Sun Cluster Geographic Edition Reference Manual

Sun microsystems

Contents

Preface

The *Sun Cluster Geographic Edition Reference Manual* provides reference information about commands that are supplied with Sun™ Cluster Geographic Edition software. This book is intended for experienced system administrators with extensive knowledge of Sun software and hardware. This book is not to be used as a planning or presales guide. The information in this book assumes knowledge of the Solaris™ Operating System and expertise with the data replication software that is used with Sun Cluster Geographic Edition software.

Both novice users and those familiar with the Solaris Operating System can use online man pages to obtain information about their SPARC™ based system or x86 based system and its features.

A man page is intended to answer concisely the question "What does this command do?" The man pages in general comprise a reference manual. They are not intended to be a tutorial.

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

Overview

The following contains a brief description of each man page section and the information it references.

Section 1M describes, in alphabetical order, commands that are used chiefly for system maintenance and administration purposes.

The following is a generic format for man pages. The man pages of each manual section generally follow this order, but include only needed headings. For example, if no bugs can be reported, no BUGS section is included. See the intro pages for more information and detail about each section, and man(1) for general information about man pages.

NAME	This section gives the names of the commands or functions that are documented, followed by a brief description of what they do.

SYNOPSIS

This section shows the syntax of commands or functions. If a command or file does not exist in the standard path, its full path name is shown. Options and arguments are alphabetized, with single-letter arguments first, and options with arguments next, unless a different argument order is required.

The following special characters are used in this section:

[ ] Brackets. The option or argument that is enclosed in these brackets is optional. If the brackets are omitted, the argument must be specified.

. . . Ellipses. Several values can be provided for the previous argument, or the previous argument can be specified multiple times, for example, "`filename...`".

| Separator. Only one of the arguments separated by this character can be specified at a time.

{ } Braces. The options and/or arguments enclosed within braces are interdependent. All characters within braces must be treated as a unit.

PROTOCOL

This section occurs only in subsection 3R and indicates the protocol description file.

DESCRIPTION

This section defines the functionality and behavior of the service. Thus it describes concisely what the command does. DESCRIPTION does not discuss OPTIONS or cite EXAMPLES. Interactive commands, subcommands, requests, macros, and functions are described under USAGE.

IOCTL

This section appears on pages in Section 7 only. Only the device class that supplies appropriate parameters to the `ioctl(2)` system call is called ioctl and generates its own heading. ioctl calls for a specific device are listed alphabetically (on the man page for that specific device). ioctl calls are used for a particular class of devices. All these calls have an io ending, such as `mtio(7I)`.

OPTIONS

This section lists the command options with a concise summary of what each option does. The options are listed

literally and in the order they appear in the SYNOPSIS section. Possible arguments to options are discussed under the option, and where appropriate, default values are supplied.

OPERANDS   This section lists the command operands and describes how they affect the actions of the command.

OUTPUT   This section describes the output – standard output, standard error, or output files – generated by the command.

RETURN VALUES   If the man page documents functions that return values, this section lists these values and describes the conditions under which they are returned. If a function can return only constant values, such as 0 or –1, these values are listed in tagged paragraphs. Otherwise, a single paragraph describes the return values of each function. Functions that are declared void do not return values, so they are not discussed in RETURN VALUES.

ERRORS   On failure, most functions place an error code in the global variable errno that indicates why they failed. This section lists alphabetically all error codes a function can generate and describes the conditions that cause each error. When more than one condition can cause the same error, each condition is described in a separate paragraph under the error code.

USAGE   This section lists special rules, features, and commands that require in-depth explanations. The subsections that are listed here are used to explain built-in functionality:

                                Commands
                                Modifiers
                                Variables
                                Expressions
                                Input Grammar

EXAMPLES   This section provides examples of usage or of how to use a command or function. Wherever possible, a complete example, which includes command-line entry and machine response, is shown. Whenever an example is given, the prompt is shown as example%, or if the user must be superuser, example#. Examples are followed by explanations, variable substitution rules, or returned

	values. Most examples illustrate concepts from the SYNOPSIS, DESCRIPTION, OPTIONS, and USAGE sections.
ENVIRONMENT VARIABLES	This section lists any environment variables that the command or function affects, followed by a brief description of the effect.
EXIT STATUS	This section lists the values the command returns to the calling program or shell and the conditions that cause these values to be returned. Usually, zero is returned for successful completion, and values other than zero are returned for various error conditions.
FILES	This section lists all file names that are referred to by the man page, files of interest, and files created or required by commands. Each file name is followed by a descriptive summary or explanation.
ATTRIBUTES	This section lists characteristics of commands, utilities, and device drivers by defining the attribute type and its corresponding value. See attributes(5) for more information.
SEE ALSO	This section lists references to other man pages, in-house documentation, and outside publications.
DIAGNOSTICS	This section lists diagnostic messages with a brief explanation of the condition that caused the error.
WARNINGS	This section lists warnings about special conditions that could seriously affect your working conditions. WARNINGS is not a list of diagnostics.
NOTES	This section lists additional information that does not belong anywhere else on the page. NOTES covers points of special interest to the user. Critical information is never covered here.
BUGS	This section describes known bugs and, wherever possible, suggests workarounds.

REFERENCE

SC32GEO 1M

Name geoadm– enable or disable the Sun Cluster Geographic Edition infrastructure on the local cluster

Synopsis /usr/cluster/bin/geoadm [*subcommand*] -?

/usr/cluster/bin/geoadm -V

/usr/cluster/bin/geoadm show

/usr/cluster/bin/geoadm start

/usr/cluster/bin/geoadm status

/usr/cluster/bin/geoadm stop [-f | -i]

Description The geoadm command enables or disables the Sun Cluster Geographic Edition infrastructure on the local cluster. You can also use this command to check whether the Sun Cluster Geographic Edition software is enabled on the cluster.

After installation, the Sun Cluster Geographic Edition product must be enabled by running the command geoadm start. This command enables the cluster to participate in partnerships and to host protection groups. The geoadm start command configures the highly available infrastructure that unlocks the Sun Cluster Geographic Edition module on the cluster.

The geoadm stop command stops the highly available infrastructure that leaves the Sun Cluster Geographic Edition module locked on the cluster. Run the geoadm stop command before you remove product packages.

Note – The geoadm stop command can successfully disable the Sun Cluster Geographic Edition module on a cluster only under one condition. All local states of the protection groups in which the cluster is involved must be Offline or Unknown.

Running the geoadm start or the geoadm stop command on one node of the cluster affects the entire cluster.

To use the geoadm command to enable or disable the Sun Cluster Geographic Edition infrastructure, you must be assigned the proper role-based access control (RBAC) rights profile.

If you have root access, you have permissions to perform any operation. If you do not have root access, the following RBAC rights apply:

- **Basic Solaris User.** You can read information about Sun Cluster Geographic Edition entities by running commands such as geopg list, geohb list, and geops list.

- **Geo Management.** You can perform all the read operations that someone with Basic Solaris User access can perform. You can also perform administrative and configuration tasks such as geohb create, geopg switchover, geoadm start, and geoadm stop.

For more information, see the rbac(5) man page and "Sun Cluster Geographic Edition Software and RBAC" in *Sun Cluster Geographic Edition System Administration Guide*.

The general form of this command is as follows:

geoadm [*subcommand*] [*options*] [*operands*]

You can omit *subcommand* only if *options* specifies the option -?, -o, -V, or -v.

Each option of this command has a long form and a short form. Both forms of each option are given with the description of the option in the OPTIONS section of this man page.

Subcommands   The following subcommands are supported:

show
    Display whether the Sun Cluster Geographic Edition software is enabled on the cluster.

start
    Configure and enable the Sun Cluster Geographic Edition infrastructure on the cluster.

status
    Display the runtime status of the Sun Cluster Geographic Edition entities on the local cluster.

    The Sun Cluster Geographic Edition software must be installed on the local cluster before you can run the status subcommand. You can run the status subcommand whether or not the cluster has been enabled for partnership.

    The status subcommand displays the following information:

    - Whether the local cluster is enabled for partnership.
    - Whether the local cluster is involved in a partnership. If the cluster is involved in a partnership, the status subcommand lists all partnership members.
    - Heartbeat status.
    - Protection group status.
    - Status of ongoing transactions.

