Oracle® Solaris Cluster Geographic Edition Installation Guide

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Contents

Preface

Oracle Solaris Cluster Geographic Edition Installation Guide contains guidelines for planning an Oracle Solaris Cluster Geographic Edition (Geographic Edition) configuration, and provides procedures for installing, configuring, upgrading, and uninstalling the Geographic Edition software.

This document is intended for experienced system administrators with extensive knowledge of Oracle software and hardware. You should have already determined your system requirements and purchased the appropriate equipment and software before reading this document.

The instructions in this book assume knowledge of the Oracle Solaris Operating System and Oracle Solaris Cluster software, expertise with the volume manager software that is used within Oracle Solaris Cluster software, and the data replication software that is used with the Geographic Edition software.

Bash is the default prompt for Oracle Solaris 11. Machine names shown with the Bash shell prompt are displayed for clarity.

Using UNIX Commands

This document contains information about commands that are used to install, configure, or administer a Geographic Edition configuration. This document might not contain complete information on basic UNIX commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following sources for this information:

- Online documentation for the Oracle Solaris software system
- Other software documentation that you received with your system
- Oracle Solaris OS man pages

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info` or visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs` if you are hearing impaired.

Typographic Conventions

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

TABLE P–1 Typographic Conventions

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

Shell Prompts in Command Examples

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

TABLE P–2 Shell Prompts

Shell	Prompt
Bash shell, Korn shell, and Bourne shell	$

TABLE P–2 Shell Prompts *(Continued)*

Shell	Prompt
Bash shell, Korn shell, and Bourne shell for superuser	#
C shell	machine_name%
C shell for superuser	machine_name#

Related Documentation

Information about related Geographic Edition topics is available in the documentation that is listed in the following table.

Topic	Documentation
Overview	*Oracle Solaris Cluster Geographic Edition Overview*
Installation	*Oracle Solaris Cluster Geographic Edition Installation Guide*
Command and function references	*Oracle Solaris Cluster Geographic Edition Reference Manual*
Data Replication	*Oracle Solaris Cluster Geographic Edition Data Replication Guide for Oracle Solaris Availability Suite*
	Oracle Solaris Cluster Geographic Edition Data Replication Guide for EMC Symmetrix Remote Data Facility
	Oracle Solaris Cluster Geographic Edition Data Replication Guide for Oracle Data Guard
	Oracle Solaris Cluster Geographic Edition Remote Replication Guide for Sun ZFS Storage Appliance
System administration	*Oracle Solaris Cluster Geographic Edition System Administration Guide*

Information about related Oracle Solaris Cluster topics is available in the documentation that is listed in the following table.

Topic	Documentation
Hardware installation and administration	*Oracle Solaris Cluster 4.1 Hardware Administration Manual*
	Individual hardware administration guides
Concepts	*Oracle Solaris Cluster Concepts Guide*
Software installation	*Oracle Solaris Cluster Software Installation Guide*

Topic	Documentation
Data service installation and administration	*Oracle Solaris Cluster Data Services Planning and Administration Guide* and individual data service guides
Data service development	*Oracle Solaris Cluster Data Services Developer's Guide*
System administration	*Oracle Solaris Cluster System Administration Guide*
	Oracle Solaris Cluster Quick Reference
Software upgrade	*Oracle Solaris Cluster Upgrade Guide*
Error messages	*Oracle Solaris Cluster Error Messages Guide*
Command and function references	*Oracle Solaris Cluster Reference Manual*
	Oracle Solaris Cluster Data Services Reference Manual
	Oracle Solaris Cluster Geographic Edition Reference Manual
	Oracle Solaris Cluster Quorum Server Reference Manual
Compatible software	Oracle Solaris Cluster Compatibility Guide available at the Oracle Solaris Cluster Technical Resources page
Compatible software	Oracle Solaris Cluster Compatibility Guide available at the Oracle Solaris Cluster Technical Resources page

Getting Help

If you have problems installing or using the Geographic Edition system, 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 OS (for example, Oracle Solaris 11)
- The release number of the Geographic Edition software (for example, 4.1)

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 software updates are installed

Command	Function
`prtdiag -v`	Displays system diagnostic information
`geoadm -V`	Displays Geographic Edition software release and package version information
`cluster status`	Provides a snapshot of the cluster status
`cluster show`	Lists cluster configuration information
`geoadm status`	Prints the Geographic Edition runtime status of the local cluster

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

◆ ◆ ◆ CHAPTER 1

Planning the Geographic Edition Installation

This chapter provides planning information and guidelines for installing an Oracle Solaris Cluster Geographic Edition (Geographic Edition) configuration. This chapter also describes how to plan the data replication between two clusters.

This chapter contains the following sections:

Installation Process

To successfully install Geographic Edition software, you must complete the following installation phases:

1. Planning your installation.
2. Connecting your hardware.
3. Installing Oracle Solaris Cluster software.
4. Installing data replication products.
5. Installing and configuring the required software.
6. Installing Geographic Edition software.
7. Configuring Geographic Edition software.

This installation process progresses from the initial planning phase to the eventual startup of Geographic Edition software. This guide provides information about phases 1, 6, and 7.

Note – You can also install Geographic Edition software at the same time that you install Oracle Solaris Cluster software.

For information about installing Oracle Solaris Cluster software, see the *Oracle Solaris Cluster Software Installation Guide*.

For information about configuring a cluster after startup, see the *Oracle Solaris Cluster Geographic Edition System Administration Guide*.

