



## **Cisco Prime Network 5.3 Gateway High Availability Guide**

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# CHAPTER 1

## Installation Overview

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This chapter provides an overview of the Prime Network gateway high availability installation process and includes these installation-related topics:

- [Assumptions in This Document, page 1-1](#)
- [Installation DVDs, page 1-1](#)
- [Installation Flow, page 1-3](#)
- [Using Gateway High Availability with Cisco Prime Central and Other Prime Network Components, page 1-7](#)
- [Licenses, page 1-8](#)

## Assumptions in This Document

The procedures described in this guide assume the following:

- Your deployment uses a Prime Network embedded database, not an external database.
- Your deployment does not have an IPv6 gateway or database.

If your gateway high availability deployment differs from the previous requirements, please contact your Cisco account representative for assistance with planning and installation of the solution.

## Installation DVDs

The gateway high availability files are provided on the Prime Network installation DVDs listed in [Table 1-1](#).



Note

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If you are upgrading an existing gateway high availability deployment to Prime Network 5.3, follow the upgrade procedure described in the [Cisco Prime Network 5.3 Installation Guide](#).

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Table 1-1 Gateway High Availability Installation Scripts

Scripts	Description	Local Redundancy		Geographical Redundancy
<b>Disk 1—RH_ha.zip Contents</b>				
<b>install_Prime_HA.pl</b>	Local redundancy—Is run from locally mounted node that has primary database. Installs gateway and embedded database on primary node, and sets up a limited number of elements on secondary node (such as cron jobs, users, groups, SSH keys, and so forth).  In case of geographical redundancy <i>only</i> or geographical + local redundancy, this script will install Prime Network gateway and embedded database on the remote site.	<b>Server P1 (primary database)</b>	<b>Server P2</b>	<b>Server S1</b>
		x	—	—
<b>setup_Prime_DR.pl</b>	Geographical redundancy—Is run from node that is running the primary database. Stops the gateway, installs Oracle ADG, and sets up cron jobs for gateway synchronization (GWSync) and ADG monitoring. Also triggers the initial Gateway Sync.	x	—	—
<b>Disk 2—sil-esb-2.3.0.tar.gz Contents (Integration Layer)</b>				
<b>installAndConfigureEsb.sh</b>	Installs local redundancy <i>alone</i> or local + geographical redundancy elements for PN-IL.  <b>Note</b> PN-IL supports local redundancy <i>alone</i> , or local + geographical redundancy. It does not support geographical redundancy <i>alone</i> .	x	—	—
<b>itgctl</b>	Configures PN-IL.	x	—	x
<b>il-watch-dog.sh</b>	Controls the PN-IL health monitor.	x	—	x
<b>DMSwitchToSuite.sh</b>	Migrates a standalone PN-IL to suite mode.	x	—	x
<b>Infobright_integ.zip Contents (Operations Reports)</b>				
<b>primenw_integration.pl</b>	Installs Operations Reports.  <b>Note</b> Operations Reports are only available to customers with Operations Reports license prior to May 2018. For re-installation of Operations Reports contact a Cisco customer support representative.	x	—	—



# Installation Flow

Gateway high availability is provided in three configurations:

- Local redundancy *alone*, which uses two active local servers for automatic failover.
- Geographical redundancy *alone*, which uses a server at a remote geographical site for a full disaster recovery.
- Local + geographical redundancy, which uses both of the above.



Note

For all gateway HA configurations, the Prime Network gateway software, the embedded Oracle database, and (if installed) the Infobright database must all be installed on the same gateway server.

Table 1-2 shows the high availability deployments that are supported, depending on your Prime Network installation.

**Table 1-2** Supported HA Deployments Available for Prime Network Installations

Installation	Supported Gateway High Availability Deployments		
	Local	Geographical	Local + Geographical
Prime Network	x	x	x
Prime Network with Operations Reports	x	x	x
Prime Network with PN-IL	x	x	x <sup>1</sup>
Prime Network with Operations Reports <sup>2</sup> and PN-IL	x	x	x <sup>1</sup>

1. If you want to integrate a PN-IL deployment with Prime Central, Prime Central must have the same configuration.
2. \*Operations Reports are only available to customers with Operations Reports license prior to May 2018. For re-installation of Operations Reports contact a Cisco customer support representative.

Table 1-3 and Figure 1-1 provide the general flow for installing and setting up gateway high availability. For detailed instructions on each, see the topics referenced in Table 1-3.



Note

If you are upgrading an existing gateway high availability deployment to Prime Network 5.3, follow the upgrade procedure described in the *Cisco Prime Network 5.3 Installation Guide*. If you are upgrading Prime Network in a HA setup, you should always start the upgrade from the Primary gateway as active gateway. The active gateway should not be the secondary gateway when starting the upgrade process.

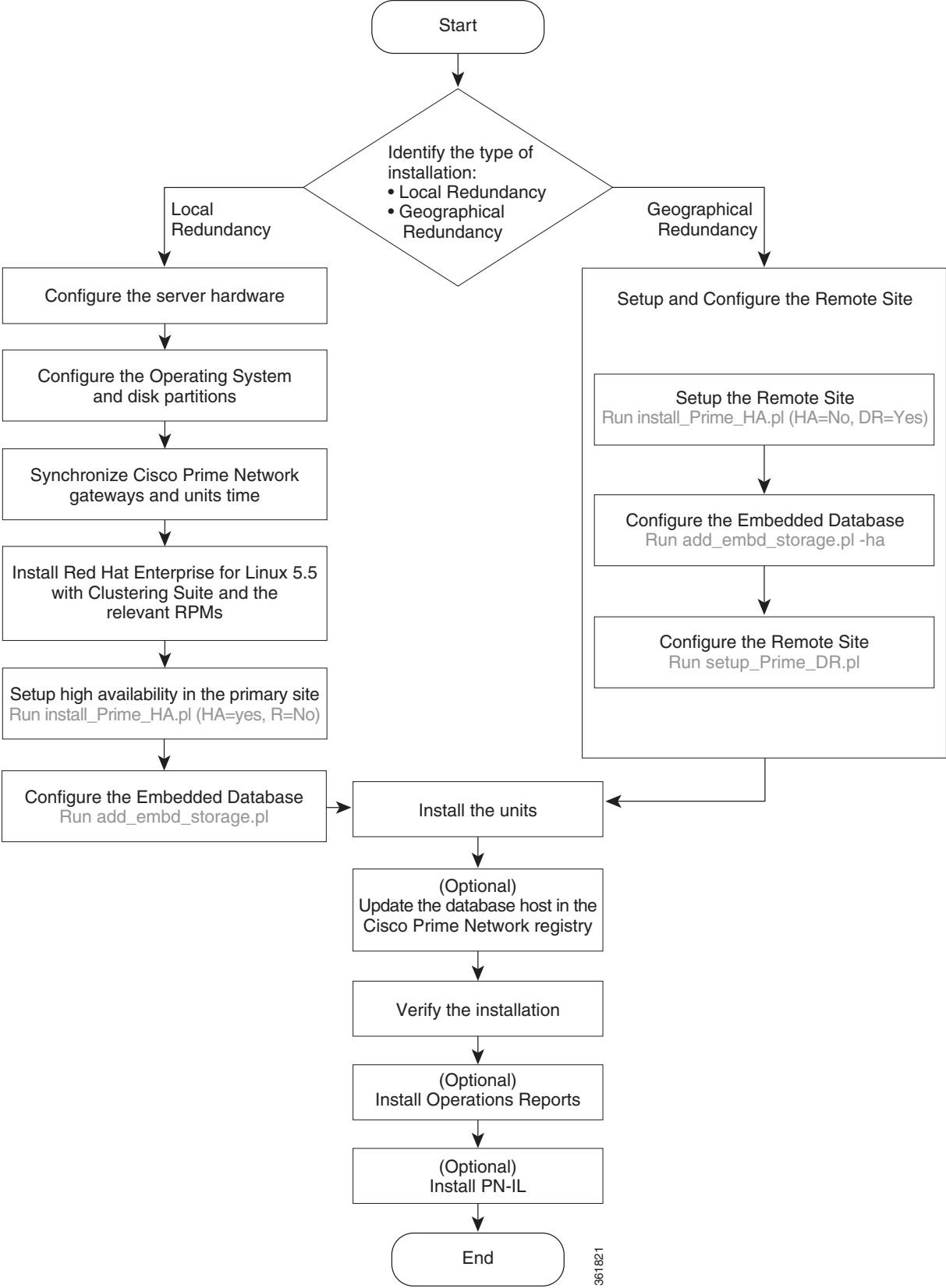
Table 1-3 Installation Flow

	Procedure	Flow
Step 1	<p>If you are you going to install gateway high availability with Operations Reports or PN-IL, or integrate with Prime Central, have you read these topics?</p> <ul style="list-style-type: none"> <li>• <a href="#">Operations Reports and Gateway High Availability, page 1-7</a></li> <li>• <a href="#">Gateway High Availability and the Prime Network Integration Layer (PN-IL), page 1-7</a></li> <li>• <a href="#">Gateway High Availability and Prime Central, page 1-8</a></li> </ul>	<p><b>Yes:</b> Go to next step.</p> <p><b>No:</b> Do not continue until you have read those sections. They contain information on supported configurations.</p>
Step 2	<p>Have you familiarized yourself with the high availability solutions by reading these topics?</p> <ul style="list-style-type: none"> <li>• <a href="#">Local Redundancy Functional Overview, page 2-1</a></li> <li>• <a href="#">Geographical Redundancy Functional Overview, page 2-5</a></li> </ul>	<p><b>Yes:</b> Go to next step.</p> <p><b>No:</b> Do not continue until you have read those sections. They contain information on supported configurations.</p>
Step 3	<p>Does the gateway where you will install gateway high availability meet the requirements?</p> <ul style="list-style-type: none"> <li>• For local redundancy <i>alone</i> (with or without Operations Reports and PN-IL), see <a href="#">Installation Requirements for Local Redundancy, page 3-4</a>.</li> <li>• For geographical redundancy <i>alone</i> (with or without Operations Reports), see <a href="#">Installation Requirements for Geographical Redundancy, page 4-4</a>.</li> <li>• For local + geographical redundancy (with or without Operations Reports and PN-IL), see <a href="#">Installation Requirements for Local Redundancy, page 3-4</a> and <a href="#">Installation Requirements for Geographical Redundancy, page 4-4</a>.</li> </ul>	<p><b>Yes:</b> Go to next step.</p> <p><b>No:</b> Do not continue until all specified requirements are met.</p>
Step 4	<p>Have you performed the tasks in these sections?</p> <ul style="list-style-type: none"> <li>• For local redundancy <i>alone</i> (with or without Operations Reports and PN-IL), see <a href="#">Preparing to Install the Local Redundancy Solution, page 3-8</a>.</li> <li>• For geographical redundancy <i>alone</i> (with or without Operations Reports), see <a href="#">Preparing to Install Geographical Redundancy, page 4-6</a>.</li> <li>• For local + geographical redundancy (with or without Operations Reports and PN-IL), see <a href="#">Preparing to Install the Local Redundancy Solution, page 3-8</a> and <a href="#">Preparing to Install Geographical Redundancy, page 4-6</a>.</li> </ul>	<p><b>Yes:</b> Go to next step.</p> <p><b>No:</b> Do not continue until all pre-installation tasks are completed.</p>
Step 5	<p>(Local redundancy) When the installation is complete, have you verified the installation according to <a href="#">Verifying the Local Redundancy Setup, page 3-21</a>?</p>	<p><b>Yes:</b> Go to next step.</p> <p><b>No:</b> Do not continue until you have verified the installation,</p>

Table 1-3 Installation Flow (continued)

	Procedure	Flow
Step 6	(Local redundancy) Have you completed all post-installation tasks according to <a href="#">Post-Installation Tasks for Local Redundancy, page 3-24?</a>	<p><b>Yes:</b> Go to next step.</p> <p><b>No:</b> Do not continue until you have finished the post-installation tasks.</p>
Step 7	Do you want to install the Prime Network Integration Layer (PN-IL) in your redundancy environment?	<p><b>Yes:</b> Perform the steps described in:</p> <ul style="list-style-type: none"> <li>• <a href="#">Installing and Configuring PN-IL with Local Redundancy, page 3-30</a>, or</li> <li>• <a href="#">Installing and Configuring PN-IL for Local + Geographical Redundancy, page 4-20</a>.</li> <li>• <a href="#">Installing and Configuring PN-IL for Geographical Redundancy Only, page 4-28</a></li> </ul> <p><b>No:</b> Installation complete.</p>

Figure 1-1 Installation Flow for Prime Network Gateway High Availability



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# Using Gateway High Availability with Cisco Prime Central and Other Prime Network Components

## Unit High Availability and Gateway High Availability

Gateway high availability is compatible with unit server high availability. However, unit server high availability must be configured separately as described in the *Cisco Prime Network 5.3 Administrator Guide*. Designating active and standby units is *not* included in the procedures described in this guide.

## Operations Reports and Gateway High Availability



Note

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Operations Reports are only available to customers with Operations Reports license prior to May 2018. For re-installation of Operations Reports contact a Cisco customer support representative.

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The gateway high availability solution also protects Operations Reports data that is stored on the gateway and the Infobright database.

You should install Operations Reports *after* you have installed the base gateway redundancy solution. Installing gateway high availability for Operations Reports is described in Installing Prime Network Operations Report with Gateway High Availability. When Operations Reports is installed, Prime Network will start the processes required to protect your Operations Reports data. This includes the folders, system files, registry data on the gateway, and event data that is stored in the Infobright database. These are monitored using:

- The RHCS Infobright database service, **ifb**:

In case of local redundancy *only* and local + geographical redundancy configurations, if a hardware or software failure occurs, the RHCS automatically restarts the failed node's services on the functional node. See [Table 2-1 on page 2-3](#) for more information.

- The GWSync process:

Replicates data between the local and remote servers in a geographical redundancy configuration.

- AVM 45:

AVM 45 runs on the active server and constantly loads data to the backup site in a geographical redundancy configuration. If there is a failover event, archived event data and standard event data from the previous 80 minutes is lost. This is due to the time required to load and validate the data that is saved on the secondary Infobright database.

Inventory data is retrieved from memory (from the inventory snapshot) and is therefore not affected by any high availability events.

## Gateway High Availability and the Prime Network Integration Layer (PN-IL)

PN-IL supports all the redundancy configurations as supported by Prime Network, i.e, local only, local + geographical, and geographical only. The RHCS **ana** service will monitor the PN-IL resources.



Note

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PN-IL supports all the redundancy configurations as that of the Prime Network. Therefore, if you want to integrate a PN-IL deployment with Prime Central, Prime Central also must have the same configuration.

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If you want to use PN-IL, install it *after* you have installed Prime Network in following HA configurations. See:

- [Installing and Configuring PN-IL with Local Redundancy, page 3-30](#)
- [Installing and Configuring PN-IL for Local + Geographical Redundancy, page 4-20](#)
- [Installing and Configuring PN-IL for Geographical Redundancy Only, page 4-28](#)

### Gateway High Availability and Prime Central

Deployments of Prime Network gateway high availability (with or without Operations Reports and PN-IL) can be integrated with Prime Central. Therefore, if you want to integrate a PN-IL deployment with Prime Central, Prime Central also must have the same configuration.

See these documents and topics for more information.

*Table 1-4 Where to Get Information on Integration with Prime Central*

To integrate Prime Central with:	See
Prime Network with or without Operations Reports	<a href="#">Cisco Prime Central High Availability Quick Start Guide</a>
Prime Network plus PN-IL	<a href="#">Configuring PN-IL with Prime Central (Suite Mode with Local Redundancy), page 3-34</a> <a href="#">Configuring and Migrating PN-IL with Prime Central (Suite Mode with Local + Geographical Redundancy), page 4-24</a> and <a href="#">Configuring and Migrating PN-IL with Prime Central (Suite Mode with Geographical Redundancy Only), page 4-32</a>

## Licenses

In addition to the gateway high availability license, you must purchase a license for each redundant gateway server and a standby license.



# Functional Overview of Gateway Local Redundancy and Geographical Redundancy

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These topics provide a functional overview of the Prime Network gateway high availability solutions:

- [Local Redundancy Functional Overview, page 2-1](#)
- [Geographical Redundancy Functional Overview, page 2-5](#)



**Note**

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Gateway high availability is supported only when the gateway software, Oracle database, and Infobright database (applicable for Operations Report) are installed on the same server.

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## Local Redundancy Functional Overview

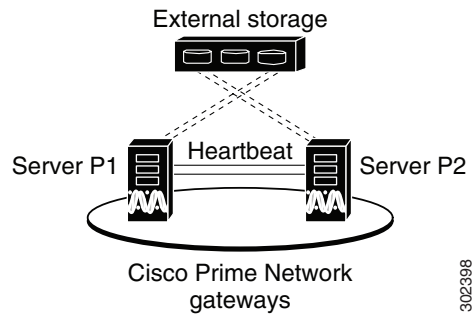
Gateway local redundancy configuration uses one active and one standby node to provide an automatic failover solution for local hardware faults, without the need to reconfigure IP addresses. The solution uses the Red Hat Cluster Suite (RHCS). The nodes are monitored by RHCS and if the node managing the services fails, the services are seamlessly moved to the other node. In case of a single service failure, the cluster will attempt to restart the service. If the retries fail, the service will be relocated to the second node and started on that node. This does not impact the other service in the cluster.

When this solution is initially installed, the gateway and database services are installed on and managed by one node in the cluster from where the installation script is run.

[Figure 2-1](#) shows a basic dual-node cluster local redundancy configuration, where the Prime Network gateway service is on Server P1, the Oracle database service is on Server P2, and both servers are connected to a server for external storage. Both servers use an embedded database.

The RHCS local redundancy solution requires a fencing device, which is a hardware unit that disconnects a node from shared storage to ensure data integrity. For more information on fencing options, see [Fencing Options, page 2-3](#).

Figure 2-1 Architecture for Gateway Local Redundancy



## Configuration Details for Local Redundancy

Local redundancy requires that RHCS be installed on both nodes. Out of the box, both services run on the node from which the installation script is run. This configuration can be changed, if desired, using RHCS web GUI or CLI (**clusvcadm** utility). For details on the required system configuration for local redundancy, see [Installation Requirements for Local Redundancy, page 3-4](#)

The local redundancy setup has the following:

- [Dual Node Cluster, page 2-2](#)
- [RHCS Installed on Both Nodes, page 2-2](#)
- [External Shared Storage, page 2-3](#)
- [Fencing Options, page 2-3](#)
- [Security, page 2-5](#)

### Dual Node Cluster

The Prime Network gateway and embedded database are installed in a dual-node cluster. Each node has the platform to run both Prime Network gateway, database services, and operations reports (optional).



#### Note

Operations Reports are only available to customers with Operations Reports license prior to May 2018. For re-installation of Operations Reports contact a Cisco customer support representative.

### RHCS Installed on Both Nodes

RHCS manages the local redundancy by monitoring cluster configured services: **ana** and **oracle\_db**. If you have installed Operations Reports, RHCS also manages the Infobright database service, **ifb**. If a hardware or software failure occurs, the RHCS automatically restarts the failed node's services on the functional node.



Table 2-1 lists the services that are monitored by RHCS.

Table 2-1 Cluster Configured Services Monitored by RHCS

RHCS Service	Description	
<b>ana</b>	Monitors Prime Network (AVM 99), the Prime Network Integration Layer (if installed), and Prime Network Operations Reports (if installed). It consists of the following resources.	
	IP address	<i>ana_service_floating_IP</i>
	Scripts	ana.sh (Prime Network) pcil.sh (Prime Network Integration Layer)
<b>oracle_db</b>	Monitors Oracle processes and listener and consists of the following resources.	
	IP address	<i>oracle_db_floating_IP</i>
	Scripts	oracles.sh, lsnr.sh
<b>ifb</b>	Monitors Infobright processes and XXX and consists of the following resources:	
	IP address	<i>infobright_db_floating_IP</i>
	Scripts	infobright.sh

The floating IP address is different from either node's physical IP address. The floating IP address is associated with a service rather than a particular machine in the cluster. Therefore, the *cluster IP address* is the *floating IP address of the management port of the cluster*. It floats because it always points the parent device (for example, it would change from P1 to P2 in case of a switchover or failover).

The Oracle listener should be running before Prime Network, which allows the Prime Network gateway process (AVM 11) to connect to the database. If the listener is not running, the Prime Network agent contains logic to enable it to delay startup of the Prime Network processes while it waits for the listener to start. If the listener does not start up on time, the Prime Network gateway agent will abort the startup, resulting in a Prime Network resource failure.

Alternatively, you can also bring the service groups online in serial sequence, starting with the Oracle and the Infobright service groups, then the Prime Network service group. (RHCS does not enforce this behavior.)

## External Shared Storage

RHCS requires an external shared storage that is mountable from both nodes. The external shared storage contain the Prime Network, Oracle, and (if Operations Reports is installed) Infobright files.



Note

Operations Reports are only available to customers with Operations Reports license prior to May 2018. For re-installation of Operations Reports contact a Cisco customer support representative.

## Fencing Options

Each node in the cluster must use a fencing method. Local redundancy configuration uses a fencing hardware unit for cutting a node off from the shared storage. This is to ensure data integrity and to prevent a *split brain* scenario by preventing the problematic node from writing to the shared storage. If any problem with cluster node occurs, RHCS invokes the fencing device with the peer and waits for the success signal. If a failure occurs, the cut off can be accomplished by powering off the node with a remote power switch, disabling a switch channel, or revoking a host's SCSI 3 reservations.

The supported fencing options are:

- **fence\_ipmilan**—Intelligent Platform Management Interface (IPMI) v1.5 or higher compliant devices over a LAN.
- **fence\_ilo**—Hewlett Packard Integrated Lights Out (HP iLO).
- **fence\_vmware\_soap**—VMware with SOAP API. This agent communicates with the VMware vCenter server that is managing the VM that will be fenced. If you choose this fencing method, you will be prompted for the vCenter user login and password, the vCenter IP address, and the vCenter hostname. Not all RHEL versions support this option; see [Hardware and Software Requirements for Local Redundancy, page 3-5](#) and the [Red Hat site](#).
- **fence\_manual**—This option allows you to add a Red Hat-supported fencing device not listed above. If you choose Manual, the **fence-manual-fencing** agent is assigned. This fencing agent is temporary and should not be used in production because it does not perform automated actions. If a cluster problem occurs, the node and storage must be manually disconnected, or another fencing agent must be used to disconnect them. If you choose this option during the installation because you want to add a different Red Hat-supported fencing device, provision the device *after* installation using the RHCS GUI. When you add it, be sure to add it as the main fencing method, and move the manual fencing agent to the backup method, as shown in [Figure 2-2](#).

General information about the RHCS web GUI is provided in [Configuring the RHCS Web Interface \(Optional\), page 3-25](#). However, see the Red Hat Conga documentation for complete information about using the RHCS web GUI application. Additionally, you need the RHCS user documentation to provision and manage cluster fencing devices. See the [Red Hat site](#) for more information.




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**Note**

Keep these items in mind:

- To prevent fencing loops, the cluster interconnect and power fencing (for example, HP-iLO) should use the same network, such as bond0.
  - If the main fencing device is a remote power switch, define all ports that supply power to the node simultaneously.
  - If manual fencing is used, before disconnecting the node, remove the cman and rgmanager services from the automatic startup sequence. For more information on the command to remove these services, see [Manually Fencing, page 3-29](#).
-

Figure 2-2 RHCS GUI Fencing Method Window

1	Backup fencing method: Move the manual fencing agent to the backup method.	2	Main fencing method: Add a different Red Hat-supported fencing device.
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## Security

When the RHCS local redundancy solution is installed, SSL keys are generated and copied to the other node in the cluster.



Note

In Operations report application, Https connection using TLS1.0 is not supported, because Pentaho upgrade does not support TLS1.1 and 1.2.versions and 3.0 and 2.0 SSL versions.

## Geographical Redundancy Functional Overview

Gateway geographical redundancy is implemented using Oracle Active Data Guard (ADG). The ADG geographical redundancy solution uses a remote site containing a single server that provides failover in case of a failure at the primary site. The remote site, which is running but has no active applications, provides redundancy for the server (or servers) at the primary site, which contain the gateway and the database services. The remote node is called the Disaster Recovery (DR) node.

Geographical redundancy can be installed alone (geographical redundancy *only*) or with local redundancy (local + geographical redundancy), depending on your configuration; see [Table 1-2 on page 1-3](#). In both cases, the remote site (S1) contains its own server, database, and storage—all located at another geographical location. The DR node at the remote site is the backup to the node primary site. [Figure 2-3](#) illustrates a deployment with geographical redundancy *alone*. It includes a single node with external storage in the primary site (P1), and a single node with external storage in the remote site (S1).

Figure 2-3 Architecture for Gateway with Geographical Redundancy Alone

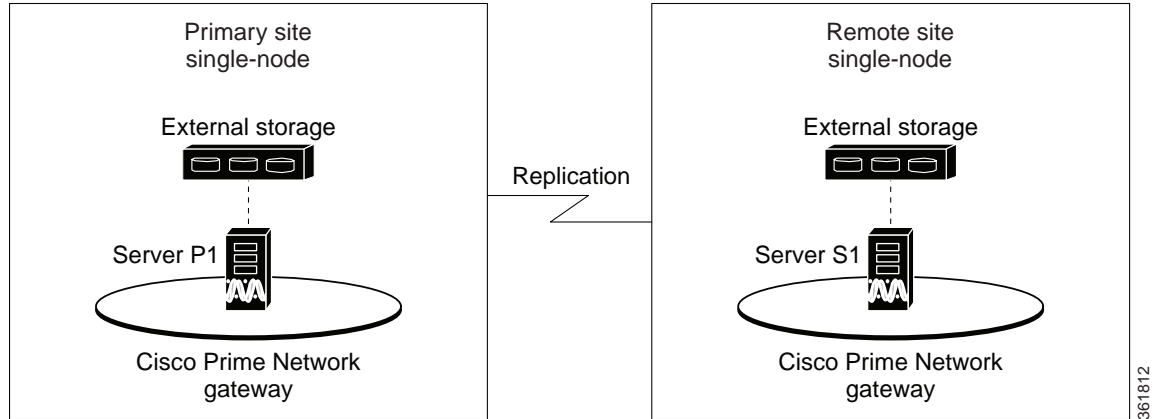
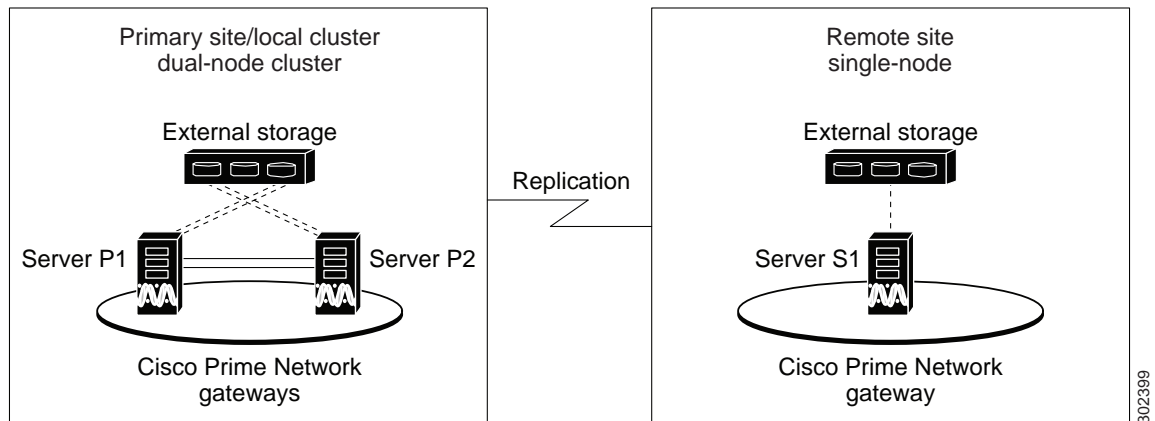


Figure 2-4 illustrates a deployment with both local + geographical redundancy. It includes a dual-node cluster with external shared storage in the primary site (P1 and P2), and a single node with external storage in the remote site (S1).

Figure 2-4 Architecture for Gateway with Local Redundancy and Geographical Redundancy



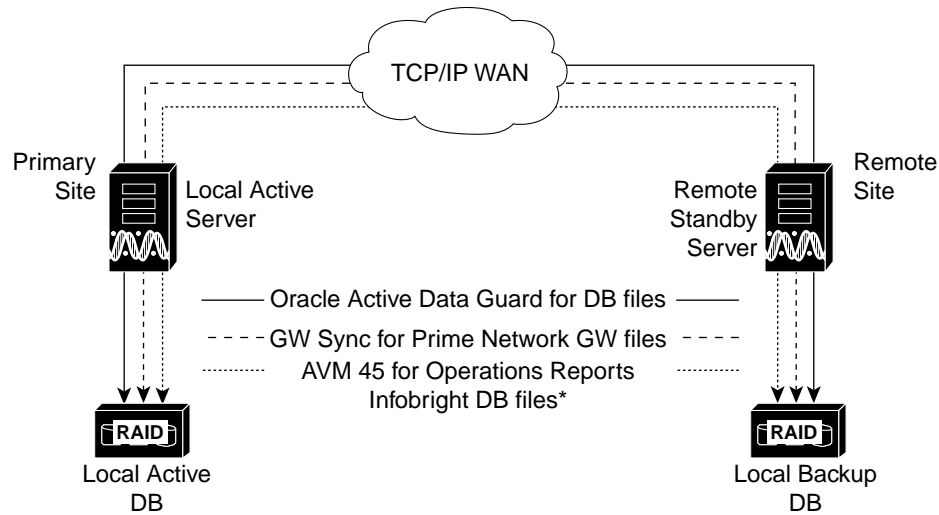
 **Note**

Geographical redundancy does not allow the Prime Network service (ana) to be brought online on the local side while the Oracle service is online on the remote site (or vice versa).