    See the EXTENDED DESCRIPTION section for details about the possible values for each status.

stop
    Disable the Sun Cluster Geographic Edition infrastructure and configuration on the cluster.

    Caution – All protection groups on the cluster must be in the Offline state to run the stop subcommand successfully.

    The stop subcommand removes the cluster state and Sun Cluster Geographic Edition infrastructure resource groups on the cluster, but the stop subcommand does not remove data replication resource groups.

The Sun Cluster Geographic Edition infrastructure is enabled and configured again the first time you run the start subcommand after running the stop subcommand.

Options   The following options are supported:

-?
--help
   Displays help information. When this option is used, no other processing is performed.

   You can specify this option without a subcommand or with a subcommand.

   If you specify this option without a subcommand, the list of subcommands for this command is displayed.

   If you specify this option with a subcommand, the usage options for the subcommand are displayed.

   The question mark might be interpreted as a special character by some shells. Use quotes (-"?") or an escape character to avoid pattern matching.

-f
--force
   Indicates that you want to bypass the command confirmation questions while the Sun Cluster Geographic Edition infrastructure is being disabled.

-i
--interactive
   Indicates that you want to display the interactive command confirmation questions while the Sun Cluster Geographic Edition infrastructure is being disabled.

-V
--version
   Displays the version of the command.

   Do not specify this option with subcommands, operands, or other options. The subcommands, operands, or other options are ignored. The -V option only displays the version of the command. No other operations are performed.

Extended Description   The following sections list the status descriptions.

Partnership Status   Partnership status displays status for the local cluster only. The partnership status can be one of the following:

OK   The partner clusters are connected.

Error   The partner clusters are disconnected.

Synchronization Status   Synchronization status displays status for all the clusters in a partnership. The partnership synchronization status can be one of the following:

OK	The configuration is synchronized between partner clusters.
Error	The configuration on the partner clusters is different. You must synchronize the partnership again.
Mismatch	The partner clusters have been configured individually. Therefore, you must remove the configuration on one cluster and copy the configuration of the partner cluster.
Unknown	Information is not accessible because the partners are disconnected.

Intercluster Resource Management Connection Status   Intercluster Resource Management (ICRM) Connection status displays status for the cluster management agent that is running on the remote cluster. The ICRM connection status can be one of the following:

OK	The ICRM module on each of the partner clusters can communicate with each other.
Error	The ICRM module on the local cluster is unable to communicate with the ICRM module on the remote cluster.

Heartbeat Status   Heartbeat status displays status for the local cluster only. The heartbeat status can be one of the following:

OK	Heartbeat monitoring is enabled, and the partner cluster is responding within timeout and retry periods.
Error	Heartbeat monitoring is running, but the partner cluster is not responding and retries have timed out.
Offline	Heartbeat monitoring is offline.

Heartbeat Plug-in Status   Heartbeat plug-in status displays status for the local cluster only. The heartbeat plug-in status can be one of the following:

OK	The partner cluster is responding.
Inactive	The plug-in is not in use. It is a standby plug-in that is used for retrying if other plug-ins do not respond.
No-Response	The partner cluster is not responding.

Protection Group Status   Protection group status displays the overall status for all the clusters in the protection group. The overall protection group status can be one of the following:

OK	The protection group is online, application resource groups are online, and data replication is running.

	Offline	The protection group is inactive.
	Degraded	The protection group and the application resource groups are online, but data replication is either not running or is in a partial error state.
	Error	The protection group is online, but at least one component of the partnership, such as configuration, data replication, or resource groups, is in an error state.
	Unknown	The protection group is online, but the status for at least one component of the partnership, such as configuration, data replication, or resource groups, is unknown.
Configuration Status		The configuration status of a protection group displays the status for a single cluster only. The configuration status of a protection group can be one of the following:
	OK	The protection group configuration has been validated without errors on the cluster.
	Error	The validation of the protection group configuration resulted in an error. You must validate the protection group again.
	Unknown	Information is not accessible because the partner clusters are disconnected.
Data Replication Status		Data replication status displays the status of data replication that has been configured for the protection group on a single cluster. The data replication status of a protection group can be one of the following:
	OK	Data replication is configured, online, and running without errors.
	Degraded	Data replication is either off or in a partial error state.
	Error	Data replication is not operating because of an error.
	None	Data replication has not been configured.
	Unknown	Information is not accessible because the partners are disconnected.
Resource Groups Status		Resource group status displays the status of resource groups that have been configured for the protection group on a single cluster. The resource group status of a protection group can be one of the following:
	OK	All resource groups are online on the primary cluster, and all resource groups are offline or unmanaged on the secondary cluster.
	Error	Not all resource groups are online on the primary cluster, or not all resource groups are offline or unmanaged on the secondary cluster.
	Unknown	Information is not accessible because the partners are disconnected.

Exit Status   The following exit values are returned:

    0   The command completed successfully.

    nonzero   An error has occurred.

Examples   EXAMPLE 1   Enabling the Sun Cluster Geographic Edition Infrastructure

The following geoadm command enables the Sun Cluster Geographic Edition control module on the local cluster.

```
# geoadm start
```

EXAMPLE 2   Disabling the Sun Cluster Geographic Edition Infrastructure

The following geoadm command removes the infrastructure resource groups that were created when you enabled the Sun Cluster Geographic Edition infrastructure.

```
# geoadm stop
```

EXAMPLE 3   Checking the Status of the Sun Cluster Geographic Edition Infrastructure

The following geoadm command displays whether the Sun Cluster Geographic Edition infrastructure is enabled on the local cluster and, if enable, the nodes on which the infrastructure is active.

```
# geoadm show
--- CLUSTER LEVEL INFORMATION ---
Sun Cluster Geographic Edition is active on:
node phys-paris-2, cluster cluster-paris

Command execution successful
#
```

EXAMPLE 4   Monitoring the Runtime Status of the Sun Cluster Geographic Edition Software

The following geoadm command displays the runtime status of the local Sun Cluster Geographic Edition enabled cluster.

```
# geoadm status
Cluster: cluster-paris

Partnership "paris-newyork-ps": OK
   Partner clusters   : cluster-newyork
   Synchronization    : OK
   ICRM Connection    :OK
```

EXAMPLE 4 Monitoring the Runtime Status of the Sun Cluster Geographic Edition Software
(Continued)

```
Heartbeat "paris-to-newyork" monitoring "cluster-newyork": OK
   Heartbeat plug-in "ping_plugin"    : Inactive
   Heartbeat plug-in "tcp_udp_plugin" : OK

Protection group "tcpg"     : OK
   Partnership              : "paris-newyork-ps"
   Synchronization          : OK

   Cluster cluster-paris    : OK
   Role                     : Primary
   PG activation state      : Activated
   Configuration            : OK
   Data replication         : OK
   Resource groups          : OK

  Cluster cluster-newyork   : OK
     Role                   : Secondary
     PG activation state    : Activated
     Configuration          : OK
     Data replication       : OK
     Resource groups        : OK

Pending operations
Protection group "tcpg" : Start
```

Attributes   See attributes(5) for descriptions of the following attributes.

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWscgctl
Interface Stability	Evolving

See Also   rbac(5), geohb(1M), geopg(1M), geops(1M)

Name geohb– configure and manage the heartbeat mechanism

Synopsis /usr/cluster/bin/geohb -?

/usr/cluster/bin/geohb -V

/usr/cluster/bin/geohb add-plugin *pluginname heartbeatname* -p *property* [-p...]

/usr/cluster/bin/geohb create -r *clusterlist* [-p *property* [-p...]] *heartbeatname*

/usr/cluster/bin/geohb delete *heartbeatname*

/usr/cluster/bin/geohb list *heartbeatname* ...

/usr/cluster/bin/geohb modify-plugin -p *property* [-p...] *pluginname heartbeatname*

/usr/cluster/bin/geohb remove-plugin *pluginname heartbeatname*

/usr/cluster/bin/geohb set-prop -p *property* [-p...] *heartbeatname* ...

Description The geohb command enables you to configure and manage the heartbeat mechanism.

A heartbeat is a monitor between two clusters: a requester cluster and a responder cluster. Creating a partnership establishes two heartbeats, one in each direction. For example, a partnership between a primary cluster, cluster-paris, and a secondary cluster, cluster-newyork, contains two heartbeats. One heartbeat has cluster-paris as the requester and cluster-newyork as the responder. The other heartbeat has cluster-newyork as the requester and cluster-newyork as the responder.