Planning Cluster Hardware

This section helps you to plan your hardware for the primary cluster, the secondary cluster, and the inter-cluster communication.

The Geographic Edition hardware configuration consists of the following elements:

- At least two separate clusters that are running Oracle Solaris Cluster software with attached data storage. One of these clusters must be designated the primary cluster.

  Note – While you can use a single-node cluster at both the primary and backup sites, a single-node cluster offers no internal redundancy. To ensure no single point of failure, you must have a minimum of two nodes in a cluster at the primary site. You can use a single-node cluster at the secondary site as a cost-effective backup solution, if the secondary site is used only for backup purposes and is not for running mission-critical applications.

- Internet connections for inter-cluster management communication between the clusters and for default inter-cluster heartbeats.
- Connections for either host-based or storage-based data replication.
- Connections for custom heartbeats, if any.

The hardware configurations that Geographic Edition software supports are identical to the hardware configurations that the Oracle Solaris Cluster product supports. For use of Geographic Edition software with storage-based data replication mechanisms, the cluster hardware configurations are those configurations that support the related storage hardware. Partner clusters must be compatibly configured to support data replication between the clusters.

Internet access is required between partner clusters. The communication between partner clusters for inter-cluster management operations is through a logical-hostname IP address. The default inter-cluster heartbeat module also communicates through a logical-hostname IP address.

A cluster in a Geographic Edition partnership conforms to the standard configuration rules of a cluster that is running Oracle Solaris Cluster software.

Planning Required Software

This section helps you to adapt the configuration of your Oracle Solaris Cluster software for the installation of Geographic Edition software. This section also helps you to plan the installation of your data replication software.

Geographic Edition software must be installed on a cluster that is running the Oracle Solaris Operating System and the Oracle Solaris Cluster software. You can install Geographic Edition software at the same time that you install Oracle Solaris Cluster software or at any time afterwards. The Geographic Edition software configuration is identical to the Oracle Solaris Cluster software configuration.

Planning the Data Replication Software

A cluster that is using Geographic Edition software with a data replication product is subject to the standard configuration rules of a cluster that is running the data replication product with Oracle Solaris Cluster software. Partner clusters must have compatible software configurations to support data replication between the clusters.

The Geographic Edition product supports the following data replication products:

- The Availability Suite feature of Oracle Solaris.
- EMC Symmetrix Remote Data Facility software.
- Oracle Data Guard software, in configurations that use Oracle Database software.
- MySQL software.
- Sun ZFS Storage Appliance software from Oracle.
- Geographic Edition script-based plug-ins.

The Availability Suite feature of Oracle Solaris software is a host-based replication method. This method consists of software installed on a host that controls replication from one server to a secondary server.

EMC Symmetrix Remote Data Facility replication uses a storage-based method. This method uses replication that is built into the storage hardware. If you use EMC Symmetrix Remote Data Facility software, you must install the software on each node of the cluster.

Oracle Data Guard functionality is part of the Oracle Database software and so does not require you to install additional software onto your system. The Geographic Edition module for Oracle Data Guard can only be used with Oracle databases.

MySQL database software offers a built-in replication protocol. Configuring the Geographic Edition MySQL replication module enables you to control replication between MySQL instances on each site.

Sun ZFS Storage Appliance replication uses a storage-based method. This method uses replication that is built into the storage appliance. If you use Sun ZFS Storage Appliance software, you must install the client software on each node of the cluster.

The Geographic Edition script-based plug-in enables the user to develop replication modules to integrate additional replication protocols into Geographic Edition. The plug-in provides the interface to register custom replication control scripts with Geographic Edition.

Planning Resource and Resource Group Names

A partnership requires two clusters to be combined into one environment, and one cluster might be a running production system. Therefore, advance planning of resources and resource groups is essential for a successful installation.

Geographic Edition software requires that resource-group names be identical on each partner cluster to ensure that a resource or resource group can be managed as a single entity across both clusters in the partnership.

Planning Required IP Addresses and Hostnames

You must have all the required IP addresses and hostnames before you begin the installation process.

- You must set up a number of IP addresses for various Geographic Edition components, depending on your cluster configuration.
- You must have an IP address for the cluster name and for each cluster node.
- You might also need additional IP addresses for data replication products.

For more information about requirements for configuring data replication, see the following data replication guides:

- *Oracle Solaris Cluster Geographic Edition Data Replication Guide for Oracle Solaris Availability Suite*
- *Oracle Solaris Cluster Geographic Edition Data Replication Guide for EMC Symmetrix Remote Data Facility*
- *Oracle Solaris Cluster Geographic Edition Data Replication Guide for Oracle Data Guard*
- Appendix F, "Deployment Example: Replicating Data With MySQL," in *Oracle Solaris Cluster Geographic Edition System Administration Guide*

- *Oracle Solaris Cluster Geographic Edition Remote Replication Guide for Sun ZFS Storage Appliance*
- Chapter 10, "Script-Based Plug-Ins," in *Oracle Solaris Cluster Geographic Edition System Administration Guide*

See "Public-Network IP Addresses" in *Oracle Solaris Cluster Software Installation Guide* for a list of components that require IP addresses. Add these IP addresses to any naming services that are used. Also add these IP addresses to the local `/etc/inet/hosts` file on each cluster node after you install Oracle Solaris software.

A cluster name must be suitable as a hostname because Geographic Edition software creates the logical hostname by using the cluster name. Therefore, the cluster name must be in the naming system.