The data stored in the server and Oracle database is continuously replicated between the two sites. The primary and standby Oracle database are monitored and synchronized using ADG. If Operations Reports is installed, AVM 45 performs the synchronization between the two Infobright databases and Oracle database.

The Prime Network server files (registry and system files) are synchronized using the GWSync utility. Prime Network periodically monitors and validates the replication process and issues a System event in case of a problem. Figure 2-5 shows the data replication process between the primary site and remote site. To secure the channel used for data replication, an SSH key exchange is performed during the Prime Network installation.

Figure 2-5 Replication Configuration for Geographical Redundancy



\* Gateway, Oracle DB, and Infobright DB are on same server

For disaster recovery (if the primary site becomes unavailable), a manual failover can be triggered from the remote site. The utilities for managing the manual failover are described in [Maintaining Geographical Redundancy, page 4-17](#).

The geographical redundancy solution uses the following replication processes.

- [Oracle ADG Replication Process, page 2-7](#)
- [Gateway Sync \(GWSync\) Replication Process, page 2-8](#)
- [Infobright Database Replication Process \(Operations Reports\), page 2-9](#)

## Oracle ADG Replication Process

When the ADG solution is installed, a standby database is created at the remote site to replicate Prime Network database information. The remote site database is a standby (read-only) Oracle instance. The primary site database, which operates in archive log mode, sends copies of the redo logs to the remote site database for archiving. Data is synchronized using Redo-apply.

When the high availability solution is installed, it sets up the cron jobs that will monitor the synchronization process.

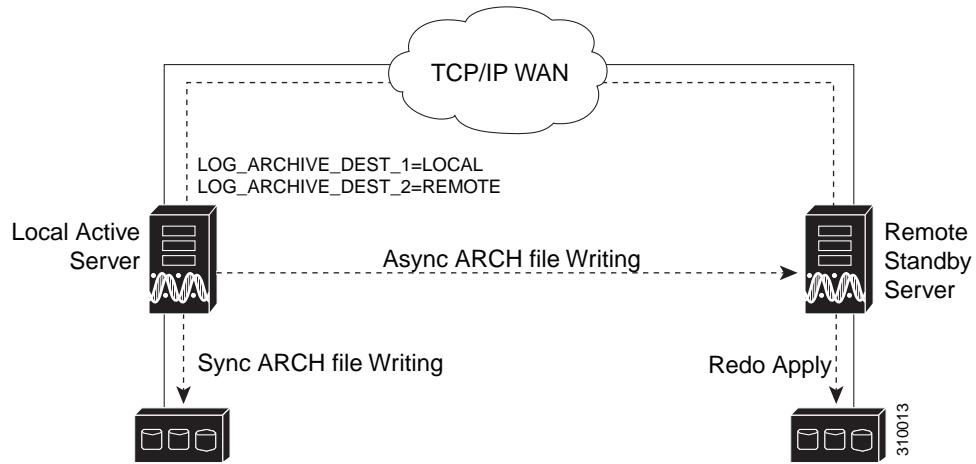


Note

ADG uses port 1521 for communication between the servers. This port must be open.

[Figure 2-6](#) illustrates how data is replicated between the primary site database and the remote site.

Figure 2-6 ADG Database Replication Process (ADG Geographical Redundancy)



**Note** The databases must have identical disk capacities and mount points.

To troubleshoot problems with the replication process, see the [Verifying the Geographical Redundancy Setup](#), page 4-15.



**Note** When the `embdctl --restore` command is used with Oracle ADG, reconfigure the Oracle database replication after restoring the primary database.

## Gateway Sync (GWSync) Replication Process

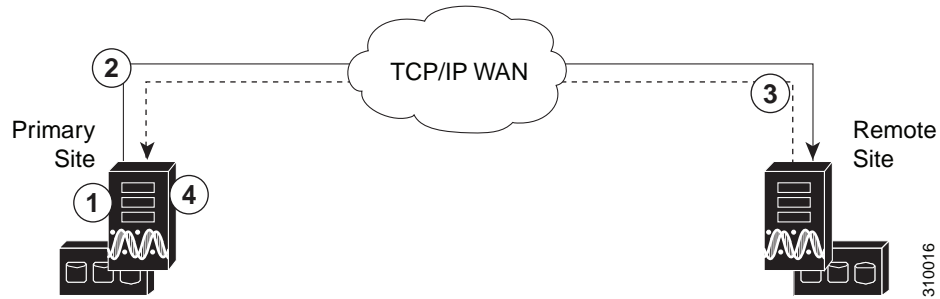
Gateway Sync (GWSync) is a RHEL rsync utility that replicates the Prime Network home directory (and any file system data that is required for disaster recovery) from the primary gateway to the remote site. The GWSync process replicates the gateway data between servers. If Operations Reports is installed, GWSync replicates the folders, system files, and registry data used by Operations Reports.

Cron jobs trigger synchronization at both the primary and remote sites. Data is exchanged using SSH across secure channels. GWSync only sends data that has changed.

The initial GWSync is triggered when the geographical redundancy solution is installed; after that, the data is synchronized every 60 seconds. The installation process also sets up the cron jobs that trigger the synchronization process.

Prime Network monitors and validates the replication processes (ADG and Gateway Sync) and issues a system event if replication problems occur. To troubleshoot problems with the replication process, see [Verifying the Geographical Redundancy Setup](#), page 4-15.

Figure 2-7 How GWSync Replication Process is Monitored (ADG Geographical Redundancy)



1	Local primary site generates local_timestamp file.	3	Primary site pulls remote site's timestamp file as remote_timestamp.
2	remote site pulls NETWORKHOME directory from local primary site (including remote site's local_timestamp file).	4	Primary site compares local_timestamp and remote_timestamp files and, if too much time has passed, issues a System event.

## Infobright Database Replication Process (Operations Reports)

The Infobright database is the repository for the event data used by Operations Reports. This primary Infobright database is synchronized with the remote Infobright database using AVM 45. The Infobright backup files are created on an hourly basis, and only after the file is closed it is loaded to the remote Infobright database using AVM45. In case of a failover, archived event data and standard event data from the previous 80 minutes is lost. This is due to the time required to load and validate the data that is saved on the secondary Infobright database.



### Note

Operations Reports are only available to customers with Operations Reports license prior to May 2018. For re-installation of Operations Reports contact a Cisco customer support representative.

## ESXi Testing Details

The nodes run on ESXi 5.1 on the Cisco UCS Blade Server.







# Installing and Maintaining Gateway Local Redundancy

The following topics provide procedures for setting up, installing, and maintaining the gateway local redundancy solution. Local redundancy is configured and monitored using the Red Hat Cluster Server (RHCS) for local redundancy. This chapter also explains how to install Prime Network Operations Reports and the Prime Network Integration Layer (PN-IL) with gateway local redundancy.



Note

Gateway high availability is supported only when the gateway software, Oracle database, and Infobright database (applicable for Operations Reports) are installed on the same server. Operations Reports are only available to customers with Operations Reports license prior to May 2018. For re-installation of Operations Reports contact a Cisco customer support representative.

- [Steps for Installing the Gateway Local Redundancy Solution, page 3-1](#)
- [Installation Requirements for Local Redundancy, page 3-4](#)
- [Preparing to Install the Local Redundancy Solution, page 3-8](#)
- [Installing the Prime Network Gateway Local Redundancy Software, page 3-15](#)
- [Verifying the Local Redundancy Setup, page 3-21](#)
- [Post-Installation Tasks for Local Redundancy, page 3-24](#)
- [Maintaining Local Redundancy, page 3-26](#)
- [Uninstalling Local Redundancy, page 3-30](#)
- [Installing and Configuring PN-IL with Local Redundancy, page 3-30](#)

Before proceeding with this chapter, make sure you have read [Local Redundancy Functional Overview, page 2-1](#).

## Steps for Installing the Gateway Local Redundancy Solution

[Table 3-1](#) lists the steps you must follow to prepare for an installation, perform an installation, and verify an installation of the Prime Network gateway local redundancy solution. The table includes steps for working in a deployment that also has local redundancy. For local redundancy, the steps assume the primary database is on cluster node P1. An **x** means you must perform the step *on that server*.



**Note** If you also have local redundancy installed, this procedure assumes the primary database is on the primary cluster server (P1).

**Table 3-1** Steps for Setting Up and Installing Local Redundancy

	Task	Topic/Action Required	Primary Node P1 <sup>1</sup>	Standby Node P2
<b>Step 1</b>	Collect server details, so that you have all information handy prior to installation.	<ul style="list-style-type: none"> <li>Prime Network Virtual IP address</li> <li>Oracle Virtual IP address</li> <li>Node 1, Node 2 Hostname and IP addresses</li> </ul>	x	x
<b>Step 2</b>	Verify that the Prime Network servers meets the prerequisites.	<a href="#">Installation Requirements for Local Redundancy, page 3-4</a>	x	x
<b>Step 3</b>	Configure the dual-node cluster server hardware including configuring the external storage.	<a href="#">Configuring Hardware and External Storage for Red Hat Cluster Site, page 3-8</a>	x	x
<b>Step 4</b>	Install RHEL and all recommended patches on both servers in the cluster.	<a href="#">Installing RHEL and Verifying the Version, page 3-9</a>	x	x
<b>Step 5</b>	Install the RPMs required for Red Hat and Oracle. If you are installing Operations Reports, be sure to check this section.	<a href="#">Installing RPMs Required on Red Hat for Prime Network, page 3-9</a>	x	x
<b>Step 6</b>	Configure disk groups, volumes, and partitions. If you are installing Operations Reports, be sure to check the required volume sizes.	<a href="#">Configuring Disk Group and Volumes, page 3-11</a>	x	x
<b>Step 7</b>	Verify that all nodes are ready for installation by checking disk access, Linux versions, and NTP synchronization.	<a href="#">Verify That All Servers Are Ready for Installation, page 3-12</a>	x	x
<b>Step 8</b>	Mount the external shared storage, Oracle and Prime Network mount points on the relevant directories.	<a href="#">Creating the Mount Points for Installation, page 3-13</a>	x	x

Table 3-1 Steps for Setting Up and Installing Local Redundancy (continued)


	Task	Topic/Action Required	Primary Node P1 <sup>1</sup>	Standby Node P2
Step 9	Make sure the format of the /etc/hosts file is correct.	<p>Make sure the /etc/hosts file lists the hostname before the fully qualified domain name (FQDN).</p> <p>Bad /etc/hosts file:</p> <pre>127.0.0.1 localhost.localdomain localhost ::1 localhost6.localdomain6 localhost6 10.128.14.247 spin  172.16.17.127 cvldprimegate1.cscdev.com cvldprimegate1</pre> <p>Good /etc/hosts file:</p> <pre>127.0.0.1 localhost.localdomain localhost ::1 localhost6.localdomain6 localhost6 10.128.14.247 spin  172.16.17.127 cvldprimegate1 cvldprimegate1.cscdev.com</pre> <p>Also make sure the hostname is not mapped to the loopback address (localhost / 127.0.0.1).</p> <p> <b>Note</b> Make sure that the etc/host value and the system returned hostname value are the same. For example, in 172.16.17.127 cvldprimegate1 cvldprimegate1.cscdev.com the format for the Node 1 name should be specified as the second value of the hostname, that is cvldprimegate1.</p>	X	X
Step 10	Back up the /etc/host and root cron jobs files (the installation software will modify them).	—	X	X
Step 11	For cluster node makes sure the specified services are configured to start automatically each time the machine is rebooted.	<a href="#">Configure the Resources for Automatic Start After Reboot, page 3-13</a>	X	X
Step 12	Stop the RHCS services in the order specified in <a href="#">Stopping the RHCS Services, page 3-14</a> .	<a href="#">Stopping the RHCS Services, page 3-14</a>	X	X

Table 3-1 Steps for Setting Up and Installing Local Redundancy (continued)

	Task	Topic/Action Required	Primary Node P1 <sup>1</sup>	Standby Node P2
Step 13	Install the gateway and Oracle database using <code>install_prime_HA.pl</code> .	<a href="#">Installing the Prime Network Gateway Local Redundancy Software</a> , page 3-15	x	—
Step 14	Configure the embedded database (using the <code>add_emdb_storage.pl -ha</code> script).			
Step 15	If desired, install any new device packages so that you have the latest device support.	<a href="#">Cisco Prime Network 5.3 Administrator Guide</a>	x	x
Step 16	Verify the installation of the gateway and database.	<a href="#">Verifying the Local Redundancy Setup</a> , page 3-21	x	x
Step 17	(Only for NAT) Update the database host.	<a href="#">Updating the Database Host in the Registry (Only for NAT)</a> , page 3-24	x	—
Step 18	(Optional) Install Operations Reports.	Installing Prime Network Operations Reports with Gateway High Availability	x	—
Step 19	(Optional) Install PN-IL.	<a href="#">Installing and Configuring PN-IL with Local Redundancy</a> , page 3-30	x	—
Step 20	(Optional) Setup RHCS Web GUI if it is not configured during installation.	<a href="#">Configuring the RHCS Web Interface (Optional)</a> , page 3-25	x	—

1. P1 is the primary cluster node and has the primary database.

## Installation Requirements for Local Redundancy

These topics list the prerequisites for installing gateway geographical redundancy:

- [Hardware and Software Requirements for Local Redundancy](#), page 3-5
- [Port Usage for Local Redundancy](#), page 3-7

## Hardware and Software Requirements for Local Redundancy

Table 3-2 shows the core system requirements for local redundancy. Local redundancy requires a Prime Network embedded database and does not support IPv6 gateways or databases. If your high availability deployment differs from these requirements, please contact your Cisco account representative for assistance with the planning and installation of high availability.


**Table 3-2** Prerequisites for Local Redundancy <sup>1</sup>

Area	Requirements
Operating System	<p>Red Hat 6.7, Red Hat 6.8, Red Hat 6.9, Red Hat 6.10, Red Hat 7.4, Red Hat 7.5, or Red Hat 7.7, 64-bit Server Edition (English language). Red Hat can run in a virtual environment and supports VMware ESXi version 5.5, 6.0, or 6.7, and also on the Openstack kernel-based virtual machine (KVM) hypervisor version 2.6.</p> <p><b>Note</b> Both nodes in the cluster must have identical RHCS versions and packages.</p> <p>Required Red Hat services and components:</p> <ul style="list-style-type: none"> <li>• /usr/bin/expect—Tool to automate interactive applications</li> <li>• /usr/bin/ksh—Korn shell</li> <li>• /usr/bin/scp—Secure copy tool</li> <li>• /usr/sbin/sshd—SSH daemon</li> <li>• /usr/bin/ssh—SSH</li> <li>• /usr/bin/ssh-keygen—Tool to generate, manage, and convert authentication keys.</li> </ul> <p>For more information on installing operating system and RPMs required on Red Hat, see <a href="#">Installing RHEL and Verifying the Version, page 3-9</a> and <a href="#">Installing RPMs Required on Red Hat for Prime Network, page 3-9</a>.</p>
Oracle	<p>12.2.0.1.</p> <p><b>Note</b> Oracle 12.2.0.1 is included in the Prime Network embedded database installation.</p>

Table 3-2 Prerequisites for Local Redundancy (continued)<sup>1</sup>

Area	Requirements
Hardware	<p>RHEL 6.7, RHEL 6.8, RHEL 6.9, RHEL 6.10, RHEL 7.4, RHEL 7.5, and RHEL 7.7 certified platform with fencing capabilities.</p> <p><b>Note</b> RHEL supports the <b>fence_vmware_soap</b> fencing method on RHEL 6.5 or higher (with the High Availability and Resilient Storage Add Ons). For more information, see the <a href="#">Red Hat site</a>. It is recommended for virtual machines, the RHCS must run with <b>fence_vmware_soap</b> fencing method.</p> <p><b>Note</b> Hardware installation with no single point of failure is recommended. See <a href="#">Configuring Hardware and External Storage for Red Hat Cluster Site, page 3-8</a>.</p> <p>While using fencing, ensure the following:</p> <ul style="list-style-type: none"> <li>– Each node in the cluster uses a fencing method.</li> <li>– If you choose manual fencing option during the local redundancy installation to add a different Red Hat-supported fencing device, provision the device after installation using the RHCS GUI. When you add it, be sure to add it as the main fencing method, and move the manual fencing agent to the backup method.</li> <li>– To prevent fencing loops, the cluster interconnect and power fencing (for example, HP-iLO) should use the same network, such as bond0.</li> <li>– If the main fencing device is a remote power switch, define all ports that supply power to the node simultaneously.</li> </ul> <p>Fencing options are listed in <a href="#">Fencing Options, page 2-3</a>. For the recommended hardware for small, medium, and large networks, see the <a href="#">Cisco Prime Network 5.3 Installation Guide</a>.</p>
Network	<ul style="list-style-type: none"> <li>• Virtual IP Address <ul style="list-style-type: none"> <li>– Reserve two floating IP addresses for <b>ana</b> and <b>oracle_db</b> services. These IP addresses are entered while executing the installation scripts.</li> <li>– Ensure that the IP addresses are on the same subnet and are not attached to any server. RHCS will manage them, that is, add and remove them from the server running the service.</li> </ul> </li> <li>• Multicast Addresses <ul style="list-style-type: none"> <li>– Cluster nodes must be able to communicate with each other using multicast.</li> <li>– Each network switch and associated networking equipment in a Red Hat cluster must be configured to enable multicast addresses and support IGMP. Without multicast and IGMP, not all nodes can participate in a cluster, causing the cluster to fail.</li> <li>– Refer to the appropriate vendor documentation or other information about configuring network switches, and associated networking equipment, to enable multicast addresses and IGMP</li> <li>– Multicast address should meet RHCS requirements and should not be blocked by a firewall. If there is a firewall, disable it; see the <a href="#">Red Hat site</a> for more information.</li> <li>– If you are using SELinux, it must be disabled (or in permissive mode). See the <a href="#">Red Hat site</a>.</li> </ul> </li> <li>• Network Timing Protocol (NTP) must be configured. For more details on procedures, see the <a href="#">Cisco Prime Network 5.3 Installation Guide</a>.</li> </ul>

Table 3-2 Prerequisites for Local Redundancy (continued)<sup>1</sup>

Area	Requirements
Storage	<p>RHCS requires a shared storage accessible from all cluster nodes. When using external storage, ensure the following:</p> <ul style="list-style-type: none"> <li>– All of the shared storage should have an ext3 file system installed.</li> <li>– Shared storage must be accessible and mountable from both nodes. The number of HDD, HDD types, HDD capacity, and RAID level, should be based on recommendations provided by the <i>Prime Network Capacity Planning Guide</i>.</li> <li>– Shared storage can be configured in several ways, it depends on your hardware. If there is only one link for the storage to the node, LABEL must be configured on each disk device. If the node is connected to the storage with more than 1 connection (recommended) multipath should be configured.</li> <li>– Each cluster service should use one partition. If the partitions are on the same disk, use a single partition for each service. If partitions are spread across disks, use a single disk for each service. Each disk must be labeled.</li> </ul> <p> <b>Note</b> Labels used by any cluster service to name a distinct block device on any node in the cluster must be unique across all block devices. Also, a label used in a cluster service may not be reused by any block device with a different UUID, which is listed by command 'blkid', run the command on all nodes of the cluster, and cross check across all results, before configuring local HA cluster.</p> <p>If you are using Operations Reports, 1-4 additional partitions should be created for the Infobright database data, cache, backup, and DLP storage.</p>
File system	ext3
Disk space	5 GB under /tmp is required for installation

1. Virtual machine and bare metal requirements for hard disk, memory, and processor are same. Refer to the [Cisco Prime Network 5.3 Installation Guide](#) for memory and processor requirements.

## Port Usage for Local Redundancy

In addition to the ports listed in the [Cisco Prime Network 5.3 Installation Guide](#), the following ports must be free.

You can check the status of the listed ports by executing the following command:

```
# netstat -tulnap | grep port-number
```

To free any ports, contact your system administrator.

Table 3-3 Additional Ports Required for Local Redundancy

Port No.	Used for:
9096	Operations Reports

## Preparing to Install the Local Redundancy Solution

These topics describe the setup tasks you may need to perform before installing the local redundancy software:

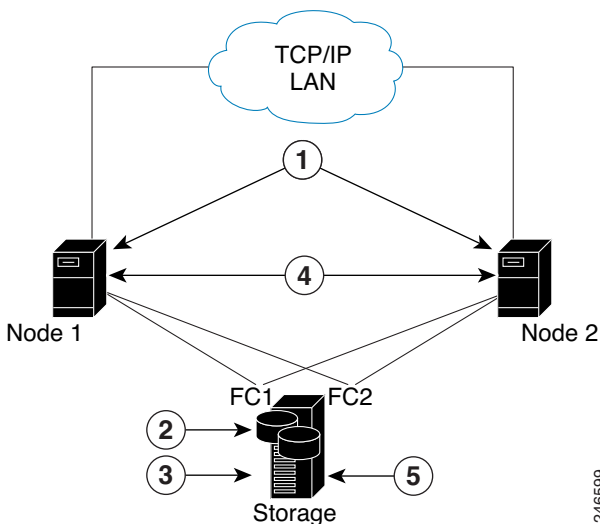
- [Configuring Hardware and External Storage for Red Hat Cluster Site, page 3-8](#)
- [Installing RHEL and Verifying the Version, page 3-9](#)
- [Installing RPMs Required on Red Hat for Prime Network, page 3-9](#)
- [Configuring Disk Group and Volumes, page 3-11](#)
- [Verify That All Servers Are Ready for Installation, page 3-12](#)
- [Creating the Mount Points for Installation, page 3-13](#)
- [Stopping the RHCS Services, page 3-14](#)
- [Updating the Database Host in the Registry \(Only for NAT\), page 3-24](#)
- [Configuring the RHCS Web Interface \(Optional\), page 3-25](#)

## Configuring Hardware and External Storage for Red Hat Cluster Site

Figure 3-1 shows the recommended hardware design to avoid a single point of failure, which includes:

- Disk mirroring at the storage location.
- Redundant RAID controllers.
- Redundant storage and gateway power supplies.
- Dual NICs on both gateways.
- Separate NIC connections to switches.
- NIC bonding in active/backup mode.

*Figure 3-1 Local Redundancy Hardware Installation to Avoid Single Points of Failure*





1	Dual NICs on both gateways	4	Redundant gateway power supplies
2	Disk mirroring	5	Redundant storage power supplies
3	Redundant RAID controllers		

Configure the external storage so all disks and logical unit numbers (LUNs) are accessible from both servers in the cluster. The disk and LUN configuration depends on the storage type:

- If you are using JBOD disks, provide enough physical disks to create the volumes shown in [Table 3-4](#) to satisfy the Oracle performance requirements.
- If you are using storage that supports hardware RAID, divide the physical disks into LUNs so that the volumes listed in [Table 3-4](#) can be created and configured to satisfy the Oracle performance requirements and protected with RAID5, RAID1, or RAID10. The Oracle volumes can be created on a single LUN.
- The number of HDD, HDD types, HDD capacity, and RAID level, should be based on recommendations provided by the *Prime Network Capacity Planning Guide*. Obtain the Capacity Planning Guide from your Cisco account representative.

## Installing RHEL and Verifying the Version

Install the RHEL with the Red Hat Cluster Suite using the procedures in the Red Hat user documentation.

To verify that you have the required Linux version, use the following command:

```
cat /etc/redhat-release
```

RHEL installation version should be identical on all the servers.



**Note**

RHCS is included in the Red Hat Advanced Platform option. If Red Hat Clustering Service was not installed as part of RHEL, install the Red Hat Clustering Service using the procedures in the Red Hat user documentation.

## Installing RPMs Required on Red Hat for Prime Network

These sections list the additional RPMs required for Red Hat and Oracle:

- [Required RPMs for Red Hat 6.5, page 3-9](#)
- [Required RPMs for Oracle Database 12c, page 3-10](#)

### Required RPMs for Red Hat 6.5

The following RPMs must be downloaded from the Red Hat website and installed on the gateway and unit servers.

#### Required 32-bit packages

- compat-libstdc++-33-3.2.3-69.el6.i686
- glibc-2.12-1.132.el6.i686

- libgcc-4.4.7-4.el6.i686
- libstdc++-devel-4.4.7-4.el6.i686
- libaio-devel-0.3.107-10.el6.i686
- libXtst-1.2.1-2.el6.i686(Required for GUI installation)
- libgcj-4.4.7-4.1.el6\_5.i686(Required for GUI installation)
- libXext.i686

#### Minimum Required 64-bit packages

- binutils-2.20.51.0.2-5.36.el6.x86\_64
- libXtst-1.2.1-2.el6.x86\_64 (Required for GUI installation)
- libgcj-4.4.7-4.1.el6\_5.x86\_64(Required for GUI installation)
- compat-libcap1-1.10-1.x86\_64
- compat-libstdc++-33-3.2.3-69.el6.x86\_64
- openssl098e-0.9.8e-17.el6\_2.2.x86\_64 (Required for installing Operations Reports)
- gcc-c++-4.4.7-4.el6.x86\_64
- glibc-devel-2.12-1.132.el6\_5.4.x86\_64
- numactl-2.0.7-8.el6.x86\_64
- ksh-20120801-10.el6.x86\_64
- libgcc-4.4.7-4.el6.x86\_64
- libstdc++-devel-4.4.7-4.el6.x86\_64
- libaio-devel-0.3.107-10.el6.x86\_64
- make-3.81-20.el6.x86\_64
- sysstat-9.0.4-22.el6.x86\_64
- expect-5.44.1.15-5.el6\_4.x86\_64
- openssh-server-5.3p1-94.el6.x86\_64
- openssh-5.3p1-94.el6.x86\_64
- telnet-0.17-47.el6\_3.1.x86\_64
- dos2unix-3.1-37.el6.x86\_64

## Required RPMs for Oracle Database 12c

The following packages, or later versions of them, are required for the Oracle 12c database on Red Hat.

- binutils-2.20.51.0.2-5.11.el6 (x86\_64)
- glibc-2.12-1.7.el6 (x86\_64)
- libgcc-4.4.4-13.el6 (x86\_64)
- libstdc++-4.4.4-13.el6 (x86\_64)
- libaio-0.3.107-10.el6 (x86\_64)
- libXext-1.1 (x86\_64)
- libXtst-1.0.99.2 (x86\_64)

- libX11-1.3 (x86\_64)
- libXau-1.0.5 (x86\_64)
- libxcb-1.5 (x86\_64)
- libXi-1.3 (x86\_64)
- make-3.81-19.el6
- sysstat-9.0.4-11.el6 (x86\_64)
- compat-libcap1-1.10-1 (x86\_64)
- compat-libstdc++-33-3.2.3-69.el6 (x86\_64)
- gcc-4.4.4-13.el6 (x86\_64)
- gcc-c++-4.4.4-13.el6 (x86\_64)
- glibc-devel-2.12-1.7.el6 (x86\_64)
- ksh (any version of ksh)
- libstdc++-devel-4.4.4-13.el6 (x86\_64)
- libaio-devel-0.3.107-10.el6 (x86\_64)



Note

If any of the preceding packages are missing, the installation fails.

To verify all required RPMs are installed, execute the following command as root:

- ```
rpm -q binutils compat-libcap compat-libstdc++ expect gcc gcc-c++ glibc glibc-devel ksh
libgcc libstdc++ libstdc++-devel libaio libaio-devel make numactl numactl-devel sysstat
--qf' %{name} . %{arch} \n' | sort
```

## Configuring Disk Group and Volumes

Table 3-4 and Table 3-5 show the disk partitions required for the dual-node cluster at the primary site.

When you set up the RHCS disk groups and volumes, keep the following in mind:

- All of the shared storage should have an ext3 file system installed.
- Shared storage must be accessible from all cluster nodes. For recommendations on the number of HDD, HDD types, HDD capacity, and RAID level contact your Cisco representative.
- Placing the individual directories in separate partitions is recommended, though not required.

Table 3-4 Prime Network Local Redundancy Cluster Volume Sizes

| Volume                          | Minimum Size (GB) | Comments                                                                                                          |
|---------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------|
| Prime Network                   | 50                | —                                                                                                                 |
| Oracle application + data files | 10                | —                                                                                                                 |
| Oracle redo logs                | 12.8              | —                                                                                                                 |
| Oracle archives                 | 20                | See the <i>Prime Network Capacity Planning Guide</i> . Contact your Cisco account representative for information. |

Table 3-4 Prime Network Local Redundancy Cluster Volume Sizes (continued)

| Volume                                                                                                                                                                                                                             | Minimum Size (GB) | Comments                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------|
| Oracle additional data files (if used)                                                                                                                                                                                             | —                 | Based on Prime Network alarm history needs. See the <i>Prime Network Capacity Planning Guide</i> . |
| Oracle backup                                                                                                                                                                                                                      | 50                | See the <i>Prime Network Capacity Planning Guide</i> .                                             |
| If Operations Reports is installed: <ul style="list-style-type: none"> <li>• Infobright data directory</li> <li>• Infobright cache directory</li> <li>• Infobright backup directory</li> <li>• Infobright DLP directory</li> </ul> | —                 | See the <i>Prime Network Capacity Planning Guide</i> and <i>Memory Assessment Tool</i> .           |

Table 3-5 Disk Groups

| Partition      | Space (in MB)                                                                                                                                                                                                |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| swap           | Twice the size of the physical memory, up to 96 GB.<br>For example, if your server has 16 GB RAM, the recommended swap space is 32 GB.<br>If your server has 64 GB RAM, the recommended swap space is 96 GB. |
| /tmp           | Standard amount of space + 5120                                                                                                                                                                              |
| /              | Standard amount of space + 6144                                                                                                                                                                              |
| /var           | Standard amount of space + 1024 for HA utilities                                                                                                                                                             |
| /usr/local/bin | Standard amount of space + 200 for cluster utilities                                                                                                                                                         |
| /etc           | Standard amount of space + 200 for cluster conf                                                                                                                                                              |

**Note**

Prime Network installation normally requires 1024 MB additional free space on the root partition. For HA, a temporary copy of Prime Network is installed under the root partition. Therefore, an additional 5120 MB free space is required, for a total of 6144 MB required free space. The HA files are installed under /usr/local/bin, /var, /etc., which requires a minimum of 1224 MB. You can add this amount to the root partition instead of creating a separate partition for each.