The Sun Cluster Geographic Edition software provides a default heartbeat mechanism that is based on the TCP/UDP plug-in as the primary plug-in and the ping plug-in as backup. The geohb command enables you to configure and maintain heartbeats. You can perform the following tasks:

- Configuring a heartbeat between clusters that participate in a partnership. Configuring a heartbeat includes the configuration of associated plug-ins.

- Creating or deleting a heartbeat property.

- Adding, modifying, and removing plug-ins that are associated with a heartbeat.

- Retrieving the current configuration of a heartbeat and its associated plug-ins.

Run the geohb command on a cluster that has been enabled for partnership.

To run the geohb command to configure and manage the heartbeat mechanism, you must be assigned the proper role-based access control (RBAC) rights profile.

If you have root access, you have permissions to perform any operation. If you do not have root access, the following RBAC rights apply:

- **Basic Solaris User.** You can read information about Sun Cluster Geographic Edition entities by running commands such as geopg list, geohb list, and geops list.

- **Geo Management.** You can perform all the read operations that someone with Basic Solaris User access can perform. You can also perform administrative and configuration tasks such as geohb create, geopg switchover, geoadm start, and geoadm stop.

For more information, see the rbac(5) man page and "Sun Cluster Geographic Edition Software and RBAC" in *Sun Cluster Geographic Edition System Administration Guide*.

The general form of this command is as follows:

geohb [*subcommand*] [*options*] [*operands*]

You can omit *subcommand* only if *options* specifies the option -?, -o, -V, or -v.

Each option of this command has a long form and a short form. Both forms of each option are given with the description of the option in the OPTIONS section of this man page.

Subcommands   The following subcommands are supported:

add-plugin
: Add a plug-in to an existing heartbeat. If you specify a custom plug-in, you must also specify the path to your custom plug-in command by using the Query_cmd property.

create
: Create a heartbeat. You can monitor heartbeat status by running the geoadm(1M) command. You must configure the remote cluster to make the heartbeat operational.

    Note – If you create a custom heartbeat, you must add at least one plug-in to prevent the partnership from remaining in degraded mode.

delete
: Delete a heartbeat.

list
: Display existing configuration information.

modify-plugin
: Modify heartbeat plug-in properties.

remove-plugin
: Remove a plug-in from a heartbeat.

set-prop
: Modify heartbeat properties.

Options   The following options are supported:

-?
--help
: Displays help information. When this option is used, no other processing is performed.

    You can specify this option without a subcommand or with a subcommand.

If you specify this option without a subcommand, the list of subcommands for this command is displayed.

If you specify this option with a subcommand, the usage options for the subcommand are displayed.

The question mark might be interpreted as a special character by some shells. Use quotes (-"?") or an escape character to avoid pattern matching.

-p *property*
--property *property*
Specifies the properties of a heartbeat or heartbeat plug-in.

A heartbeat property is assigned a value by using a *name=statement* pair. Multiple properties might be set at one time by using multiple statements.

The values for these properties are assigned at creation and tunable at runtime.

See the EXTENDED DESCRIPTION section for currently defined properties.

-r *clusterlist*
--remote-cluster *clusterlist*
Specifies the name of a remote cluster with which the local cluster should establish heartbeat monitoring.

-V
--version
Displays the version of the command.

Do not specify this option with subcommands, operands, or other options. The subcommands, operands, or other options are ignored. The -V option only displays the version of the command. No other operations are performed.

Operands The following operands are supported:

heartbeatname
Specifies an identifier for the heartbeat on the local cluster. If you are trying to create a new heartbeat, and the specified identifier already exists, the geohb create command fails.

pluginname
Specifies the name of the heartbeat plug-in.

Extended Description The following sections list the heartbeat and heartbeat plug-in properties.

Heartbeat Properties You can specify the following heartbeat property:

Query_interval
Specifies the frequency between heartbeat status requests in seconds. The plug-in enters emergency mode if three Query_interval periods pass without response. The plug-in times out and enters error mode if a further Query_interval period passes with no response.

Optional property.

Type: Integer.

Tuning recommendations: The value of this property is assigned at creation and tunable at runtime.

Default value: 120 seconds.

Heartbeat Plug-in Properties

Heartbeat plug-in properties determine how a heartbeat functions.

`Plugin_properties`
Specifies a property string that is specific to the plug-in.

Optional property.

Type: String.

Tuning recommendations: The value of this property is assigned at creation and tunable at runtime.

Default value: None, except for heartbeats that use the default heartbeat plug-ins, `tcp_udp_plugin` and `ping-plugin`.

For the `tcp_udp_plugin` plug-in, the format of this string is predefined as *remote_IP_address*`/UDP/2084/`*ipsec*`,`*remote_IP_address*`/TCP/2084/`*ipsec*. The *remote_IP_address* argument specifies the IP address of the partner cluster. The optional `/ipsec` string indicates that the plug-in uses IPsec.

For the `ping-plugin`, the format of this string is predefined as *remote_IP_address*, where *remote_IP_address* specifies the IP address of the partner cluster.

`Query_cmd`
Specifies the path to the command for a heartbeat status request.

Required property if the plug-in does not specify a predefined plug-in.

Type: String.

Tuning recommendations: The value of this property is assigned at creation and tunable at runtime.

Default value: None.

`Requester_agent`
Specifies the absolute path to requester agent.

Optional property.

Type: String.

Tuning recommendations: The value of this property for the default plug-in should not be tuned except for testing purposes.

Default value: None.

Responder_agent
Specifies the absolute path to the responder agent.

Optional property.

Type: String.

Tuning recommendations: The value of this property for the default plug-in should not be tuned except for testing purposes.

Default value: None.

Type
Specifies the type of plug-in. Set to either Primary or Backup.

Required property.

Type: Enum.

Tuning recommendations: The value of this property is assigned at creation and tunable at runtime.

Default value: None, except for heartbeats with default heartbeat name ping_plugin. In this case, the default value is Backup.

Exit Status The following exit values are returned:

0	The command completed successfully, indicating that the remote cluster is alive.
nonzero	An error has occurred, meaning that the remote cluster did not respond to the heartbeat check.

Examples EXAMPLE 1   Creating a Heartbeat

The following geohb command creates a heartbeat that is named paris-to-newyork, which communicates between the local cluster and the cluster cluster-newyork.

```
# geohb create -r cluster-newyork paris-to-newyork
```

EXAMPLE 2   Creating a Heartbeat Plug-in

The following geohb command creates a heartbeat plug-in that is named command1 for the heartbeat paris-to-newyork.

```
# geohb add-plugin command1 -p Query_cmd=/usr/bin/hb paris-to-newyork
```

EXAMPLE 3 Modifying a Heartbeat

The following geohb command modifies the properties for the default heartbeat between cluster-paris and cluster-newyork.

```
# geohb set-prop -p Query_interval=60 hb_cluster-paris~cluster-newyork
```

EXAMPLE 4 Modifying a Heartbeat Plug-in

The following geohb command modifies the properties of the default TCP/UDP plug-in, tcp_udp_plugin, to use only TCP.

```
# geohb modify-plugin -p Plugin_properties=paris-cluster/TCP/2084 \
tcp_udp_plugin hb_cluster-paris~cluster-newyork
```

EXAMPLE 5 Deleting a Plug-in From a Heartbeat

The following geohb command deletes the plug-in that is named command1, from the heartbeat that is named paris-to-newyork.

```
# geohb remove-plugin command1 paris-to-newyork
```

Attributes See attributes(5) for descriptions of the following attributes.