Also, cluster names must be unique. For example, if you have a cluster wholly within the domain `.france`, you can use hostnames like `paris` and `grenoble`. However, if you have a cross-domain cluster, you must specify the hostnames with enough qualification to identify the host on the network. You can link `paris` and `munich` with hostnames `paris.france` and `munich.germany`, and the cluster names remain `paris` and `munich`.

You cannot create a partnership between clusters `paris.france` and `paris.texas` because of a collision on the cluster name `paris`.

Planning the Geographic Edition Environment

This section provides guidelines for planning and preparing the following components for Geographic Edition software installation:

- "Licensing" on page 15
- "Logical Hostnames" on page 16
- "Zone Clusters" on page 16

Licensing

Ensure that you have available all necessary license certificates before you begin software installation. Geographic Edition software does not require a license certificate. However, each node that is installed with Geographic Edition software must be covered under your Geographic Edition software license agreement.

For licensing requirements for data replication software and application software, see the installation documentation for those products.

Logical Hostnames

Geographic Edition software uses the logical hostname of a cluster for inter-cluster management communication and heartbeat communication. The IP address for a cluster name must be available for Geographic Edition software to wrap a logical hostname around the IP address when the software is started by using the `geoadm start` command.

You can use the `cluster` command to find the name of the cluster when you need to verify that the cluster name is suitable for use as a hostname. To find the name of the cluster, run the following command:

```
# cluster list
```

For more information, see the `cluster(1CL)` man page.

Zone Clusters

In some Geographic Edition configurations, a zone cluster can be configured as a cluster partner. Observe the following guidelines for the use of zone clusters in a cluster partnership.

- Zone clusters can be cluster partners in a Geographic Edition configuration that meets either of the following conditions:
  - Application-based data replication is used. Geographic Edition supports Oracle Data Guard, MySQL, and Geographic Edition script-based plug-ins application-based data replication.
  - No data replication is used.
- The partnership can use other zone clusters or a combination of zone clusters and global clusters.
- Geographic Edition framework packages are required in the global zones in all cases, even if Geographic Edition is only going to be enabled in the zone clusters. The Geographic Edition framework package is `ha-cluster/geo/geo-framework`.
- If storage-based replication is used, all members of a cluster partnership must be global clusters. Zone clusters can exist in a global-cluster partnership that uses storage-based replication, but the zone clusters themselves cannot be members of a partnership that uses storage-based replication.
- You can start the Geographic Edition infrastructure from within a zone cluster node, but not from within any other type of non-global zone.

◆ ◆ ◆ CHAPTER 2

Installing Geographic Edition Software

This chapter describes how to install Geographic Edition software on a pair of clusters. This chapter also provides a procedure to uninstall Geographic Edition software.

This chapter contains the following sections:

Installation Overview

You can install Geographic Edition software on a running cluster without disruption. Because the Geographic Edition software installation process does not require you to restart Oracle Solaris Cluster software, the cluster remains in production with services running.

Note – Ensure that you have installed all the required software updates for your cluster configuration on each node of every cluster before you start installing the software. See "Software Updates" in *Oracle Solaris Cluster 4.1 Release Notes* for installation instructions.

For zone clusters that are already created, when you install the Geographic Edition software, the software is propagated to the zone-cluster nodes by default. If you create a zone cluster after Geographic Edition software is installed in the global cluster, you must install the Geographic Edition software in the new zone-cluster nodes.

Installing Geographic Edition Software

You must install Geographic Edition software on every node of each cluster in your geographically separated cluster by using the `pkg add` command.

▼ How to Install Geographic Edition Software

This procedure explains how to install Geographic Edition software. Perform the procedure in the global zone for each node of a global cluster or zone cluster that you are configuring in a partnership.

Before You Begin Before you begin to install software, make the following preparations:

- Ensure that the Oracle Solaris OS is installed to support Geographic Edition software.

  If Oracle Solaris software is already installed on the node, you must ensure that the Oracle Solaris installation meets the requirements for Geographic Edition software and any other software that you intend to install on the cluster.
- Read Chapter 1, "Planning the Geographic Edition Installation."
- Read the following manuals, which contain information that can help you plan your configuration and prepare your installation strategy:
  - *Oracle Solaris Cluster 4.1 Release Notes* – Restrictions, bug workarounds, and other late-breaking information.
  - *Oracle Solaris Cluster Geographic Edition Overview*.
  - Documentation for all third-party software products.

1 Become the `root` role in the global zone of the node where you intend to run the Geographic Edition software.

Note – Geographic Edition software must be installed in the global zone for all nodes of each cluster in the partnership, whether the cluster is a global cluster or a zone cluster.

---

2 Set up the repository for the Oracle Solaris Cluster software packages.

- **If the cluster nodes have direct access or web proxy access to the Internet, perform the following steps.**

  a. Go to `http://pkg-register.oracle.com`.

  b. Choose `Oracle Solaris Cluster software`.

  c. Accept the license.

d. Request a new certificate by choosing `Oracle Solaris Cluster software` and submitting a request.

The certification page is displayed with download buttons for the key and the certificate.

e. Download the key and certificate files and install them as described in the returned certification page.

f. Configure the ha-cluster publisher with the downloaded SSL keys and set the location of the Oracle Solaris Cluster 4.1 repository.

In the following example the repository name is https://pkg.oracle.com/solaris/cluster/.

```
# pkg set-publisher \
-k /var/pkg/ssl/Oracle_Solaris_Cluster_4.1.key.pem \
-c /var/pkg/ssl/Oracle_Solaris_Cluster_4.1.certificate.pem \
-O https://pkg.oracle.com/solaris/cluster/ ha-cluster
```

`-k /var/pkg/ssl/Oracle_Solaris_Cluster_4.1.key.pem`
Specifies the full path to the downloaded SSL key file.