## Verify That All Servers Are Ready for Installation

Verify the following on all servers: disk access, Linux versions, and NTP sync on all servers:

- Access to all external disks is available.
- The same version of Linux is deployed on all servers. To check the version:

```
cat /etc/redhat-release
```

- Verify that the time is synchronized on both servers using NTP. For information on configuring NTP, see the [Cisco Prime Network 5.3 Installation Guide](#).

## Creating the Mount Points for Installation

Use this procedure to create mount points before setting up high availability.



Note

All servers in the local redundancy setup should have same mount points.

- Step 1** Log in as root user, and create the following directories:
- Prime Network home directory and Oracle directories.
- ```
mkdir -p /pn41
mkdir -p /opt/ora
mkdir -p /redo
mkdir -p /data
```
- Operations Reports directories (applicable for Operations Reports).
- ```
mkdir -p /ldata
mkdir -p /lcache
mkdir -p /lbackup
mkdir -p /ldlp
```
- Step 2** Mount the external shared storage on the relevant directories of the node from where you will run the installation. Mount it manually and do not add it to the fstab file. Comment out any corresponding entry to the shared storage in /etc/fstab for both cluster nodes.
- Step 3** If the embedded database mount points contained in networkdata/archive logs and control files are set outside the local disks, for example, on a SAN, make corresponding entries in /etc/fstab so the mount points are available during a reboot.
- Step 4** Mount all of the Oracle, Prime Network, Operations Reports mount points on the server where you will run the installation.

In this example, PRIMENETWORK and ORACLE are the sample label names:

```
mount -L PRIMENETWORK/pn41
mount -L ORACLE/opt/ora
mount -L PRIMENETWORK/redo
mount -L PRIMENETWORK/data
```

```
mount /dev/sda1 /ldata
mount /dev/sda2 /lcache
mount /dev/sda3 /lbackup
mount /dev/sda4 /ldlp
```

## Configure the Resources for Automatic Start After Reboot

For every cluster node, make sure the following resources are configured to start automatically each time the server is rebooted.

- modclusterd

- ricci
- rgmanager
- cman

For automatically starting these services, run the following command:

```
chkconfig modclusterd on
chkconfig ricci on
chkconfig rgmanager on
chkconfig cman on
```

Check that status of these services using the following command:

```
chkconfig --list ricci
ricci 0:off 1:off 2:off 3:off 4:off 5:off 6:off
```

The above output indicate the ricci service is disabled

```
chkconfig --list ricci
sshd 0:off 1:off 2:on 3:on 4:on 5:on 6:off
```

The above output indicate the ricci service is enabled

## Stopping the RHCS Services

Make sure that the Red Hat Cluster Suite rgmanager and cman services are turned off before installing Prime Network high availability on the gateway.

To turn off the RHCS services:

---

**Step 1** On P1, stop the rgmanager service using the following command:

```
service rgmanager stop
```

**Step 2** On P2, stop the rgmanager service using the following command:

```
service rgmanager stop
```

**Step 3** On P1, stop the cman service using the following command:

```
service cman stop
```

**Step 4** On P2, stop the cman service using the following command:

```
service cman stop
```

**Step 5** Enter the following command on all cluster nodes to verify the service status:

```
service rgmanager status
service cman status
```

**Step 6** The services are stopped.

For rgmanager stopped services the output is displayed as `clurgmgrd is stopped` and for cman as `ccsd is stopped`.

# Installing the Prime Network Gateway Local Redundancy Software

The local redundancy solution for dual-node cluster is installed using `install_prime_HA.pl` script that is available in `RH_ha.zip` file in the installation DVD as described in [Installation DVDs, page 1-1](#).

You can run the installation in interactive or in non-interactive mode. Interactive mode installation prompts you to enter the gateway HA data values one at a time. The Prime Network installer then updates the `auto_install_RH.ini` file template, which populates the `install_Prime_HA.pl` script.

Alternatively, you can enter all the installation values in the `auto_install_RH.ini` template, located in the `RH_ha` directory, then run the installation in non-interactive mode. The installation mode is determined by the presence or absence of the `-autoconf` flag.

**Note**

It is recommended you run the installation in interactive mode first to populate the `auto_install_RH.ini` template with the user input. This gives you the ability to verify the input and run the installation again in non-interactive mode, if needed.

This procedure installs gateway high availability for local redundancy with RHEL 6.5, 6.7, or 6.8.

- Step 1** Change to the root user, then unzip the `RH_ha.zip` located on the installation DVD. Unzipping `RH_ha.zip` creates the `/tmp/RH_ha` directory.



**Note** If you are running the Korn shell (`/bin/ksh`) and the prompt is the hash tag (`#`), the installation will fail. Run the installation script using `bash`.

- Step 2** From the `/tmp/RH_ha` directory run the `install_Prime_HA.pl` in interactive or non-interactive mode. For information on the `install_Prime_HA.pl` script, see [Installation DVDs, page 1-1](#).
- Step 3** For local redundancy *alone*, enter `local HA= yes, DR= no`, when prompted. See [Table 3-6](#) for the prompts that appears while installing local redundancy configuration.
- Step 4** Execute the `install_Prime_HA.pl` script in interactive or non-interactive method.

- **Interactive Installation:**

For interactive installation, execute the following commands:

```
cd /tmp/RH_ha
perl install_Prime_HA.pl
```

See [Table 3-6](#) for descriptions of other parameters you will be asked to enter at various stages of the interactive installation.

- **Non-Interactive Installation (Automatic):**

- a. Edit the `auto_install_RH.ini` file template found under the `RH_ha` directory with all of the installation details.
- b. Run the following command:

```
cd /tmp/RH_ha
perl install_Prime_HA.pl -autoconf <full-path-of-auto_install_RH.ini-file>
```



**Note** To prevent any security violation, it is highly recommended to remove the password in `auto_install_RH.ini` file after the successful installation.

After the `install_Prime_HA.pl` script is completed:

- Prime Network and embedded database will be installed on the setup node. The cluster standby node will have only the users and home directory.
- RHCS will be up and running the Prime Network (`ana`) and Oracle (`oracle_db`) services.

[Table 3-6](#) describes the prompts that you need to enter during the local redundancy installation.



**Note** If you experience problems, see [Troubleshooting the Local Redundancy Installation, page 3-20](#).

**Table 3-6** *Installation Prompts for Local Redundancy Alone*

| Prompt for                                      | Enter...                                       | Notes                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configure local HA?                             | yes                                            | —                                                                                                                                                                                                                                                                                              |
| Configure DR?                                   | no                                             | Enter <b>no</b> ; this procedure is for local redundancy <i>alone</i> .<br>To install local + geographical redundancy, see <a href="#">Installing the Prime Network Gateway Geographical Redundancy Software, page 4-6</a> .                                                                   |
| Configure NTP on 2 gateways?                    | yes                                            | <b>yes</b> or <b>no</b> depending on whether NTP should be configured on two gateways. If not configured, first configure NTP and then continue with the installation. For more details on procedures, see configuring NTP in the <a href="#">Cisco Prime Network 5.3 Installation Guide</a> . |
| OS user of the database                         | oracledb                                       | Oracle installation owner (default is oracle).                                                                                                                                                                                                                                                 |
| Prime Network OS user                           | <i>pnuser</i>                                  | User-defined Prime Network OS user ( <i>pnuser</i> ). Username must start with a letter and contain only the following characters: [A-Z a-z 0-9].                                                                                                                                              |
| Oracle user home directory                      | Home directory of user oracle                  | Location of the mount point given for the <i>oracle-home/oracle-user</i> . Default is <code>/opt/ora/oracle</code> .                                                                                                                                                                           |
| Home directory of the Prime Network user        | Example:<br><code>/export/home/ana/pn41</code> | Directory should be located under <i>Prime Network file system mount point</i> but <i>not</i> the mount point itself.                                                                                                                                                                          |
| Prime Network user password                     | <i>password</i>                                | User-defined password for the <i>pnuser</i> .                                                                                                                                                                                                                                                  |
| Location of the Prime Network installation file | Example: <code>/dvd/Server</code>              | Mount point of the Prime Network installation. Should be the same for all relevant nodes. Example: For <b>install.pl</b> the path will be <code>/dvd/Server</code> .                                                                                                                           |



Table 3-6 Installation Prompts for Local Redundancy Alone (continued)

| Prompt for                                 | Enter...                                             | Notes                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oracle mount point                         | Example: /opt/ora                                    | Location of Oracle mount points, separated by ",". First is the mount point for the Oracle home directory, for example, /opt/ora,/opt/dbf.<br><b>Note</b> For interactive installations: Installer asks you for a mount, then asks if you want to add another one. For non-interactive installations, enter all Oracle mount data in the input file.                                                                               |
| Configure another oracle file system mount | no                                                   | <b>yes</b> or <b>no</b> value indicating whether you want to use the default Oracle mount point or not                                                                                                                                                                                                                                                                                                                             |
| Prime Network mount point                  | Example: /export/home                                | Location of Prime Network mount point.                                                                                                                                                                                                                                                                                                                                                                                             |
| Directory for the Oracle zip files         | Example: /opt/ora/oracle_zip                         | Directory containing embedded Oracle zip files. Can be a temporary location where the files were copied from the installation DVDs; or directly specify the location on DVD.                                                                                                                                                                                                                                                       |
| Node one name                              | node 1 hostname                                      | Hostname for node running the installation. For local redundancy dual-node clusters, node must be one of the cluster nodes. This is the value returned by the system call hostname.                                                                                                                                                                                                                                                |
| Node two name                              | node 2 hostname                                      | hostname for the second cluster node for local redundancy dual-node clusters. This is the value returned by the system call hostname.                                                                                                                                                                                                                                                                                              |
| DB profile                                 | The number corresponding to the DB profile required. | Select from (1-7). Estimated DB profile.                                                                                                                                                                                                                                                                                                                                                                                           |
| Password for 5 built-in users              | password                                             | Password for Prime Network root, bosenable, bosconfig, bosusermgr, and web monitoring users (users for various system components). Passwords must contain: <ul style="list-style-type: none"> <li>• Contain at least eight alphanumeric characters.</li> <li>• Contain upper and lower case letters.</li> <li>• Contain one number and one special character.</li> <li>• Cannot contain:<br/>@ / ! \$ ~ * ( ) - + = [ {</li> </ul> |
| Running database backups.                  | yes/no                                               | Whether to enable embedded database automated backups.                                                                                                                                                                                                                                                                                                                                                                             |
| SMTP server                                | Example:<br>outbound.cisco.com                       | Local e-mail server.                                                                                                                                                                                                                                                                                                                                                                                                               |

Table 3-6 Installation Prompts for Local Redundancy Alone (continued)

| Prompt for                       | Enter...                                               | Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| User email                       | email address                                          | <p>E-mail address to which embedded database will send error messages.</p> <p>When a local HA Oracle database is switched to run on a different gateway either manually or automatically, the <b>oracle started in machine_name</b> notification will be emailed to the recipient with email address configured in oracle.sh. If you want a different recipient to receive the email notification, you need to manually update the oracle.sh file.</p> <p>For example,</p> <pre>[root@pslucbpngd1 ~]# less /usr/local/bin/oracle.sh #!/bin/bash # Global variables ORACLE_USER=oracle HOMEDIR=/oracle/oracle ORACLE_MOUNT1=/oracle ORACLE_MOUNT2=/oradata ORACLE_MOUNT3=/redo01 ORACLE_MOUNT4=/archduplex OVERRIDE_FILE=/var/tmp/override REC_LIST= jpratap@cisco.com</pre> |
| DB archive                       | Example:/opt/ora/oracle/arch                           | Location of the database archive files. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| DB redo                          | Example:<br>/opt/ora/oracle/redo                       | Location of database redologs. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| DB backup dest                   | Example:/opt/ora/oracle/back<br>up                     | Location of database backup files. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| DB datafiles                     | Example:/opt/ora/oracle/data                           | Location of database data files. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Oracle service IP address        | IP address                                             | Virtual IP of local cluster Oracle service group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Prime Network service IP address | IP address                                             | Virtual IP of local cluster Prime Network service group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Multicast address                | IP address                                             | An available multicast address accessible and configured for both cluster nodes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Prime Network cluster name       | <i>username</i>                                        | User-defined cluster name. The cluster name cannot be more than 15 non-NUL (ASCII 0) characters. For local HA, the cluster name must be unique within the LAN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Node one fence agent             | The number corresponding to the fencing agent required | Type of fencing device configured for node running the installation. (For information about supported fencing devices and information you may need to provide to the installation script, see supported fencing methods in <a href="#">Fencing Options, page 2-3.</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 3-6 Installation Prompts for Local Redundancy Alone (continued)

| Prompt for                                   | Enter...                                               | Notes                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Node one fence hostname                      | hostname                                               | Hostname of fencing device configured for the node running the installation (for some fencing devices, can be an IP address).                                                                                                                                                                          |
| Node one fence login                         | login name                                             | Login name for fencing device configured for node running the installation.                                                                                                                                                                                                                            |
| Node one fence passwd                        | password                                               | Password for fencing device configured for node running the installation.                                                                                                                                                                                                                              |
| Node two fence agent                         | The number corresponding to the fencing agent required | Type of fencing device configured for second cluster node. (For information about supported fencing devices and information you may need to provide to the installation script, see supported fencing methods in <a href="#">Fencing Options, page 2-3.</a> )                                          |
| Node two fence hostname                      | hostname                                               | Hostname of fencing device configured for second cluster node (for some fencing devices, can be an IP address ).                                                                                                                                                                                       |
| Node two fence login                         | login name                                             | Login name for fencing device configured for second cluster node.                                                                                                                                                                                                                                      |
| Node two fence passwd                        | password                                               | Password for fencing device configured for second cluster node.                                                                                                                                                                                                                                        |
| Prime Network cluster web interface password | port number and password                               | ort and the password for cluster web interface.<br><i>LUCI_PORT</i> must be available and should not be in Prime Network debug range:<br>$60000 \leq x < 61000$<br>or in Prime Network AVM port range:<br>$2000 \leq x < 3000$ or $8000 \leq x < 9000$<br>Password must contain at least 6 characters. |
| Prime Network cluster web interface port     |                                                        |                                                                                                                                                                                                                                                                                                        |

- Step 5** Configure the embedded database by running the **add\_emdb\_storage.pl** utility. In the following, *NETWORKHOME* is the Prime Network installation directory (*/export/home/pnuser* by default).
- a. Log in as *pnuser*.  

```
su - pnuser
```
  - b. Change directories to *NETWORKHOME/Main/scripts/embedded\_db* and enter the following command:  

```
perl add_emdb_storage.pl -ha
```

Enter the number corresponding to the estimated database profile that meets your requirement. For more information, contact your Cisco representative and obtain the *Prime Network Capacity Planning Guide*.
  - c. Insert the event and workflow archiving size in days. If you are not sure what to choose, take the default.

---

When you are done, validate the installation by following the steps in [Verifying the Local Redundancy Setup, page 3-21](#).

## Troubleshooting the Local Redundancy Installation

**1. Problem:** Installation fails.

**Solution:** Please review the following:

- Make sure all the necessary ports for installation are free, otherwise installation prerequisite verification returns an error that a needed port is blocked.
- For a virtual machine, if the installation prerequisite verification returns an error that swap space is insufficient, you can override the message and continue the installation by adding the following entry into the `auto_install_RH.ini` file.

```
OVERRIDE_SWAP=true
```




---

**Note** Changing the Override Swap value to True is not recommended because a Prime Network service might not function correctly without the required swap space.

---

- If the failure occurs because a parameter needs to change, save the `auto_install_RH.ini` file to a temporary directory, then remove the old `RH_ha` directory and files. After you remove the old directory and files, redeploy the **RH\_ha.zip** file. You must do this because installation changes the template files. However, after correcting the incorrect parameters, you can use the old `auto_install_RH.ini` file so you do not have to enter the correct input parameters again.
- If a local service (network/oracle\_db services) in a local redundancy configuration fails, RHCS will try to stop, unmount, mount, then start the service locally. If this does not succeed, RHCS will automatically try to relocate the service to the standby node.
- If the local redundancy cluster nodes lose connection to each other, they try to fence each other. The node that succeeds starts the cluster services.
- If a local redundancy service enters a stopped state and does not start automatically on either node, you can start the service using the RHCS web or CLI interface. Before you do this, review the cluster log located in the `/var/log/messages`.
- When you run the **install\_Prime\_HA.pl** script log files are created. These are located in `tmp/RH_ha`.
- If the Prime Network file replication (not the Oracle database) in a geographical redundant configuration fails, verify the root cron jobs on both the primary and remote sites. The cron list and scripts run by the crons are located in the `/var/adm/cisco/prime-network/scripts/ha/rsync` directory.



**Note**

---

If you need to reinstall an embedded database in a directory that previously contained an embedded database, you must manually remove the database. If you do not do this, the installation will fail.

---

**2. Problem:** PN service relocation fails.

**Description:** This occurs when the unmount operation fails.

**Solution:** Cisco Advanced Malware Protection (AMP) service has to be disabled to resolve this issue. Follow the below mentioned steps:

1. Check the status of Cisco AMP service. Execute the following command:

On RHEL 7.x:

```
systemctl status cisco-amp
```

On RHEL 6.x:

```
initctl status cisco-amp
```

- If Cisco AMP is enabled, execute the following commands to disable it:

On RHEL 7.x:

```
cd/opt/cisco/amp/bin
systemctl disable cisco-amp
systemctl stop cisco-amp
```

On RHEL 6.x:

```
cd/opt/cisco/amp/bin
initctl stop cisco-ampmon
```

- Perform service relocation.
- Re-enable Cisco AMP service after relocating the services. Execute the following commands:

On RHEL 7.x:

```
systemctl start cisco-amp
```

On RHEL 6.x:

```
initctl start cisco-ampmon
```

- Repeat Step 1 to verify the status of Cisco AMP service.

## Verifying the Local Redundancy Setup

To verify the installation, perform the verification steps in [Table 3-7](#). After you have verified the setup, proceed to [Post-Installation Tasks for Local Redundancy](#), page 3-24.

**Table 3-7** Local Redundancy Verification Tests

| Description                                                                                                                                       | Procedure                                                                                                                                                                                                                               | Expected Results                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Local Cluster Hardware Failure</i>                                                                                                             |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                    |
| <p><b>Name:</b> Cluster Node Hardware Failure</p> <p><b>Purpose:</b> Test the local site failover (including fence test) due to node failure.</p> | <ol style="list-style-type: none"> <li>Power off the active node that runs both services (Prime Network and DB).</li> <li>Verify that both services are relocated to the redundant node.</li> </ol>                                     | <p>Within several minutes, the redundant cluster node identifies that the active node is not available and fences it, evicting it from the cluster and relocating all the services to the only remaining node.</p> |
| <i>Manual Cluster Administration</i>                                                                                                              |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                    |
| <p><b>Name:</b> Manual Service Stop</p> <p><b>Purpose:</b> Verify that the service can be manually stopped.</p>                                   | <ol style="list-style-type: none"> <li>Enter:           <pre>clusvcadm -d service_name</pre> </li> <li>Verify the service is not running and no errors appear in the cluster log (/var/log/messages for both cluster nodes).</li> </ol> | <p>The stopped service is no longer running.</p>                                                                                                                                                                   |
| <p><b>Name:</b> Manual Service Start</p> <p><b>Purpose:</b> Verify that the service can be manually started.</p>                                  | <ol style="list-style-type: none"> <li>Run <pre>clusvcadm -e service_name</pre></li> <li>Verify that it is running and no errors exist in cluster log (/var/log/messages on both cluster nodes).</li> </ol>                             | <p>The service is running.</p>                                                                                                                                                                                     |

Table 3-7 Local Redundancy Verification Tests (continued)

| Description                                                                                                                                        | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Expected Results                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>Name:</b> Manual Service Relocation<br><b>Purpose:</b> Verify that the service can be manually relocated.                                       | <ol style="list-style-type: none"> <li>Enter:<br/> <code>clusvcadm -r service_name</code></li> <li>Verify that the service is not running on the current node and is running on the standby node.</li> <li>Verify that no errors appear in the cluster log (/var/log/messages on both cluster nodes). The service is stopped on the active node and then started on the redundant node.</li> <li>Test both the Prime Network and Oracle services.</li> </ol> | The service is stopped on the active node and started on the redundant node. |
| <i>Ordered Cluster Node Startups</i>                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                              |
| <b>Name:</b> Node Startup in Existing Cluster<br><b>Purpose:</b> Verify that a cluster node starts up and rejoins a cluster after it is restarted. | <ol style="list-style-type: none"> <li>Restart one of the cluster nodes.</li> <li>Verify that the node joins the cluster after the reboot.</li> <li>Relocate one of the services to the rebooted node and verify that it is running.</li> <li>Check the log for errors.</li> </ol>                                                                                                                                                                           | The rebooted node joins the cluster and runs the services.                   |
| <b>Name:</b> Simultaneous Node Startup<br><b>Purpose:</b> Verify that the cluster is set up correctly when both nodes start simultaneously.        | <ol style="list-style-type: none"> <li>Start both nodes from the power off state.</li> <li>Verify that both nodes appear in the cluster after they are up with both services are running on the cluster.</li> <li>Check the log for errors.</li> </ol>                                                                                                                                                                                                       | Both cluster nodes join the cluster; both services are running.              |
| <b>Name:</b> Single Node Startup<br><b>Purpose:</b> Test the cluster functionality when only one is node running.                                  | <ol style="list-style-type: none"> <li>Power down both nodes, then start one of them.<br/>The running node will fence the other node and run the services. The fenced node joins the cluster to create the dual node cluster.</li> <li>Check log for errors.</li> </ol>                                                                                                                                                                                      | Both cluster nodes join the cluster; both services are running.              |
| <i>Local Cluster Service Failure</i>                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                              |
| <b>Name:</b> Service Failure<br><b>Purpose:</b> Test the service startup after a failure occurs.                                                   | <ol style="list-style-type: none"> <li>Simulate a service failure by stopping its processes or shutting down the Oracle listener.</li> <li>Verify that the service restarts on the same node it was running.</li> <li>Check the log for errors.</li> <li>Test both the Prime Network and Oracle services.</li> </ol>                                                                                                                                         | The service is restarted on the same node.                                   |
| <i>Local Cluster HW Failure</i>                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                              |

Table 3-7 Local Redundancy Verification Tests (continued)

| Description                                                                                                                                                                  | Procedure                                                                                                                                                                                                                                                                                                                             | Expected Results                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Name:</b> Stop Node with Fencing Off</p> <p><b>Purpose:</b> Verify the node requires manual fencing after the other node, including its fencing agent, is removed.</p> | <ol style="list-style-type: none"> <li>1. Disconnect the fencing agent to one of the nodes, then power it off unexpectedly.</li> <li>2. Observe the other node behavior.</li> <li>3. Check the log for errors and the request for manual fencing.</li> </ol>                                                                          | <p>The fence_ack_manual required notification appears in the logs. A message is printed to /var/log/messages advising you to run the fence_ack_manual command on the gateway server.</p> <p>The cluster is running with one node and all services running on it.</p> |
| <p><b>Name:</b> Single Node Cluster</p> <p><b>Purpose:</b> Checks that the cluster can function when the other node does not exist at all, or have no power at all</p>       | <ol style="list-style-type: none"> <li>1. Power down both nodes,</li> <li>2. Disconnect the fencing agent to one of the nodes.</li> <li>3. Start the other node. It will attempt to fence the other node, but fail with the regular fencing agent. Manual fencing is required.</li> <li>4. Acknowledge the manual fencing.</li> </ol> | <p>The cluster does not start the services (and does not show in the clustat command) before acknowledging that manual fencing is performed.</p>                                                                                                                     |

*Verifying Cluster Services*

|                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <p><b>Name:</b> Verifying Cluster Services</p> <p><b>Purpose:</b> Verify that the cman and rgmanager services are running on both cluster nodes.</p> | <p>As the root user, enter the following command to verify the cluster and services are running:</p> <pre>clustat</pre> <p>Example:</p> <pre>[root@hostname RH_ha] clustat Cluster Status for network_cluster @ Mon Apr 16 10:01:02 2013 Member Status: Quorate  Member Name ID      Status ----- ----- hostname.cisco.com 1 Online, Local, rgmanager hostname2.cisco.com 2 Online, rgmanager  Service Name Owner (Last) State service:ana hostname.cisco.com started service:oracle_db          hostname.cisco.com started</pre> | <p>Verify that the cman and rgmanager services are running on both cluster nodes.</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

## Post-Installation Tasks for Local Redundancy

After you have validated the installation, perform these post-installation tasks:

- [Updating the Database Host in the Registry \(Only for NAT\), page 3-24](#)
- [Configuring the RHCS Web Interface \(Optional\), page 3-25](#)

### Updating the Database Host in the Registry (Only for NAT)

If you are using network address translation (NAT) with the Cisco Prime Network Vision client, update the database host in the Prime Network registry to contain the hostname instead of the IP address.

Complete the following mandatory steps after the Cisco Prime Network 5.3 gateway installation or upgrade is complete and the system is up and running.



#### Note

If you already use a hostname instead of an IP address, you do not have to repeat this procedure.

In the following procedure, *NETWORKHOME* is the Prime Network installation directory (/export/home/*pnuser* by default).

**Step 1** Before changing the hostname, verify that the Windows client workstations have the correct Domain Name System (DNS) mapping.

**Step 2** From *NETWORKHOME*/Main, enter the following commands:

```
./runRegTool.sh -gs 127.0.0.1 set 0.0.0.0 site/persistency/nodes/main/Host
database-server-hostname
./runRegTool.sh -gs 127.0.0.1 set 0.0.0.0 site/persistency/nodes/ep/Host
database-server-hostname
```

During switchover, you should unset the entries in the site.xml file and then reset using the following commands:

```
./runRegTool.sh -gs 127.0.0.1 set 0.0.0.0 persistency/nodes/main/Host
database-server-hostname
./runRegTool.sh -gs 127.0.0.1 set 0.0.0.0 persistency/nodes/ep/Host
database-server-hostname
```

You can also change the FQDN in all nodes of persistency.xml.

Example:

```
./runRegTool.sh -gs 127.0.0.1 set 0.0.0.0 persistency/nodes/infobright/Host
database-server-hostname
./runRegTool.sh -gs 127.0.0.1 set 0.0.0.0 persistency/nodes/ep_rep/Host
database-server-hostname
./runRegTool.sh -gs 127.0.0.1 set 0.0.0.0 persistency/nodes/main_rep/Host
database-server-hostname
./runRegTool.sh -gs 127.0.0.1 set 0.0.0.0 persistency/nodes/admin/Host
database-server-hostname
./runRegTool.sh -gs 127.0.0.1 set 0.0.0.0 persistency/nodes/xmp/Host
database-server-hostname
```

**Step 3** Enter the following command to restart the Prime Network system:

```
networkctl restart
```



## Configuring the RHCS Web Interface (Optional)

The RHCS web interface is configured during the install process. Use the information provided in this section only if you decide to change the configuration of the web interface at a later stage or if the web interface was not configured during the installation process.

The RHCS “luci” web interface allows you to configure and manage storage and cluster behavior on remote systems. You will use it to manage the Prime Network gateway HA. Before you begin this procedure, you should have the Red Hat *Conga User Manual*. It can be obtained at:

[http://sources.redhat.com/cluster/conga/doc/user\\_manual.html](http://sources.redhat.com/cluster/conga/doc/user_manual.html)

If your fencing device is supported by RHCS but not listed in [Fencing Options, page 2-3](#), that is, you chose the Manual fencing option during the installation, manually configure the device using the Red Hat fencing configuration documentation. This can be obtained at:

[http://docs.redhat.com/docs/en-US/Red\\_Hat\\_Enterprise\\_Linux/5/pdf/Configuration\\_Example\\_-\\_Fence\\_Devices/Red\\_Hat\\_Enterprise\\_Linux-5-Configuration\\_Example\\_-\\_Fence\\_Devices-en-US.pdf](http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/5/pdf/Configuration_Example_-_Fence_Devices/Red_Hat_Enterprise_Linux-5-Configuration_Example_-_Fence_Devices-en-US.pdf)



**Note**

The following procedure provides the general steps to configure the luci interface. See the Red Hat *Conga User Manual* for details on performing steps in this procedure.



**Note**

The RHCS web interface must be configured for both servers in the local redundant dual-node cluster.

**Step 1** As root user, run the following command and enter the needed details:

```
luci_admin init
```

**Step 2** Edit `/etc/sysconfig/luci` to change the default port to an available port. (The default 8084 port is used by Prime Network.) For example:

```
defaults for luci,
web UI fronted for remote cluster and storage management
```

```
LUCI_HTTPS_PORT=8085
```



**Note**

The ports must be available and should not be in Prime Network debug range (60000 <= X < 61000) or in Prime Network avm port range (2000 <= X < 3000 or 8000 <= X < 9000)

**Step 3** As the root user, enter:

```
service luci restart
```

**Step 4** Enter the web interface using the following link:

```
https://node host name:port
```

From the RHCS web interface you can stop, start, and relocate the Prime Network and oracle\_db services managed by the cluster.

- Step 5** In the luci web interface, add the cluster that was configured by the Prime Network installation. See the Red Hat *Conga User Manual* for details on performing the following:
- Add a system.
  - Add an existing cluster.
  - Add a user.
- Step 6** If your fencing device is supported by RHCS but not listed in [Fencing Options, page 2-3](#), use the Red Hat fencing configuration guide to configure the device.




---

**Note** If you provision a new fencing device, set it as the primary fencing method. The manual fencing agent should be kept as the backup fencing method.

---

## Maintaining Local Redundancy

After the local redundancy cluster is deployed, failovers are automatic. In case of a single service failure, the cluster will attempt to restart the service. If the retries fail, the service will be relocated to the second node and started on that node. This does not impact the other service in the cluster.




---

**Note** For complete redundancy, a configuration with no single point of failure is recommended. See the RHCS documentation for recommended configurations.