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWscgctl
Interface Stability	Evolving

See Also rbac(5), geops(1M)

Name   geopg– create or manage protection groups

Synopsis   `/usr/cluster/bin/geopg -?`

`/usr/cluster/bin/geopg -V`

`/usr/cluster/bin/geopg add-device-group -p` *property* `[-p...]` *devicegroupname*
protectiongroupname

`/usr/cluster/bin/geopg add-replication-component -p` *property* `[-p...]` *configurationname*
protectiongroupname

`/usr/cluster/bin/geopg add-resource-group` *resourcegroup*`[,`*resourcegroup*`...]`
protectiongroupname

`/usr/cluster/bin/geopg create -s` *partnershipname* `-o` *localrole* `[-d` *datareplicationtype*`]`
`[-p` *property* `[-p...]]` *protectiongroupname*

`/usr/cluster/bin/geopg delete` *protectiongroupname*

`/usr/cluster/bin/geopg get -s` *partnershipname* `[`*protectiongroupname*`]`

`/usr/cluster/bin/geopg list [`*protectiongroupname*`] [...]`

`/usr/cluster/bin/geopg modify-device-group` *devicegroupname* `-p` *property* `[-p...]`
protectiongroupname

`/usr/cluster/bin/geopg modify-replication-component` *configurationname*
`-p` *property* `[-p...]` *protectiongroupname*

`/usr/cluster/bin/geopg remove-device-group` *devicegroupname* *protectiongroupname*

`/usr/cluster/bin/geopg remove-replication-component` *configurationname* *protectiongroupname*

`/usr/cluster/bin/geopg remove-resource-group` *resourcegroup*`[,`*resourcegroup*`...]`
protectiongroupname

`/usr/cluster/bin/geopg set-prop -p` *property* `[-p...]` *protectiongroupname*

`/usr/cluster/bin/geopg start -e {local | global} [-n]` *protectiongroupname*

`/usr/cluster/bin/geopg stop -e {local | global} [-D]` *protectiongroupname*

`/usr/cluster/bin/geopg switchover -m` *newprimaryclustername* `[-f]` *protectiongroupname*

`/usr/cluster/bin/geopg takeover [-f]` *protectiongroupname*

`/usr/cluster/bin/geopg update` *protectiongroupname*

`/usr/cluster/bin/geopg validate` *protectiongroupname*

Description   The geopg command enables you to configure and maintain protection groups. You can
perform the following tasks:

- Configure a protection group between clusters that participate in a partnership. This task
  includes the configuration of associated data replication parameters.

- Add or remove resource groups and data-replication disk device groups.

- Add, modify, and remove data replication parameters that are associated with a protection group property.

- Retrieve the current configuration of a specific protection group or all defined protection groups.

- Activate a protection group.

- Deactivate a protection group.

- Switch over the role of a protection group.

- Take over the primary role of a protection group.

Before you create a protection group, ensure that the clusters that will host the protection group are already placed in a partnership.

To run the geopg command to create, modify, or delete a protection group, or a data-replication disk device group, you must be assigned the proper role-based access control (RBAC) rights profile.

If you have root access, you have permission to perform any operation. If you do not have root access, the following RBAC rights apply:

- **Basic Solaris User.** You can read information about Sun Cluster Geographic Edition entities by running commands such as geopg list, geohb list, and geops list.

- **Geo Management.** You can perform all the read operations that someone with Basic Solaris User access can perform. You can use commands geohb create, geopg switchover, geoadm start, and geoadm stop to perform administrative and configuration operations.

For more information, see the rbac(5) man page and "Sun Cluster Geographic Edition Software and RBAC" in *Sun Cluster Geographic Edition System Administration Guide*.

The general form of this command is as follows:

geopg [*subcommand*] [*options*] [*operands*]

You can omit *subcommand* only if *options* specifies the option -?, -o, -V, or -v.

Each option of this command has a long form and a short form. Both forms of each option are given with the description of the option in the OPTIONS section of this man page.

How Protection Groups Start

The geopg start command activates the protection group on both the primary and standby clusters. This activation starts the Sun Cluster Geographic Edition management of the resource groups in the protection group. Depending on the form of the command that you use and on the cluster where you issue the command, activating the protection group might not start the resource groups on that cluster. The resource groups start, or are brought online, only on the primary cluster.

The -e option defines the scope of the geopg start command. If you specify -e local, the geopg start command runs on the cluster where you issue the command. If you specify -e global, the geopg start command runs on both clusters in the partnership.

The different forms of the command have the following effects:

- If you run the geopg start -e local command on the primary cluster, and if you run the geopg start -e global command on either cluster, the Sun Cluster Geographic Edition software activates the protection group on both clusters in the partnership. The software brings online resource groups on the primary cluster only. The resource groups are put in a managed state.

- If you run the geopg start -e local command on the standby cluster, the Sun Cluster Geographic Edition software activates the protection group on the standby cluster only. Resource groups are not started on the standby cluster. The resource groups are put in the Unmanaged state.

Subcommands The following subcommands are supported:

add-device-group
> Enables a data-replication disk device group to be part of a protection group. The system performs this action on the local cluster, then propagates the action to the partner cluster.

add-replication-component
> Enables a data-replication component to be part of a protection group. The system performs this action on the local cluster, then propagates the action to the partner cluster.

add-resource-group
> Enables an application resource group to be part of a protection group. The system performs this action on the local cluster, then propagates the action to the partner cluster.
>
> If a protection group is active when you add a resource group, the resource group must be in either the Unmanaged or Online state. To start an unmanaged resource group, run the geopg start command.
>
> If a protection group is inactive, the resource group must be in the Unmanaged state when you add the resource group. If the resource group is offline, bring the resource group to the Unmanaged state before adding the resource group to an inactive protection group.

create
> Creates a protection group within an existing partnership. The system performs this action on only the local cluster.

delete
> Deletes a protection group. The system performs this action on only the local cluster.

get
> Creates the local configuration for a protection group that already exists on the remote partner cluster by retrieving the configuration from the partner cluster. If you do not

specify a protection group name, all the protection groups that have been configured for the partnership on the remote cluster will be created on the local cluster. The system performs this action on only the local cluster.

list

Displays the following information about the protection group:

- Defined protection groups
- Resource groups that are wrapped into protection groups
- Operation status information

If you do not specify the name of a protection group, the list subcommand displays information for all the protection groups configured on the local cluster. The system performs this action on only the local cluster.

modify-device-group

Modifies the properties of a data-replication disk device group. The system performs this action on the local cluster, then propagates the action to the partner cluster.

modify-replication-component

Modifies the properties of a data-replication component. The system performs this action on the local cluster, then propagates the action to the partner cluster.

remove-device-group

Removes data-replication disk device groups from a protection group. The system performs this action on the local cluster, then propagates the action to the partner cluster.

Removing a data-replication disk device group does not stop data replication or change the data-replication status for that data-replication disk device group.

remove-replication-component

Removes data-replication components from a protection group. The system performs this action on the local cluster, then propagates the action to the partner cluster.

Removing a data-replication component does not stop data replication or change the data-replication status for that data-replication component.

remove-resource-group

Removes resource groups from a protection group. The system performs this action on the local cluster, then propagates the action to the partner cluster.

Removing an application resource group does not change the application resource group to the Unmanaged state.

set-prop

Modifies the properties of a protection group. The system performs this action on the local cluster, then propagates the action to the partner cluster.

start

Starts a protection group. When you start a protection group for the first time, the role of the protection group on a cluster is the role that was assigned to the protection group when you created the protection group. After that, the protection group starts with the latest role it was given.

The start subcommand uses Sun Cluster commands to bring resources and resource groups under the management of the protection group.

You can start a protection group on the following levels, depending on whether you specify local or global to the -e option:

- With the -e global option, starts the protection group on all clusters where the protection group has been configured
- With the -e local option, starts the protection group on either the primary cluster or standby cluster, whichever cluster the command is issued from

For more details about activating a protection group and the effects on the resource groups in that protection group, see "How Protection Groups Start" in the DESCRIPTION section of this man page.

Starting a protection group enables the following events to occur:

- The protection group configuration is validated.
- Clusters can determine whether an operation has been completed.
- Data replication can be started, depending on the data replication that you use.
  - When using Sun StorageTek Availability Suite software, you can start data replication from the primary cluster only.
  - When using Hitachi TrueCopy or EMC Symmetrix Remote Data Facility (SRDF) software, you can start data replication from either the primary or standby cluster.
  - When using the Oracle Data Guard software, you can start data replication from the primary cluster by using the local or the global scope.

  For all supported data replication software, you must not specify the -n option when using this form of the command.
- Protected applications can be started.
- If the partner can be reached, the partner cluster can be notified of the protection group activation.

