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 Solaris Operating System (Solaris OS) 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.

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 Solaris software system
- Other software documentation that you received with your system
- Solaris OS man pages

Documentation, Support, and Training

See the following web sites for additional resources:

- Documentation (http://docs.sun.com)
- Support (http://www.oracle.com/us/support/systems/index.html)
- Training (http://education.oracle.com) – Click the Sun link in the left navigation bar.

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Oracle Technology Network (http://www.oracle.com/technetwork/index.html) offers a range of resources related to Oracle software:

- Discuss technical problems and solutions on the Discussion Forums (http://forums.oracle.com).
- Get hands-on step-by-step tutorials with Oracle By Example (http://www.oracle.com/technology/obe/start/index.html).
- Download Sample Code (http://www.oracle.com/technology/sample_code/index.html).

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 .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 the default UNIX system prompt and superuser prompt for shells that are included in the Oracle Solaris OS. Note that the default system prompt that is displayed in command examples varies, depending on the Oracle Solaris release.

TABLE P–2   Shell Prompts

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

Related Documentation

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

Topic	Documentation
Overview	*Oracle Solaris Cluster Geographic Edition Overview*
	Oracle Solaris Cluster Geographic Edition 3.3 Documentation Center
Installation	*Oracle Solaris Cluster Geographic Edition Installation Guide*
Data Replication	*Oracle Solaris Cluster Geographic Edition Data Replication Guide for EMC Symmetrix Remote Data Facility*
	Oracle Solaris Cluster Geographic Edition Data Replication Guide for Hitachi TrueCopy and Universal Replicator
	Oracle Solaris Cluster Geographic Edition Data Replication Guide for Oracle Data Guard
	Oracle Solaris Cluster Geographic Edition Data Replication Guide for Sun StorageTek Availability Suite
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. All Oracle Solaris Cluster documentation is available at `http://docs.sun.com`.

Topic	Documentation
Overview	*Oracle Solaris Cluster Overview*
	Oracle Solaris Cluster 3.3 Documentation Center
Concepts	*Oracle Solaris Cluster Concepts Guide*
Hardware installation and administration	*Oracle Solaris Cluster 3.3 Hardware Administration Manual*
	Individual hardware administration guides
Software installation	*Oracle Solaris Cluster Software Installation Guide*
Data service installation and administration	*Oracle Solaris Cluster Data Services Planning and Administration Guide*
	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 Quorum Server Reference Manual

For a complete list of Oracle Solaris Cluster documentation, see the release notes for your release of Oracle Solaris Cluster software at http://wikis.sun.com/display/SunCluster/Home/.

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, Solaris 10)
- The release number of the Geographic Edition software (for example, 3.3)

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

Command	Function
prtconf -v	Displays the size of the system memory and reports information about peripheral devices
psrinfo -v	Displays information about processors
showrev —p	Reports which patches are installed
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.

1 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" on page 11
- "Planning Cluster Hardware" on page 12
- "Planning Required Software" on page 13
- "Planning Resource and Resource Group Names" on page 14
- "Planning Required IP Addresses and Hostnames" on page 14
- "Planning the Geographic Edition Environment" on page 15

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 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:

- Sun StorageTek Availability Suite software.
- Hitachi TrueCopy and Universal Replicator software.
- EMC Symmetrix Remote Data Facility software.
- Oracle Data Guard software.
- MySQL software.
- Geographic Edition script-based plug-ins.

The Sun StorageTek Availability Suite 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.

The Hitachi TrueCopy and Universal Replicator and EMC Symmetrix Remote Data Facility replication use a storage-based method. These methods use replication that is built into the storage hardware. If you use Hitachi TrueCopy and Universal Replicator RAID Manager software or 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 Real Application Clusters 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.

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 Sun StorageTek Availability Suite*
- *Oracle Solaris Cluster Geographic Edition Data Replication Guide for Hitachi TrueCopy and Universal Replicator*
- *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 E, "Deployment Example: Replicating Data With MySQL," in *Oracle Solaris Cluster Geographic Edition System Administration Guide*
- 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 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 15

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.
- 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.
- A zone cluster must run on Oracle Solaris Cluster 3.3 software to be a supported cluster partner. A zone cluster that runs on Sun Cluster 3.2 11/09 software cannot be a cluster partner.
- You can start the Geographic Edition infrastructure from within a zone-cluster node, but not from within any other type of non-global zone.
- The Oracle Solaris Cluster Manager -Geographic Edition GUI cannot be used to manage Geographic Edition components of a zone cluster that is a partnership member.