---

- [Monitoring Log Messages, page 3-26](#)
- [Monitoring Cluster Status Using the CLI, page 3-27](#)
- [Monitoring Cluster Status Using the GUI, page 3-27](#)
- [Managing the Local Redundancy Cluster, page 3-27](#)
- [Manually Fencing, page 3-29](#)

## Monitoring Log Messages

The RHCS log messages provide information about cluster-related issues, such as service failure.

Every 30 seconds, RHCS issues status commands to check the Prime Network, Oracle, and Oracle listener processes. These messages are logged to `/var/log/messages` and can be viewed by the root user (or from the RHCS web GUI). The following are some example messages.

```
Mar 23 13:45:47 hostname clurgmgrd: [27961]: <info> Executing /usr/local/bin/ana.sh status
Mar 23 13:46:07 hostname clurgmgrd: [27961]: <info> Executing /usr/local/bin/oracle.sh
status
Mar 23 13:46:07 hostname clurgmgrd: [27961]: <info> Executing /usr/local/bin/lsnr.sh
status
```

## Monitoring Cluster Status Using the CLI

You can use the `clustat` command checks a cluster's members and overall status.

As the root user, enter the following command to verify the cluster and services are running:

```
clustat
```

In the following example, the cluster name is `ana_cluster` and `hostname.cisco.com` is the node from which the command was run.

```
root@hostname.cisco.com] clustat
Cluster Status for ana_cluster @ Thu Mar  3 10:24:50 2014
Member Status: Quorate

Member Name                ID      Status
-----
hostname.cisco.com         1      Online, Local, rgmanager
hostname2.cisco.com        2      Online, rgmanager

Service Name                Owner (Last)      State
-----
service:ana                 hostname.cisco.com  started
service:oracle_db           hostname2.cisco.com  started
```

## Monitoring Cluster Status Using the GUI

The RHCS web interface is automatically configured by the Prime Network installation script. If the interface was not configured during the installation process, use the procedure in [Configuring the RHCS Web Interface \(Optional\)](#) section to configure RHCS Web GUI. For details on how to use the web GUI, see the appropriate RHCS documentation.

Web GUI is used to:

- Check the cluster status, including the status of each service and the node each service is running on.
- Initiate a switchover of a service to the other node (relocate the service from the Services area of the GUI).

You can connect to the RHCS web interface by entering the following in the address field of your browser: **`https://cluster-node-hostname:port/luci`**.

## Managing the Local Redundancy Cluster

You can use `clusvcadm` command to check the version of the RHCS used on the cluster, stop, restart the cluster services and so on. To manage the cluster from the CLI, enter:

```
[root@hostname RH_ha] clusvcadm
```

[Table 3-8](#) shows the RHCS `clusvcadm` command options to manage the cluster.

*Table 3-8 RHCS CLI Commands*

| <code>clusvcadm +</code> | Description              |
|--------------------------|--------------------------|
| <code>-v</code>          | Display version and exit |
| <code>-d group</code>    | Disable <i>group</i>     |

Table 3-8 RHCS CLI Commands (continued)

| <b>clusvcadm +</b>              | <b>Description</b>                                                     |
|---------------------------------|------------------------------------------------------------------------|
| <code>-e group</code>           | Enable <i>group</i>                                                    |
| <code>-e group -F</code>        | Enable <i>group</i> according to failover domain rules                 |
| <code>-e group -m member</code> | Enable <i>group</i> on <i>member</i>                                   |
| <code>-r group -m member</code> | Relocate <i>group</i> to <i>member</i>                                 |
| <code>-M group -m member</code> | Migrate <i>group</i> to <i>member</i> (e.g. for live migration of VMs) |
| <code>-R group</code>           | Restart a <i>group</i> in place                                        |
| <code>-s group</code>           | Stop <i>group</i>                                                      |
| <code>-Z</code>                 | Freeze <i>group</i> in place                                           |
| <code>-U</code>                 | Unfreeze/thaw <i>group</i>                                             |

To restart Prime Network, Oracle, or (if installed) Operations Reports application processes, use the following procedure.

- Step 1** Place the Prime Network and database RHCS services in maintenance mode (also called freezing) using the following command, where *service* is **ana**, **oracle\_db**, or **ifb**.

```
clusvcadm -Z service
```

- Step 2** Confirm that the services are in maintenance mode. Run **clustat** and verify that the output shows the service followed by a [Z], which indicates the service is in maintenance mode (frozen). When the services are frozen, the cluster does not monitor them.

```
root@hostname.cisco.com] clustat
Cluster Status for ana_cluster @ Thu Mar  3 12:31:55 2013
Member Status: Quorate

Member Name                ID          Status
-----
hostname.cisco.com         1          Online, rgmanager
hostname.cisco.com         2          Online, Local, rgmanager

Service Name                Owner (Last)      State
-----
service:ana                 hostname.cisco.com started [Z]
service:oracle_db           hostname.cisco.com started [Z]
```

**Note**

If you attempt to restart either the Prime Network, Oracle, or Infobright applications without freezing the RHCS process, the cluster may detect that the services are down and attempt to restart them.

- Step 3** After confirming that the **ana**, **oracle\_db**, and **ifb** cluster configured services are frozen, use the normal application commands to stop Prime Network and Oracle.

```
clusvcadm -s group
```

- Step 4** After restarting the Prime Network, Oracle, and Infobright applications, move the RHCS services out of freeze mode and reinitiate the cluster's monitoring of the ana and oracle services:

```
clusvcadm -U group
```

## Manually Fencing

During the installation of the RHCS solution, you are prompted to select one of three fencing options. You can reconfigure the fencing choice at any time using the RHCS web interface or other RHCS tools. If you choose manual fencing, you must disconnect the node and storage when a problem occurs (either by disconnecting the node and storage by hand or by using another fencing agent).



Note

We recommend that manual fencing only be used on a temporary basis. If you use manual fencing, it is your responsibility to make sure that when an error occurs, the node and the storage are disconnected during the cluster workflow. We recommend that manual fencing only be used on a temporary basis and as a backup for your chosen fencing agent.

If you are using manual fencing and an error occurs that requires fencing intervention, a message is printed to `/var/log/messages` advising you to run the **fence\_ack\_manual** command on the gateway server.



Note

(Only for Red Hat 6.x)

- Before disconnecting the faulty node, remove the **cman** and **rgmanager** services from the automatic startup sequence. This is to avoid the failure when the restored node joins the cluster. You can remove these services by using the commands,

```
chkconfig -del cman  
chkconfig -del rgmanager
```

- Start these services after the servers are restored using the following command:

```
service cman start  
service rgmanager start
```

Use the procedure below to disconnect the faulty node.

**Step 1** Log into the gateway server as root and enter the command using the following syntax.

```
fence_ack_manual -n nodename
```

where **n** *nodename* indicates the node that has been disconnected from storage.



Note

For Red Hat 6.x, use only **fence\_ack\_manual** *nodename*.

**Step 2** Continue with the confirmation message to disconnect the faulty node from the storage.

## Uninstalling Local Redundancy

To uninstall local redundancy setup, follow the procedure provided below. The procedure also removes the operations reports if installed.

---

**Step 1** Determine the active and standby cluster nodes using the following command:

**clustat**

**Step 2** Stop cluster services on the standby nodes using the following command:

**service regmanager stop**

**service cman stop**

**Step 3** Uninstall the Prime Network on the standby nodes by choosing **Yes** to all the prompts. The process uninstalls the Prime Network even if the disks are not mounted on the secondary nodes.

**/var/adm/cisco/prime-network/reg/current/uninstall.pl**

**Step 4** Verify if the configuration file (cluster.conf) located at **/etc/cluster/cluster.conf** is either deleted or rolled back to the state before the Prime Network is installed.

**Step 5** Stop the cluster services on the active node using the following commands:

**service regmanager stop**

**service cman stop**



**Note**

---

Verify if ana/oracle disks are not mounted by using the command **df -h**

---

**Step 6** Manually remount the filesystems used by the cluster on the correct mounting points. This is because shutting down the cluster results in dismounting of all filesystems related to the cluster services.

**Step 7** Uninstall Prime Network on the active node using the following command.

**/var/adm/cisco/prime-network/reg/current/uninstall.pl**

**Step 8** Verify if the configuration file (cluster.conf) located at **/etc/cluster/cluster.conf** is either deleted or rolled back to the state before the Prime Network is installed.

---

## Installing and Configuring PN-IL with Local Redundancy

This section explains how to install and configure the Prime Network Integration Layer (PN-IL) 1.2 with a Prime Network gateway local redundancy deployment. It also explains how to integrate the deployment with Cisco Prime Central. For information on the Prime Central releases with which you can install PN-IL 1.2, see the [Cisco Prime Network 5.3 Release Notes](#).

These topics provide the information you will need to install and configure PN-IL local redundancy:

- [Installation DVD](#), page 3-31
- [Steps for Installing PN-IL with Local Redundancy](#), page 3-31
- [Installing PN-IL on a Prime Network Server \(Local Redundancy\)](#), page 3-32
- [Configuring PN-IL on a Prime Network Gateway \(Local Redundancy\)](#), page 3-33
- [Disabling the PN-IL Health Monitor](#), page 3-36

If you want to migrate an *existing* standalone installation of PN-IL (with local redundancy) to suite mode, you can use the procedure in [Configuring PN-IL with Prime Central \(Suite Mode with Local Redundancy\)](#), page 3-34.

## Installation DVD

The PN-IL high availability files are provided on the Prime Network installation DVD named **Disk 1: New Install DVD**. **Disk 2** contains the tar file **sil-esb-2.3.0.tar.gz**, which contains the PN-IL installation files and scripts, including:

- `installAndConfigureESB.sh`—PN-IL installation script
- `itgetl`—PN-IL configuration script
- `il-watch-dog.sh`—PN-IL health monitor control script
- `DMSwitchToSuite.sh`—Script to migrate to suite

## Steps for Installing PN-IL with Local Redundancy

[Table 3-9](#) provides the basic steps you must follow to set up local redundancy for PN-IL.



Note

Install PN-IL only on the primary server.

If you want to migrate an *existing* standalone installations of PN-IL (with local redundancy) to suite mode, see the procedure in [Configuring PN-IL with Prime Central \(Suite Mode with Local Redundancy\)](#), page 3-34.

**Table 3-9** Steps for Installing PN-IL Local Redundancy

|        | Task                                                                                  | Topic/Action Required                                                                                                                                                                                                                                                                                                                                                                                                                             | Server (P1)<br>(has<br>Primary<br>database) | Server (P2) |
|--------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------------|
| Step 1 | Collect server details, so that you have all information handy prior to installation. | <ul style="list-style-type: none"> <li>• Virtual IP address of P1</li> <li>• Prime Network application root username and password for P1</li> <li>• URL for authenticating Prime Network calls on P1 (normally <b>https://localhost:6081/ana/services/userman</b>)</li> <li>• (Suite mode) For the Prime Central server where Oracle is installed: Hostname, database service name, database username and password, and database port.</li> </ul> | x                                           | —           |
| Step 2 | Verify the server meets the prerequisites.                                            | <a href="#">Installation Requirements for Local Redundancy</a> , page 3-4                                                                                                                                                                                                                                                                                                                                                                         | x                                           | —           |
| Step 3 | Freeze RHCS and install PN-IL.                                                        | <a href="#">Installing PN-IL on a Prime Network Server (Local Redundancy)</a> , page 3-32                                                                                                                                                                                                                                                                                                                                                         | x                                           | —           |

Table 3-9 Steps for Installing PN-IL Local Redundancy (continued)

|        | Task                                                             | Topic/Action Required                                                                      | Server (P1)<br>(has<br>Primary<br>database) | Server (P2) |
|--------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------|-------------|
| Step 4 | Configure PN-IL (in standalone or suite mode) and unfreeze RHCS. | <a href="#">Configuring PN-IL on a Prime Network Gateway (Local Redundancy), page 3-33</a> | x                                           | —           |
| Step 5 | Disable the PN-IL Health Monitor                                 | <a href="#">Disabling the PN-IL Health Monitor, page 3-36</a>                              | x                                           | —           |

## Installing PN-IL on a Prime Network Server (Local Redundancy)

### Before You Begin:

Make sure Prime Network is installed and running on the cluster.

In the following procedure, \$ANAHOME is the *pnuser* environment variable for the Prime Network installation directory (/export/home/*pnuser* by default). To install PN-IL on a server running Prime Network local redundancy software:

- Step 1** On the primary cluster node (P1), log in as root and freeze the ana service.



**Note** The cluster server should be the active node where the ana service is running.

```
ssh root@active-cluster-node
clusvcadm -Z ana
```

- Step 2** As *pnuser* (the operating system user for the Prime Network application), log into the active node where you froze the ana service.

```
su - pnuser
```

For example:

```
su - pn41
```

- Step 3** Create an installation directory for PN-IL.

```
mkdir -p $ANAHOME/new-pnil-dir
```

For example, if the Prime Network installation directory was /export/home/pn41, you would run this command to create an installation directory called pn1l:

```
mkdir -p $ANAHOME/pn1l
```

- Step 4** Copy the installation files from the installation DVD, extract them, and start the installation script. These examples use the PN-IL installation directory named pn1l.

- a. Copy the PN-IL installation tar file from Disk 2 to the directory you created in [Step 3](#).

```
cp /tmp/sil-esb-2.3.0.tar.gz $ANAHOME/pn1l
```

- b. Change to the directory you created in [Step 3](#) and extract the PN-IL installation tar:

```
cd $ANAHOME/pn1l
tar -zxf sil-esb-2.3.0.tar.gz
```



- c. Change to directory where the installation tar files were extracted and run the installation script:

```
cd sil-esb-2.3.0/install/packages
./installAndConfigureEsb.sh
```

- Step 5** Reload the user profile using the following command:

```
source $ANAHOME/.cshrc
```

Next, perform the necessary configuration steps that are described in [Configuring PN-IL on a Prime Network Gateway \(Local Redundancy\)](#), page 3-33.

## Configuring PN-IL on a Prime Network Gateway (Local Redundancy)

If you are using Prime Network in standalone mode—that is, without Prime Central—configure PN-IL using the instructions in [Configuring PN-IL with Prime Network \(Standalone Mode with Local Redundancy\)](#), page 3-33.

If you are using Prime Network with Prime Central, configure PN-IL as described in [Configuring PN-IL with Prime Central \(Suite Mode with Local Redundancy\)](#), page 3-34.

## Configuring PN-IL with Prime Network (Standalone Mode with Local Redundancy)

In standalone mode, Prime Network is not integrated with Prime Central and can independently expose MTOSI and 3GPP web services to other OSS/applications. In the following procedure, \$PRIMEHOME is the *pnuser* environment variable for the PN-IL installation directory you created in [Installing PN-IL on a Prime Network Server \(Local Redundancy\)](#), page 3-32.

- Step 1** As *pnuser*, configure PN-IL in standalone mode using the following command:

```
itgctl config 1 --anaPtpServer ana-cluster-ip --anaPtpUser pn-root-user --anaPtpPw
pn-root-user-password --authURL network-authentication-URL
```

**itgctl** uses these arguments.

| Options and Arguments                       | Description                                                                                                               |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| --anaPtpServer <i>ana-cluster-ip</i>        | Specifies the virtual IP of the Prime Network primary cluster server.                                                     |
| --anaPtpUser <i>pn-root-user</i>            | Specifies the name of Prime Network application root user (usually <b>root</b> ).                                         |
| --anaPtpPw <i>pn-root-user-password</i>     | Specifies the password for Prime Network application root user.                                                           |
| --authURL <i>network-authentication-URL</i> | Specifies the URL used to authenticate Prime Network calls (usually <b>https://localhost:6081/ana/services/userman</b> ). |

For example:

```
itgctl config 1 --anaPtpServer 192.0.2.22 --anaPtpUser root --anaPtpPw myrootpassword
--authURL https://192.0.2.22:6081/ana/services/userman
```

**Step 2** Start PN-IL by using the following command:

```
$PRIMEHOME/bin/itgctl start
```

**Step 3** Log out as *pnuser* and log back in as the operating system root user.

**Step 4** Unfreeze the ana service.

```
clusvcadm -U ana
```

**Step 5** Enable NBI:

```
cd $PRIMEHOME/install/scripts  
./accessconfig.sh nbi enable
```

---

Next, disable the PN-IL health monitor as described in [Disabling the PN-IL Health Monitor, page 3-36](#).

## Configuring PN-IL with Prime Central (Suite Mode with Local Redundancy)



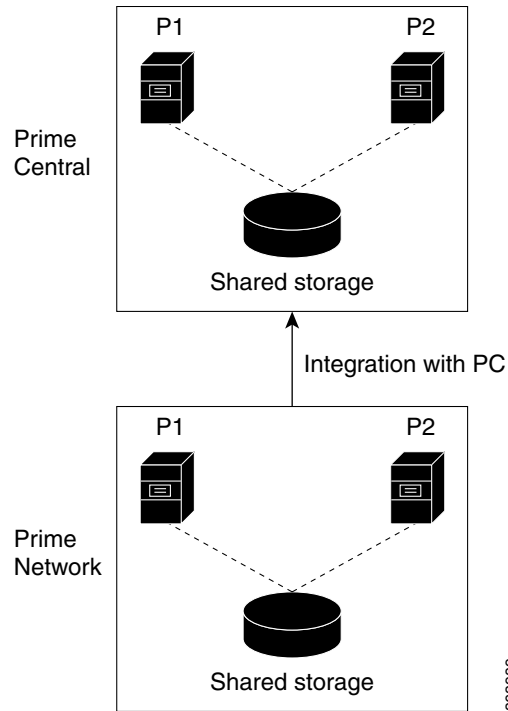
**Note** Use this procedure only after installing the PN-IL as described in [Installing and Configuring PN-IL with Local Redundancy, page 3-30](#).

When Prime Network is in suite mode, it is integrated with Prime Central. This procedure explains how to integrate PN-IL with a deployment of Prime Central that is using gateway local redundancy. You can use this procedure for:

- New installations of PN-IL with local redundancy.
- Existing standalone installations of PN-IL with local redundancy, that you want to move from standalone to suite mode.

[Figure 3-2](#) illustrates the deployment of local redundancy in Suite Mode.

Figure 3-2 Local Redundancy Suite Mode



In the following procedure, \$PRIMEHOME is the *pnuser* environment variable for the PN-IL installation directory you created in [Installing PN-IL on a Prime Network Server \(Local Redundancy\)](#), page 3-32.

### Before You Begin

Make sure Prime Network is in suite mode. For information on integrating Prime Network with Prime Central, refer to the [Cisco Prime Central Quick Start Guide](#).

**Step 1** Edit the necessary integration files and run the integration script:

- a. Log into the Prime Network primary gateway server as *pnuser* and change to the \$PRIMEHOME/integration directory.

```
cd $PRIMEHOME/integration
```

- b. Edit the **ILIntegrator.prop** file and change the value of the 'HOSTNAME' property to ana-cluster-ana, which is the fixed name for the Prime Network cluster server.

```
HOSTNAME=ana-cluster-ana
```

- c. Execute the following integration script to integrate PN-IL into the deployment:



**Note** When you run DMIntegrator.sh, you must exactly follow the format below or the script will fail.

```
./DMIntegrator.sh -a ILIntegrator.prop prime-central-db-hostname
prime-central-db-service-name prime-central-db-user prime-central-db-user-password
prime-central-port-number
```

**DMIntegrators.sh** uses these variables. You must enter them in this exact order.

| DMIntegrator.sh Variable              | Description                                                                  |
|---------------------------------------|------------------------------------------------------------------------------|
| <i>prime-central-db-hostname</i>      | Specifies the IP address of the Prime Central database server                |
| <i>prime-central-db-service-name</i>  | Specifies the name of Prime Central database service                         |
| <i>prime-central-db-user</i>          | Specifies the name of Prime Central database user (usually <b>primedba</b> ) |
| <i>prime-central-db-user-password</i> | Specifies the password for Prime Central database user                       |
| <i>prime-central-db-port</i>          | Specifies the port for Prime Central database (usually <b>1521</b> )         |

Example:

```
./DMIntegrator.sh -a ILIntegrator.prop 10.10.10.10 primedb primedba mypassword 1521
```

**Step 2** Reload the user profile:

```
source $PRIMEHOME/.cshrc
```

**Step 3** Start PN-IL:

```
$PRIMEHOME/bin/itgctl start
```

**Step 4** Log out as pnuser and log back in as the operating system root user.

**Step 5** Unfreeze the ana service.

```
clusvcadm -U ana
```

**Step 6** Enable NBI:

```
cd $PRIMEHOME/install/scripts
./accessconfig.sh nbi enable
```

Next, disable the PN-IL health monitor as described in [Disabling the PN-IL Health Monitor, page 3-36](#).

## Disabling the PN-IL Health Monitor

When PN-IL is installed in a local redundancy deployment, the RHCS cluster service monitors PN-IL's status. Therefore, you should disable the PN-IL health monitor.

To disable the PN-IL health monitor, log in as *pnuser* and execute the following command:

```
$PRIMEHOME/local/scripts/il-watch-dog.sh disable
```



# Installing and Maintaining Gateway Geographical Redundancy

The following topics provide procedures for setting up, installing, and maintaining the gateway geographical redundancy solution. Geographical redundancy is configured and monitored using Oracle Active Data Guard (ADG) for geographical redundancy. This chapter explains how to install Prime Network Operations Reports and the Prime Network Integration Layer (PN-IL) with gateway geographical redundancy and the recommended procedures to upgrade Prime Network in Geographical redundancy setup without the downtime.



**Note**

Gateway high availability is supported only when the gateway software, Oracle database, and Infobright database (applicable for Operations Reports) are installed on the same server.

Also, you can upgrade Prime Network in Geographical redundancy without the network downtime.

This chapter covers the following topics:

- [Steps for Installing the Geographical Redundancy Solution, page 4-2](#)
- [Installation Requirements for Geographical Redundancy, page 4-4](#)
- [Preparing to Install Geographical Redundancy, page 4-6](#)
- [Installing the Prime Network Gateway Geographical Redundancy Software, page 4-6](#)
- [Verifying the Geographical Redundancy Setup, page 4-15](#)
- [Maintaining Geographical Redundancy, page 4-17](#)
- [Uninstalling the Geographical Redundancy Software, page 4-19](#)
- [Installing and Configuring PN-IL for Local + Geographical Redundancy, page 4-20](#)
- [Installing and Configuring PN-IL for Geographical Redundancy Only, page 4-28](#)
- [Upgrading Prime Network in Geographical Redundancy without Network Down Time, page 4-34](#)

Before proceeding with this chapter, make sure you have read [Geographical Redundancy Functional Overview, page 2-5](#).

# Steps for Installing the Geographical Redundancy Solution

Table 4-1 lists the steps you must follow to prepare for an installation, perform an installation and verify an installation of the Prime Network gateway geographical redundancy solution. The standby P2 node is only relevant if you are installing geographical + local redundancy. An x means you must perform the step *on that server*.


**Note**

The steps in the following table area based on these assumptions:

- For geographical redundancy *only*: Node P1 is the active node and has the primary database. (Installation prompts for geographical redundancy *only* are provided in [Table 4-4 on page 4-8](#).)
- For geographical + local redundancy: Node P1 has the primary database. The local site will also have a standby node (P2); it should be configured as described in is the local redundancy standby node. (The installation prompts for geographical + local redundancy are provided in [Table 4-5 on page 4-10](#).)

**Table 4-1** Steps for Setting Up and Installing Geographical Redundancy

|               |                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                          | Local                        |                              | Remote    |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------|-----------|
|               |                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                          | Primary Node P1 <sup>1</sup> | Standby Node P2 <sup>2</sup> | DR NodeS1 |
| <b>Step 1</b> | Collect the server details so that you have all information handy prior to installation.                                                                      | <ul style="list-style-type: none"> <li>• Prime Network Virtual IP address</li> <li>• Oracle IP address</li> <li>• Oracle virtual IP address for Local HA /Geo+local HA</li> <li>• Node1, Node 2, DR Node Hostname and IP address.</li> </ul>                                                                                                                                                             | x                            | x                            | x         |
| <b>Step 2</b> | Verify that the servers meet the prerequisites.                                                                                                               | <a href="#">Installation Requirements for Geographical Redundancy, page 4-4</a>                                                                                                                                                                                                                                                                                                                          | x                            | x                            | x         |
| <b>Step 3</b> | Configure the server hardware.<br><b>Note</b> If your setup contains primary and a remote site, make sure the remote site is the replica of the primary site. | <ul style="list-style-type: none"> <li>• Geographical and local redundancy: If you have dual-node cluster configured at the primary site, see <a href="#">Configuring Hardware and External Storage for Red Hat Cluster Site, page 3-8</a>.</li> <li>• Geographical redundancy only: See the gateway hardware requirements in the <a href="#">Cisco Prime Network 5.3 Installation Guide</a>.</li> </ul> | x                            | x                            | x         |
| <b>Step 4</b> | Install the RHEL and all recommended patches on the servers.                                                                                                  | <a href="#">Installing RHEL and Verifying the Version, page 3-9</a>                                                                                                                                                                                                                                                                                                                                      | x                            | x                            | x         |

Table 4-1 Steps for Setting Up and Installing Geographical Redundancy (continued)

|                |                                                                                                                                                          |                                                                                     | Local                        |                              | Remote    |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------|------------------------------|-----------|
|                |                                                                                                                                                          |                                                                                     | Primary Node P1 <sup>1</sup> | Standby Node P2 <sup>2</sup> | DR NodeS1 |
| <b>Step 5</b>  | Install the RPMs required on Red Hat for Prime Network.<br><br>If you are installing Operations Reports, be sure to check this section.                  | <a href="#">Installing RPMs Required on Red Hat for Prime Network, page 3-9</a>     | x                            | x                            | x         |
| <b>Step 6</b>  | Configure disk groups, volumes, and partitions.<br><br>If you are installing Operations Reports, be sure to check the required volume sizes.             | <a href="#">Configuring Disk Group and Volumes, page 3-11</a>                       | x                            | x                            | x         |
| <b>Step 7</b>  | Mount the installation files (in the same directory on both nodes).                                                                                      | —                                                                                   | x                            | x                            | x         |
| <b>Step 8</b>  | Verify that all nodes are ready for installation by checking disk access, Linux versions, and NTP synchronization.                                       | <a href="#">Verify That All Servers Are Ready for Installation, page 3-12</a>       | x                            | x                            | x         |
| <b>Step 9</b>  | Configure the disk partitions.                                                                                                                           | <a href="#">Configuring Disk Group and Volumes, page 3-11</a>                       | x                            | x                            | x         |
| <b>Step 10</b> | Mount the external shared storage, Oracle, and Prime Network mount points on the relevant directories.                                                   | <a href="#">Creating the Mount Points for Installation, page 3-13</a>               | x                            | x                            | —         |
| <b>Step 11</b> | Back up the /etc/host and root cron jobs files (the installation software will modify them).                                                             | —                                                                                   | x                            | x                            | x         |
| <b>Step 12</b> | (Local + geographical) For cluster node makes sure the specified resources are configured to start automatically each time the machine is rebooted.      | <a href="#">Configure the Resources for Automatic Start After Reboot, page 3-13</a> | x                            | x                            | —         |
| <b>Step 13</b> | (Local + geographical) Stop the RHCS services.<br><br><b>Note</b> Except for RHEL 7.2 and above versions, all other earlier RHEL versions are supported. | <a href="#">Stopping the RHCS Services, page 3-14</a>                               | x                            | x                            | x         |

Table 4-1 Steps for Setting Up and Installing Geographical Redundancy (continued)

|         |                                                                                                           |                                                                                                  | Local                        |                              | Remote    |
|---------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------|------------------------------|-----------|
|         |                                                                                                           |                                                                                                  | Primary Node P1 <sup>1</sup> | Standby Node P2 <sup>2</sup> | DR NodeS1 |
| Step 14 | Install the server and Oracle database using <code>install_prime_HA.pl</code> .                           | <a href="#">Installing the Prime Network Gateway Geographical Redundancy Software</a> , page 4-6 | x                            | —                            | —         |
| Step 15 | Configure the embedded database (using the <code>add_emdb_storage.pl -ha</code> script).                  |                                                                                                  | x                            | —                            | —         |
| Step 16 | Configure the remote site (S1) (execute <code>setup_prime_DR.pl</code> )                                  |                                                                                                  | x                            | —                            | —         |
| Step 17 | If desired, install any new device packages so that you have the latest device support.                   | <a href="#">Cisco Prime Network 5.3 Release Notes</a>                                            | x                            | x                            | —         |
| Step 18 | Verify the installation.                                                                                  | <a href="#">Verifying the Geographical Redundancy Setup</a> , page 4-15                          | x                            | x                            | x         |
| Step 19 | (Optional) Install PN-IL                                                                                  | <a href="#">Installing and Configuring PN-IL for Local + Geographical Redundancy</a> , page 4-20 | x                            | —                            | x         |
| Step 20 | (Optional) Setup RHCS Web GUI if it is not configured during installation.                                | <a href="#">Configuring the RHCS Web Interface (Optional)</a> , page 3-25                        | x                            | —                            | —         |
| Step 21 | (Only for NAT) Update the database host.                                                                  | <a href="#">Updating the Database Host in the Registry (Only for NAT)</a> , page 3-24            | x                            | x                            | x         |
| Step 22 | (Local + geographical HA only) (Optional) Setup RHCS Web GUI if it is not configured during installation. | <a href="#">Configuring the RHCS Web Interface (Optional)</a> , page 3-25                        | x                            | —                            | —         |

1. P1 node has primary database (geographical redundancy *only*, or geographical + local redundancy).

2. P2 node is only relevant if local redundancy is also installed.

## Installation Requirements for Geographical Redundancy

These topics list the prerequisites for installing gateway geographical redundancy:

- [Hardware and Software Requirements for Geographical Redundancy](#), page 4-4
- [Ports Usage for Geographical Redundancy](#), page 4-6

## Hardware and Software Requirements for Geographical Redundancy

[Table 4-2](#) shows the core system requirements for geographical redundancy. All the hardware and software requirements are also applicable for virtual machines. Geographical redundancy requires a Prime Network embedded database and does not support IPv6 gateways or databases. If your high availability deployment differs from these requirements, please contact your Cisco account representative for assistance with the planning and installation of high availability.