Note – Protection groups that are referred to as "online" are active protection groups.

stop

Stops a protection group. You can stop a protection group on the following levels, depending on whether you specify local or global to the -e option:

- With the `-e global` option, stops the protection group on all clusters where the protection group has been configured

- With the `-e local` option, stops the protection group on either the primary or standby cluster, whichever cluster the command is issued from

Stopping a protection group enables the following events to occur:

- The protection group becomes inactive.

- Data replication and application resource groups stop. You can prevent application resource groups from stopping by taking the resource groups out of the protection group *before* you stop the protection group.

    - When using Sun StorageTek Availability Suite software, you can stop data replication from the primary cluster only.

    - When using Hitachi TrueCopy or EMC Symmetrix Remote Data Facility (SRDF) software, you can stop data replication from either the primary or standby cluster.

    - When using Oracle Data Guard, you can stop data replication from either the primary or standby cluster, by using either the local or the global scope.

- If the partner cluster is reachable, the partner cluster is notified that the protection group has been stopped.

switchover

Switches the assigned role of a cluster in the protection group. You must start the protection group before you can perform a switchover. The system performs this action on the local cluster, then propagates the action to the partner cluster.

takeover

Forces a cluster to become the `primary` cluster without considering the partner cluster state. The system performs this action on the local cluster, then propagates the action to the partner cluster.

If you issue a takeover from the standby cluster and the cluster is able to communicate with the partner cluster, the Sun Cluster Geographic Edition software switches the role of the partner cluster so that the partner cluster becomes the new standby. This operation is not the same as a switchover. The protection group is deactivated on the new standby.

After the geopg takeover command successfully completes, reactivating the protection group on the standby cluster might require that you recover and synchronize data.

Note – When possible, run the `geopg switchover` command instead of the `geopg takeover` command to coordinate between partner clusters to avoid loss of replicated data.

Run the `geopg takeover` command only in situations when the primary cluster is not available or during unplanned downtime. The situation must justify a potential loss of data and the time required to repair and to reactivate the protection group on the standby cluster.

update
    Resynchronizes the configuration information of the local protection group with the
    partner's configuration information. The geopg update command overwrites the
    configuration information of the protection group on the local cluster with the
    configuration information from the partner cluster. This command does not overwrite
    replicated data. The system performs this action on only the local cluster.

validate
    Validates a protection group on the local cluster by performing a sanity check of the
    dynamic values. The system performs this action on only the local cluster.

Options   The following options are supported:

-?
--help
    Displays help information. When this option is used, no other processing is performed.

    You can specify this option with or without a subcommand.

    If you specify this option without a subcommand, the list of subcommands for this
    command is displayed.

    If you specify this option with a subcommand, the usage options for the subcommand are
    displayed.

    The question mark might be interpreted as a special character by some shells. Use quotes
    (-"?") or an escape character to avoid pattern matching.

-D
--only-datarep
    Specifies that only the data replication should be deactivated, leaving the protection group
    active. If you do not use this option, the entire protection group is deactivated. To stop a
    protection group that has already had its data replication subsystem stopped, you must run
    the geopg stop command again and omit this option.

-d *datareplicationtype*
--datarep-type *datareplicationtype*
    Specifies the data replication mechanism for data replication between the clusters of the
    protection group.

    The *datareplicationtype* must be one of the following strings:

    avs   Specifies that the data replication mechanism is Sun StorageTek
                       Availability Suite Remote Mirror, with patches.

    odg   Specifies that the data replication mechanism is Oracle Data Guard.

    srdf   Specifies that the data replication mechanism is the dynamic EMC
                       Symmetrix Remote Data Facility (SRDF).

truecopy　　　　　　Specifies that the data replication mechanism is Hitachi TrueCopy.

`-e {local|global}`
`--scope {local|global}`
　　Specifies whether the command operates only on the local cluster, `local`, or on both
　　clusters, `global`, where the protection group has been configured.

`-f`
`--force`
　　Forces the command to perform the operation without asking you for confirmation.

`-m` *newprimarycluster*
`--primary` *newprimarycluster*
　　Specifies the name of the cluster that is to be the new primary cluster for the protection
　　group.

`-n`
`--nodatarep`
　　This option is only valid when starting a protection group that is not active. If the
　　protection group is not active, it is started without data replication. If data replication for
　　this protection group is already running independently, it is stopped before the protection
　　group is started.

　　If the protection group is already active with data replication enabled, data replication is
　　not stopped. An error message is displayed that states that the `geopg stop -D` command
　　should be used to stop data replication for an active protection group.

　　If this option is omitted, data replication starts at the same time as the protection group.

`-o` *localrole*
`--role` *localrole*
　　Specifies the role of the local cluster as either `primary` or `secondary` when used with the
　　`create` subcommand. You can change the role of a cluster by running the `geopg`
　　`switchover` command.

`-p` *property*
`--property` *property*
　　Sets the properties of a protection group.

　　A protection group property is assigned a value by using a *name*=*statement* pair statement.
　　You can set multiple properties at one time by using multiple statements.

　　See the EXTENDED DESCRIPTION section for defined properties.

`-s` *partnershipname*
`--partnership` *partnershipname*
　　Specifies the name of the existing partnership where the protection group is configured.

`-V`
`--version`

Displays the version of the command.

Do not specify this option with subcommands, operands, or other options, as they are ignored. The -V option only displays the version of the command. No other operations are performed.

Operands The following operands are supported:

configurationname
Specifies the name of any device group or replicated component that you want to add.

devicegroupname
Specifies the name of the disk device group to be created or added to the protection group.

protectiongroupname
Specifies the name of the protection group. The create subcommand fails if the protection group that you specify with this option already exists. The modify subcommand fails if the specified protection group is not valid.

resourcegroupname
Specifies a comma-separated list of resource groups to add to or delete from the protection group. The specified resource groups must already be defined.

If a protection group is active when you add a resource group, the resource group must be in either the Unmanaged or Online state. To start an unmanaged resource group, run the geopg start command.

If the protection group is inactive when you add a resource group, the resource group must be in the Unmanaged state before you add the resource group.

Extended Description This section contains descriptions of properties that you can specify.

Note – Property values, such as true and false, are *not* case sensitive.

General Protection Group Properties
Description (string)
Describes the protection group. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Category:
Optional

Default:
None

Tunable:
Assigned at creation and tunable at runtime

External_Dependency_Allowed (boolean)

Specifies whether to allow any dependencies between resource groups and resources that belong to this protection group and resource groups and resources that do not belong to this protection group. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Category:
Optional

Default:
False

Tunable:
Any time

RoleChange_ActionArgs (string)

Specifies the arguments that follow the system-defined arguments that are paired with the role change callback script during a protection group switchover or takeover. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Category:
Optional

Default:
None

Tunable:
Assigned at creation and tunable at runtime

RoleChange_ActionCmd (string)

Specifies the absolute path to the executable file to run when the primary cluster of the protection group changes. This file should exist on all nodes of both partner clusters that host the protection group. This script is run before the application resource group is brought online on the new primary cluster. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Category:
Optional

Default:
None

Tunable:
Assigned at creation and tunable at runtime

Timeout (integer, but you must specify a value equal to or greater than 20)

Specifies, in seconds, the longest time that the Sun Cluster Geographic Edition software waits for a response after running a geopg command. Examples of responses include start, stop, switchover, and takeover. If the command does not return within the timeout period, the Sun Cluster Geographic Edition software reports the operation as timed out, even if the underlying command that was run eventually completes successfully.

The timeout period applies to operations on a per-cluster basis. An operation with a local scope times out if the operation is not completed after the specified timeout period.

An operation with a global scope consists of an action on the local cluster and an action on the remote cluster. The local and remote actions are timed separately. So, an operation with a global scope times out if the local operation is not completed after the specified timeout period or if the remote operation is not completed after the specified timeout period.

For example, the following command is started with a local scope:

```
# geopg start -e local protectiongroupname
```

If you set the timeout property 3000 seconds, the geopg start command times out if the operation does not complete after 3000 seconds.

You can start the same command with a global scope as follows:

```
# geopg start -e global protectiongroupname
```

If the timeout property is set to 3000 seconds, the geopg start command times out if the operation is not completed on the local cluster after 3000 seconds or if the operation is not completed on the remote cluster after 3000 seconds. If the local action takes 1500 seconds and the remote action takes 1500 seconds, the operation is not timed out.