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.

The `installer` program offers two interactive installation modes, graphical user interface (GUI) and text-based interface. The graphical mode provides a wizard that guides you, step by step, through the tasks that you need to perform to install the Geographic Edition components. The text-based mode provides the same functions that the GUI provides. However, this mode prompts you for responses on a line-by-line basis, rather than by means of a wizard.

If you are installing Geographic Edition 3.3 software on a cluster that runs Sun Cluster 3.2 11/09 software, you must use the `pkgadd` command to install Geographic Edition packages. The `installer` program does not permit installation of software from different marketing releases of the same product group.

> **Note** – Ensure that you have installed all the required patches for your cluster configuration on each node of every cluster before you start installing the software. See "Required Patches" in Oracle Solaris Cluster Geographic Edition 3.3 Release Notes for the location of patches and installation instructions.

You must install Geographic Edition software in the global zone for all nodes of a cluster in a partnership, whether it is a global cluster or a zone cluster. For zone clusters, the Geographic Edition software is propagated to the zone-cluster nodes by default.

Installing Geographic Edition Software

You must install Geographic Edition software on every node of each cluster in your geographically separated cluster by using the `installer` program or the `pkgadd` 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 Solaris OS is installed to support Geographic Edition software.

    If Solaris software is already installed on the node, you must ensure that the 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 Geographic Edition 3.3 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 superuser 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 Load the installation DVD-ROM into the DVD-ROM drive.

If the volume management daemon vold(1M) is running and is configured to manage CD-ROM or DVD devices, the daemon automatically mounts the media on the /cdrom/cdrom0/ directory.

3 Determine your installation method.

- **If you are installing Geographic Edition 3.3 software on a cluster that runs Sun Cluster 3.2 11/09 software, use the pkgadd command to install the Geographic Edition packages that you want for your configuration.**

  The installer program does not permit installation of software from different marketing releases of the same product group.

  a. Change to the Solaris_*arch*/Product/sun_cluster_geo/Solaris_*ver*/Packages/ directory, where *arch* is sparc or x86, and where *ver* is 10 for Solaris 10.

  `# cd /cdrom/cdrom0/Solaris_`*arch*`/Product/sun_cluster_geo/Solaris_`*ver*`/Packages/`

  b. Install the Geographic Edition 3.3 software packages.

  `# pkgadd -G -d .` *geopackages*

Component	Packages
Geographic Edition infrastructure	SUNWscghbr, SUNWscghb, SUNWscgctlr, SUNWscgctl, SUNWscgspm[1], SUNWgman
EMC Symmetrix Remote Data Facility data replication	SUNWscgrepsrdf, SUNWscgrepsrdfu
Hitachi TrueCopy and Universal Replicator data replication	SUNWscgreptc, SUNWscgreptcu
Oracle Data Guard data replication	SUNWscghrepodg, SUNWscgrepodgu
Sun StorageTek Availability Suite software	SUNWscgrepavs[1], SUNWscgrepavsu[1]

[1] not applicable in zone clusters

Component	Packages
Geographic Edition script-based plug-ins data replication	SUNWscgrepsbpu

- **If you are installing Geographic Edition 3.3 on Oracle Solaris Cluster 3.3 software, use the `installer` program.**

  a. **To use the `installer` program with a GUI, ensure that the display environment of the cluster node to install is set to display the GUI.**

     ```
     % xhost +
     % setenv DISPLAY nodename:0.0
     ```

     If the display environment is not set to display the GUI, the `installer` program instead displays in text-based mode.

  b. **Change to the installation wizard directory of the DVD-ROM.**

     - **For the SPARC platform, type the following command:**

       ```
       # cd /cdrom/cdrom0/Solaris_sparc
       ```

     - **For the x86 platform, type the following command:**

       ```
       # cd /cdrom/cdrom0/Solaris_x86
       ```

  c. **Start the `installer` program.**

     ```
     # ./installer
     ```

     The installer starts and displays the Welcome page. To exit the installer at any time, click Cancel. For more information about the `installer` program, see *Sun Java Enterprise System 5 Update 1 Installation Guide for UNIX*.

