server EE (HADB)

The fault monitor for Sun Cluster HA for Sun Java System Application Server EE (HADB) is contained in the resource that represents Sun Java System Application Server EE (HADB). You create this resource when you register and configure Sun Cluster HA for Sun Java System Application Server EE (HADB). For more information, see [“Registering and Configuring Sun Cluster HA for Sun Java System Application Server EE \(HADB\)”](#) on page 32.

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 Sun Cluster installations. Therefore, you should tune the fault monitor *only* if you need to modify this preset behavior.

For more information, see the following sections.

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

Operations by the Fault Monitor During a Probe

The start method of the HADB resource starts HADB nodes that are configured to run on the local Sun Cluster node if they are not running. The method then attempts to start the HADB database. If a failure occurs, the database is started later in the probe.

The fault monitor probe periodically checks the status of the HADB database and the HADB nodes. The probe restarts failed HADB nodes. The probe also starts the HADB database if the HADB resource is not ready to start the database during the start method. For each iteration of this procedure, the probe executes the following steps:

1. The probe retrieves the current status of the HADB database and the HADB nodes by executing the `hadbm status` and `hadbm status --nodes` commands.

2. If the database is not running, the probe checks that the HADB `stopstate` file corresponding to that database exists on the local Sun Cluster node. The `hadbm start` command references the `stopstate` file for role assignment of nodes when it starts the database.
3. If the `stopstate` file exists, the HADB resource examines it to determine if the database can be started.
 - If the database can be started, the probe starts the database and sets the resource status to `Online`.
 - If the database cannot be started, the probe sets the resource status to `Online Degraded`.
4. If the database is running, the probe starts the HADB nodes configured to run on the local Sun Cluster node.
5. If the database and the local HADB nodes are running, the probe sets the resource status to `Online` if it was `Online Degraded`.
6. If all the Sun Cluster nodes in the HADB resource group have the HADB resource running in the `Online Degraded` state longer than `Stop_timeout` seconds, the HADB resource concludes that the database cannot be started. For a description of the `Stop_timeout` property, see the `method_timeout` resource property in [Appendix B, “Standard Properties,” in *Sun Cluster Data Services Planning and Administration Guide for Solaris OS*](#).
7. If the `Auto_recovery` extension property is set to `TRUE`, the HADB resource attempts to recover the database.
8. If recovery of the database is attempted, the probe executes the following steps:
 - Issues the `hadbm clear - - fast` command on one of the Sun Cluster nodes in the resource group's node list. This command clears the database contents and reinitializes and restarts the database.
 - If the `hadbm clear` command succeeds, the command specified in `Auto_recovery_command` is issued on the same Sun Cluster node that issued the `hadbm clear` command. The command would normally be a script that contains the `asadmin create-session-store` command. The command can also perform other actions. For example, it might send mail to the Application Server administrator.
 - If both steps succeed, the probe sets the state of the resource to `Online`.

Properties for Sun Cluster HA for Sun Java System Application Server EE (Supporting HADB Versions as of 4.4)

This section describes the extension properties for the resource type `SUNW.hadb_ma`. This resource type represents the Sun Java System Application Server EE (HADB) application (supporting HADB versions as of 4.4) in a Sun 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.hadb_ma` resource type are as follows:

HADB_MA_CFG

The full path to the configuration file that is used to start the HADB Management Agent Server.

Data type	String
Default	<code>/etc/opt/SUNWhadb/mgt.cfg</code>
Range	Not applicable
Tunable	When disabled

HADB_MA_START

The full path to the script that is used to start and stop the HADB Management Agent Server. This script must be able to start and stop the MA Server without any input from the user. Any configuration parameters must be specified in the file indicated by the extension property `HADB_MA_CFG`.

Data type	String
Default	<code>/etc/init.d/ma-initd</code>
Range	Not applicable
Tunable	When disabled

HADB_MA_USER

The user name of the user that starts the HADB Management Agent Server.

Data type	String
Default	root
Range	Not applicable
Tunable	When disabled

HADB_ROOT

The complete path to the HADB installation directory. This directory contains the directory structure bin/, which contains the files ma and hadbm.

Data type	String
Default	/opt/SUNWhadb/4
Range	Not applicable
Tunable	When disabled

HADBM_PASSWORDFILE

The complete path to the file that contains the HADB administrative password. This property must be set if the HADB management domain is created with an administrative password. If this property is not set, the default null value indicates that no authentication is available for the administrative user.

Data type	String
Default	Null
Range	Not applicable
Tunable	At any time

Properties for Sun Cluster HA for Sun Java System Application Server EE (HADB Versions Before 4.4)

This section describes the extension properties for the resource type `SUNW.hadb`. This resource type represents the Sun Java System Application Server EE (HADB) application (supporting HADB versions before 4.4) in a Sun 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.hadb` resource type are as follows:

`Auto_recovery`

Indication of whether to attempt recovery if database is unable to start.

Data type	Boolean
Default	FALSE
Range	Not applicable
Tunable	At any time

`Auto_recovery_command`

Command to execute after recovering the database. This extension property is optional, regardless of the value of the `Auto_recovery` property.

Data type	String
Default	Null
Range	Not applicable
Tunable	At any time

`Confdir_list`

A path name that points to the configuration directory. The data service requires this extension property, and the property must have one entry.

Data type	String array
------------------	--------------

Default No default defined

Range Not applicable

Tunable At creation

DB_name

The name of an HADB database. The data service requires this extension property.

Data type String

Default No default defined

Range Not applicable

Tunable When disabled

DB_password_file

The file from which HADB reads the password.

Data type String

Default Null

Range Not applicable

Tunable At any time

HADB_ROOT

The installation directory location. The data service requires this extension property.

Data type String

Default No default defined

Range Not applicable

Tunable At creation

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