**Note**

Geographical redundancy for PN-IL is only supported if the local redundancy solution is also installed.

If you are installing both local and geographical redundancy, for the local redundancy site, refer to the requirements in [Hardware and Software Requirements for Local Redundancy, page 3-5](#).

**Table 4-2** System Requirements for Geographical Redundancy<sup>1</sup>

| Area             | Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating System | RHEL 6.7, RHEL 6.8, RHEL 6.9, RHEL 6.10, RHEL 7.4, RHEL 7.5, and RHEL 7.7 64-bit Server Edition (English language).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Oracle           | 12.2.0.1.<br>Oracle 12.2.0.1 is included in the Prime Network embedded database installation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Hardware         | RHEL 6.7, RHEL 6.8, RHEL 6.9, RHEL 6.10, RHEL 7.4, RHEL 7.5, and RHEL 7.7 certified platform.<br>For recommended hardware for small, medium and large networks, see the <a href="#">Cisco Prime Network 5.3 Installation Guide</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Network          | <ul style="list-style-type: none"> <li>Gateway and database should use logical IP addresses which are different between two sites (the sites can be on different subnets).</li> </ul> <p><b>Note</b> If you are using the <b>network-conf</b> script, when you are prompted for the IP address of units, use the floating IP address of the gateway.</p> <ul style="list-style-type: none"> <li>A SSH connection between all nodes is required.</li> <li>Port 1521 must be open between all nodes to allow ADG data to transfer between the primary and standby database.</li> <li>IP reachability to the primary site.</li> <li>SSL connectivity to primary site. For SSL, generate SSL keys and copy to all nodes in primary site.</li> <li>If you use LDAP authentication in a geographical redundancy configuration, the gateway servers must be configured to communicate with two different LDAP servers, one at the local site and one at the remote site. For this reason the switchover and failover utilities will prompt you for the relevant LDAP parameters. The LDAP parameters are set once using Prime Network Administration.</li> </ul> <p>If for some reason the necessary IP addresses are not updated after a switchover or failover, you can set them manually (which includes setting the necessary LDAP parameters). See <a href="#">Changing the Gateway IP Address on a Gateway and All Units (changeSite.pl)</a>, page 5-15.</p> <p>For more information on using LDAP for user authentication, see Using an External LDAP Server for Password Authentication in the <a href="#">Cisco Prime Network 5.3 Administrator Guide</a>.</p> |
| Storage          | Based on requirements determined by the <a href="#">Cisco Prime Network Capacity Planning Guide</a> .<br>To obtain a copy of <a href="#">Capacity Planning Guide</a> , contact your Cisco representative.<br>Geographical redundant storage should have the same capacity and mount points as the local site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| File system      | ext3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Disk space       | 5 GB under /tmp is required for installation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| rsync            | The rsync utility must be installed on all servers that are part of the geographical redundant solution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| scp              | The scp program must be installed on all servers that are part of the geographical redundant solution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

1. Virtual machine and bare metal requirements for hard disk, memory, and processor are same. Refer to the [Cisco Prime Network 5.3 Installation Guide](#) for memory and processor requirements.

## Ports Usage for Geographical Redundancy

In addition to the ports listed in the [Cisco Prime Network 5.3 Installation Guide](#), the following ports must be free.

You can check the status of the listed ports by executing the following command:

```
# netstat -tulnap | grep port-number
```

To free any ports, contact your system administrator.

**Table 4-3** Additional Ports Required for Local Redundancy

| Port No. | Used for:                           |
|----------|-------------------------------------|
| 9096     | Prime Network cluster web interface |

## Preparing to Install Geographical Redundancy

There are a number of pre installation steps you need to perform before you install the geographical redundancy solution. These steps are similar to those for local redundancy, except that you are performing them on the primary server (P1) and the remote DR server (S2). These steps include the following:

- Configuring the server hardware, disk groups, volumes, and partitions
- Installing RHEL and the recommended patches and RPMs
- Mounting the installation files, and creating the mount points for the external shared storage, Oracle, and Prime Network
- Backing up your deployment

Extra steps are included if you are using both geographical *and* local redundancy. The preparation procedures are in [Table 4-1 on page 4-2](#), starting with Steps 3. Some procedures will refer you to the instructions for local redundancy; this is because the steps are identical but are performed on the primary node (P1) and the remote DR node (S1) instead of the primary and secondary cluster nodes (P1 and P2).

## Installing the Prime Network Gateway Geographical Redundancy Software

The geographical redundancy solution uses a remote site that contains a single server that provides failover in case of a failure at the primary site. It is installed using `install_prime_HA.pl` script that is available in `RH_ha.zip` file in the installation DVD as described in [Installation DVDs, page 1-1](#).

You can use this procedure to:

- Install the geographical redundancy software only on a remote server (S1 in [Figure 2-4 on page 2-6](#))
- Install the geographical redundancy software on a deployment that is also using local redundancy (P1, P2, S1 in [Figure 2-4 on page 2-6](#))

You can run the installation in interactive or in non-interactive mode. Interactive mode installation prompts you to enter the gateway HA data values one at a time. The Prime Network installer then updates the `auto_install_RH.ini` file template, which populates the `install_Prime_HA.pl` script.



**Note**

It is recommended you run the installation in interactive mode first to populate the `auto_install_RH.ini` template with the user input. This gives you the ability to verify the input and run the installation again in non-interactive mode, if needed.

Alternatively, you can enter all the installation values in the `auto_install_RH.ini` template, located in the `RH_ha` directory, then run the installation in non-interactive mode. The installation mode is determined by the presence or absence of the `-autoconf` flag.



**Note**

The geographic redundancy configuration takes time. Depending on the speed of the local and remote site connection and size of the database, the configuration can take several hours.

To set up and configure the geographical redundancy site:

**Step 1** Change to root user, then **unzip the `RH_ha.zip`** file located on the installation DVD in the `/tmp` path. This is a mandatory process to unzip the `RH_ha` file in the `/tmp/RH_ha` directory.



**Note**

If you are running the Korn shell (`/bin/ksh`) and the prompt is the hash tag (`#`), the installation will fail. Run the installation script using `bash`.

**Step 2** From the `/tmp/RH_ha` directory, run the `install_Prime_HA.pl` in interactive or non-interactive mode.

**Step 3** If you are using Pacemaker Corosync cluster setup, you need to manually perform the pacemaker configuration for geographical + local redundancy first before you proceed with the Prime Network installation, else skip to step 4. For more information, see the Configuring Clusters for Pacemaker and Corosync Setup section in the *Prime Network 5.3 Installation Guide*.

**Step 4** Depending on whether you want to configure geographical + local redundancy or geographical redundancy only, do one of the following for the prompts shown in [Table 4-4](#) or [Table 4-5](#):

- For geographical redundancy only, enter:  
local HA= no, DR= yes.
- For local + geographical redundancy, enter:  
local HA= yes, DR= yes.

**Step 5** Execute the `install_Prime_HA.pl` script in interactive or non-interactive method.

- **For Interactive Installation:**

For interactive installation, execute the following commands:

```
cd /tmp/RH_ha
perl install_Prime_HA.pl
```

See [Table 4-4](#) or [Table 4-5](#) for descriptions of parameters you will be asked to enter at various stages of the interactive installation.

- **For Non-Interactive Installation (Automatic):**
  - a. Edit the `auto_install_RH.ini` file template found under the `RH_ha` directory with all of the installation details.

- b. Run the following command:

```
cd /tmp/RH_ha
perl install_Prime_HA.pl -autoconf auto_install_RH.ini full path
```



**Note** To prevent a security violation, it is highly recommended to remove the password in `auto_install_RH.ini` file after the successful installation.

After the `install_Prime_HA.pl` script is completed, Prime Network gateway and embedded database are installed on the remote site.

The following tables describe the installation prompts, depending on your deployment:

- [Table 4-4, Installation Prompts for Geographical Redundancy Only](#) (this deployment is not supported for PN-IL)
- [Table 4-5, Installation Prompts for Local and Geographical Redundancy](#)

**Table 4-4** *Installation Prompts for Geographical Redundancy Only*

| Prompt for.                                   | Enter...                                | Notes                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configure local HA                            | no                                      | Enter <b>no</b> ; this procedure is for geographical redundancy <i>alone</i> .<br>To install geographical redundancy with local redundancy, see <a href="#">Table 4-5</a> .<br>To install local redundancy, see <a href="#">Installing and Maintaining Gateway Local Redundancy, page 3-1</a>  |
| Configure DR                                  | yes                                     | —                                                                                                                                                                                                                                                                                              |
| Configuring NTP on the 2 gateways             | yes   no                                | <b>yes</b> or <b>no</b> depending on whether NTP should be configured on two gateways. If not configured, first configure NTP and then continue with the installation. For more details on procedures, see configuring NTP in the <a href="#">Cisco Prime Network 5.3 Installation Guide</a> . |
| OS user of the database                       | oracledb                                | Oracle installation owner (default is oracle).                                                                                                                                                                                                                                                 |
| Oracle file system mount point                | Example:/opt/ora/oracle                 | Location of the mount point given for the <i>oracle-home/oracle-user</i> .                                                                                                                                                                                                                     |
| Configure another oracle file system mount    | no                                      | <b>yes</b> or <b>no</b> value indicating whether you want to use the default Oracle mount point or not.                                                                                                                                                                                        |
| Home directory of the OS user of the database | Example:/opt/ora/oracledb               | OS user home directory ( default is /opt/ora/oracledb).                                                                                                                                                                                                                                        |
| Oracle database redolog location              | Example:/opt/ora/oracledb/redo          | Location of the database redologs. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.                                                                                                                      |
| Oracle database data files location           | Example:/opt/ora/oracledb/oradata/anadb | Location of the database data files. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.                                                                                                                    |

Table 4-4 Installation Prompts for Geographical Redundancy Only (continued)

| Prompt for.                                     | Enter...                                             | Notes                                                                                                                                                                            |
|-------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oracle database backup location                 | Example:/opt/ora/oracledb/backup                     | Location of the database backup files. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.    |
| Oracle database archive location                | Example:/opt/ora/oracledb/arch                       | Location of the database archive files. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.   |
| Prime Network OS user                           | <i>pnuser</i>                                        | User-defined Prime Network OS user ( <i>pnuser</i> ). Username must start with a letter and contain only the following characters: [A-Z a-z 0-9].                                |
| Prime Network file system mount point           | Example: /export/home/ana                            | Location of the mount point for Prime Network.                                                                                                                                   |
| Home directory of the Prime Network user        | Example: /export/home/ana/pn50                       | Directory should be located under <i>Prime Network file system mount point</i> but not the mount point itself.                                                                   |
| Prime Network user password                     | <i>password</i>                                      | User-defined password for the <i>pnuser</i> .                                                                                                                                    |
| Location of the Prime Network installation file | Example: /dvd/Server                                 | Mount point of Prime Network installation. Should be the same for all relevant nodes. Example: For <b>install.pl</b> the path will be /dvd/Server.                               |
| Directory for the Oracle zip files              | Example: /opt/ora/oracle_zip                         | Directory containing the embedded Oracle zip files. Can be a temporary location where the files were copied from the installation DVDs; or directly specify the location on DVD. |
| Node one password                               | node1 password                                       | Root user password for the node running the installation. For local redundancy dual-node clusters, this node must be one of the cluster nodes.                                   |
| DR node name                                    | DR hostname                                          | For geographic redundancy, hostname for the remote site (the value returned by the system call hostname).                                                                        |
| DR node password                                | DR node password                                     | For geographic redundancy, root user password for the remote site.                                                                                                               |
| DB profile                                      | The number corresponding to the DB profile required. | Select from 1-7 (estimated DB profile).                                                                                                                                          |

Table 4-4 Installation Prompts for Geographical Redundancy Only (continued)

| Prompt for.                   | Enter...                    | Notes                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Password for 5 built-in users | password                    | Password for Prime Network root, bosenable, bosconfig, bosusermgr, and web monitoring users (users for various system components). Passwords must contain: <ul style="list-style-type: none"> <li>Contain at least eight alphanumeric characters.</li> <li>Contain upper and lower case letters.</li> <li>Contain one number and one special character.</li> <li>Cannot contain:<br/>@ / ! \$ ~ * ( ) - + = [ {</li> </ul> |
| SMTP server                   | Example: outbound.cisco.com | Local e-mail server.                                                                                                                                                                                                                                                                                                                                                                                                       |
| User email                    | email address               | E-mail address to which embedded database will send error messages.                                                                                                                                                                                                                                                                                                                                                        |
| Run database backups?         | Y/N                         | Whether to enable embedded database automated backups.                                                                                                                                                                                                                                                                                                                                                                     |
| Public network interface      | Example: eth0               | Name of network interface to which logical IPs will be added. Must be identical on all servers (for example: eth0, bge0).                                                                                                                                                                                                                                                                                                  |

Table 4-5 shows the installation prompts when setting up local and geographical redundancy.

Table 4-5 Installation Prompts for Local and Geographical Redundancy

| Prompt for.                                             | Enter... | Notes                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configure local HA?                                     | yes      | Enter <b>yes</b> ; this procedure is for geographical redundancy + local redundancy.<br>To install geographical only, see <a href="#">Table 4-4</a> .<br>To install local redundancy, see <a href="#">Installing and Maintaining Gateway Local Redundancy, page 3-1</a>                          |
| Configure DR?                                           | yes      | —                                                                                                                                                                                                                                                                                                |
| Is NTP configured on the 3 gateways (local and remote)? | yes      | <b>yes</b> or <b>no</b> depending on whether NTP should be configured on three gateways. If not configured, first configure NTP and then continue with the installation. For more details on procedures, see configuring NTP in the <a href="#">Cisco Prime Network 5.2 Installation Guide</a> . |
| OS user of the database                                 | oracledb | Oracle installation owner (default is oracle).                                                                                                                                                                                                                                                   |
| Configuring multipath                                   | no       | Answer <b>yes</b> if the node is connected to storage with more than one connection (recommended).                                                                                                                                                                                               |

Table 4-5 Installation Prompts for Local and Geographical Redundancy

| Prompt for.                                     | Enter...                                | Notes                                                                                                                                                                            |
|-------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oracle file system mount point                  | Example:/opt/ora/oracle                 | Location of the mount point given for the <i>oracle-home/oracle-user</i> .                                                                                                       |
| Configure another oracle file system mount      | no                                      | <b>yes</b> or <b>no</b> value indicating whether you want to use the default Oracle mount point or not.                                                                          |
| Home directory of the OS user of the database   | Example:/opt/ora/oracledb               | OS user home directory ( default is /opt/ora/oracledb).                                                                                                                          |
| Oracle database redolog location                | Example:/opt/ora/oracledb/redo          | Location of the database redologs. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.        |
| Oracle database data files location             | Example:/opt/ora/oracledb/oradata/anadb | Location of the database data files. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.      |
| Oracle database backup location                 | Example:/opt/ora/oracledb/backup        | Location of the database backup files. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.    |
| Oracle database archive location                | Example:/opt/ora/oracledb/arch          | Location of the database archive files. Should be located under one of the Oracle mounts but not directly on the mount, and should be compliant with the storage requirements.   |
| Prime Network OS user                           | <i>pnuser</i>                           | User-defined Prime Network OS user ( <i>pnuser</i> ). Username must start with a letter and contain only the following characters: [A-Z a-z 0-9].                                |
| Prime Network file system mount point           | Example: /export/home/ana               | Mount point of Prime Network installation.                                                                                                                                       |
| Home directory of the Prime Network user        | Example: /export/home/ana/pn41          | Directory should be located under <i>Prime Network file system mount point</i> but <i>not</i> the mount point itself.                                                            |
| Prime Network user password                     | <i>password</i>                         | User-defined password for the <i>pnuser</i> .                                                                                                                                    |
| Location of the Prime Network installation file | Example: /dvd/Server                    | The mount point of the Prime Network installation. The mount point should be the same for all relevant nodes. Example: For <b>install.pl</b> the path will be /dvd/Server.       |
| Directory for the Oracle zip files              | Example: /opt/ora/oracle_zip            | Directory containing the embedded Oracle zip files. Can be a temporary location where the files were copied from the installation DVDs; or directly specify the location on DVD. |
| Node one password                               | node1 password                          | Root user password for the node running the installation. For local redundancy dual-node clusters, this node must be one of the cluster nodes.                                   |

Table 4-5 Installation Prompts for Local and Geographical Redundancy

| Prompt for.                             | Enter...                                               | Notes                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DR node hostname                        | DR hostname                                            | For geographic redundancy, hostname for the remote site. This is the value returned by the system call hostname.                                                                                                                                                                                                                                                                                                                   |
| DR node password                        | DR node password                                       | For geographic redundancy, root user password for the remote site.                                                                                                                                                                                                                                                                                                                                                                 |
| DB profile                              | The number corresponding to the DB profile required.   | Select from 1-7 (estimated DB profile).                                                                                                                                                                                                                                                                                                                                                                                            |
| Password for 5 built-in users           | password                                               | Password for Prime Network root, bosenable, bosconfig, bosusermgr, and web monitoring users (users for various system components). Passwords must contain: <ul style="list-style-type: none"> <li>• Contain at least eight alphanumeric characters.</li> <li>• Contain upper and lower case letters.</li> <li>• Contain one number and one special character.</li> <li>• Cannot contain:<br/>@ / ! \$ ~ * ( ) - + = [ {</li> </ul> |
| SMTP server                             | Example: outbound.cisco.com                            | Local e-mail server.                                                                                                                                                                                                                                                                                                                                                                                                               |
| User email                              | email address                                          | E-mail address to which embedded database will send error messages.                                                                                                                                                                                                                                                                                                                                                                |
| Oracle service IP address               | IP address                                             | Logical IP of Oracle service group.                                                                                                                                                                                                                                                                                                                                                                                                |
| Prime Network service IP address        | IP address                                             | Logical IP of Prime Network service group.                                                                                                                                                                                                                                                                                                                                                                                         |
| Multicast address for the cluster nodes | IP address                                             | An available multicast address accessible and configured for both cluster nodes.                                                                                                                                                                                                                                                                                                                                                   |
| Prime Network cluster name              | <i>username</i>                                        | User-defined cluster name. Cannot be more than 15 non-NUL (ASCII 0) characters. For local redundancy, cluster name must be unique within the LAN.                                                                                                                                                                                                                                                                                  |
| Node one fence agent                    | The number corresponding to the fencing agent required | Type of fencing device configured for the node running the installation. (See <a href="#">Fencing Options, page 2-3.</a> )                                                                                                                                                                                                                                                                                                         |
| Node two fence agent                    | The number corresponding to the fencing agent required | Type of fencing device configured for the second cluster running the installation. (See <a href="#">Fencing Options, page 2-3.</a> )                                                                                                                                                                                                                                                                                               |



Table 4-5 Installation Prompts for Local and Geographical Redundancy

| Prompt for.                                  | Enter...                 | Notes                                                                                                                                                                                                                                                                            |
|----------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prime Network cluster web interface password | port number and password | Port and the password for cluster web interface. LUCI_PORT must be available and should not be in Prime Network debug range:<br>60000 <=x< 61000<br>or in Prime Network AVM port range:<br>2224 <= x < 3000 or 8000 <= x < 9000)<br>Password must contain at least 6 characters. |
| Prime Network cluster web interface port     |                          |                                                                                                                                                                                                                                                                                  |
| Node one IP                                  | node1 IP address         | IP address of the node running the installation. Local redundancy dual-node clusters: Must be one of the cluster nodes.                                                                                                                                                          |
| DR node IP                                   | DR node IP address       | IP address of DR node at remote site (geographical redundancy).                                                                                                                                                                                                                  |
| Run database backups?                        | Y/N                      | Whether to enable embedded database automated backups.                                                                                                                                                                                                                           |
| Public network interface                     | Example: eth0            | Name of network interface to which logical IPs will be added. Must be identical on all servers (for example: eth0, bge0).                                                                                                                                                        |
| Node one fence hostname                      | hostname                 | Hostname of fencing device configured for node running the installation (for some fencing devices, this can be an IP address).                                                                                                                                                   |
| Node one fence login                         | login name               | Login name for fencing device configured for node running the installation.                                                                                                                                                                                                      |
| Node one fence passwd                        | password                 | Password for fencing device configured for node running the installation.                                                                                                                                                                                                        |
| Node two fence hostname                      | hostname                 | Hostname of fencing device configured for second cluster node (for some fencing devices, this can be an IP address).                                                                                                                                                             |
| Node two fence login                         | login name               | Login name for fencing device configured for second cluster node.                                                                                                                                                                                                                |
| Node two fence passwd                        | password                 | Password for fencing device configured for node second cluster node.                                                                                                                                                                                                             |

**Step 6** Configure the Embedded Database by running the **add\_emdb\_storage.pl** utility and you must include **-ha** flag while running this utility.

- a. Log in as prime network user

```
su - pnuser
```

- b. Change directories to *NETWORKHOME*/Main/scripts/embedded\_db and enter the following command:

```
./add_emdb_storage.pl -ha
```

- c. Enter the number corresponding to the estimated database profile that meets your requirement.

d. Insert the event and workflow archiving size in days.

**Step 7** Configure the remote site using the `setup_Prime_DR.pl` command in interactive or non-interactive mode. For more information on `setup_Prime_DR.pl` script, see [Installation DVDs, page 1-1](#).




---

**Note** The `setup_Prime_DR.pl` script must run on the node running the primary database.

---

- **For Interactive Installation:**

For interactive mode, enter the following commands:

```
cd /tmp/RH_ha
perl setup_Prime_DR.pl
```

- **For Non- Interactive Installation (Automatic):**

a. Edit the `auto_install_RH.ini` file template found under the `RH_ha` directory with all of the installation details.

b. Run the following command:

```
cd /tmp/RH_ha
perl setup_Prime_DR.pl -autoconf auto_install_RH.ini full path
```

Example: `perl setup_Prime_DR.pl -autoconf /tmp/RH_dr/ auto_install_RH.ini`




---

**Note** If the `setup_Prime_DR.pl` script is executed from the same node as the `install_Prime_HA.pl` script, and if all the parameters are same, you can use the same `auto_install_RH.ini` file. The prompts and outputs while executing this script are a subset of the install script prompts.

---

**Step 8** Verify the setup as described in [Verifying the Geographical Redundancy Setup, page 4-15](#).

---

After the `setup_Prime_DR.pl` script is completed:

- The Prime Network and embedded database files are replicated to the remote site.
- All utility scripts are located under `/var/adm/cisco/prime-network/scripts/ha/util/`.

# Verifying the Geographical Redundancy Setup

Table 4-6 shows the geographical redundancy verification tests.



**Note** The geographical redundancy verification tests are for the embedded database and must be performed by Cisco personnel only.

Table 4-6 Geographical Redundancy Verification Tests

| Description                                                                                                                                                                                                           | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Expected Results                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <i>Database Replication</i>                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                    |
| <b>Name:</b> tnsping Test: Primary to remote site<br><b>Purpose:</b> Verify tnsping from the primary to the remote site.                                                                                              | From the primary DB server enter the following as the OS Oracle UNIX user:<br><pre>tnsping anadb tnsping anadb_sb</pre>                                                                                                                                                                                                                                                                                                                                     | Verify that the TNS connection on port 1521 is available between the two database servers.         |
| <b>Name:</b> tnsping Test: remote site to Primary<br><b>Purpose:</b> Verify tnsping from the remote site to the primary site.                                                                                         | From the standby database server enter the following as the as Oracle UNIX user:<br><pre>tnsping anadb tnsping anadb_sb</pre>                                                                                                                                                                                                                                                                                                                               | Verify that the TNS connection on port 1521 is available between the two database servers.         |
| <b>Name:</b> Get the <i>pnuser_admin</i> Password<br><b>Purpose:</b> Get the <i>pnuser_admin</i> login password from the registry for later tests.                                                                    | As the Prime Network UNIX user, enter:<br><pre>cd NETWORKHOME/Main ./runRegTool.sh localhost get persistence/nodes/admin/PASS</pre>                                                                                                                                                                                                                                                                                                                         | Derive the password for <i>pnuser_admin</i> database user from the registry for creating db_links. |
| <b>Name:</b> Replication Test<br><b>Purpose:</b> Verify the object and data replication.                                                                                                                              | <ol style="list-style-type: none"> <li>On the primary database server, connect to sqlplus as <i>pnuser_admin</i>, then enter the following:<br/> <pre>CREATE TABLE NETWORK_TEST_REP (NUM NUMBER); INSERT INTO NETWORK_TEST_REP VALUES (1); COMMIT; ALTER SYSTEM SWITCH LOGFILE;</pre> </li> <li>On the standby database server, connect to sqlplus as <i>pnuser_admin</i> and query this table:<br/> <pre>SELECT * FROM NETWORK_TEST_REP;</pre> </li> </ol> | The table and data are replicated                                                                  |
| <b>Name and Purpose:</b> Create Database Links on the Primary Database<br><b>Note</b> Perform this step once, after installing RHEL. Do not repeat this step when verifying the setup after a switchover or failover. | Connect to sqlplus as the <i>pnuser_admin</i> , then enter the following:<br><pre>CREATE DATABASE LINK TO_anadb_sb CONNECT TO pnuser_ADMIN IDENTIFIED BY pnuser_admin_password USING 'anadb_sb'; CREATE DATABASE LINK TO_anadb CONNECT TO pnuser_ADMIN IDENTIFIED BY pnuser_admin_password USING 'anadb';</pre>                                                                                                                                             | The database link is created.                                                                      |

Table 4-6 Geographical Redundancy Verification Tests (continued)

| Description                                                                                                                                                                                             | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Expected Results                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Name:</b> Query Replication SCN Gap.</p> <p><b>Purpose:</b> Verify that an SCN gap is not growing between the two databases.</p>                                                                  | <ol style="list-style-type: none"> <li>1. Connect to sqlplus as <i>puser_admin</i>.</li> <li>2. Run the following query several times to verify gap is not growing: <pre>with v1 as (select current_scn anadb_sb_SCN from v\$database@TO_anadb_sb), v2 as (select current_scn anadb_SCN from v\$database@TO_anadb) select v1.anadb_sb_SCN anadb_sb_SCN,v2.anadb_SCN anadb_SCN,v1.anadb_sb_SCN-v2.anadb_SCN "SCN GAP" from v1,v2;</pre> </li> </ol>                                                                                                                                                                                                                                                                                                                                  | Run the query several times to verify the gap is not growing. The SCN gap should be less than 100,000.                                |
| <p><b>Name:</b> Replication is running</p> <p><b>Purpose:</b> Verify the file replication process is running correctly by checking the monitoring log files under the Prime Network home directory.</p> | <p>Check the following log files under <i>NETWORKHOME</i>.</p> <ul style="list-style-type: none"> <li>• <i>NETWORKHOME</i>/.replication—A time stamp file is created on the primary Prime Network node.</li> <li>• <i>NETWORKHOME</i>/.replication_remote—A time stamp file is created on the primary Prime Network node and replicated to the remote Prime Network node and back again. This will hold the time stamp of the last Prime Network file replication.</li> <li>• <i>NETWORKHOME</i>/.replication_log—Log file created by the Prime Network replication monitoring. It will be empty if all is considered OK (the difference between the time stamp files is within range).</li> <li>• <i>NETWORKHOME</i>/oracle_monitor.log—Remote database monitoring log.</li> </ul> | The replication is running correctly.                                                                                                 |
| <b>File Replication</b>                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                       |
| <p><b>Name:</b> File replication</p> <p><b>Purpose:</b> Verify the file replication process.</p>                                                                                                        | <ol style="list-style-type: none"> <li>1. Create a file under <i>NETWORKHOME</i> by entering: <pre>touch filename</pre> </li> <li>2. Verify that the file is created on the geographical remote node.</li> <li>3. Remove the file and verify that the file is removed on the remote node.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>The file is created and removed.</p> <p><b>Note</b> File replication from primary to geographical remote node takes some time.</p> |
| <p><b>Name:</b> Replication is running</p> <p><b>Purpose:</b> Verify the file replication process is running correctly by checking the monitoring log files under the Prime Network home directory.</p> | <p>Check the following log files under <i>NETWORKHOME</i>.</p> <ul style="list-style-type: none"> <li>• <i>NETWORKHOME</i>/.replication—A time stamp file is created on the primary Prime Network node.</li> <li>• <i>NETWORKHOME</i>/.replication_remote—A time stamp file is created on the primary Prime Network node and replicated to the remote Prime Network node and back again. This will hold the time stamp of the last Prime Network file replication.</li> <li>• <i>NETWORKHOME</i>/.replication_log—Log file created by the Prime Network replication monitoring. It will be empty if all is considered OK (the difference between the time stamp files is within range).</li> <li>• <i>NETWORKHOME</i>/oracle_monitor.log—Remote database monitoring log.</li> </ul> | The replication is running correctly.                                                                                                 |

Table 4-6 Geographical Redundancy Verification Tests (continued)

| Description                                                                                                                                                                                                                                                       | Procedure                                                                                                                                                                                                                                       | Expected Results                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| <b>Key Files for Geographical Redundancy</b>                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                 |                                                                           |
| <p><b>Name:</b> Checking the key files under Prime Network and Oracle home directories.</p> <p><b>Purpose:</b> Verify that the both the remote site and primary sites are properly marked with key files under the Prime Network and oracle home directories.</p> | <p>Check the following files under NETWORKHOME (Prime Network Home directory) and Oracle home directories.</p> <ul style="list-style-type: none"> <li>• .local_ana</li> <li>• .remote_ana</li> <li>• .local_db</li> <li>• .remote_db</li> </ul> | <p>Key files should be under Prime Network and Oracle home directory.</p> |

## Maintaining Geographical Redundancy

These topics provide information pertaining to ongoing management of an ADG geographical redundancy configuration. The utilities used for these operations are stored in `/var/adm/cisco/prime-network/scripts/ha/util`.