  d. **Follow instructions on the screens to read and accept the Software License Agreement.**

     After you accept the license terms, the Choose Software Components menu is displayed.

  e. **Select Oracle Solaris Cluster Geographic Edition 3.3 and press Return.**

     The Confirm Choices screen is displayed.

  f. **Press Return to confirm your choice.**

     The Oracle Solaris Cluster Geographic Edition 3.3 submenu is displayed.

  g. **Follow onscreen instructions to select the following products from the Oracle Solaris Cluster Geographic Edition submenu.**

     - Oracle Solaris Cluster Geographic Edition 3.3.
     - The data replication software that you want to use.

- (*Optional*) Oracle Solaris Cluster Manager - Geographic Edition.

    h. When prompted, choose whether to install multilingual packages.

Note – If you choose to install multilingual packages, ensure that all nodes of the cluster have the same default locale.

---

4 Unload the installation DVD-ROM from the DVD-ROM drive.

5 Repeat this procedure on each node of each partner cluster.

Next Steps Install required patches. Go to "Installing Patches" on page 21.

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

Installing Patches

Observe the following guidelines and requirements to patch Geographic Edition 3.3 software:

- You must run the same patch levels for Oracle Solaris Cluster software and the common agent container software on all nodes of the same cluster.
- Within a cluster, the patch level for each node on which you have installed Geographic Edition software must meet the Oracle Solaris Cluster 3.3 patch-level requirements.
- All nodes in the same cluster must have the same version of Geographic Edition software and the same patch level. However, primary and secondary clusters can run different versions of Geographic Edition software, provided that each version of Geographic Edition is correctly patched and the versions are no more than one release different.
- To ensure that the patches have been installed properly, install the patches on your secondary cluster before you install the patches on the primary cluster.
- For additional information about Geographic Edition patches, see the patch README file.
- See Oracle Solaris Cluster Geographic Edition 3.3 Release Notes for a list of required patches.

▼ How to Prepare the Cluster for Patch 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   Become superuser 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 patch 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 patches for the Geographic Edition software. Go to "How to Install Patches" on page 22.

▼ **How to Install Patches**

Perform this procedure on all nodes of the cluster.

Patch the secondary cluster before you patch the primary cluster, to permit testing.

Before You Begin   Perform the following tasks:

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

If Solaris software is already installed on the node, you must ensure that the 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 Patch 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   Become superuser in the global zone of a node.

3   Install any necessary patches to support Geographic Edition software by using the patchadd command.

If you are applying Oracle Solaris Cluster patches, use the Oracle Solaris Cluster methods on both clusters.

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

5   After you have installed all required patches 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 patch 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."

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 "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   **Become superuser on a node of the global cluster that supports the zone cluster you are configuring.**

2   Set the common agent container module location for the zone cluster.

```
phys-schost# clzonecluster configure zoneclustername
clzc:zoneclustername> add fs
clzc:zoneclustername:fs> set special=/etc/cacao/instances/default/modules
clzc:zoneclustername:fs> set dir=/etc/cluster/geocmass
clzc:zoneclustername:fs> set type=lofs
clzc:zoneclustername:fs> add options [ro,nodevices]
clzc:zoneclustername:fs> set cluster-control=false
clzc:zoneclustername:fs> end

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

phys-schost# clzonecluster reboot zoneclustername
```

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. One possible cause for a module not to load is if the mapping for the /etc/cluster/geocmass loopback mount was not added to the zone cluster.

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. You can use the CLI or the GUI to create a cluster partnership.

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 superuser access.

▼ 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 Solaris Operating System and Oracle Solaris Cluster software.
- The Oracle Solaris Cluster management-agent container for Oracle Solaris Cluster Manager is running.
- 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.

    However, when you upgrade to Oracle Solaris Cluster 3.3 software, you must copy the security certificates manually from one node of the cluster to the other nodes of the cluster. This action restores identical security certificates on all nodes. For more information about copying the security files for the common agent container, see the procedures in "How to Finish Upgrade to Oracle Solaris Cluster 3.3 Software" in *Oracle Solaris Cluster Upgrade Guide*.