The protection group timeout value is an estimated value that is applied to some sub-operations. The timeout value does not apply to the entire operation, so not every operation on a protection group is timed against the timeout period. For example, the time taken to initialize the data structure and to check for the precondition of the operation are not timed in the timeout period.

You can specify a maximum of 1,000,000 (one million) seconds for the timeout property.

Category:
   Optional

Default:
   3600

Tunable:
   Assigned at creation and tunable at runtime

Sun StorageTek Availability Suite Data Replication Type Properties

Device group property: Enable_volume_set (boolean)
   Defines whether the volume sets that are defined in the /var/cluster/geo/avs/*AVS-devicegroup*-volset.ini file are to be enabled by Sun Cluster Geographic Edition. You can set this property to True or to False. The system sets this property on the local cluster, then propagates the value to the partner cluster.

   If the enable_volume_set property is set to True, volume sets defined in the /var/cluster/geo/avs/*AVS-devicegroup*-volset.ini file are enabled when the device group is added to the protection group or when the protection group that contains the

device group is replicated from the partner cluster. Any volume sets of that device group that are not defined in the file are disabled. The /var/cluster/geo/avs/*AVS-devicegroup*-volset.ini file must exist on every node of the primary and standby cluster.

If the Enable_volume_set property is set to False, you must manually enable volume sets by using the Sun StorageTek Availability Suite commands.

The parameters in the volume set file that are handled by the Sun Cluster Geographic Edition software are described in the following table.

Note – The Sun Cluster Geographic Edition software does not handle other parameters of the volume set file, such as disk queue, size of memory queue, and number of asynchronous threads. You must adjust these parameters manually by using Sun StorageTek Availability Suite commands.

Parameter	Meaning	Description
phost	Primary host	The logical host of the server on which the primary volume resides.
pdev	Primary device	Primary volume partition. Specify full path names only.
pbitmap	Primary bitmap	Volume partition in which the bitmap of the primary partition is stored. Specify full path names only.
shost	Secondary host	The logical host of the server on which the secondary volume resides.
sdev	Secondary device	Secondary volume partition. Specify full path names only.
sbitmap	Secondary bitmap	Volume partition in which the bitmap of the secondary partition is stored. Specify full path names only.
ip	Network transfer protocol	IP address.
sync | async	Operating mode	In sync mode the I/O operation is confirmed as complete only when the volume on the standby cluster has been updated.
		In async mode the primary host I/O operation is confirmed as complete before updating the volumes on the standby clusters.
g iogroupname	I/O group name	An I/O group name. The set must be configured in the same I/O group on both the primary and standby clusters. This parameter is optional and need only be configured if you have an I/O group.

C devicegroupname	Device group name	The device group name or resource tag of the local data and bitmap volumes in cases where this information is not implied by the name of the volume. For example, `/dev/md/avsdg/rdsk/vol` or `/dev/vx/rdsk/avsdg/vol` indicates a device group named avsdg. It can be Solaris Volume Manager volumes, Veritas Volume Manager volumes, or raw device volumes.

Category:
    Optional

Default:
    `False`

Tunable:
    Until you add the device group to a protection group

Device group property: `Local_logical_host` (string)
    Defines the local logical host name that is used for the replication of the disk device group. Do not use an underscore character (_) in the logical host name. The name is also set on the partner cluster as the `Remote_logical_host` value.

Category:
    Required

Default:
    None

Tunable:
    Until you add the device group to a protection group

Data replication property: `Nodelist` (stringarray)
    Lists the host names of the machines that can be primary for the replication mechanism. You can specify more than one host name by separating each host name with a comma. The system sets this property value on only the local cluster.

Category:
    Optional

Default:
    All nodes in the cluster

Tunable:
    Only when the protection group is inactive

Device group property: `Remote_logical_host` (string)
    Specifies the remote logical host name that is used for the replication of the disk device group. The name is also set on the partner cluster as the `Local_logical_host` value.

Category:
    Required

Default:
   None

Tunable:
   Until you add the device group to a protection group

EMC Symmetrix
Remote Data Facility
Data Replication Type
Properties

Data replication property: `Cluster_dgs` (`stringarray`)
   Lists the disk device groups where the data is written. You can specify more than one disk group by separating each disk group with a comma. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Category:
   Optional

Default:
   Empty

Tunable:
   Only when the protection group is inactive on both partner clusters

Data replication property: `DG_or_CG` (`string`)
   Specifies the device group identifier as "SRDF Device Group." You must set this property to `DG`. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Category:
   Optional

Default:
   `DG`

Tunable:
   Never

Data replication property: `Nodelist` (`stringarray`)
   Lists the host names of the machines that can be primary for the replication mechanism. This list is comma delimited. The system sets this property value on only the local cluster.

Category:
   Optional

Default:
   Empty

Tunable:
   Any time

Data replication property: `R1_SID` (`integer`)
   Specifies the Symmetrix Remote Data Facility (SRDF) identification of the primary devices. The value also set on the partner cluster as the `R2_SID` value.

Note – If you do not specify a value for this property when you add a device group, the Sun Cluster Geographic Edition software searches for the value and sets the property automatically.

Category:
    Required

Default:
    None, until you add a Symmetrix Remote Data Facility (SRDF) device group

Tunable:
    Any time

Data replication property: R2_SID (integer)
    Specifies the Symmetrix Remote Data Facility (SRDF) identification of the secondary devices. The value is also set on the partner cluster as the R2_SID value.

Note – If you do not specify a value for this property when you add a device group, the Sun Cluster Geographic Edition software searches for the value and sets the property automatically.

Category:
    Required

Default:
    None, until you add a Symmetrix Remote Data Facility (SRDF) device group

Tunable:
    Any time

Hitachi TrueCopy Data Replication Type Properties

Data replication property: Cluster_dgs (stringarray)
    Lists the disk device groups where the data is written. The list is comma delimited. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Category:
    Optional

Default:
    Empty

Tunable:
    Only when the protection group is inactive on both partner clusters

Device group property: Fence_level (enum)
    Defines the fence level that is used by the disk device group. The fence level determines the level of consistency among the primary and secondary volumes for that disk device group. Possible values are data, status, never, and async. The system sets this property on the local cluster, then propagates the value to the partner cluster.

    You can set this property to any valid Fence_level when the current pair state is SMPL.

Caution – If contact with the remote storage box is lost for any reason, to ensure that an application that is running on the primary cluster is not blocked, specify a Fence_level of never or async. If you specify a Fence_level of data or status, the primary storage box refuses updates if the updates cannot be copied to the remote storage box.

Category:
Required

Default:
None

Tunable:
Only when the protection group is inactive

Data replication property: Nodelist (stringarray)
Lists the host names of the machines that can be primary for the replication mechanism. This list is comma delimited. The system sets this property value on only the local cluster.

Category:
Optional

Default:
Empty

Tunable:
Any time

Oracle Data Guard Data Replication Type Properties

Data replication property: local_database_name (string)
Name of the local Oracle database in the Oracle Data Guard Broker configuration that is being replicated to the remote cluster. This name is the Oracle db_unique_name initialization parameter for the Oracle RAC database on the local cluster. The name is also set on the partner cluster as the remote_database_name value.

Category:
Required

Default:
None

Tunable:
At creation

Data replication property: local_db_service_name (string)
Oracle net service name that is used to connect to the local Oracle database. The name is also set on the partner cluster as the remote_db_service_name value.

Category:
Required

Default:
None

Tunable:
   Any time

Data replication property: `local_rac_proxy_svr_rg_name` (`string`)
   Name of the local Oracle RAC server proxy resource group that manages the local database
   in the Oracle Data Guard Broker configuration. The name is also set on the partner cluster
   as the `remote_rac_proxy_svr_rg_name` value.

Category:
   Required

Default:
   None

Tunable:
   At creation

Data replication property: `remote_database_name` (`string`)
   Name of the remote database in the Oracle Data Guard Broker configuration that is being
   replicated from the local cluster. This name is the Oracle `db_unique_name` initialization
   parameter for the Oracle RAC database on the remote cluster. The name is also set on the
   local cluster as the `local_database_name` value.

Category:
   Required

Default:
   None

Tunable:
   At creation

Data replication property: `remote_db_service_name` (`string`)
   Oracle net service name that is used to connect to the remote Oracle database. The name is
   also set on the local cluster as the `local-db_service_name` value.