This section includes:

- [Checking Log Messages, page 4-17](#)
- [Monitoring Overall Status, page 4-18](#)

### Checking Log Messages

Prime Network generates the following system events for geographical redundancy monitoring:

- **Informational event** to indicate that both ADG and GWSync monitoring is active. This is done on an hourly basis based on cron jobs.
- **Critical events** when the following occur:
  - An GWSync has not occurred in the last 10 minutes.
  - The standby database is down.
  - The standby database is up but has been out of sync for 60 minutes.

The log files for data replication are described in the following table. To troubleshoot problems with the replication process, see [Verifying the Geographical Redundancy Setup, page 4-15](#).

| Log File                                                                              | Description                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>NETWORKHOME/.replication</code><br><code>NETWORKHOME/.replication_remote</code> | Contains the local and remote timestamps used by GWSync.                                                                                                                                                             |
| <code>NETWORKHOME/.replication_log</code>                                             | <p>This log is only populated if the GWSync local and remote timestamps are more than 10 minutes apart (and a System event is generated), as in the following example:</p> <pre>Replication failed since: date</pre> |

| Log File                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>NETWORKHOME</i> /oracle_monitoring.log | <p>Information on the Redo-apply log from the standby server.</p> <pre>+ Testing the replication state on the remote database  - Redo transport lag: NAME                VALUE                TIME_COMPLETED ----- transport lag      +00 00:00:00        04/14/2013 10:30:34  - Redo apply lag: NAME                VALUE                TIME_COMPLETED ----- apply lag          +00 00:00:00        04/14/2013 10:30:35  - Active apply rate: ITEM                UNITS SO FAR ----- Active Apply Rate   KB/sec 286  - Data base role: PHYSICAL STANDBY</pre> |

## Monitoring Overall Status

The **primeha** command is a central utility for checking the status of the high availability nodes, performing switchovers and failovers, and stopping and resuming data replication.

Use the following command to view the status of the cluster:

```
perl primeha -status
```

The below output is an example for a network that has both local and geographical redundancy.

- The first portion of the output as shown below, shows the status of the geographical redundancy configuration. The server `hostname1.cisco.com` is the remote gateway and database server. The server `hostname2.cisco.com` is the other node in the local redundancy cluster and is not running any service.

```
- Installing Perl-5.16.0-x86_64-linux-thread-multi
  Log can be found at
  /var/adm/cisco/prime-network/scripts/ha/util/perlForHA/installPerlForHA-1365070277.log
```

```
HOST                ANA SERVICE                ORACLE SERVICE
hostname.cisco.com  Active Prime Network        Active oracle    local
hostname1.cisco.com Standby Prime Network        Standby oracle
hostname2.cisco.com Prime Network not running on this node  oracle not running on
this node
```

- The second portion of the output as shown below (that begins with Cluster Status) shows the status of the local redundancy configuration. (This is displayed because this setup also contains a local redundancy configuration.)

```
Cluster Status for ana_cluster @ Mon Aug  1 12:34:40 2013
Member Status: Quorate
```

```
Member Name        ID        Status
-----
hostname.cisco.com  1         Online, Local, rgmanager
hostname2.cisco.com 2         Online, rgmanager
```

| Service Name      | Owner (Last)       | State   |
|-------------------|--------------------|---------|
| -----             | -----              | -----   |
| service:ana       | hostname.cisco.com | started |
| service:oracle_db | hostname.cisco.com | started |

- In case of Pacemaker and Corosync setup, the output shown below (that begins with PCs Status) displays the status of the Pacemaker cluster. (This is displayed because this setup also contains a local redundancy configuration.)

```

@pn50-qa2-ha-01 /]# pcs status
Cluster name: hacluster
: corosync
Current DC: pn50-qa2-ha-01 (version 1.1.15-11.e17_3.5-e174ec8) - partition with quorum
updated: Tue Nov 28 09:22:00 2017          Last change: Mon Nov 27 13:46:11 2017 by hacluster via crmd on pn50-qa2-
01
Resources and 10 resources configured

Cluster: [ pn50-qa2-ha-01 pn50-qa2-ha-02 ]

List of resources:

Resource Group: Oracle
oracle_vip (ocf::heartbeat:IPaddr2):      Started pn50-qa2-ha-02
oracle_fs1 (ocf::heartbeat:Filesystem):   Started pn50-qa2-ha-02
oracle_fs2 (ocf::heartbeat:Filesystem):   Started pn50-qa2-ha-02
oracle_fs3 (ocf::heartbeat:Filesystem):   Started pn50-qa2-ha-02
listener (lsb:lsnr.sh):                   Started pn50-qa2-ha-02
oracle_db (lsb:oracle_db.sh):             Started pn50-qa2-ha-02
Resource Group: PrimeNetwork
pn_vip (ocf::heartbeat:IPaddr2):          Started pn50-qa2-ha-01
pn_fs1 (ocf::heartbeat:Filesystem):       Started pn50-qa2-ha-01
pn (lsb:pn.sh):                            Started pn50-qa2-ha-01
pn11 (lsb:pcil.sh):                        Started pn50-qa2-ha-01

Cluster Status:
corosync: active/enabled
pacemaker: active/enabled
clusterd: active/enabled
@pn50-qa2-ha-01 /]#

```

## Uninstalling the Geographical Redundancy Software

To uninstall geographical redundancy, use this procedure. If Operations Reports was also installed, this procedure will remove it.

If your deployment also has local redundancy, uninstall the software on the primary cluster server (P1) first using the procedure in [Uninstalling Local Redundancy, page 3-30](#).

- 
- Step 1** If any RHCS services are running, log into the primary cluster server and freeze the relevant services (service can be **ana**, **oracle**, and, if Operations Reports is installed, **ifb**).

```
clusvcdm -Z service
```

- Step 2** Log in as the root user and change to the following directory:

```
cd /var/adm/cisco/prime-network/reg/pnuser
```

- Step 3** Enter the following command:

```
perl uninstall.pl
```

# Installing and Configuring PN-IL for Local + Geographical Redundancy

This section explains how to install the Prime Network Integration Layer (PN-IL) 1.2 for a local + geographical redundancy deployment. It also explains how to integrate the deployment with Cisco Prime Central. For information on the Prime Central releases with which you can integrate PN-IL 1.2, see the [Cisco Prime Network 5.3 Release Notes](#).

These topics provide the information you will need to install and configure PN-IL geographical, and local redundancy:

- [Installation DVD, page 4-20](#)
- [Steps for Installing PN-IL with Local + Geographical Redundancy, page 4-20](#)
- [Installing PN-IL on a Prime Network Server \(Local + Geographical Redundancy\), page 4-21](#)
- [Configuring PN-IL on a Prime Network Gateway \(Local + Geographical Redundancy\), page 4-23](#)
- [Disabling the PN-IL Health Monitor, page 4-27](#)

If you want to migrate an *existing* standalone installations of PN-IL (local + geographical) to suite mode, you can use the procedure in [Configuring and Migrating PN-IL with Prime Central \(Suite Mode with Local + Geographical Redundancy\), page 4-24](#).

## Installation DVD

The PN-IL high availability files are provided on the Prime Network installation DVD named **Disk 1: New Install DVD**. **Disk 2** contains the tar file `sil-esb-2.3.0.tar.gz`, which contains the PN-IL installation files and scripts, including:

- `installAndConfigureESB.sh`—PN-IL installation script
- `itgctl`—PN-IL configuration script
- `il-watch-dog.sh`—PN-IL health monitor control script
- `DMSwitchToSuite.sh`—Script to migrate to suite

## Steps for Installing PN-IL with Local + Geographical Redundancy

[Table 4-7](#) provides the basic steps you must follow to set up local + geographical redundancy for PN-IL. If you want to migrate an *existing* standalone installations of PN-IL (local + geographical) to suite mode, you can use the procedure in [Configuring and Migrating PN-IL with Prime Central \(Suite Mode with Local + Geographical Redundancy\), page 4-24](#).

Note that you only have to install PN-IL on the primary cluster server (P1), not on the remote (DR) server (S2). However, you will have to do some configuration tasks on the remote server.



Table 4-7 Steps for Setting Up PN-IL Local + Geographical Redundancy

|        | Task                                                                                  | Topic/Action Required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Local Cluster                      |             | Remote (DR) Server |
|--------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------|--------------------|
|        |                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Server (P1) (has Primary database) | Server (P2) | Remote Server (S1) |
| Step 1 | Collect server details, so that you have all information handy prior to installation. | <ul style="list-style-type: none"> <li>Virtual IP address of P1</li> <li>IP Address of remote DR server S1</li> <li>Prime Network application root username and password for primary cluster and remote DR servers (P1 and S1)</li> <li>URL for authenticating Prime Network calls for P1 and S1 (normally <b>https://localhost:6081/ana/services/userman</b>)</li> <li>((Suite mode) For the Prime Central server where Oracle is installed: Hostname, database service name, database username and password, and database port.</li> </ul> | x                                  | —           | —                  |
| Step 2 | Verify the server meets the prerequisites.                                            | <a href="#">Installation Requirements for Geographical Redundancy, page 4-4</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                              | x                                  | —           | —                  |
| Step 3 | Freeze RHCS and install PN-IL.                                                        | <a href="#">Installing PN-IL on a Prime Network Server (Local + Geographical Redundancy), page 4-21</a>                                                                                                                                                                                                                                                                                                                                                                                                                                      | x                                  | —           | —                  |
| Step 4 | Configure PN-IL (in standalone or suite mode) on both nodes, and unfreeze RHCS.       | <a href="#">Configuring PN-IL on a Prime Network Gateway (Local + Geographical Redundancy), page 4-23</a>                                                                                                                                                                                                                                                                                                                                                                                                                                    | x                                  | —           | x                  |
| Step 5 | Disable the PN-IL Health Monitor.                                                     | <a href="#">Disabling the PN-IL Health Monitor, page 4-27</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | x                                  | —           | x                  |

## Installing PN-IL on a Prime Network Server (Local + Geographical Redundancy)

Use this procedure to install PN-IL with local + geographical redundancy on the primary cluster server (P1). The primary cluster node will copy the necessary files to the remote DR node (S1). For the remote DR node, you only have to perform some minor configurations.

### Before You Begin:

Make sure Prime Network is installed and is up and running on the both the primary cluster node (P1) and the remote DR node (S2). In the following procedure, \$ANAHOME is the *pnuser* environment variable for the Prime Network installation directory (/export/home/*pnuser* by default).

**Step 1** On the primary cluster node (P1), log in as root and freeze the ana service.



**Note** The cluster server should be the active node where the ana service is running.

```
ssh root@active-cluster-node
clusvcadm -Z ana
```

**Step 2** On the remote DR node (S1), log in as root and save your rsync settings so they are not overwritten during the PN-IL installation process.

```
ssh root@remote-DR-node-name
cd /var/adm/cisco/prime-network/scripts/ha/rsync
mv rsync_exclude_pnil.txt rsync_exclude_pnil.txt.org
mv rsync_exclude_pnil_cfg.txt rsync_exclude_pnil_cfg.txt.org
```

**Step 3** On the primary cluster node (P1), log in as *pnuser*.

```
su - pnuser
```

For example:

```
su - pn41
```

**Step 4** On the primary cluster node, create an installation directory for PN-IL.

```
mkdir -p $ANAHOME/new-pnil-dir
```

For example, if the Prime Network installation directory was /export/home/pn41, you would run this command to create an installation directory called *pnil*:

```
mkdir -p $ANAHOME/pnil
```

**Step 5** On the primary cluster node (P1), copy the installation files from the installation DVD, extract them, and start the installation script. These examples use the PN-IL installation directory /*pnil*.

- a. Copy the PN-IL installation tar file from Disk 2 to the directory you created in [Step 4](#). In the following example, the installation directory is named **pnil**.

```
cp /tmp/sil-esb-2.3.0.tar.gz $ANAHOME/pnil
```

- b. Change to the directory you created in [Step 4](#) and extract the files from the PN-IL installation tar:

```
cd $ANAHOME/pnil
tar -zxf sil-esb-2.3.0.tar.gz
```

- c. Change to directory where the installation tar files were extracted and run the installation script:

```
cd sil-esb-2.3.0/install/packages
./installAndConfigureEsb.sh
```

**Step 6** On the primary cluster node (P1), reload the user profile.

```
source $ANAHOME/.cshrc
```

**Step 7** Log into the remote DR server (S1) as root and move the original rsync exclude file (that you moved in [Step 2](#)) back to its proper place.

```
ssh root@remote-DR-server
cd /var/adm/cisco/prime-network/scripts/ha/rsync
mv rsync_exclude_pnil.txt.org rsync_exclude_pnil.txt
mv rsync_exclude_pnil_cfg.txt.org rsync_exclude_pnil_cfg.txt
```

**Step 8** Configure PN-IL as described in [Configuring PN-IL on a Prime Network Gateway \(Local + Geographical Redundancy\)](#), page 4-23.



**Note** Do not unfreeze the ana service until PN-IL has been configured.



**Note** You do not have to install the geographical redundancy files on the remote server (S1); the necessary files will be copied to the remote DR server by the primary cluster node.

## Configuring PN-IL on a Prime Network Gateway (Local + Geographical Redundancy)

Configuration tasks must be performed on both the primary cluster node (P1) and the remote DR node (S1).

- For standalone mode (that is, Prime Network is not integrated with Prime Central), follow the instructions in [Configuring PN-IL with Prime Network \(Standalone Mode with Local + Geographical Redundancy\)](#), page 4-23.
- For suite mode (Prime Network is integrated with Prime Central), follow the instructions in [Configuring and Migrating PN-IL with Prime Central \(Suite Mode with Local + Geographical Redundancy\)](#), page 4-24.

## Configuring PN-IL with Prime Network (Standalone Mode with Local + Geographical Redundancy)

In standalone mode, Prime Network is not integrated with Prime Central and can independently expose MTOSI and 3GPP web services to other OSS/applications. In the following procedure:

- \$PRIMEHOME is the *pnuser* environment variable for the PN-IL installation directory you created in [Installing PN-IL on a Prime Network Server \(Local + Geographical Redundancy\)](#), page 4-21.
- \$ANAHOME is the *pnuser* environment variable for the Prime Network installation directory (/export/home/*pnuser* by default).

**Step 1** From the primary cluster node (P1), log in as *pnuser*.

**Step 2** On the primary cluster node (P1), configure PN-IL in standalone mode.

```
itgctl config 1 --anaPtpServer ana-cluster-ip --anaPtpUser pn-root-user --anaPtpPw
pn-root-user-password --authURL network-authentication-URL
```

*itgctl* uses these arguments.

| Argument              | Description                                                                                                                                                                                                                                     |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ana-cluster-ip</i> | <ul style="list-style-type: none"> <li>• When run on the primary cluster node (P1), this is the IP address of the primary cluster server.</li> <li>• When run on the remote DR node, this is the IP address of the remote DR server.</li> </ul> |
| <i>pn-root-user</i>   | Name of Prime Network root user (usually <b>root</b> )                                                                                                                                                                                          |

| Argument                          | Description                                                                                                |
|-----------------------------------|------------------------------------------------------------------------------------------------------------|
| <i>pn-root-user-password</i>      | Password for Prime Network root user                                                                       |
| <i>network-authentication-URL</i> | URL used to authenticate Prime Network calls (usually <b>https://localhost:6081/ana/services/userman</b> ) |

For example:

```
itgctl config 1 --anaPtpServer 192.0.2.22 --anaPtpUser root --anaPtpPw myrootpassword
--authURL https://192.0.2.22:6081/ana/services/userman
```

**Step 3** On the primary cluster node (P1), start PN-IL.

```
$PRIMEHOME/bin/itgctl start
```

**Step 4** Open a new session on the remote DR server (S1) and log in as *pnuser*.

**Step 5** On the remote DR server (S1), configure PN-IL in standalone mode but use the *remote DR server's IP address* (**--anaPtpServer remote-DR-ip**).

```
itgctl config 1 --anaPtpServer remote-DR-server-ip --anaPtpUser pn-root-user --anaPtpPw
pn-root-user-password --authURL network-authentication-URL
```

**Step 6** On the primary cluster node (P1), start PN-IL.

```
$PRIMEHOME/bin/itgctl start
```



**Note**

To avoid the automatic start of PN-IL on the DR server, disable the PN-IL Health monitor, and stop the PN-IL service on that server, using the following command:

```
$PRIMEHOME/local/scripts/il-watch-dog.sh disableandstop.
```

**Step 7** On the primary cluster node, log in as the operating system root user and unfreeze the ana service.

```
clusvcadm -U ana
```

**Step 8** To enable NBI, contact Cisco representative.

Next, perform the necessary configuration steps that are described in [Configuring PN-IL on a Prime Network Gateway \(Local + Geographical Redundancy\)](#), page 4-23.

## Configuring and Migrating PN-IL with Prime Central (Suite Mode with Local + Geographical Redundancy)

When Prime Network and PN-IL are running in *suite mode*, that means they are integrated with Prime Central. This procedure explains how to integrate PN-IL with a deployment of Prime Central that uses geographical redundancy. You can use this procedure for:

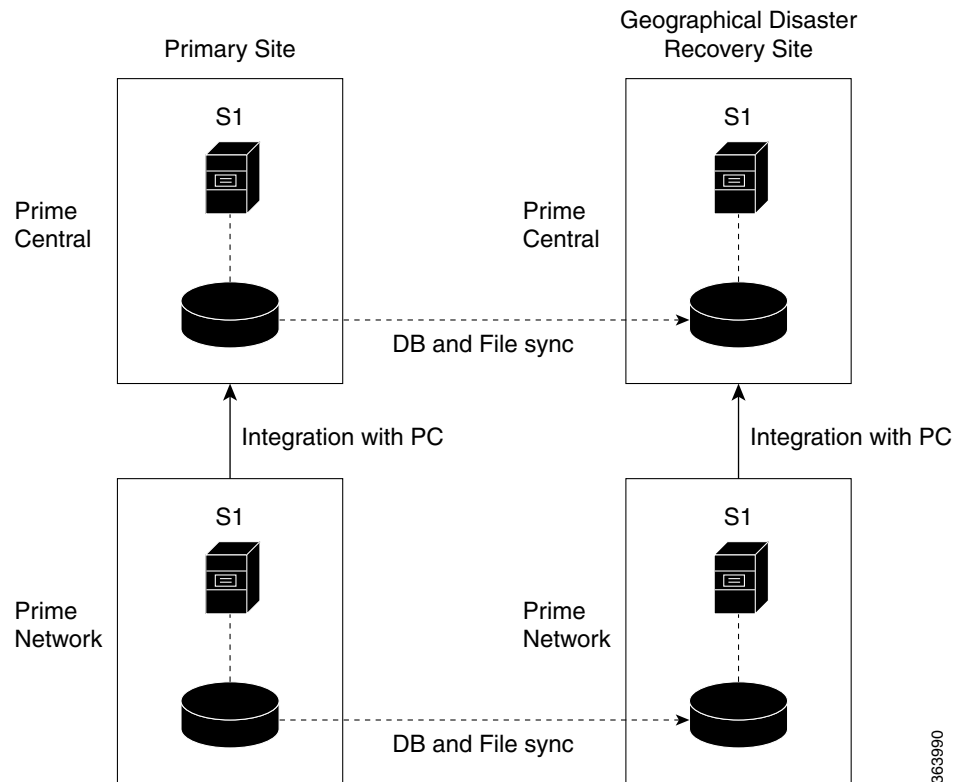
- New installations of PN-IL with geographical redundancy.
- Existing standalone installations of PN-IL with geographical redundancy, that you want to move from standalone to suite mode.

[Figure 4-1](#) illustrates the deployment of both local and geographical redundancy in Suite Mode.

**Note**

PN-IL geographical redundancy is only supported when the deployment also has local redundancy. Therefore, Prime Central must also be using both local and geographical redundancy.

**Figure 4-1** Local Redundancy with Geographical Redundancy Suite Mode



In the following procedure, \$PRIMEHOME is the *pnuser* environment variable for the PN-IL installation directory you created in [Installing PN-IL on a Prime Network Server \(Local + Geographical Redundancy\)](#), page 4-21.

#### Before You Begin

Before you begin, verify the following:

- PN-IL is already installed. If it is not, install it as described in [Installing and Configuring PN-IL for Local + Geographical Redundancy](#), page 4-20.
- Prime Network is running suite mode.
- Prime Central is using both local geographical redundancy.

To integrate PN-IL with Prime Central:

- Step 1** From the Prime Network primary cluster node (P1), log in as *pnuser*.
- Step 2** On the Prime Network primary cluster node (P1), configure PN-IL in suite mode, edit the necessary integration files, and run the integration script:
- Move to the PN-IL integration directory.
 

```
cd $PRIMEHOME/integration
```

- b. Edit the **ILIntegrator.prop** file and change the value of the 'HOSTNAME' property to ana-cluster-ana, which is the fixed name for the Prime Network cluster server.

```
HOSTNAME=ana-cluster-ana
```

- c. Execute the following integration script to integrate PN-IL with Prime Central. Prime Central will assign an ID number to PN-IL. Note the ID number because you will need it later to integrate the remote DR server (S1) with Prime Central.



**Note** When you run DMIntegrator.sh, you must exactly follow the format below or the script will fail.

```
./DMIntegrator.sh -a ILIntegrator.prop prime-central-db-hostname
prime-central-db-service-name prime-central-db-user prime-central-db-user-password
prime-central-db-port-number
```

**DMIntegrator** uses these variables. You must enter them in this exact order.

| DMIntegrator.sh Variable              | Description                                                                 |
|---------------------------------------|-----------------------------------------------------------------------------|
| <i>prime-central-server-hostname</i>  | Specifies the IP address of the Prime Central database server               |
| <i>prime-central-db-service-name</i>  | Specifies the name of Prime Central database service                        |
| <i>prime-central db-user</i>          | Specifies the name of Prime Central database user (usually <b>primedb</b> ) |
| <i>prime-central-db-user-password</i> | Specifies the password for Prime Central database user                      |
| <i>prime-central-db-port</i>          | Specifies the port for Prime Central database (usually <b>1521</b> )        |

Example:

```
./DMIntegrator.sh -a ILIntegrator.prop 10.10.10.10 primedb primedb mypassword 1521
```

- Step 3** On the Prime Network primary cluster node (P1), reload the user profile:

```
source $PRIMEHOME/.cshrc
```

- Step 4** On the Prime Network primary cluster node (P1), retrieve the ID that Prime Central assigned to Prime Network using **itgctl list**. You will need it in a future step.

```
$PRIMEHOME/bin/itgctl list
```

- Step 5** Open a new session to the Prime Network remote DR server (S1) as a root user and rename file as shown below.

```
cd /var/adm/cisco/prime-network/scripts/ha/rsync
mv rsync_exclude_pnil.txt rsync_exclude_pnil.txt.org
mv rsync_exclude_pnil_cfg.txt rsync_exclude_pnil_cfg.txt.org
```

- Step 6** On the Prime Network remote DR server (S1), configure PN-IL in suite mode as *pnuser*. Edit the necessary integration files, and run the integration script.

a. `su - pnuser`

- b. Move to the PN-IL integration directory.

```
cd $PRIMEHOME/integration
```

- c. Edit the **ILIntegrator.prop** file and change the value of the 'HOSTNAME' property to the Prime Network remote DR server (S1) hostname. For example:

```
HOSTNAME=remote-pn-DR-server
```

- d. Execute the following integration script to integrate PN-IL into the deployment:

```
./DMIntegrator.sh -a ILIntegrator.prop prime-DR-db-server-hostname db-service-name
db-user db-user-password db-port pn-id
```

**DMIntegrator** uses these variables. You must enter them in this exact order.

| DMIntegrator.sh Variable           | Description                                                   |
|------------------------------------|---------------------------------------------------------------|
| <i>prime-DR-db-server-hostname</i> | IP address of the Prime Central DR database server            |
| <i>db-service-name</i>             | Name of Prime Central database service                        |
| <i>db-user</i>                     | Name of Prime Central database user (usually <b>primedb</b> ) |
| <i>db-user-password</i>            | Password for Prime Central database user                      |
| <i>db-port</i>                     | Port for Prime Central database (usually <b>1521</b> )        |
| <i>prime-pn-id</i>                 | Prime Network ID number assigned by Prime Central             |

Example:

```
./DMIntegrator.sh -a ILIntegrator.prop 10.10.1.11 primedb primedb mypassword 1521 10
```

- Step 7** On the remote DR node (S1), reload the user profile:

```
source $ANAHOME/.cshrc
```

- Step 8** Log out from Prime Network application user and as root user change the following file name

```
cd /var/adm/cisco/prime-network/scripts/ha/rsync
mv rsync_exclude_pnil.txt.org rsync_exclude_pnil.txt
mv rsync_exclude_pnil_cfg.txt.org rsync_exclude_pnil_cfg.txt
```

- Step 9** As the operating system root user, on the primary cluster node (P1), unfreeze the ana service.

```
clusvcadm -U ana
```

Next, disable the PN-IL health monitor as described in [Disabling the PN-IL Health Monitor, page 4-27](#).

## Disabling the PN-IL Health Monitor

When PN-IL is installed in a geographical redundancy deployment, the RHCS cluster service monitors PN-IL's status. Therefore, you should disable the PN-IL health monitor.

To disable the PN-IL health monitor, execute the following command as *pnuser*:

```
$ANAHOME/local/scripts/il-watch-dog.sh disable
```

# Installing and Configuring PN-IL for Geographical Redundancy Only

This section explains how to install the Prime Network Integration Layer (PN-IL) 1.2 for a geographical redundancy only deployment. It also explains how to integrate the deployment with Cisco Prime Central. For information on the Prime Central releases with which you can integrate PN-IL 1.2, see the [Cisco Prime Network 5.3 Release Notes](#).

**Note**

---

PN-IL geographical redundancy only has a primary server (P1) at the local site and remote server (S1) at a remote geographical site for a full disaster recovery.

---

These topics provide the information you will need to install and configure PN-IL geographical only deployments:

- [Installation DVD, page 4-20](#)
- [Steps for Installing PN-IL with Geographical Redundancy Only, page 4-28](#)
- [Installing PN-IL on a Prime Network Server \(Geographical Redundancy Only\), page 4-29](#)
- [Configuring PN-IL on a Prime Network Gateway \(Geographical Redundancy Only\), page 4-31](#)
- [Disabling the PN-IL Health Monitor, page 4-27](#)

If you want to migrate an *existing* standalone installations of PN-IL (with geographical redundancy) to suite mode, you can use the procedure in [Configuring and Migrating PN-IL with Prime Central \(Suite Mode with Local + Geographical Redundancy\)](#), page 4-24.

## Steps for Installing PN-IL with Geographical Redundancy Only

[Table 4-7](#) provides the basic steps you must follow to set up geographical redundancy only for PN-IL. If you want to migrate an *existing* standalone installations of PN-IL (with geographical redundancy only) to suite mode, you can use the procedure in [Configuring and Migrating PN-IL with Prime Central \(Suite Mode with Local + Geographical Redundancy\)](#), page 4-24.

Note that you only have to install PN-IL on the primary server (P1), not on the remote (DR) server (S2). However, you will have to do some configuration tasks on the remote server.



Table 4-8 Steps for Setting Up PN-IL Geographical Redundancy

|        | Task                                                                                  | Topic/Action Required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Local Cluster                      |             | Remote (DR) Server |
|--------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------|--------------------|
|        |                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Server (P1) (has Primary database) | Server (P2) | Remote Server (S1) |
| Step 1 | Collect server details, so that you have all information handy prior to installation. | <ul style="list-style-type: none"> <li>IP address of P1</li> <li>IP Address of remote DR server S1</li> <li>Prime Network application root username and password for primary and remote DR servers (P1 and S1)</li> <li>URL for authenticating Prime Network calls for P1 and S1 (normally <b>https://localhost:6081/ana/services/userman</b>)</li> <li>((Suite mode) For the Prime Central server where Oracle is installed: Hostname, database service name, database username and password, and database port.</li> </ul> | x                                  | —           | x                  |
| Step 2 | Verify the server meets the prerequisites.                                            | <a href="#">Installation Requirements for Geographical Redundancy, page 4-4</a>                                                                                                                                                                                                                                                                                                                                                                                                                                              | x                                  | —           | —                  |
| Step 3 | Configure PN-IL (in standalone or suite mode) on both nodes.                          | <a href="#">Configuring PN-IL on a Prime Network Gateway (Local + Geographical Redundancy), page 4-23</a>                                                                                                                                                                                                                                                                                                                                                                                                                    | x                                  | —           | x                  |
| Step 4 | Disable the PN-IL Health Monitor.                                                     | <a href="#">Disabling the PN-IL Health Monitor, page 4-27</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | x                                  | —           | x                  |

## Installing PN-IL on a Prime Network Server (Geographical Redundancy Only)

Use this procedure to install PN-IL with geographical redundancy on the primary server (P1). The primary node will copy the necessary files to the remote DR node (S1). For the remote DR node, you only have to perform some minor configurations.

### Before You Begin:

Make sure Prime Network is installed and is up and running on the both the primary node (P1) and the remote DR node (S1). In the following procedure, \$ANAHOME is the *pnuser* environment variable for the Prime Network installation directory (/export/home/*pnuser* by default).

**Step 1** On the remote DR node (S1), log in as root and save your rsync settings so they are not overwritten during the PN-IL installation process.

```
ssh root@remote-DR-node-name
cd /var/adm/cisco/prime-network/scripts/ha/rsync
```

```
mv rsync_exclude_pnil.txt rsync_exclude_pnil.txt.org
mv rsync_exclude_pnil_cfg.txt rsync_exclude_pnil_cfg.txt.org
```

**Step 2** On the primary node (P1), log in as *pnuser*.

```
su - pnuser
```

For example:

```
su - pn41
```

**Step 3** On the primary node, create an installation directory for PN-IL.

```
mkdir -p $ANAHOME/new-pnil-dir
```

For example, if the Prime Network installation directory was `/export/home/pn41`, you would run this command to create an installation directory called `pnil`:

```
mkdir -p $ANAHOME/pnil
```

**Step 4** On the primary cluster node (P1), copy the installation files from the installation DVD, extract them, and start the installation script. These examples use the PN-IL installation directory `/pnil`.