`-c /var/pkg/ssl/Oracle_Solaris_Cluster_4.1.certificate.pem`
Specifies the full path to the downloaded certificate file.

`-O https://pkg.oracle.com/solaris/cluster/`
Specifies the URL to the Oracle Solaris Cluster 4.1 package repository.

For more information, see the `pkg(1)` man page.

- **If you are using an ISO image of the software, perform the following steps.**

a. Download the Oracle Solaris Cluster 4.1 ISO image from Oracle Software Delivery Cloud at `http://edelivery.oracle.com/`.

Note – A valid Oracle license is required to access Oracle Software Delivery Cloud.

Oracle Solaris Cluster software, which includes Geographic Edition software, is part of the Oracle Solaris Product Pack. Follow online instructions to complete selection of the media pack and download the software.

b. Make the Oracle Solaris Cluster 4.1 ISO image available.

```
# lofiadm -a path-to-iso-image
/dev/lofi/N
# mount -F hsfs /dev/lofi/N /mnt
```

`-a` *path-to-iso-image*
Specifies the full path and file name of the ISO image.

c. Set the location of the Oracle Solaris Cluster 4.1 package repository.

```
# pkg set-publisher -g file:///mnt/repo ha-cluster
```

3. **Ensure that the Oracle Solaris and `ha-cluster` publishers are valid.**

```
# pkg publisher
PUBLISHER                             TYPE     STATUS   URI
solaris                               origin   online   solaris-repository
ha-cluster                            origin   online   ha-cluster-repository
```

4. **Install the Geographic Edition 4.1 software.**

```
# /usr/bin/pkg install ha-cluster-geo-full
```

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

   Output is similar to the following example, which checks the installation state of the `ha-cluster-geo-full` group package.

```
% pkg info ha-cluster/group-package/ha-cluster-geo-full
         Name: ha-cluster/group-package/ha-cluster-geo-full
      Summary: Oracle Solaris Cluster Geographic Edition full group package
  Description: Oracle Solaris Cluster Geographic Edition full group package
     Category: Meta Packages/Group Packages
        State: Installed
    Publisher: ha-cluster
      Version: 4.1.0
Build Release: 5.11
       Branch: 0.22
Packaging Date: Sat Oct 22 07:28:36 2011
         Size: 77.00 B
         FMRI: pkg://ha-cluster/ha-cluster/group-package/ha-cluster-geo-full@4.0.0,5.11-0.22:20111022T072836Z
```

6. **If you installed from a DVD-ROM, unload the installation DVD-ROM from the DVD-ROM drive.**

7. **Repeat this procedure on each node of each partner cluster.**

Next Steps Install required software updates. Go to "Installing Software Updates" on page 20.

Configure Geographic Edition software on the clusters. Go to Chapter 3, "Enabling and Configuring the Geographic Edition Software."

Installing Software Updates

This section provides the following information to install software updates (SRUs) to Geographic Edition software:

To upgrade to a new Geographic Edition software version, instead see Chapter 4, "Upgrading the Geographic Edition Software."

Guidelines for Updating Geographic Edition Software

Observe the following guidelines and requirements to update Geographic Edition software:

- You must run the same software updates for Oracle Solaris Cluster software and the common agent container software on all nodes of the same cluster.
- Within a cluster, the software updates for each node on which you have installed Geographic Edition software must meet the Oracle Solaris Cluster software update requirements.
- All nodes in the same cluster must have the same version of Geographic Edition software and the same software updates. However, primary and secondary clusters can run different versions of Geographic Edition software, provided that each version of Geographic Edition is correctly updated and the versions are no more than one release different.
- To ensure that the updates have been installed properly, install the software updates on your secondary cluster before you install the software updates on the primary cluster.
- For additional information about Geographic Edition software updates, see the software update `README` file.
- See the *Oracle Solaris Cluster 4.1 Release Notes* for a list of any required software updates.

▼ How to Prepare the Cluster for Software Update Installation

1 Ensure that the cluster is functioning properly.

To view the current status of the cluster, run the following command from any node:

```
% cluster status
```

See the `cluster`(1CL) man page for more information.

Search the `/var/adm/messages` log on the same node for unresolved error messages or warning messages.

2 Assume the `root` role on a node of the global cluster.

3 Remove all application resource groups from protection groups.

This step ensures that resource groups are not stopped when you later stop the protection groups.

```
# geopg remove-resource-group resourcegroup protectiongroup
```

See the `geopg`(1M) man page for more information.

4 Perform the preceding steps on all clusters that have a partnership with this cluster.

5 **Stop all protection groups that are active on the cluster.**

```
# geopg stop -e local protectiongroup
```

See the geopg(1M) man page for more information.

6 **Stop the Geographic Edition infrastructure.**

```
# geoadm stop
```

Shutting down the infrastructure ensures that a software update installation on one cluster does not affect the other cluster in the partnership.

See the geoadm(1M) man page for more information.

7 **On each node, stop the common agent container.**

```
# /usr/sbin/cacaoadm stop
```

Next Steps Install the required software updates for the Geographic Edition software. Go to "How to Install Software Updates" on page 22.

▼ How to Install Software Updates

Perform this procedure on each cluster node where you want the Geographic Edition software to run.

Update the secondary cluster before you update the primary cluster, to permit testing.

Before You Begin Perform the following tasks:

- Ensure that the Oracle Solaris OS is installed to support Geographic Edition software.