1   **Become superuser 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 .

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 28.

- 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 Become superuser 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*.

4

Upgrading the Geographic Edition Software

This chapter describes how to upgrade Geographic Edition software on a pair of clusters. You can upgrade an installation of Geographic Edition software by uninstalling the existing version of Geographic Edition software and installing the upgraded version of the software.

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.

Upgrading a Geographic Edition Configuration

This section provides the following information to upgrade a Geographic Edition configuration:

- "Upgrade Requirements and Software Support Guidelines" on page 33
- "How to Prepare the Cluster for an Upgrade" on page 34
- "How to Upgrade Geographic Edition Software" on page 35
- "How to Verify Upgrade of Geographic Edition Software" on page 38

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 3.3 software:

- **Supported hardware** - The cluster hardware must be a supported configuration for Geographic Edition 3.3 software. Contact your Oracle representative for information about Geographic Edition configurations that are currently supported.

■ **Minimum Solaris OS version** - The cluster must run on or be upgraded to at least Solaris 10 11/09 software, including the most current required patches.

■ **Minimum Oracle Solaris Cluster version** - The cluster must run on or be upgraded to either Sun Cluster 3.2 11/09 or Oracle Solaris Cluster 3.3 software.

■ **Cluster partnerships** - You must upgrade Geographic Editionsoftware on all nodes of all clusters that have a partnership with the cluster you are upgrading to either Geographic Edition 3.2 11/09 or 3.3 software, if any cluster node is not already running one of those versions.

▼ 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 33.

■ Have available the installation media, documentation, and patches for all software products that you are upgrading, including Solaris OS, Oracle Solaris Cluster software, and Geographic Edition 3.3 software.

■ Ensure that you have installed all the required patches for your cluster configuration on each node of every cluster before you start upgrading the software. See "Required Patches" in Oracle Solaris Cluster Geographic Edition 3.3 Release Notes for the location of patches and installation instructions.

Note – If you want to upgrade the Solaris OS or other applications during the Geographic Edition software upgrade process, you must remove the Geographic Edition packages before you upgrade the Solaris OS or other applications. For information about uninstalling Geographic Edition software, see "Uninstalling Geographic Edition Software" on page 42 to determine the proper method of uninstallation.

---

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

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

■ On Sun Cluster 3.1 8/05 software, use the following command:

   % `scstat`

■ On Sun Cluster 3.2 software, use the following command:

   % `cluster status`

See the scstat(1M) or 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 **Become superuser 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 upgraded to Geographic Edition 3.2 11/09 or 3.3 software before the Geographic Edition 3.3 software can start.

1 **To use the `uninstall` program with a GUI, ensure that the display environment of the cluster node to uninstall is set to display the GUI.**
   ```
   % xhost +
   % setenv DISPLAY nodename:0.0
   ```

If the display environment is not set to display the GUI, the uninstall program instead runs in text-based mode.

2   **Become superuser on a node where you intend to uninstall Geographic Edition software.**

3   **Uninstall the current Geographic Edition software.**

Version of Geographic Edition Software	Version of Solaris OS	Method of Uninstallation
3.1 8/05	8 or 9	The uninstall program that is provided with Geographic Edition 3.1 8/05. For more information, see Chapter 4, "Uninstalling the Sun Cluster Geographic Edition Software," in *Sun Cluster Geographic Edition Installation Guide*.
	10	The pkgrm command. For more information, see "Limitations on Running Sun Cluster Geographic Edition Software on Solaris OS 10" in *Sun Cluster Geographic Edition 3.1 8/05 Release Notes*.
3.1 2006Q4	8	The pkgrm command. For more information, see "Uninstalling Sun Cluster Geographic Edition Software on Solaris OS 8" in *Sun Cluster Geographic Edition Installation Guide*.
	9 or 10	The uninstall program. For more information, see "Uninstalling Sun Cluster Geographic Edition Software on Solaris OS 9 and 10" in *Sun Cluster Geographic Edition Installation Guide*.
3.2	9 or 10	The uninstall program. For more information, see "Uninstalling Sun Cluster Geographic Edition Software on Solaris OS 9 and 10" in *Sun Cluster Geographic Edition Installation Guide*.