- a. Copy the PN-IL installation tar file from Disk 2 to the directory you created in [Step 4](#). In the following example, the installation directory is named **pnil**.

```
cp /tmp/sil-esb-2.3.0.tar.gz $ANAHOME/pnil
```

- b. Change to the directory you created in [Step 4](#) and extract the files from the PN-IL installation tar:

```
cd $ANAHOME/pnil
tar -zxf sil-esb-2.3.0.tar.gz
```

- c. Change to directory where the installation tar files were extracted and run the installation script:

```
cd sil-esb-2.3.0/install/packages
./installAndConfigureEsb.sh
```

**Step 5** On the primary node (P1), reload the user profile.

```
source $ANAHOME/.cshrc
```

**Step 6** Log into the remote DR server (S1) as root and move the original rsync exclude file (that you moved in [Step 1](#)) back to its proper place.

```
ssh root@remote-DR-server
cd /var/adm/cisco/prime-network/scripts/ha/rsync
mv rsync_exclude_pnil.txt.org rsync_exclude_pnil.txt
mv rsync_exclude_pnil_cfg.txt.org rsync_exclude_pnil_cfg.txt
```

**Step 7** Configure PN-IL as described in [Configuring PN-IL on a Prime Network Gateway \(Local + Geographical Redundancy\)](#), page 4-23.




---

**Note** Do not unfreeze the ana service until PN-IL has been configured.

---




---

**Note** You do not have to install the geographical redundancy files on the remote server (S1); the necessary files will be copied to the remote DR server by the primary node.

---

## Configuring PN-IL on a Prime Network Gateway (Geographical Redundancy Only)

Configuration tasks must be performed on both the primary node (P1) and the remote DR node (S1).

- For standalone mode (that is, Prime Network is not integrated with Prime Central), follow the instructions in [Configuring PN-IL with Prime Network \(Standalone Mode with Local + Geographical Redundancy\)](#), page 4-23.
- For suite mode (Prime Network is integrated with Prime Central), follow the instructions in [Configuring and Migrating PN-IL with Prime Central \(Suite Mode with Local + Geographical Redundancy\)](#), page 4-24.

## Configuring PN-IL with Prime Network (Standalone Mode with Geographical Redundancy Only)

In standalone mode, Prime Network is not integrated with Prime Central and can independently expose MTOSI and 3GPP web services to other OSS/applications. In the following procedure:

- \$PRIMEHOME is the *pnuser* environment variable for the PN-IL installation directory you created in [Installing PN-IL on a Prime Network Server \(Local + Geographical Redundancy\)](#), page 4-21.
- \$ANAHOME is the *pnuser* environment variable for the Prime Network installation directory (/export/home/*pnuser* by default).

**Step 1** From the primary node (P1), log in as *pnuser*.

**Step 2** On the primary node (P1), configure PN-IL in standalone mode.

```
itgctl config 1 --anaPtpServer ana-primary-ip --anaPtpUser pn-root-user --anaPtpPw
pn-root-user-password --authURL network-authentication-URL
```

*itgctl* uses these arguments.

| Argument                          | Description                                                                                                                                                                                                                             |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ana-primary-ip</i>             | <ul style="list-style-type: none"> <li>• When run on the primary cluster node (P1), this is the IP address of the primary server.</li> <li>• When run on the remote DR node, this is the IP address of the remote DR server.</li> </ul> |
| <i>pn-root-user</i>               | Name of Prime Network root user (usually <b>root</b> )                                                                                                                                                                                  |
| <i>pn-root-user-password</i>      | Password for Prime Network root user                                                                                                                                                                                                    |
| <i>network-authentication-URL</i> | URL used to authenticate Prime Network calls (usually <b>https://localhost:6081/ana/services/userman</b> )                                                                                                                              |

For example:

```
itgctl config 1 --anaPtpServer 192.0.2.22 --anaPtpUser root --anaPtpPw myrootpassword
--authURL https://192.0.2.22:6081/ana/services/userman
```

**Step 3** On the primary node (P1), start PN-IL.

```
$PRIMEHOME/bin/itgctl start
```

**Step 4** Open a new session on the remote DR server (S1) and log in as *pnuser*.

- Step 5** On the remote DR server (S1), configure PN-IL in standalone mode but use the *remote DR server's IP address* (`--anaPtpServer remote-DR-ip`).

```
itgctl config 1 --anaPtpServer remote-DR-server-ip --anaPtpUser pn-root-user --anaPtpPw
pn-root-user-password --authURL network-authentication-URL
```

- Step 6** On the primary cluster node (P1), start PN-IL.

```
$PRIMEHOME/bin/itgctl start
```

- Step 7** Enable NBI:

```
cd $PRIMEHOME/install/scripts
./accessconfig.sh nbi enable
```

---

Next, perform the necessary configuration steps that are described in [Configuring PN-IL on a Prime Network Gateway \(Local + Geographical Redundancy\)](#), page 4-23.

## Configuring and Migrating PN-IL with Prime Central (Suite Mode with Geographical Redundancy Only)

When Prime Network and PN-IL are running in *suite mode*, that means they are integrated with Prime Central. This procedure explains how to integrate PN-IL with a deployment of Prime Central that uses geographical redundancy only. You can use this procedure for:

- New installations of PN-IL with geographical redundancy.
- Existing standalone installations of PN-IL with geographical redundancy, that you want to move from standalone to suite mode.

In the following procedure, \$PRIMEHOME is the *pnuser* environment variable for the PN-IL installation directory you created in [Installing PN-IL on a Prime Network Server \(Local + Geographical Redundancy\)](#), page 4-21.

### Before You Begin

Before you begin, verify the following:

- PN-IL is already installed. If it is not, install it as described in [Installing and Configuring PN-IL for Local + Geographical Redundancy](#), page 4-20.
- Prime Network is running suite mode. For information on integrating Prime Network with Prime Central, see [Cisco Prime Central Quick Start Guide, 2.0](#).
- Prime Central is using both local geographical redundancy.

To integrate PN-IL with Prime Central:

- 
- Step 1** From the Prime Network primary node (P1), log in as *pnuser* and stop prime network integration layer.

```
su - pnuser
$PRIMEHOME/itgctl stop
```

- Step 2** On the Prime Network primary node (P1), configure PN-IL in suite mode, edit the necessary integration files, and run the integration script:

- a. Move to the PN-IL integration directory.

```
cd $PRIMEHOME/integration
```

- b. Execute the following integration script to integrate PN-IL with Prime Central. Prime Central will assign an ID number to PN-IL. Note the ID number because you will need it later to integrate the remote DR server (S1) with Prime Central.



**Note** When you run `DMIntegrator.sh`, you must exactly follow the format below or the script will fail.

```
./DMIntegrator.sh -a ILIntegrator.prop prime-central-db-hostname
prime-central-db-service-name prime-central-db-user prime-central-db-user-password
prime-central-port-number
```

**DMIntegrator** uses these variables. You must enter them in this exact order.

| DMIntegrator.sh Variable                    | Description                                                                 |
|---------------------------------------------|-----------------------------------------------------------------------------|
| <code>prime-central-server-hostname</code>  | Specifies the IP address of the Prime Central database server               |
| <code>prime-central-db-service-name</code>  | Specifies the name of Prime Central database service                        |
| <code>prime-central db-user</code>          | Specifies the name of Prime Central database user (usually <b>primedb</b> ) |
| <code>prime-central-db-user-password</code> | Specifies the password for Prime Central database user                      |
| <code>prime-central-db-port</code>          | Specifies the port for Prime Central database (usually <b>1521</b> )        |

Example:

```
./DMIntegrator.sh -a ILIntegrator.prop 10.10.10.10 primedb primedb mypassword 1521
```

- Step 3** On the Prime Network primary cluster node (P1), reload the user profile:
 

```
source $PRIMEHOME/.cshrc
```
- Step 4** On the Prime Network primary node (P1), retrieve the ID that Prime Central assigned to Prime Network using `itgctl list`. You will need it in a future step.
 

```
$PRIMEHOME/bin/itgctl list
```
- Step 5** Open a new session to the Prime Network remote DR server (S1) as a root user and rename file as shown below.
 

```
cd /var/adm/cisco/prime-network/scripts/ha/rsync
mv rsync_exclude_pnil.txt rsync_exclude_pnil.txt.org
mv rsync_exclude_pnil_cfg.txt rsync_exclude_pnil_cfg.txt.org
```
- Step 6** On the Prime Network remote DR server (S1), configure PN-IL in suite mode as `pnuser`. Edit the necessary integration files, and run the integration script.
  - a. `su - pnuser`
  - b. Move to the PN-IL integration directory.
 

```
cd $PRIMEHOME/integration
```
  - c. Edit the `ILIntegrator.prop` file and change the value of the 'HOSTNAME' property to the Prime Network remote DR server (S1) hostname. For example:
 

```
HOSTNAME=remote-pn-DR-server
```
  - d. Execute the following integration script to integrate PN-IL into the deployment:

```
./DMIntegrator.sh -a IIntegrator.prop prime-DR-db-server-hostname db-service-name
db-user db-user-password db-port pn-id
```

**DMIntegrator** uses these variables. You must enter them in this exact order.

| DMIntegrator.sh Variable           | Description                                                                |
|------------------------------------|----------------------------------------------------------------------------|
| <i>prime-DR-db-server-hostname</i> | IP address of the Prime Central DR database server                         |
| <i>db-service-name</i>             | Name of Prime Central database service                                     |
| <i>db-user</i>                     | Name of Prime Central database user (usually <b>primedba</b> )             |
| <i>db-user-password</i>            | Password for Prime Central database user                                   |
| <i>db-port</i>                     | Port for Prime Central database (usually <b>1521</b> )                     |
| <i>prime-PNIL-DMID</i>             | Prime Network Integration Layer Domain ID number assigned by Prime Central |

Example:

```
./DMIntegrator.sh -a IIntegrator.prop 10.10.1.11 primedb primedba mypassword 1521 10
```

**Step 7** On the remote DR node (S1), reload the user profile:

```
source $ANAHOME/.cshrc
```

**Step 8** Log out from Prime Network application user and as root user change the following file name

```
cd /var/adm/cisco/prime-network/scripts/ha/rsync
mv rsync_exclude_pnil.txt.org rsync_exclude_pnil.txt
mv rsync_exclude_pnil_cfg.txt.org rsync_exclude_pnil_cfg.txt
```

Next, disable the PN-IL health monitor as described in [Disabling the PN-IL Health Monitor, page 4-27](#).

## Upgrading Prime Network in Geographical Redundancy without Network Down Time

You can upgrade Prime Network 5.3 in Geographical redundancy setup without network down time.



### Caution

This is a complex procedure and could be risky (data loss, network outage) if the steps are not done exactly the way they are documented. It is recommended only for those, who strictly does not want any network down time during Prime Network Upgrade in Geo Redundancy setup. Only those with sound knowledge on Prime Network HA Geographical Redundancy (installing, maintaining, switchover, failure, disaster recovery) are recommended to execute this procedure. Before you begin to execute this procedure, understand the purpose and requirement.

### Prerequisites

In your setup, make sure to have the following setup:

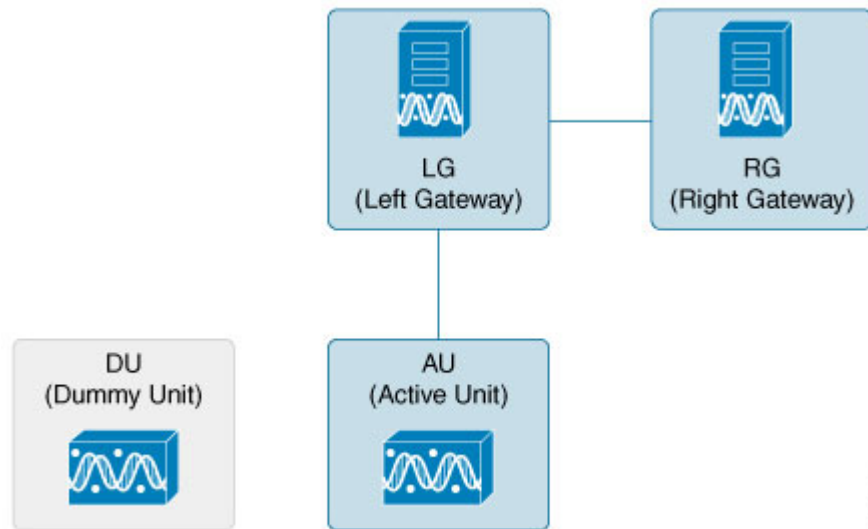
- At least one Active Unit (AU) attached to the Primary Node (LG).

- One DR Node (RG).
- In case of multiple units (AUs) attached to the Primary Node (LG), equal number of dummy units with data must be available.
- Fresh unit that is not connected to any gateway.
- With PN versions less than PN50, you should initially upgrade to PN50 following the below steps and then proceed upgrading to PN53 accordingly.

## Upgrading Prime Network 5.2 to 5.3 with RHEL 7.7

You can Upgrade Prime Network 5.2 with RHEL 7.5 to Prime Network 5.3 with RHEL 7.7 version. This procedure is described using the following topology example, with only 1 Unit (AU) attached to Primary Node (LG) and having DR Node (RG). If you have multiple units attached to primary node, you should have equal no. of dummy Units and accordingly follow similar steps based on your setup.

*Figure 4-2 Single Unit Setup with Left Gateway and Right Gateway*



where,

- LG is the Primary Node
- RG is the DR Node
- AU is considered as Active Unit with data, which is connected to LG and DU is considered as a Fresh Unit, which is not connected to any gateway.

### Procedure

**Step 1** As the root user, Log in to the Prime Network primary cluster node (LG).

```
PRIME_HOME - /export/home/PN432
ORACLE_Home - /ora/opt/oral/oracle
```

If you use any Dummy Units with LG with no data, avm, vne's and so on, disconnect and delete them completely from LG.

**Step 2** Block the route (connectivity) between AU and RG. (This is to avoid AU moving to RG when fail\_over is run on RG).

For example, add the below route in RG

```
# route add -host <AU ip address> reject
```

**Step 3** Block the route (connectivity) between two gateways (LG and RG).

**Step 4** Run Fail\_over in RG.

```
perl primeha -fail" executed from /var/adm/cisco/prime-network/scripts/ha/util
```

Follow the steps to perform the post failover procedure in RG:

1. Copy the "authorized\_keys", "id\_dsa", "id\_dsa.pub" files from Oracle ana\_secured (ORACLE\_Home/ana\_secured) to PN ana\_secured (PRIME\_HOME/local/ana\_secured).

Make sure to overwrite these files by providing "yes" when asked. For example:

```
[root@pn-lnx ana_secured]# cp authorized_keys /export/home/pn432/local/ana_secured/
cp: overwrite '/export/home/pn50/local/ana_secured/authorized_keys'? yes
```

2. Change the ownership of file to ana user and restart the SSH control.

```
service sshd restart.
```

For PN versions below PN50 and in PN50, if there is a delay in the visibility of the Compliance Engine in RG post failover, follow the additional steps that are required to bring the compliance engine up.

- a. Connect to RG : In "/export/home/PN<user>/Main/resources/compliance/product\_profile.xml" file, make sure this line "<ConnectionURL>jdbc:oracle:thin:" has RG ip address.
- b. Now, perform "networkctl restart" in RG. This should bring up the Compliance Engine.

**Step 5** Verify if,

- both gateways acting as Active-Active with AU are still attached to the LG
- AU is moved to RG after Fail\_over




---

**Note** Though AU is not moved to RG, it should still appear in RG after Fail\_over with an unreachable state.

---

**Step 6** Disconnect AU and Delete from the RG. (If you miss this step, RG looks for AU during upgrade and it might fail).

- It won't allow to delete any units directly, first you need to disconnect Unit, delete all VNE's, AVM's and then delete the unit. For multiple units attached to LG, follow the same process.

The LG & AU monitors the n/w.

**Step 7** Attach the DU to RG by running *network-conf*.




---

**Note** Make sure you select the same PN user name while installing, which the LG and RG have.

---

**Step 8** Use **Export to CSV** to export all VNE's of AU (attached to LG).

**Step 9** Import them to DU (attached to RG). Provide valid device credentials and telnet sequence columns for all VNE's accordingly in the Import CSV file. Now, DU will have a replica of AU.

**Step 10** Compare and verify if both units have same set of data. For example, AVM's, VNE's including Tickets, Alarms, Map's and so on. CCM jobs will be available in the Gateways.





**Note** In case, the Export/Import CSV option becomes very difficult in scale environment, contact an Advance services representative to get access to the tool. This tool helps you to handle importing large number of VNE's.

**Step 11 Take the back-up in RG before upgrade.**

Execute "emdbctl -backup" from path - /PRIME\_HOME/Main/scripts/embedded\_db.  
Back up files will be copied to /ORACLE\_Home/backup/.

**Step 12** Copy the *DR\_disable\_enable* script (available in the image/upgrade.zip folder of PN50) to PN home directory, and run as PN user in RG as shown below.

```
PN430@PN-HA% perl DR_disable_enable.pl -disable
successfully site updated DR value
Successfully updated /var/adm/cisco/prime-network/scripts/ha/ana_ha.conf dr_installed as
false
```

Prior to triggering Prime Network 5.3 upgrade in RG:

1. Log in as PN user in RG.
2. Delete the known\_hosts file under ssh.
3. Connect SSH to self host, self ip, localhost one after other. This is to update the known\_hosts entry with latest information.



**Note** After successful ssh to self host, you need to exit out and retry ssh to self ip. Follow the same for localhost. If you miss this step, upgrade the PN53 might fail.  
Ensure to SSH all units connected to RG from PN user, so that RG will have a complete known\_hosts updated list. This process will avoid units getting missed from upgrade to PN50 along with RG automatically

**Step 13** Now, upgrade RG to PN50 using *upgrade.pl* script.



**Note** This upgrade takes care of DU upgrade as well.

While executing *Upgrade.pl*, select this option as YES, as shown below:

```
- High-Availability setup found
Collecting High-Availability nodes credentials:
Is it ACTIVE-ACTIVE mode? (YES/NO) Default (NO): YES
Please Provide the root user password for PN-HA-1-S [10.6.7.79]:
- Setting High Availability scripts permissions:
Updating PN-HA-1-S [OK]
- Restarting databases
Restarting embedded Oracle database
```

**Step 14** After a successful upgrade to PN50 in RG, upgrade the oracle. For more information, see [Upgrading the Oracle 12.2.0.1 to Embedded Database](#).

## Upgrading the Oracle 12.2.0.1 to Embedded Database

After upgrading Prime Network 5.3 in RG, upgrade the oracle (embedded database) also to 122.

### Before you begin

- Stop PN in RG. (networkctl stop).

To upgrade Oracle 12.2.0.1, complete the following procedure:

1. `mkdir /tmp/upg12cunzip embedded_upgrade_12.1.zip to /tmp/upg12c`  
(`embedded_upgrade_12.1.zip` should be taken from PN50)

```
chmod a+x /tmp/upg12c/*.pl
```

2. Copy the zip file to/tmp/upg12c:

```
-upgrade_embedded_oracle_12.1.0.2_to_12.2.0.1.pl
```

3. Create the staging directory by entering the following commands:

```
mkdir /export/home/stg
cd /tmp/upg12c
```

4. Upgrade to Oracle 12.2.0.1 by entering the following command:

```
# perl upgrade_embedded_oracle_12.pl
```

5. Verify if the oracle upgrade is successful using the following command:

```
"opatch lsinventory" as oracle user
```

6. After successful completion, start the Prime Network in RG.

**Step 15** Start AVM's in DU under RG. Now, RG and DU will start monitoring the n/w.

**Step 16** Stop AVM's in AU, as soon as the DU is ready to monitor the n/w.

**Step 17** Upgrade RHEL in LG and AU.

After the RHEL upgrade, LG will be fresh without PN.

Follow the below steps to upgrade:

1. Install all the required RPM's for RHEL 7.2, stop, and disable firewall all (this is to avoid RMAN issue in later steps).
2. Like a fresh install, create partitions, mounts, /etc/hosts, copy PN50 oracle zip files accordingly.
3. Unzip RH\_ha.zip of PN50 under /tmp in LG.
4. Enable the "DR\_disable\_enable" script (available in /export/home/pn50/local/scripts/) by executing as PN user in RG, as shown below:

```
PN430@PN-HA% perl DR_disable_enable.pl -enable
successfully site reverted DR value
Successfully updated /var/adm/cisco/prime-network/scripts/ha/ana_ha.conf dr_installed
as true
```

5. Unblock the route between Gateways.
6. As part of catastrophic recovery, (restore the redundancy configuration on the failed site after a catastrophic failure)

```
execute perl resumeFromFailOver.pl -reinstall_setup from /tmp/RH_ha/ in LG.
```

This will install PN50 and latest oracle122 in LG. Make sure you select the same name for PN user, which RG have.


7. Run "perl resumeFromFailOver.pl --setup\_replication" from /tmp/RH\_ha/ in RG. Wait for "Replication Success" event in RG.

### Verifying Replication of Prime Network and Database

1. Verify the setup:
    - a. LG – RHEL 7.2, PN50, oracle 12.1.0.2.
    - b. RG – RHEL 6.7, PN50, oracle 12.1.0.2 (RHEL still needs to be upgraded). Same is the status of DU.
    - c. RG is current Active which is monitoring the n/w with DU and LG is current standby.
- 

## Upgrading RHEL in RG

To upgrade RHEL in RG:

- 
- Step 1** Block the route between DU and LG. (This is to avoid DU moving to LG when `fail_over` is run on LG, resulting in a minimal downtime.)
  - Step 2** Block the route between Gateways.
  - Step 3** Run this file as PN user `/PRIME_HOME/.deploy/linux/fetch_ssh_daemon/deploy.cmd` in LG.
  - Step 4** Run `Fail_over (perl primeha -fail)` in LG. Now we have Active-Active Gateways. RG & DU still monitoring the network.
  - Step 5** Though DU is still with RG monitoring the n/w, it would show up in LG post `fail_over` (in LG) with state as unreachable. Disconnect DU and delete the entries of DU completely in LG.
  - Step 6** Pick AU which is already upgraded to RHEL 7.2, install PN50 and attach it to LG by running `network-conf`. Make sure to select the same PN user name which, LG and RG have.
  - Step 7** Use **Export/Import CSV** to copy all the VNE's from DU to AU.
  - Step 8** Start AVM's in AU. Now monitoring of n/w should be taken care by LG and AU.
  - Step 9** Upgrade RHEL in RG.
    - a. Re-install **all required RPM's**.
- 
-  **Note** Make sure **firewall is stopped and disabled**.
- 
- b. As like fresh install - create partitions, mounts, `/etc/hosts`
  - c. Copy PN53 oracle zip files.
  - d. Unzip `RH_ha.zip` of PN53 under `/tmp`.
- Step 10** Unblock the route between Gateways, AU and RG.
  - Step 11** As part of catastrophic recovery, execute `perl resumeFromFailOver.pl -reinstall_setup` from `/tmp/RH_ha/` in RG. This will install PN50 and latest oracle122 in RG. Make sure you select the same name for PN user which, LG have.
  - Step 12** Run `perl resumeFromFailOver.pl --setup_replication` from `/tmp/RH_ha/` in LG.
  - Step 13** Wait for “Replication Success” event in LG. Verify that the replication of PN and Database is successful.
  - Step 14** View the similar final setup that is being illustrated in the beginning. For example, LG (active) – AU: monitoring the network. RG will be standby g/w. Finally DU remain dummy, as before.





## Performing Switchovers and Failovers

---

These topics describe how to use the high availability scripts to perform a switchover between two active sites, perform a failover when a primary site fails, restore the configuration of a failed site, and other high availability operations.

- [Performing a Scheduled Site Move, page 5-1](#)
- [Failing Over to the Standby Site for Disaster Recovery, page 5-5](#)
- [Restoring the Failed Site \(Hot Backup\), page 5-7](#)
- [Stopping and Restarting Data Replication, page 5-11](#)
- [Changing IP Addresses after a Failover or Switchover, page 5-15](#)

### Performing a Scheduled Site Move

Use the **primeha -switch** command to perform a scheduled move from a primary site to a remote site, when both sites are available. This is called a *switchover*. This is used for planned switches initiated by administrators.

The **primeha -switch** command will use the inputs you provided when you installed the gateway server high availability solution but will also give you an opportunity to modify those settings before performing the switchover. The switchover process consists of the following:

- Switch the roles between the primary and standby sites.
- Switch the data replication sides (ADG and GWSync). In other words, the new primary site will be replicated to the new standby site.
- For Operations Reports, start AVM 45 on the standby site.

You can also use the switchover command to fallback to the primary site when a failed server is brought back online. The switchover will again reverse the replication directions. After performing a manual switchover, move any AVMs from unreachable units at the primary site to reachable units at the remote site.



Note

---

**primeha -switch** command must be run from the server with the *primary active* database.

---

To perform a switchover:

**Step 1** Log into the server that contains the primary active database. (You can validate this by running **primeha -status**.)

**Step 2** Move to the proper directory and start the script. The script will use the inputs you provided when you installed the gateway server high availability solution but will also give you an opportunity to modify those settings before performing the switchover.

```
cd /var/adm/cisco/prime-network/scripts/ha/util
perl primeha -switch
```

Make sure:

- If switching to a dual-node cluster, when you are prompted for the gateway and database IP addresses, use the floating IP addresses for the Prime Network, Oracle, and Infobright (if installed) services.
- You are only prompted for the “remote node” if the utility is invoked from a server that is part of a local redundancy setup. You should enter the IP address of the remote node—that is, the node the script is *not* being run from.

```
+ Switching over to remote node
+ These are the parameters for the switchover process
you will switch over to :
  gateway   : 1.1.1.1
  database  : 1.1.1.1
  remote node : 1.1.1.2
  Prime Network user : pn41
  Prime Network user home : /export/home/pn41
  oracle user : oracle
  oracle user home : /opt/ora/oracle
```

**Step 3** Approve or edit the default choices that appear based on the inputs you provided when you installed the gateway server high availability:

Do you approve? (yes/no)

- If you enter **yes** and the system is using external authentication (LDAP), provide the necessary information at the following prompt.

- From Prime Network 5.2 onwards,

While doing `switch_over` from active to standby server or while doing failover from the server, Switch over scripts prompts the option "AD Search Scope" in "switch\_over.pl" and other fail over scripts. Now both LDAP settings and AD Search scope are stored in the Registry file.

```
[root@cvg-ha03-lnx RH_ha]# perl primeha -switch or perl primeha -fail
```

```
+ Switching over to remote node
Parameters for Switch Over process:

Switch over to :
  gateway   : 10.76.83.121
  database  : 10.76.83.121
  Prime Network user : pn431
  Prime Network user home: /export1/ana-home/ana/pn431
  oracle user : oracle
  oracle user home: /ora/opt/ora1/oracle

Do you approve (yes/no) : yes
- Does this setup have an LDAP configured? [yes,no] yes
- Enter the new LDAP URL : www.google.com
-AD Search Scope
```

1. Entire Directory
  2. Within Domain
  3. Within Group or Subgroup
- Enter An option :

- For details on these LDAP prompt, see Configuring Prime Network to Communicate with the External LDAP Server in the [Cisco Prime Network 5.3 Administrator Guide](#).

Does this setup have an LDAP configured? (yes/no)

Otherwise, proceed to [Step 4](#).

- If you enter **no**, you are prompted for the following information:

| Field                                                                     | Description                                                                                                                                    |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| IP address of the remote gateway server on which Prime Network will run.  | IP address of the standby gateway.                                                                                                             |
| Root password for the remote node on which Prime Network will run.        | For the remote site gateway server, the root password for the operating system (required for SSH).                                             |
| IP address of the remote server\service on which Oracle database will run | IP address of the standby database.                                                                                                            |
| Root password of the remote server on which Oracle database will run      | For the remote database, the root password for the operating system (required for SSH).                                                        |
| Name for the OS user of the database                                      | Example: Oracle                                                                                                                                |
| Home directory of the user                                                | Example: /opt/ora/oracle                                                                                                                       |
| Name for the OS user for Prime Network                                    | Example: <i>pn41</i>                                                                                                                           |
| Home directory of the user                                                | Example: /export/home/ <i>pn41</i>                                                                                                             |
| Whether the setup has LDAP configured                                     | If system users LDAP (external authentication) for user authentication (see the <a href="#">Cisco Prime Network 5.3 Administrator Guide</a> ). |

- Step 4** Confirm that you want to continue with the switchover. Prime Network proceeds and displays text similar to the following.

```

- Checking if Prime Network is mounted on local node           [MOUNTED]
- Verifying local oracle status
- Verifying remote oracle status
- Changing local Prime Network flag to remote                 [OK]
- Stopping Prime Network on local side..                       [OK]
- Switching local server to remote
- Copying scripts to remote database
- Running pre-switchover script on remote database
- Changing local oracle flag to remote
- Copying scripts to remote database
- Running switchover script on remote database
- Copying scripts to remote gateway
- Running switchover script on remote gateway
- Switching local server to recover mode
- Set db to read only mode

```

- Step 5** If required, manually move the AVMs from the unreachable units at the primary site to the reachable units at the remote site. For moving and deleting AVMs information see the [Cisco Prime Network 5.3 Administrator Guide](#). (This is not required if the local units were not affected by a failure; the script will reconfigure the units to use the relevant gateway and database.)

- Step 6** Verify that the new gateway IP address and database IP addresses are correct. If needed, switch the IP address manually using one of the following procedures:
- [Changing the Gateway IP Address on a Gateway and All Units \(changeSite.pl\)](#), page 5-15
  - [Changing the Gateway IP Address on a Single Unit \(switchUnit.pl\)](#), page 5-17
- Step 7** To verify the setup, perform all of the tests (not including the step for creating database links) that are described in [Verifying the Geographical Redundancy Setup](#), page 4-15.