  If Oracle Solaris software is already installed on the node, you must ensure that the Oracle Solaris installation meets the requirements for Geographic Edition software and any other software that you intend to install on the cluster.
- Ensure that Geographic Edition software packages are installed on the node.
- Ensure that you completed all steps in "How to Prepare the Cluster for Software Update Installation" on page 21.

1 **Ensure that all the nodes are online and part of the cluster.**

To view the current status of the cluster, run the following command from any node:

```
% cluster status
```

See the cluster(1CL) man page for more information.

Search the `/var/adm/messages` log on the same node for unresolved error messages or warning messages.

2. **Assume the `root` role in the global zone of a node.**

3. **Perform any necessary updates to the Geographic Edition software by using the `pkg update` command.**

   If you are updating Oracle Solaris Cluster software, perform updates on both clusters.

   For instructions on performing a software update, see Chapter 11, "Updating Your Software," in *Oracle Solaris Cluster System Administration Guide*

4. **Repeat Step 2 and Step 3 on each remaining node.**

5. **After you have installed all required software updates on all nodes of the cluster, on each node of the global cluster or zone cluster that you are configuring with Geographic Edition, start the common agent container.**

   ```
   # /usr/sbin/cacaoadm start
   ```

Next Steps After you update the secondary cluster, perform a sanity test on the Geographic Edition software, and then repeat this procedure on the primary cluster.

Configure Geographic Edition software on the clusters. Go to Chapter 3, "Enabling and Configuring the Geographic Edition Software."

◆ ◆ ◆ CHAPTER 3

Enabling and Configuring the Geographic Edition Software

This chapter describes the steps for enabling and configuring the Geographic Edition infrastructure. This chapter contains the following sections:

Preparing a Zone Cluster for Partner Membership

To enable a zone cluster to function as a member of a Geographic Edition partnership, the common agent container must be manually configured within the zone cluster.

▼ How to Prepare a Zone Cluster for Partner Membership

This procedure configures common agent container security in a zone cluster to prepare the zone cluster for use in a cluster partnership.

Before You Begin Ensure that the following conditions are met:

- The zone cluster is created. See "Creating and Configuring a Zone Cluster" in *Oracle Solaris Cluster Software Installation Guide*.
- You have read the requirements for using a zone cluster in a cluster partnership. See "Zone Clusters" on page 16.
- Geographic Edition software is installed in the global cluster that supports the zone cluster you are configuring.

1 Assume the `root` role on a node of the global cluster that supports the zone cluster you are configuring.

2 Set up the network address for the zone cluster.

```
phys-schost# clzonecluster configure zoneclustername
clzc:zoneclustername> add net
clzc:zoneclustername:net> set address=zoneclustername
clzc:zoneclustername:net> end

clzc:zoneclustername> verify
clzc:zoneclustername> commit
clzc:zoneclustername> exit
```

3 Copy the security files for the common agent container to all zone cluster nodes.

This step ensures that security files for the common agent container are identical on all cluster nodes and that the copied files retain the correct file permissions.

Perform all steps in the zone cluster.

a. Log in to each node of the zone cluster.

```
phys-schost# zlogin zoneclustername
zcname#
```

b. On each node, stop the common agent container.

```
zcname# /usr/sbin/cacaoadm stop
```

c. On one node, create the security keys.

```
zcname# cacaoadm create-keys --force
```

d. Create a tar file of the `/etc/cacao/instances/default/security` directory.

```
zcname# tar cf /tmp/SECURITY.tar /etc/cacao/instances/default/security
```

e. Copy the `/tmp/SECURITY.tar` file to each of the other cluster nodes.

f. On each node to which you copied the `/tmp/SECURITY.tar` file, extract the security files.

Any security files that already exist in the `/etc/cacao/instances/default/security` directory are overwritten.

```
zcname# cd /etc/cacao/instances/default
zcname# tar xf /tmp/SECURITY.tar
```

g. Delete the `/tmp/SECURITY.tar` file from each node in the cluster.

You must delete each copy of the tar file to avoid security risks.

```
zcname# rm /tmp/SECURITY.tar
```

h. On each node, set the common agent container network-bin address.

```
zcname# cacaoadm set-param network-bind-address=0.0.0.0
```

i. On each node, enable and start the common agent container.

```
zcname# /usr/sbin/cacaoadm enable
zcname# /usr/sbin/cacaoadm start
```

4 **Verify that the Geographic Edition modules are loaded on the zone cluster node.**

```
phys-schost# cacaoadm status com.sun.cluster.geocontrol
phys-schost# cacaoadm status com.sun.cluster.geoutilities
phys-schost# cacaoadm status com.sun.cluster.notifier
```

- If a module is loaded, command output would be similar to the following. You can safely ignore the message `Module is not in good health`.

```
Operational State:ENABLED
Administrative State:LOCKED
Availability Status:[]
Module is not in good health.
```

- If a module is not loaded, command output would be similar to the following.

```
Module com.sun.cluster.geocontrol has not been loaded.
Cause of the problem:[DEPENDENCY]
```

  See the Troubleshooting section at the end of this procedure.

5 **Exit the zone cluster node.**

```
zcname# exit
phys-schost#
```

Troubleshooting If a Geographic Edition module is not loaded, check that the zone cluster configuration is correct.