Category:
   Required

Default:
   None

Tunable:
   Any time

Data replication property: `remote_rac_proxy_svr_rg_name` (`string`)
   Name of the remote Oracle RAC server proxy resource group on the partner cluster that
   manages the remote database in the Oracle Data Guard Broker configuration. The name is
   also set on the local cluster as the `local_rac_proxy_svr_rg_name` value.

Category:
   Required

Default:
    None

Tunable:
    At creation

Data replication property: `replication_mode` (`string`)
    The Oracle Data Guard replication mode between the primary database and the standby
    database. The system sets this property on the local cluster, then propagates the value to the
    partner cluster.

    Valid values to which you set this property include `maxAvailability`, `maxPerformance`,
    and `maxProtection`.

Category:
    Required

Default:
    None

Tunable:
    Any time

Data replication property: `standby_type` (`string`)
    Type of Oracle standby database that is used in the Oracle Data Guard Broker
    configuration. The system sets this property on the local cluster, then propagates the value
    to the partner cluster.

    Valid values to which you set this property include `logical` and `physical`.

Category:
    Required

Default:
    None

Tunable:
    At creation

Data replication property: `sysdba_password` (`string`)
    Password for the Oracle `SYSDBA` privileged database user. The system sets this property on
    the local cluster, then propagates the value to the partner cluster.

    Do not specify a password on the command line. If you specify only
    `-p sysdba_password=`, the geopg command prompts you to type an actual password,
    which is not displayed as you type it.

Category:
    Required

Default:
   None

Tunable:
   Any time

Data replication property: sysdba_username (string)
   Name of an Oracle SYSDBA privileged database user who can perform the Oracle Data
   Guard Broker switchover and takeover operations on both the primary and standby
   clusters. The Sun Cluster Geographic Edition software uses this property to monitor and
   manage the Oracle Data Guard Broker configurations. The system sets this property on the
   local cluster, then propagates the value to the partner cluster.

Category:
   Required

Default:
   None

Tunable:
   Any time

Exit Status The following exit values are returned:

0   The command completed successfully.

nonzero   An error occurred.

Examples EXAMPLE 1   Adding an Oracle Data Guard Broker Configuration to a Protection Group

The following geopg command adds the Oracle Data Guard Broker configuration
mysales.com to the protection group sales-pg.

To ensure security, do *not* supply a password when you specify the sysdba_password
property. If you do not provide a password, the geopg command prompts for one.

```
phys-paris-1# geopg add-replication-component \
    -p local_database_name=sales \
    -p remote_database_name=salesdr \
    -p local_db_service_name=sales-svc \
    -p remote_db_service_name=salesdr-svc \
    -p standby_type=physical \
    -p replication_mode=MaxPerformance \
    -p sysdba_username=sys \
    -p sysdba_password= \
    -p local_rac_proxy_svr_rg_name=sales-rac-proxy-svr-rg \
    -p remote_rac_proxy_svr_rg_name=salesdr-rac-proxy-svr-rg \
    mysales.com sales-pg
```

Oracle Data Guard configuration "mysales.com" successfully added to the

EXAMPLE 1 Adding an Oracle Data Guard Broker Configuration to a Protection Group   *(Continued)*

```
protection group "sales-pg"
```

EXAMPLE 2 Creating a Protection Group That Uses Data Replication

The following geopg command creates a Sun StorageTek Availability Suite protection group
avspg on the primary cluster cluster-paris.

```
# geopg create -s paris-newyork-ps -d avs -o primary \
    -p Nodelist=phys-paris-1,phys-paris-2 avspg
```

EXAMPLE 3 Creating a Protection Group That Does Not Use Data Replication

The following geopg command creates a protection group example-pg that is not configured
to use data replication.

```
# geopg create -s paris-newyork-ps -o primary example-pg
```

EXAMPLE 4 Deleting a Protection Group While Keeping Application Resource Groups Online

The following geopg command keeps two application resource groups, apprg1 and apprg2,
online while deleting their protection group, avspg. Remove the application resource groups
from the protection group, then delete the protection group.

```
# geopg remove-resource-group apprg1,apprg2 avspg
# geopg stop -e global avspg
# geopg delete avspg
```

EXAMPLE 5 Modifying a Protection Group

The following geopg command modifies the timeout property of the protection group avspg.

```
# geopg set-prop -p Timeout=3000 avspg
```

EXAMPLE 6 Adding a Data Replication Device Group to a Sun StorageTek Availability Suite Protection
Group

The following geopg command creates a Sun StorageTek Availability Suite data replication
device group in the avspg protection group.

```
# geopg add-device-group -p Local_logical_host=lh-paris-1 \
    -p Remote_logical_host=lh-newyork-1 -p Enable_volume_set=True avsdg avspg
```

EXAMPLE 6 Adding a Data Replication Device Group to a Sun StorageTek Availability Suite Protection Group   *(Continued)*

If the command returns successfully, volume sets that are defined in the /var/cluster/geo/avs/avsdg-volset.ini file are enabled. The file might look like this for a Solaris Volume Manager device group.

```
lh-paris-1 /dev/md/avsdg/rdsk/d100 /dev/md/avsdg/rdsk/d101
lh-newyork-1 /dev/md/avsdg/rdsk/d100 /dev/md/avsdg/rdsk/d101
ip async C avsdg
```

The description of the parameters is as follows:

- `lhparis-1` — Primary host
- `/dev/md/avsdg/rdsk/d100` — Primary data
- `/dev/md/avsdg/rdsk/d101` — Primary bitmap
- `lh-newyork-1` — Secondary host
- `/dev/md/avsdg/rdsk/d100` — Secondary data
- `/dev/md/avsdg/rdsk/d101` — Secondary bitmap
- `ip` — Protocol
- `async` — Mode
- `C` — C tag
- `avsdg` — Device group

Attributes   See `attributes(5)` for descriptions of the following attributes.

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWscgctl
Interface Stability	Evolving

See Also   geoadm(1M), geohb(1M), geops(1M), rbac(5)

Name   geops– create, configure, and manage partnerships between clusters

Synopsis   `/usr/cluster/bin/geops [`*subcommand*`] -?`

`/usr/cluster/bin/geops -V`

`/usr/cluster/bin/geops add-trust -c `*remotepartnerclustername*

`/usr/cluster/bin/geops create -c `*remotepartnerclustername*` [-h `*heartbeatname*`]`
`[-p `*property*` [-p...]] `*partnershipname*

`/usr/cluster/bin/geops join-partnership `*remoteclustername*` [-h `*heartbeatname*`]`
partnershipname

`/usr/cluster/bin/geops leave-partnership `*partnershipname*

`/usr/cluster/bin/geops list `*partnershipname*

`/usr/cluster/bin/geops remove-trust -c `*remotepartnerclustername*

`/usr/cluster/bin/geops set-prop -p `*property*` [-p...] `*partnershipname*

`/usr/cluster/bin/geops update `*partnershipname*

`/usr/cluster/bin/geops verify-trust [-c `*remotepartnerclustername*`]`

Description   The geops command enables you to create, configure, and manage the partnerships that are
defined between clusters. A partnership is a pair of clusters that define a cluster infrastructure
on which an application might be protected against disaster.

Two clusters must be configured to trust each other before you create a partnership between
two clusters.

A partnership requires a running heartbeat between clusters. Partner clusters monitor each
other with heartbeats.

The Sun Cluster Geographic Edition software notifies all remote partners of changes in the
partnership configuration.

Run the geops command on a cluster that has been enabled for partnership.

To run the geops command to create, configure, and manage the partnerships, you must be
assigned the proper role-based access control (RBAC) rights profile.

If you have root access, you have permissions to perform any operation. If you do not have
root access, the following RBAC rights apply:

- **Basic Solaris User.** You can read information about Sun Cluster Geographic Edition
  entities by running commands such as geopg list, geohb list, and geops list.

- **Geo Management.** You can perform all the read operations that someone with Basic
  Solaris User access can perform. You can also perform administrative and configuration
  tasks such as geohb create, geopg switchover, geoadm start, and geoadm stop.

Note – You must have root access to run the following subcommands:

- geops add-trust
- geops remove-trust
- geops verify-trust

For more information, see the rbac(5) man page and "Sun Cluster Geographic Edition Software and RBAC" in *Sun Cluster Geographic Edition System Administration Guide*.