4   **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.**

   - On Sun Cluster 3.1 8/05 software, use the following command:

     % **scstat**

   - On Sun Cluster 3.2 software, use the following command:

     % **cluster status**

   See the scstat(1M) or 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.**

5   Upgrade to either Sun Cluster 3.2 11/09 or Oracle Solaris Cluster 3.3 software.

See *Oracle Solaris Cluster Software Installation Guide* for more information.

6   Install Geographic Edition 3.3 software as described in Chapter 2, "Installing Geographic Edition Software."

7   Install all the required patches as described in "Installing Patches" on page 21.

8   Perform the preceding steps on all other nodes of the cluster.

Note – All clusters in a partnership must run either Sun Cluster 3.2 11/09 or Oracle Solaris Cluster 3.3 software. If a cluster is already running on Sun Cluster 3.2 11/09 software, you are not required to upgrade it to Oracle Solaris Cluster 3.3 software to upgrade that cluster to Geographic Edition 3.3 software.

---

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

```
# geoadm start
```

10   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*.

11   If you upgraded from Geographic Edition 3.1 8/05 software, remove the ICRM plug-in from all the heartbeats on both partner clusters.

In the following commands, the cluster names cluster-paris and cluster-newyork and the heartbeat identifiers hb_paris~newyork and hb_newyork~paris are used to provide clarity.

```
phys-paris-1# geohb remove-plugin pluginname hb_cluster-paris~cluster-newyork
phys-paris-1# geohb remove-plugin pluginname hb_cluster-newyork~cluster-paris
```

```
phys-newyork-1# geohb remove-plugin pluginname hb_cluster-paris~cluster-newyork
phys-newyork-1# geohb remove-plugin pluginname hb_cluster-newyork~cluster-paris
```

12 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.

13 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

Perform this procedure to verify that the cluster is successfully upgraded to Geographic Edition 3.3 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 Become superuser 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 3.3 software is 1.6.

---

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.

5

Uninstalling Geographic Edition 3.3 Software

When you uninstall Geographic Edition 3.3 software, the node or cluster is no longer a part of the geographically separated cluster.

This chapter contains the following sections:

- "Uninstallation Overview" on page 41
- "Uninstalling Geographic Edition Software" on page 42

Uninstallation Overview

This chapter describes uninstalling Geographic Edition 3.3 software. For information about uninstalling previous versions of Geographic Edition software, use the following table to determine the required method.

Version of Geographic Edition Software	Version of Solaris OS	Method of Uninstallation
3.1 8/05	8 or 9	The uninstall program that is provided with Geographic Edition 3.1 8/05. For more information, see Chapter 4, "Uninstalling the Sun Cluster Geographic Edition Software," in *Sun Cluster Geographic Edition Installation Guide*.
	10	The pkgrm command. For more information, see "Limitations on Running Sun Cluster Geographic Edition Software on Solaris OS 10" in *Sun Cluster Geographic Edition 3.1 8/05 Release Notes*.
3.1 2006Q4	8	The pkgrm command. For more information, see "Uninstalling Sun Cluster Geographic Edition Software on Solaris OS 8" in *Sun Cluster Geographic Edition Installation Guide*.
	9 or 10	The uninstall program. For more information, see "Uninstalling Sun Cluster Geographic Edition Software on Solaris OS 9 and 10" in *Sun Cluster Geographic Edition Installation Guide*.

Version of Geographic Edition Software	Version of Solaris OS	Method of Uninstallation
3.2	9 or 10	The uninstall program. For more information, see "Uninstalling Sun Cluster Geographic Edition Software on Solaris OS 9 and 10" in *Sun Cluster Geographic Edition Installation Guide*.