After you have verified that the configuration is complete and correct, and you have fixed any errors, do one of the following:

- On each zone cluster node, restart the common agent container.

```
zcnode# /usr/sbin/cacaoadm restart
```

- From a global-cluster node, reboot the zone cluster.

```
phys-schost# clzonecluster reboot zoneclustername
```

After processing is complete on all zone cluster nodes, check that the Geographic Edition modules are now loaded. If any modules are still not loaded, contact your Oracle service representative for assistance.

Enabling the Geographic Edition Infrastructure

When Geographic Edition software is enabled, the cluster is ready to enter a partnership with another enabled cluster.

For more information about setting up and installing Geographic Edition, see Chapter 3, "Administering the Geographic Edition Infrastructure," in *Oracle Solaris Cluster Geographic Edition System Administration Guide*.

To use the `geoadm` command to enable the local cluster for partnership membership, you must have assume the `root` role.

▼ How to Enable Geographic Edition Software

This procedure enables the Geographic Edition infrastructure on the local cluster only. Repeat this procedure on all the clusters of your geographically separated cluster.

Before You Begin Ensure that the following conditions are met:

- The cluster is running the Oracle Solaris Operating System and Oracle Solaris Cluster software.
- Geographic Edition software is installed.
- The cluster has been configured for secure cluster communication by using security certificates, that is, nodes within the same cluster must share the same security certificates. This is configured during Oracle Solaris Cluster installation.

1 Assume the `root` role on a global-cluster node.

2 Ensure that the logical hostname, which is the same as the cluster name, is available and defined.

```
# cluster list
```

For global clusters, if the cluster name is not the name that you want to use, change the cluster name with the following command:

```
# cluster rename -c newclustername clustername
```

`-c` *newclustername* Specifies the new cluster name.

clustername The cluster whose name you are changing.

For more information, see the `cluster(1CL)` man page.

Note – After you have enabled the Geographic Edition infrastructure, you must not change the cluster name while the infrastructure is enabled.

---

3 Confirm that the naming service and the local `hosts` files contain a host entry that matches the cluster name.

The local hosts file, `hosts`, is located in the `/etc/inet` directory.

4 On a node of the cluster, start the Geographic Edition infrastructure.

```
# geoadm start
```

The `geoadm start` command enables the Geographic Edition infrastructure on the local cluster only. For more information, see the `geoadm`(1M) man page.

5 Verify that you have enabled the infrastructure and that the Geographic Edition resource groups are online.

```
# geoadm show
# clresourcegroup status geo-clusterstate geo-infrastructure
# clresource status -g geo-clusterstate,geo-infrastructure
```

The output for the `geoadm show` command displays that the Geographic Edition infrastructure is active from a particular node in the cluster.

The output for the `clresourcegroup status` and `clresource status` commands display that the `geo-failovercontrol`, `geo-hbmonitor`, and `geo-clustername` resources and the `geo-infrastructure` resource group is online on one node of the cluster. The `geo-clusterstate` resource group is online on both nodes.

For more information, see the `clresourcegroup`(1CL) and `clresource`(1CL) man pages.

Example 3–1 Enabling the Geographic Edition Infrastructure on a Cluster

This example enables Geographic Edition software on the `cluster-paris` cluster.

1. Start the Geographic Edition infrastructure on `cluster-paris`.

```
phys-paris-1# geoadm start
```

2. Ensure that the Geographic Edition infrastructure was successfully enabled.

```
phys-paris-1# geoadm show

--- CLUSTER LEVEL INFORMATION ---
Oracle Solaris Cluster Geographic Edition is active on cluster-paris from node phys-paris-1
Command execution successful
phys-paris-1#
```

3. Verify the status of the Geographic Edition resource groups and resources.

```
phys-paris-1# clresourcegroup status geo-clusterstate geo-infrastructure

=== Cluster Resource Groups ===

Group Name                     Node Name             Suspended           Status
----------                     ---------             ---------           ------
geo-clusterstate               phys-paris-1          No                  Online
                               phys-paris-2          No                  Online

geo-infrastructure             phys-paris-1          No                  Online
                               phys-paris-2          No                  Offline

phys-paris-1# clresource status -g geo-clusterstate,geo-infrastructure

=== Cluster Resources ===
```

```
Resource Name           Node Name       State         Status Message
-------------           ---------       -----         --------------
geo-clustername         phys-paris-1    Online        Online - LogicalHostname online.
                        phys-paris-2    Offline       Offline

geo-hbmonitor           phys-paris-1    Online        Online - Daemon OK
                        phys-paris-2    Offline       Offline

geo-failovercontrol     phys-paris-1    Online        Online - Service is online.
                        phys-paris-2    Offline       Offline
```

Next Steps Configure trust between partner clusters. Go to "How to Configure Trust Between Two Clusters" on page 30.

Configuring Trust Between Partner Clusters

Before you create a partnership between two clusters, you must configure Geographic Edition software for secure communication between the two clusters. The configuration must be reciprocal. For example, you must configure the cluster `cluster-paris` to trust the cluster `cluster-newyork`, and you must also configure the cluster `cluster-newyork` to trust the cluster `cluster-paris`.

▼ How to Configure Trust Between Two Clusters

Before You Begin Ensure that the following conditions are met:

- The cluster on which you want to create the partnership is running.
- The `geoadm start` command has already been run on this cluster and the partner cluster. For more information about using the `geoadm start` command, see "Enabling the Geographic Edition Infrastructure" on page 27.
- The cluster name of the partner cluster is known.
- The host information of the partner cluster is defined in the local hosts file. The local cluster needs to know how to reach the partner cluster by name.