The general form of this command is as follows:

geops [*subcommand*] [*options*] [*operands*]

You can omit *subcommand* only if *options* specifies the option -?, -o, -V, or -v.

Each option of this command has a long form and a short form. Both forms of each option are given with the description of the option in the OPTIONS section of this man page.

Subcommands   The following subcommands are supported:

add-trust
  Retrieve public keys of a remote cluster and add the keys to the truststore file on every node of the local cluster. The truststore file is at /etc/cacao/instances/default/security/jsse/truststore. The system performs this action on only the local cluster.

  The new key is not added to the truststore file if an entry with the same alias already exists in the truststore file on a node. If the existing entry contains a key that is different from the new key, you must delete the entry from the truststore file before you add the new key.

create
  Create a partnership between the local cluster and a remote cluster. The two clusters must be configured to trust each other. The system performs this action on only the local cluster.

join-partnership
  Enable the local cluster to join an existing partnership. The system performs this action on the local cluster, then propagates the action to the partner cluster.

  Running the geops join-partnership command on a cluster that is already a member of a partnership causes the partnership configuration from the remote cluster to overwrite the partnership configuration of the local cluster.

leave-partnership
  Remove the local cluster from a partnership. The system performs this action on the local cluster and notifies the partner cluster that the local cluster has left the partnership. This subcommand deletes the partnership when the last participating cluster in the partnership leaves.

list
  Display partnership configuration information. The system performs this action on only the local cluster.

remove-trust

Remove all keys for the remote cluster from the truststore file on the local node. You
must remove all keys for the remote cluster from the local host before you can add a new
key. The system performs this action on only the local cluster.

To remove a key from a cluster, dissolve the partnership between the two clusters (by
running geops leave on each cluster) and run the remove-trust subcommand from each
node of the cluster.

set-prop

Modify the properties of a partnership. This subcommand updates the local cluster
configuration and notifies remote partner clusters of the configuration change.

update

Synchronize information with the partner cluster. The geops update command overwrites
the configuration on the local cluster with the configuration from the remote partner
cluster.

This subcommand cannot update a partnership while the cluster is disconnected from the
partner cluster.

If the remote partner cluster is down, modifications to the local cluster might not be
propagated to the remote partner cluster.

verify-trust

Retrieve node information on the remote cluster and establish a secure Java Management
Extensions (JMX) connection from the local host to every node of the remote cluster. The
verify-trust subcommand verifies that the certificates have been exchanged properly
between the remote and the local clusters.

If you do not specify a remote cluster, the verify-trust subcommand verifies the
connections between the local host and other nodes of the local cluster.

Options The following options are supported:

-?
--help

Displays help information. When this option is used, no other processing is performed.

You can specify this option without a subcommand or with a subcommand.

If you specify this option without a subcommand, the list of subcommands for this
command is displayed.

If you specify this option with a subcommand, the usage options for the subcommand are
displayed.

The question mark might be interpreted as a special character by some shells. Use quotes
(-"?") or an escape character to avoid pattern matching.

`-c` *remoteclustername*
`--cluster` *remoteclustername*

Specifies the logical hostname of the cluster with which to form a partnership. The logical hostname is used by the Sun Cluster 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`, `remote-trust`, or `verify-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 must have the following pattern:

remotepartnercluster`.certificate[0-9]*`

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

Note – The `remove-trust` subcommand removes only keys you have added with the `add-trust` subcommand, and keys with an alias that matches the following pattern:

remotepartnercluster`.certificate[0-9]*`.

`-h` *heartbeatname*
`--heartbeat-name` *heartbeatname*

Specifies an identifier for the heartbeat on a partner cluster that the local cluster can use to monitor partner availability. You must create the heartbeat by running the `geohb` command before you specify the heartbeat in the `geops` command.

If this option is omitted, the Sun Cluster Geographic Edition software uses the default heartbeat mechanism between member clusters.

`-p` *property*
`--property` *property*

Specifies the value of partnership properties. You can specify multiple properties at one time by using multiple statements.

See the EXTENDED DESCRIPTION section for a description of the properties.

`-V`
`--version`

Displays the version of the command.

Do not specify this option with subcommands, operands, or other options. The subcommands, operands, or other options are ignored. The `-V` option only displays the version of the command. No other operations are performed.

Operands   The following operand is supported:

partnershipname   Specifies the name of the partnership

Extended Description   The following section lists the partnership properties. These properties are set at creation and tunable at runtime.

Partnership Properties   Description
Describes the partnership. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Optional property.

Type: String.

Default value: Empty string.

Notification_ActionCmd
Specifies the path to the script or command that is triggered when a heartbeat-loss notification is issued. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Optional property.

Type: String.

Default value: Empty string.

The Sun Cluster Geographic Edition software enables you to specify a command to run when a heartbeat-loss notification is issued. You can specify the path to the command by using the Notification_ActionCmd property. The command runs with root permissions, so the file must have root ownership and execution permissions. If both Notification_ActionCmd and Notification_EmailAddrs properties have been configured, an email is sent after the command that is specified in the Notification_ActionCmd property is run.

Caution – A heartbeat loss indicates only a lost connection to a remote cluster and not the cause for the lost connection. A remote cluster that has lost a heartbeat connection might still be functioning even though the heartbeat monitoring has lost its connection.

Therefore, you must exercise caution in the script you specify for the Notification_actioncmd parameter. For example, if you specify a forced takeover or a switchover in the Notification_actioncmd script, a takeover or a switchover might be run even though one might not be necessary.

Notification_EmailAddrs
Specifies the email address to send messages to when a heartbeat-loss notification is issued. You can specify multiple email addresses by separating each email address with a comma. The system sets this property on the local cluster, then propagates the value to the partner cluster.

Optional property.

Type: String array.

Default value: Empty string.

The Notification_EmailAddrs and the Notification_ActionCmd properties enable notification in heartbeat-loss events. Heartbeat-loss events are detected locally on each cluster of the partnership, and the notification is triggered locally on the cluster where the event is detected. The email addresses and the notification action path should be valid on each cluster in the partnership.

Exit Status The following exit values are returned:

0	The command completed successfully.
nonzero	An error has occurred.

Examples EXAMPLE 1   Adding Trust Between Two Clusters

The following geops commands add trust between the clusters cluster-paris and cluster-newyork.

1. Add cluster cluster-newyork to the trust on the cluster cluster-paris.

    cluster-paris# **/usr/cluster/bin/geops add-trust -c cluster-newyork**

    Keys are stored on every node of cluster cluster-paris with alias cluster-newyork.certificate*number*.

2. Add cluster cluster-paris to the trust on the cluster cluster-newyork.

    cluster-newyork# **/usr/cluster/bin/geops add-trust -c cluster-paris**

3. Verify trust between the two clusters.

    cluster-paris# **/usr/cluster/bin/geops verify-trust -c cluster-newyork**

    cluster-newyork# **/usr/cluster/bin/geops verify-trust -c cluster-paris**

EXAMPLE 2   Creating a Partnership

The following geops command creates the partnership paris-newyork-ps, on the cluster cluster-paris.

```
cluster-paris# geops create -c cluster-newyork -p Description=Transatlantic \
-p Notification_emailaddrs=sysadmin@companyX.com paris-newyork-ps
```

EXAMPLE 3   Joining a Partnership

The following geops command joins cluster-paris and cluster-newyork in the
paris-newyork-ps partnership.

cluster-paris# **geops join-partnership cluster-newyork paris-newyork-ps**

EXAMPLE 4   Modifying a Partnership

The following geops command modifies the notification email address for cluster-paris.

cluster-paris# **geops set-prop -p Notification_emailaddrs=operations@companyX.com \
paris-newyork-ps**

EXAMPLE 5   Leaving a Partnership

The following geops command removes the cluster cluster-paris from the partnership
paris-newyork-ps.

cluster-paris# **geops leave-partnership paris-newyork-ps**

EXAMPLE 6   Resynchronizing a Partnership

The following geops command resynchronizes the partnership paris-newyork-ps.

The geops update command overwrites the configuration on the local cluster with the
configuration from the remote partner cluster.

geops update paris-newyork-ps

Attributes   See attributes(5) for descriptions of the following attributes.

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWscgctl
Interface Stability	Evolving

See Also   rbac(5)

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