**Note**


---

To make cross-launch work on the upgrade setup, de-register and register the Prime Network, after the Prime Central and Prime Network switchover.

---

## Performing Switchover on Systems with Prime Network Integration Layer Installed on Prime Network

Use the below procedure to perform switch over from local node (also local cluster node) to remote (DR) server (S2) with Prime Network Integration Layer installed.

To perform a switchover on systems that has PN-IL installed on top of Prime Network.

- 
- Step 1** As root user, log in to Prime Network primary server and perform switch over to DR node, using the procedure in [Performing a Scheduled Site Move](#), page 5-1.
- Step 2** After switchover, login to the DR node as the Prime Network user.
- ```
su - pnuser
```
- Step 3** Enable PN-IL Health monitor. [Health monitor will bring up PN-IL service if it is down.]
- ```
$PRIMEHOME/local/scripts/il-watch-dog.sh enable
```
- Step 4** After the primary server is up, login as a root user to the Prime Network DR node and again perform the switch over to primary node, using the procedure in [Performing a Scheduled Site Move](#), page 5-1.
- Step 5** After switchover, log in to the DR node as the Prime Network user and disable the PN-IL health monitor
- ```
$PRIMEHOME/local/scripts/il-watch-dog.sh disableandstop
```
-



# Failing Over to the Standby Site for Disaster Recovery



Note

A *manual failover* should only be performed when the primary site has failed.

Use the **primeha -fail** command to perform a site failover for disaster recovery. A site failover is a manual move from the failed primary site to the standby site at remote location. The script will use the inputs you provided when you installed the gateway server high availability solution but will also give you an opportunity to modify those settings before performing the failover. When you invoke **primeha -fail**, the command does the following:

- Disconnects the primary site from the remote site.
- Stops the GWSync and ADG replication processes.
- Start the standby server as standalone node without geographical redundancy.

After performing a manual failover, move any AVMs from unreachable units at the primary site to reachable units at the remote site.

If you are using Operations Reports, the data from the past 1 hour and 20 minutes will be lost.



Note

The failover must be run from the node that contains the *standby* database. If the system is using external authentication (LDAP), you will have to provide the LDAP URL, distinguished name prefix and suffix, and the protocol (see *Configuring Prime Network to Communicate with the External LDAP Server* in the [Cisco Prime Network 5.3 Administrator Guide](#)).

To perform a failover:

**Step 1** As a root user, log into the active node that contains the standby database. (You can validate this by running **primeha -status**.)

Move to the proper directory and start the script. The script will use the inputs you provided when you installed the gateway server high availability solution but will also give you an opportunity to modify those settings before performing the failover.

```
cd /var/adm/cisco/prime-network/scripts/ha/util
perl primeha -fail
```

Make sure:

- If the setup includes a dual-node cluster, when you are prompted for the gateway and database IP addresses, use the floating IP addresses for the Prime Network and Oracle services.
- You are only prompted for the “remote node” if the utility is invoked from a server that is part of a local redundancy setup. You should enter the IP address of the remote node—that is, the node the script is *not* being run from.

```
+ Failing over to remote node
+ These are the parameters for the fail over process
you will fail over to :
  gateway   : 1.1.1.1
  database  : 1.1.1.2
from :
  gateway   : 1.1.1.1
  database  : 1.1.1.1
  remote node : 1.1.1.3
  Prime Network user : pn41
  Prime Net work user home : /export/home/pn1
```

```
oracle user : oracle
oracle user home : /opt/ora/oracle
```

**Step 2** Approve or edit the default choices that appear based on the inputs you provided when you installed the gateway server high availability:

Do you approve? (yes/no)

- If you enter **yes** and the system is using external authentication (LDAP), provide the necessary information at the following prompt. For details on these LDAP prompt, see [Configuring Prime Network to Communicate with the External LDAP Server in the \*Cisco Prime Network 5.3 Administrator Guide\*](#):

Does this setup have an LDAP configured?

If you enter **yes** and the system is *not* using external authentication, proceed to [Step 3](#).


- If you enter **no**, you are prompted for the following information:

Field	Description
IP address of the server to which the gateway should fail over	IP address of the standby gateway. If the remote site is a member of a dual-node cluster, use the floating IP address (of the management port of the cluster).
IP address of the server to which the database should fail over	IP address of the standby database. If the remote site is a member of a dual-node cluster, use the floating IP address.
IP address of the current gateway server	
Root password for the node that has the gateway mounted	For the remote gateway server, the root password for the operating system (required for SSH).
IP address of the current database server	
Root password for the node that has the database mounted	For the remote database, the root password for the operating system (required for SSH).
OS user of the database	Name of database OS user.
Home directory of the user (oracle)	Example: /opt/ora/oracle
OS user for Prime Network	Example: pn41
Home directory of the user (pn41)	Example: /export/home/pn41
Whether the setup has LDAP configured (yes/no)	If system users LDAP (external authentication) for user authentication (For details on LDAP, see <a href="#">Configuring Prime Network to Communicate with the External LDAP Server in the <i>Cisco Prime Network 5.3 Administrator Guide</i></a> ).

**Step 3** Confirm that you want to continue with the failover. Prime Network proceeds and displays text similar to the following.

```
- Checking if Prime Network is mounted on local node [MOUNTED]
- Verifying local oracle status
- Copying scripts to remote gateway
- Running failover script on remote gateway
- Copying scripts to remote database
- Running failover script on remote database
- Switching local db to active mode
- Changing remote oracle flag to local
```

- Starting replication monitoring cron [OK]
- Changing remote Prime Network flag to local [OK]
- Copying scripts to sub
- Running script on cluster standby node

- Step 4** Move any AVMs from unreachable units at the primary site to reachable units at the remote site. For moving and deleting AVMs information see the [Cisco Prime Network 5.3 Administrator Guide](#).
- Step 5** Verify that the new gateway IP address and database IP addresses are correct. If needed, switch the IP address manually using one of the following procedures:
- [Changing the Gateway IP Address on a Gateway and All Units \(changeSite.pl\)](#), page 5-15
  - [Changing the Gateway IP Address on a Single Unit \(switchUnit.pl\)](#), page 5-17
-  **Note** To restore the configuration after a disaster, see [Restoring the Failed Site \(Hot Backup\)](#), page 5-7.
- Step 6** To verify the setup, perform all of the tests (not including the step for creating database links) that are described in [Verifying the Geographical Redundancy Setup](#), page 4-15.
- Step 7** Log into Prime Network using the new IP address.

## Restoring the Failed Site (Hot Backup)



**Note**

In this section, *failed site* refers to the non-active site. This could be:

- A cluster (Server P1 and Server P2 in a local or geographic redundancy setup), or
- A single node (Server P1 in a geographical redundancy (only) setup).

After the servers are up and running on the failed site, use the procedures in this section to restore the redundancy configuration on the failed site. For information about how to failover to a standby site after a disaster, see [Failing Over to the Standby Site for Disaster Recovery](#), page 5-5.

While restoring the redundancy configuration on the failed site, you do not have to take down the active site. Both sites are up while the failed site resumes, and you can switch back to the active site, without any down time. Restoring the redundancy configuration on the failed site depends on whether the servers on the failed site were down due to a catastrophic or non-catastrophic failure.

- A catastrophic failure is when the servers becomes unoperative and unreachable, for example, unexpected breakdown on the server side due to disk crash, or sudden power surge. In this case, the existing setup or configuration is completely lost.
- A non-catastrophic failure is when the server may be unoperative for some time but the setup is still intact, for example, in case of a reboot.

The **resumeFromFailOver.pl** script is used for restoring the redundancy configuration and has the following format:

```
perl resumeFromFailOver.pl -setup_replication [-daemonize] | -reconfigure_setup | [-autoconf dir]
-reinstall_setup
```

[Table 5-1](#) describes the arguments and option and also indicates the node from where the commands should be executed.

Table 5-1 Options/Arguments for `resumeFromFailOver.pl`

Arguments/Options	Description	Failed Site <sup>1</sup>	Active Site
		<code>[-autoconf dir]</code> <code>-reinstall_setup</code>	Reinstalls the gateway on the failed site <sup>1</sup> that can be either a dual node cluster or a single node server.  The <code>-autoconf dir</code> option runs the operation in non-interactive mode using input from the <code>rf_auto_install_RH.ini</code> file located in <code>dir</code> ( <code>dir</code> must be a full pathname).
<code>-setup_replication</code> <code>[-daemonize]</code>	Restores the replication between the failed site and remote site. The <code>daemonize</code> option runs the replication process in background without any user interaction.	-	x
<code>-reconfigure_setup</code>	Reconfigures the failed <sup>2</sup> site <sup>1</sup> after a failover. Use this flag only when the setup still exists on the failed site.  If for some reason, the <code>--setup_replication</code> fails, then use this flag on the failed site first, and then run <code>--setup_replication</code> again (from the active site).	x	-

1. The site which had failed. This could be a Cluster (Server P1 and Server P2 in a local or geographic redundancy setup) or only a single node (Server P1 in a geographical redundancy (only) setup)
2. Failed server still operates and Prime Network installation exists. Redundancy setup can be reconfigured without reinstalling.

Depending on the type of failure on the failed site, do one of the following to restore the redundancy configuration on the failed site:

- [Restoring Redundancy Configuration After a Catastrophic Failure, page 5-8](#)
- [Restoring Redundancy Configuration After a Non-Catastrophic Failure, page 5-11](#)

## Restoring Redundancy Configuration After a Catastrophic Failure

### Before You Begin:

Make sure all the installation and high availability requirements are met. See [Installation Requirements for Geographical Redundancy, page 4-4](#).



#### Note

Ensure that you have already performed the failover procedure before proceeding to the restore redundancy configuration on the failed site. For information about how to failover to a standby site after a disaster, see [Failing Over to the Standby Site for Disaster Recovery, page 5-5](#).

To restore the redundancy configuration on the failed site after a catastrophic failure, do the following:

- Step 1** As a root user, log into the failed site and unzip the `RH_ha.zip` located on the “Disk 1 New Install” DVD. Unzipping `RH_ha.zip` creates the `/tmp/RH_ha` directory. Also, unzip the `RH_ha.zip` in the primary location.

- Step 2** From the /tmp/RH\_ha directory, run the **perl resumeFromFailOver.pl -reinstall\_setup** for reinstalling the failed site. For information about other options or arguments used with **resumeFromFailOver.pl** script, see [Table 5-1](#).

```
cd /tmp/RH_ha
perl resumeFromFailOver.pl -reinstall_setup
```

- Step 3** Enter **y** at the prompt to continue with the Prime Network installation.

```
Would you like to continue? (y/n)
```

- Step 4** Enter the server details as shown in [Table 5-2](#) or [Table 5-3](#), depending on whether it is local and geographical redundancy configuration or a geographical redundancy only.

**Table 5-2 Prompts that Appear While Restoring Local and Geographical Redundancy Configuration**

Field	Description
Hostname of the primary node	Hostname of the active site, i.e, the site that is currently running both the cluster services (ana, oracle_db).
Password for the primary node root user	Password of the active site, i.e, the site that is currently running both the cluster services (ana, oracle_db).
Whether NTP is configured on the 2 gateways (local)	NTP should be configured on two gateways. If not configured, first configure NTP and then continue with the installation. For more details on procedures, see configuring NTP in the <a href="#">Cisco Prime Network 5.3 Installation Guide</a> .
Checking whether multipath is configured	Check whether multipath is enabled.
Checking whether to run automated backup for embedded database backup	Indicates whether to run the embedded database automated backups, yes or no.
Password for <i>pnuser</i>	User-defined password for the <i>pnuser</i> .
Location of the Prime Network build image	Enter full path to the installation image version that was first installed.  For example, if you had installed 3.8 first, then upgraded to 3.10, then upgraded to 4.1, and then upgraded to 4.2, 4.2.3, or 4.3 provide the path of the 3.8 image.
Directory for the oracle zip files	The directory containing the embedded Oracle zip files.
Password for <i>NODE_ONE_HOSTNAME</i> root user	The root user password for the node running the installation. For local redundancy dual-node clusters, this node must be one of the cluster nodes.
Hostname for the cluster second node	Hostname of the second node in the cluster
Password for <i>NODE_TWO_HOSTNAME</i> root user	Password of the second node in the cluster
SMTP server	The local mail server
User email address	The email address to which error messages will be sent from the embedded database if problems occur.
IP address for the ORACLE service	Floating or Virtual IP of the Oracle service group.
IP address for the Prime Network service	Floating or Virtual IP of the Prime Network service.

Table 5-2 Prompts that Appear While Restoring Local and Geographical Redundancy Configuration

Field	Description
Valid multicast address for the cluster nodes	An available multicast address accessible and configured for both cluster nodes.
Name for the Prime Network cluster	User-defined cluster name. The cluster name cannot be more than 15 non-NUL (ASCII 0) characters. For local redundancy, the cluster name must be unique within the LAN.
<i>NODE_ONE_HOSTNAME</i> fencing agent	The hostname of the fencing device configured for the node running the installation. This can be an IP address for some fencing devices.
<i>NODE_TWO_HOSTNAME</i> fencing agent	The hostname of the fencing device configured for the second cluster node. For some fencing devices, this can be an IP address.
Password for the Prime Network cluster web interface admin user	Indicates the port and the password for the cluster web interface. The LUCI_PORT must be available and should not be in the Prime Network debug range (60000 <= X < 61000) or in the Prime Network avm port range (2000 <= X < 3000) OR (8000 <= X < 9000). The password must contain at least 6 characters.
Port for the Prime Network cluster web interface	

Table 5-3 Prompts that Appear While Restoring Geographical Redundancy Configuration

Field	Description
Hostname of the primary node	Hostname of the active server.
Password for the primary node root user	The root user password for the active server.
Whether NTP is configured on the 2 gateways (local and remote)	NTP should be configured on two gateways. If not configured, first configure NTP and then continue with the installation. For more details on procedures, see configuring NTP in the <a href="#">Cisco Prime Network 5.3 Installation Guide</a> .
Password for <i>pnuser</i>	User-defined password for the <i>pnuser</i> .
Location of the Prime Network build image	Enter full path to the installation image version that was first installed.  For example, if you had installed 3.8 first, then upgraded to 3.10, then upgraded to 4.1, and then upgraded to 4.2, 4.2.2, 4.2.3, or 4.3, provide the path of the 3.8 image.
Directory for the oracle zip files	The directory containing the embedded Oracle zip files.
Password for <i>HOSTNAME</i> root user	The root user password for the host machine.
SMTP server	The local mail server
User email address	The email address to which error messages will be sent from the embedded database if problems occur.

- Step 5** Log into the active site and run the `perl resumeFromFailOver.pl -setup_replication` from the directory where **RH\_ha.zip** was extracted. This script will set up replication between the failed and the active site.

For information on other options or arguments used with `resumeFromFailOver.pl` script, see [Table 5-1](#).

- Step 6** Confirm that you want to continue with setting up of replication process.
- Step 7** To verify the setup, perform all of the tests (not including the step for creating database links) that are described in [Verifying the Geographical Redundancy Setup, page 4-15](#).
- 

## Restoring Redundancy Configuration After a Non-Catastrophic Failure

### Before You Begin:

Make sure all the installation and high availability requirements are met. See [Installation Requirements for Geographical Redundancy, page 4-4](#).



**Note** Ensure that you have already performed the failover procedure before proceeding to restore the redundancy configuration on the failed site. For information about how to failover to a standby site after a disaster, see [Failing Over to the Standby Site for Disaster Recovery, page 5-5](#).

---

To restore the redundancy configuration on the failed site after a non-catastrophic failure, do the following:

- Step 1** As a root user, log into the failed site and unzip the `RH_ha.zip` located on the “Disk 1 New Install” DVD. Unzipping `RH_ha.zip` creates the `/tmp/RH_ha` directory. Also, unzip the `RH_ha.zip` in the primary location.
- Step 2** From the `/tmp/RH_ha` directory, run the `perl resumeFromFailOver.pl -reconfigure_setup` for restoring the replication between the failed and the active site.
- For information on options or arguments used with `resumeFromFailOver.pl` script, see [Table 5-1](#).
- ```
cd /tmp/RH_ha
perl resumeFromFailOver.pl -reconfigure_setup
```
- Step 3** Log into the active site and run the `perl resumeFromFailOver.pl -setup_replication` from the `/tmp/RH_ha` directory for setting up replication between the failed and the active site.
- For information on other options or arguments used with `resumeFromFailOver.pl` script, see [Table 5-1](#)
- Step 4** Confirm to continue with setting up of replication process.
- Step 5** To verify the setup, perform all of the tests (not including the step for creating database links) that are described in [Verifying the Geographical Redundancy Setup, page 4-15](#).
- 

## Stopping and Restarting Data Replication

These topics explain how to stop and restart the data replication process:

- [Stopping Data Replication, page 5-12](#)
- [Resuming Data Replication, page 5-14](#)

## Stopping Data Replication

Use the stop replication command **primeha -stop** when you need to perform scheduled work on a server in the remote site. It stops the replication process to the remote site and shuts down the standby database. Then resume replication when maintenance is complete as described in [Resuming Data Replication, page 5-14](#).

The following includes an example of a stop replication session. In the example:

- The local active gateway is P1 with the IP address 10.33.150.66.
- The remote standby gateway is S1.

This example stops data replication from P1 to S1.



### Note

This command *must* be run from the server that contains the standby database (S1 in this example). You can validate which server is the standby by running **primeha -status**.

**Step 1** Move to the correct directory.

```
# cd /var/adm/cisco/prime-network/scripts/ha/util
```

**Step 2** Verify the status of the active and backup servers using **primeha -status**:

```
# primeha -status
```

```
+ Perl for HA already installed
```

```
HOST          Prime Network SERVICE      ORACLE SERVICE
S1            Standby Prime Network      Standby oracle   local
P1            Active Prime Network       Active oracle
```

**Step 3** Log into the *server with the remote database* (S1) and enter the following command. This will stop replicating data and will shut down the remote site database.

```
# ./primeha -stop
```

**Step 4** Enter the server details as shown in the following table.

**Table 5-4** Prompts for **primeha -stop** and **-start**

| Prompt for                                               | Description                                                                                                                                                                                                                  |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remote server's gateway IP address                       | IP address for the primary gateway (P1). If the primary site has a local redundancy setup, enter the floating IP address for the Prime Network service.<br><br>(Because the script is run from S1, P1 is the remote server.) |
| Root password for the node that has the gateway mounted  | The root password for the operating system (required for SSH). (This would be the password for the P1 node.)                                                                                                                 |
| Remote database IP address                               | IP address for the primary database. If the primary site has a local redundancy setup, enter the floating IP address of the Oracle service.<br><br>(Because the script is run from S1, P1 is the remote database.)           |
| Root password for the node that has the database mounted | The root password for the operating system (required for SSH). (Again, this would be the password for the P1 node.)                                                                                                          |



Table 5-4 Prompts for `primeha -stop` and `-start`

| Prompt for                                       | Description                                                                                                                                            |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cluster sub server's IP address                  | (Displayed if standby database is part of a cluster) Enter the physical IP address of the remote node. (This would be the physical IP address for P1.) |
| Name for the OS user of the database             | Example: oracle                                                                                                                                        |
| Home directory of the user                       | Example: /opt/ora/oracle                                                                                                                               |
| Name for the OS user for Prime Network           | Example: pn41                                                                                                                                          |
| Home directory of the user Prime Network OS user | Example: /export/home/pn41                                                                                                                             |

```
# ./primeha -stop

+ Perl for HA already installed

+ Stopping replication to remote node
- Enter the remote server's gateway IP address:
10.33.150.66
- Enter the root password for the node that has the gateway mounted:
pwd
- Enter the remote data base IP address:
10.33.150.66
- Enter the root password for the node that has the data base mounted:
pwd
- Enter a name for the OS user of the database
oracle
- Enter the home directory of the user (oracle)
/opt/ora/oracle
- Enter a name for the OS user for Prime Network
pn41
- Enter the home directory of the user (pn41)
/export/home/pn41
- Checking if Prime Network is mounted on local node [MOUNTED]
- Removing local node Prime Network flag
- Stopping local db replication
- Removing local node data base flag
- Stopping replication on remote gateway
- Copying scripts to remote database
- Running stop replication script on remote database
```

**Step 5** Verify the status of the active and backup servers using `primeha -status`:

```
# primeha -status

+ Perl for HA already installed

HOST      Prime Network SERVICE      ORACLE SERVICE
S1        Prime Network not running on this node  Oracle not running on this node
P1        Prime Network not running on this node  Oracle not running on this node
```

**Step 6** Verify that all applications on the standby server (S1) are stopped by running `fsuser -c /export/home`. If any processes are still running (such as the Apache webserver), boot the standby server in single-user mode.

**Step 7** Perform any necessary maintenance.

## Resuming Data Replication



### Note

This command can only be used if (1) the remote database was stopped using **primeha -stop**, and (2) the remote database has *not* been down for more than 7 days. If the remote database *has* been down for more than seven days, you must recreate the remote database by using the **setup\_Prime\_DR.pl** script. See [Installing the Prime Network Gateway Geographical Redundancy Software, page 4-6](#) for information on using **setup\_Prime\_DR.pl** script.

Use the resume replication utility **primeha -start** to start the database at the remote site (in open, read-only mode) and restart the replication process. Run this command after all work is completed on the remote site.

The following includes an example of a start replication session. In this example:

- The local active gateway P1 with IP address 10.33.150.66.
- The remote standby gateway is S1.

This example starts data replication from the local active gateway (P1) to the remote standby gateway (S1).



### Note

This command must be run from the server that contains the remote database.

- Step 1** Verify the following on the server with the remote database (S1):
- The database has not been down for more than seven days. If it has, you must recreate the remote database using **setup\_Prime\_DR.pl** script (see [Installing the Prime Network Gateway Geographical Redundancy Software, page 4-6](#)).
  - Maintenance on the server is complete.
  - Whether the server is in single-user mode. If it is, reboot it in multi-user mode.
- Step 2** Log into the server with the remote database (S1) and move to the correct directory.
- ```
# cd /var/adm/cisco/prime-network/scripts/ha/util
```
- Step 3** Verify the status of the active and backup servers using **primeha -status**. If any services are running, stop them using **primeha -stop**.
- Step 4** Enter the following command. This will start replicating data and will shut down the remote site database.
- ```
# ./primeha -start
```
- Step 5** Enter the server details (see [Table 5-4](#)).



### Note

If the process aborts, run **primeha -stop** again. (The script most likely aborted because a process is not shut down.) Then verify that no services are running with **primeha -status**.

- Step 6** When the process completes, verify the status of the active and backup servers using **primeha -status**:
- ```
# primeha -status

+ Perl for HA already installed

HOST          Prime Network SERVICE          ORACLE SERVICE
```

S1	Standby Prime Network	Standby oracle	local
P1	Active Prime Network	Active oracle	

## Changing IP Addresses after a Failover or Switchover

If all IP addresses are not automatically changed after a failover or switchover, use the following procedures, as appropriate.

- [Changing the Gateway IP Address on a Gateway and All Units \(changeSite.pl\)](#), page 5-15
- [Changing the Gateway IP Address on a Single Unit \(switchUnit.pl\)](#), page 5-17

### Changing the Gateway IP Address on a Gateway and All Units (changeSite.pl)

If the gateway IP address is not updated on any of the units (or on the gateway) during a site-to-site failover or switchover, use the **changeSite.pl** utility to do so manually. This procedure will change the address on the gateway and all reachable units.



#### Note

If a dual-node cluster is part of a local redundancy setup, use the logical IP addresses.

The following table describes the options or arguments to the **changeSite.pl** utility. If you are using an external LDAP server for user authentication, you must also set the necessary LDAP parameters, as described below. For more details on these parameters, see *Configuring Prime Network to Communicate with the External LDAP Server* in the [Cisco Prime Network 5.3 Administrator Guide](#).

Option/Arguments	Description
<b>-force</b>	Allow manual change to registry settings. (Because this script runs as part of a failover or switchover, the <b>-force</b> option is required when running the script from the command line.)
<b>-newgwip</b> <i>new-gateway-ip</i>	IP address of the gateway that is running after the failover or switchover.
<b>-newdbip</b> <i>new-database-ip</i>	IP address of the database that running after the failover or switchover.
<b>-oldgwip</b> <i>old-gateway-ip</i>	IP address of the gateway that was running prior to the failover or switchover.
<b>-oldbip</b> <i>old-database-ip</i>	IP address of the database that was running prior to the failover or switchover.
[ <b>-newldapurl</b> <i>new-ldap-url</i> <b>-oldldapurl</b> <i>old-ldap-url</i> ]	(LDAP only) URL for the LDAP server that will be used by the running gateway ( <i>new-ldap-url</i> ), and the URL that was used by the gateway that was running prior to the failover or switchover ( <i>old-ldap-url</i> ). Use the following format: <b>ldap://host.company.com:port</b>

Option/Arguments	Description
[ <b>-newldapprefix</b> <i>new-ldap-prefix</i> <b>-oldldapprefix</b> <i>old-ldap-prefix</i> ]	(LDAP only) First part of the LDAP DN (which is used to uniquely identify users) for the new and old LDAP server. Both <i>new-ldap-prefix</i> and <i>old-ldap-prefix</i> should be entered exactly as shown below:  <b>CN</b>  (The actual format is <b>CN=Value</b> , which specifies the common name for specific users. = <i>Value</i> will be automatically populated with Prime Network usernames.)
[ <b>-newldapsuffix</b> <i>new-ldap-suffix</i> <b>-oldldapsuffix</b> <i>old-ldap-suffix</i> ]	(LDAP only) Second part of the LDAP distinguished name, which specifies the location in the directory for both the new and old LDAP servers. Both <i>new-ldap-suffix</i> and <i>old-ldap-suffix</i> should use the following format  <b>,CN=Users,DC=LDAP_server,DC=company,DC=com</b>
[ <b>-newldapisssl</b> <i>new-ldap-is-ssl</i> <b>-oldldapisssl</b> <i>old-ldap-is-ssl</i> ]	(LDAP only) Encryption protocol to be used for communication between the running Prime Network gateway server and the new LDAP server ( <i>new-ldap-is-ssl</i> ), and the protocol that was used between the old gateway and LDAP servers ( <i>old-ldap-is-ssl</i> ).

**Step 1** If you will reset LDAP information, reconfigure them first from the Prime Network Administration GUI client. For details on LDAP, see Configuring Prime Network to Communicate with the External LDAP Server in the [Cisco Prime Network 5.3 Administrator Guide](#).

**Step 2** Log into the primary gateway server as *pnuser*.

**Step 3** Change to the correct directory:

```
cd $ANAHOME/Main/ha
```

**Step 4** Run the following command:

```
perl changeSite.pl -force -newgwip new-gw-ip -newdbip new-db-ip
-oldgwip old-gw-ip -olddbip old-db-ip
[-newldapurl new-ldap-url -oldldapurl old-ldap-url]
[-newldapprefix new-ldap-prefix -oldldapprefix old-ldap-prefix]
[-newldapsuffix new-ldap-suffix -oldldapsuffix old-ldap-suffix]
[-newldapisssl new-ldap-is-ssl -oldldapisssl old-ldap-is-ssl]
```

The following is an example of a **changeSite.pl** session. In this example the following is being changed:

- The original gateway and database IP address was 1.1.1.1.
- The site was switched over to the standby gateway (1.1.1.2) and database (1.1.1.3).

For some reason, the IP addresses were not correctly changed to reflect the new addresses. The utility forces the IP addresses to be changed to 1.1.1.2 for the gateway and 1.1.1.3 for the database. In this example the system is not using LDAP, so those parameters are not included.

```
hostname% cd $ANAHOME/Main/ha
```

```
hostname% perl changeSite.pl -force -newgwip 1.1.1.2 -newdbip 1.1.1.3 -oldgwip 1.1.1.1
-olddbip 1.1.1.1
```

```
Thu Apr 14 16:08:22 2013 --[INFO]: '-Forced change of gw address from 1.1.1.1 to
1.1.1.2.... '
```

```

Thu Apr 14 16:08:22 2013 --[INFO]: '--changing uplinks for gw AVM0'
Thu Apr 14 16:08:22 2013 --[INFO]: '--changing uplinks for unit AVM0s'
Thu Apr 14 16:08:22 2013 --[INFO]: '--changing gw ip and haservice for unit AVM99s'
Thu Apr 14 16:08:22 2013 --[INFO]: '--changing registry on units'
Thu Apr 14 16:08:37 2013 --[INFO]: '--changing localhost entry for gw AVM99'
Thu Apr 14 16:08:37 2013 --[INFO]: '-Forced change of db server address from 1.1.1.1 to
1.1.1.3.... '
Thu Apr 14 16:08:37 2013 --[INFO]: '--changing db server ip for gw AVM66'
Thu Apr 14 16:08:38 2013 --[INFO]: '--changing db server ip for gw persistency.xml'
Thu Apr 14 16:08:38 2013 --[INFO]: '--changing db server ip for template persistency.xml'
Thu Apr 14 16:08:38 2013 --[INFO]: '--changing db server ip for unit persistency.xml'
Thu Apr 14 16:08:38 2013 --[INFO]: '-Forced change of NCCM address from 1.1.1.1 to
1.1.1.3.... '
new IP address is: 1.1.1.3
jdbc.properties file has been updated to change to new IP address
Thu Apr 14 16:08:39 2013 --[INFO]: '->Done'

```

## Changing the Gateway IP Address on a Single Unit (switchUnit.pl)

If any of the units do not reflect the updated gateway and database IP address after a site-to-site failover or switchover, use the **switchUnit.pl** utility to do so manually. This procedure will change the address only on the unit from which it is run.




---

**Note** If a dual-node cluster is part of a local redundancy setup, use the logical IP addresses.

---

For any unit that does not reflect the updated gateway and database IP addresses:

- 
- Step 1** Log into the unit as *pnuser*.
- Step 2** Change to the correct directory:
- ```
cd $ANAHOME/Main/ha
```
- Step 3** Run the following command:
- ```
perl switchUnit.pl new-gw-ip old-gw-ip new-db-ip old-db-ip
```
-