1 Assume the `root` role on a cluster node.

2 Import the public keys from the remote cluster to the local cluster.

Run the following command on one node of the local cluster to import the keys from the remote cluster to one node of the cluster.

```
# geops add-trust -c remotecluster
```

`-c` *remotecluster* Specifies the logical hostname of the cluster with which to form a partnership. The logical hostname is used by Geographic Edition software

and maps to the name of the remote partner cluster. For example, a remote partner cluster name might resemble the following:

```
cluster-paris
```

When you use this option with the `add-trust` or `remove-trust` subcommand, the option specifies the alias where the public keys on the remote cluster are stored. An alias for certificates on the remote cluster has the following pattern:

remotecluster`.certificate[0-9]*`

Keys and only keys that belong to the remote cluster should have their alias match this pattern.

For more information about the `geops` command, refer to the `geops(1M)` man page.

3 Repeat the preceding steps on a node of the remote partner cluster.

4 Verify trust from one node of each cluster.

```
# geops verify-trust -c remotecluster
```

Next Steps Configure and join the partnership. See Chapter 5, "Administering Cluster Partnerships," in *Oracle Solaris Cluster Geographic Edition System Administration Guide*.

See Also To remove a partnership between two clusters, see "How to Remove Trust Between Two Clusters" in *Oracle Solaris Cluster Geographic Edition System Administration Guide*.

◆ ◆ ◆ CHAPTER 4

Upgrading the Geographic Edition Software

This chapter describes how to upgrade Geographic Edition software on a pair of clusters.

You can upgrade Geographic Edition software on a running cluster without disruption. Because the Geographic Edition software installation process does not require you to restart the Oracle Solaris Cluster software, the cluster remains in production with services running. Geographic Edition software configuration data is retained across the upgrade process. Highly available applications do not have downtime during Geographic Edition software upgrade.

Note – If you are upgrading the Oracle Solaris Cluster software, the Geographic Edition software is automatically upgraded at the same time. You do not then need to perform this procedure to upgrade the Geographic Edition software.

Upgrading a Geographic Edition Configuration

This section provides the following information to upgrade to a new Geographic Edition software version:

To install a Geographic Edition software update (SRU), instead see "Installing Software Updates" on page 20.

Upgrade Requirements and Software Support Guidelines

Observe the following requirements and software-support guidelines on all clusters that have a partnership with the cluster that you are upgrading when you upgrade a cluster to the Geographic Edition 4.1 software:

- **Supported hardware** - The cluster hardware must be a supported configuration for Geographic Edition 4.1 software. Contact your Oracle representative for information about Geographic Edition configurations that are currently supported.
- **Minimum Oracle Solaris OS version** - The cluster must run on Oracle Solaris 11.1 software, including the most current required software updates.
- **Minimum Oracle Solaris Cluster version** - The cluster must run on or be upgraded to either Oracle Solaris Cluster 4.0 or Oracle Solaris Cluster 4.1 software.

Note – All clusters in a partnership must run either Oracle Solaris Cluster 4.0 or Oracle Solaris Cluster 4.1 software. If a cluster is already running on Oracle Solaris Cluster 4.0 software, you are not required to upgrade it to Oracle Solaris Cluster 4.1 software to upgrade that cluster to Geographic Edition 4.1 software.

- **Cluster partnerships** - For all clusters that have a partnership with the cluster that you are upgrading, all nodes of a cluster must run either Geographic Edition 4.0 or 4.1 software.

▼ How to Prepare the Cluster for an Upgrade

Perform this procedure on all clusters that have a partnership with the cluster you are upgrading to remove the Geographic Edition layer from production. Perform all steps from the global zone only.

Before You Begin Perform the following tasks:

- Ensure that the configuration meets the requirements for the upgrade. See "Upgrade Requirements and Software Support Guidelines" on page 34.
- Have available the installation media or the IPS publisher configured, documentation, and software updates for all software products that you are upgrading, including Oracle Solaris OS, Oracle Solaris Cluster software, and Geographic Edition 4.1 software.
- Ensure that you have installed all the required software updates for your cluster configuration on each node of every cluster before you start upgrading the software. See "Software Updates" in *Oracle Solaris Cluster 4.1 Release Notes* for the location of software updates and installation instructions.

1. **Ensure that the cluster is functioning properly.**

   a. **From any node, view the current status of the cluster.**

      ```
      % cluster status
      ```

      See the cluster(1CL) man page for more information.

   b. **Search the `/var/adm/messages` log on the same node for unresolved error messages or warning messages.**

   c. **Check the volume manager status.**

2. **Assume the `root` role on a node of the cluster.**

3. **Remove all application resource groups from protection groups.**

   Highly available applications do not have downtime during the Geographic Edition software upgrade.

   ```
   # geopg remove-resource-group resourcegroup protectiongroup
   ```

   See the geopg(1M) man page for more information.

4. **Perform the preceding steps on all clusters that have a partnership with this cluster.**

5. **Stop all protection groups that are active on the cluster.**

   ```
   # geopg stop protectiongroup -e local
   ```

   See the geopg(1M) man page for more information.

6. **Stop the Geographic Edition infrastructure.**

   ```
   # geoadm stop
   ```

   See the geoadm(1M) man page for more information.

Next Steps Upgrade the Geographic Edition software on the clusters. Go to "How to Upgrade Geographic Edition Software" on page 35.

▼ How to Upgrade Geographic Edition Software

Perform this procedure on all nodes of the cluster. You can perform this procedure on more than one node at the same time.

Caution – If the cluster is in a partnership, both partners must be installed with Geographic Edition 4.0 or 4.1 software before the Geographic Edition 4.1 software can start.