You can remove Geographic Edition software without stopping applications or data replication. For more information about how to keep applications and data replication online, see one of the following data replication guides:

- "How to Deactivate a Sun StorageTek Availability Suite Protection Group" in *Oracle Solaris Cluster Geographic Edition Data Replication Guide for Sun StorageTek Availability Suite*

- "Deactivating a Hitachi TrueCopy or Universal Replicator Protection Group" in *Oracle Solaris Cluster Geographic Edition Data Replication Guide for Hitachi TrueCopy and Universal Replicator*

- "Deactivating an SRDF Protection Group" in *Oracle Solaris Cluster Geographic Edition Data Replication Guide for EMC Symmetrix Remote Data Facility*

- "How to Deactivate an Oracle Data Guard Protection Group" in *Oracle Solaris Cluster Geographic Edition Data Replication Guide for Oracle Data Guard*

For more information about disabling the local cluster for partnership membership, see "Disabling the Geographic Edition Software" in *Oracle Solaris Cluster Geographic Edition System Administration Guide*.

Uninstalling Geographic Edition Software

The installation tools provide an uninstallation program for removing components that were installed on your system by using the installer program. Like the installer program, the uninstall program can be run in graphical or text-based mode. The uninstall program is located at /var/sadm/prod/SUNWentsys*ver*, where *ver* is the version number of the distribution from which you installed Geographic Edition software.

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

The uninstall program might behave differently depending on which component products you installed and how the products are interrelated. Remember the following when you run the uninstall program:

- Run the uninstall program separately on each node that contains Geographic Edition components.
- The uninstall program removes only component products that were installed by the installer program.
- The uninstall program does not check product dependencies for the system.
- The uninstall program does not remove configuration and user data files.

If you installed Geographic Edition software by using the pkgadd command, you cannot use the uninstall program to remove those packages. Instead, use the pkgrm command.

The section contains the following procedures:

▼ How to Uninstall Geographic Edition Software (uninstall)

Use this procedure to uninstall Geographic Edition software that was installed with the installer program. 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.

If you used the pkgadd command to install the Geographic Edition software that you want to remove, do not use this procedure. Instead, go to .

1   To use the uninstall program with a GUI, ensure that the display environment of the cluster node to uninstall is set to display the GUI.

```
% xhost +
% setenv DISPLAY nodename:0.0
```

If the display environment is not set to display the GUI, the uninstall program instead displays in test-based mode.

2   Become superuser on the node where you intend to uninstall Geographic Edition software.

3   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*.

4   Change to the directory where the `uninstall` program for this software version resides.

In the following path, *ver* is the version number of the distribution from which you installed Geographic Edition software.

```
# cd /var/sadm/prod/SUNWentsysver
```

5   Start the `uninstall` program.

```
# ./uninstall
```

The Welcome page is displayed.

6   Click Next to proceed.

The Select Components page is displayed.

7   Select the components that you want to uninstall, and click Next.

To exit the `uninstall` program at any time, click Cancel.

8   Review the uninstallation selections you have made.

- If changes are needed, click Back through successive pages until the Component Selection page is displayed.

- Make changes as needed on the Component Selection page.

- Click Next to proceed again through the uninstaller pages.

  The `uninstall` program remembers previously-specified values. You can modify any value that you previously specified.

9   Click Next when you are satisfied with your selections.

The `uninstall` program begins removing software from your system and displays the following:

- A progress bar that displays the overall completion percentage.

- The name of the package that is currently being removed.

- After all component software has been removed, the uninstaller displays the Uninstallation Complete page.

10   Click View Summary or View Log for information about the uninstallation.

- Uninstallation summary shows the components that were uninstalled and a list of configuration information for the components.

- Uninstallation log shows all messages that were generated by the uninstaller during uninstallation.
- You can also review the uninstallation summary and log files in /var/sadm/install/logs.

11 Click Close to exit the `uninstall` program.

▼ How to Uninstall Geographic Edition Software (`pkgrm`)

Use this procedure to uninstall Geographic Edition software that was installed with the pkgadd 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.

If you used the installer program to install the Geographic Edition software that you want to remove, do not use this procedure. Instead, go to "How to Uninstall Geographic Edition Software (uninstall)" on page 43.

1 Become superuser 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 all Geographic Edition software packages from each node in the local cluster.

For a list of the Geographic Edition 3.3 packages, see "How to Install Geographic Edition Software" on page 18.

```
# pkgrm geopackages
```

4 Verify that all Geographic Edition packages are removed.

```
# pkginfo | grep -i geographic
```

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