Before You Begin Ensure that the cluster is prepared for upgrade. See "How to Prepare the Cluster for an Upgrade" on page 34.

1. **Assume the `root` role on a node where you intend to upgrade Geographic Edition software.**

2. **Ensure that the cluster is functioning properly and that all nodes are online and part of the cluster.**

   a. **From any node, view the current status of the cluster.**

      ```
      % cluster status
      ```

      See the `cluster`(1CL) man page for more information.

   b. **Search the `/var/adm/messages` log on the same node for unresolved error messages or warning messages.**

   c. **Check the volume manager status.**

3. **Upgrade the Geographic Edition software to the new update or release.**

   ```
   # pkg update ha-cluster-geo-incorporation
   ```

4. **Install all the required software updates as described in "Installing Software Updates" on page 20.**

   Ensure that Geographic Edition software upgrade is completed on all cluster nodes before you continue to the next step.

5. **On one node of each partner cluster that you upgraded, enable Geographic Edition software.**

   ```
   # geoadm start
   ```

6. **Update the public keys on all nodes on both partner clusters.**

   a. **On each node in the local cluster, remove the public keys.**

      ```
      localnode# geops remove-trust -c remotecluster
      ```

   b. **On each node in the remote cluster, remove the public keys.**

      ```
      remotenode# geops remove-trust -c localcluster
      ```

   c. **On one node of the local cluster, import the public keys from the remote cluster.**

      ```
      localnode# geops add-trust -c remotecluster
      ```

d. On one node of the remote cluster, import the public keys from the local cluster.

```
remotenode# geops add-trust -c localcluster
```

e. On each node of each cluster, verify trust.

```
# geops verify-trust -c partnercluster
```

For a complete example of how to configure and join a partnership, see "How to Join a Partnership" in *Oracle Solaris Cluster Geographic Edition System Administration Guide*.

7 From one node in one of the partner clusters, add back to the protection group all application resource groups that you removed while you were preparing the cluster for upgrade.

```
# geopg add-resource-group resourcegroup protectiongroup
```

See the geopg(1M) man page for more information.

8 Start all the protection groups that you added.

```
# geopg start protectiongroup -e local [-n]
```

See the geopg(1M) man page for more information.

Next Steps Go to "How to Verify Upgrade of Geographic Edition Software" on page 37.

▼ How to Verify Upgrade of Geographic Edition Software

Perform this procedure to verify that the cluster is successfully upgraded to Geographic Edition 4.1 software. Perform all steps from the global zone only.

Before You Begin Ensure that all upgrade procedures are completed for all cluster nodes that you are upgrading.

1 Assume the `root` role on each node.

2 On each upgraded node, view the installed levels of Geographic Edition software.

```
# geoadm -V
```

The last line of output states which version of Geographic Edition software the node is running. This version should match the version to which you just upgraded.

Note – The version number that the `geoadm -v` command returns does not coincide with the marketing release version numbers. The version number for Geographic Edition 4.1 software is 4.1.

---

3 Ensure that the cluster is running properly.

```
# geoadm status
```

4 **(Optional) Perform a switchover to ensure that Geographic Edition software was installed properly.**

```
# geopg switchover remotecluster protectiongroup
```

You must test your geographically separated cluster properly, so that no problems prevent a switchover. Upgrading the secondary cluster first and switching over to it enables you to verify that switchover still works. If the switchover fails, the primary site is untouched and you can switch back. If switchover works on the secondary site, then after a certain 'soak time' you can upgrade the primary site as well.

Note – A switchover might interrupt the services that are running on the cluster. You should carefully plan the required tasks and resources before you perform a switchover.

If you have added your application resource groups back into the protection groups, performing a switchover shuts down the applications on the original primary cluster and migrates the applications to the secondary cluster.

◆ ◆ ◆ CHAPTER 5

Uninstalling Geographic Edition 4.1 Software

This chapter describes how to uninstall the Geographic Edition software.

When you uninstall Geographic Edition 4.1 software, the node or cluster is no longer a part of the geographically separated cluster.

Note – You must uninstall Geographic Edition software before you uninstall Oracle Solaris Cluster software.

Uninstalling Geographic Edition Software

▼ How to Uninstall Geographic Edition Software

Use this procedure to uninstall Geographic Edition software that was installed with the `pkg add` command. Remove Geographic Edition software from all nodes in the cluster, unless you are removing the software from node that you are also removing from the cluster. You can continue to run applications during the uninstallation of Geographic Edition software.

1 Assume the `root` role on the node where you intend to uninstall Geographic Edition software.

2 Stop the Geographic Edition infrastructure on the local cluster.

```
# geoadm stop
```

For more information about disabling the Geographic Edition software on a cluster, see "Disabling the Geographic Edition Software" in *Oracle Solaris Cluster Geographic Edition System Administration Guide*.

3 **Remove the `ha-cluster-full` group package from each node in the local cluster.**

You must remove the core Oracle Solaris Cluster group package before you can remove the Geographic Edition software. However, this does not remove the installed Oracle Solaris Cluster software.

```
# pkg uninstall ha-cluster-full
```

4 **Uninstall all Geographic Edition software packages from each node in the local cluster.**

For a list of the Geographic Edition 4.1 packages, see "How to Install Geographic Edition Software" on page 18.

```
# pkg uninstall ha-cluster/geo* ha-cluster/group-package/ha-cluster-geo*
```

5 **Verify that all Geographic Edition packages are removed.**

```
# pkg info | grep geo
```

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