



Installing the Cisco Prime Optical High Availability Solution in a Local Redundancy Configuration on a Linux Server

This section contains the following topics:

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For more information about local redundancy configuration on Linux, including hardware configuration and network diagrams; see [Local Redundancy Configuration, page 1-1](#).

Local Redundancy Configuration Checklists

This section provides checklists to help with Prime Optical HA on Linux installation tasks. We recommend that you print the checklists from the PDF, which shows the section number where you will find each task, and either check off tasks as you complete them or enter information as needed.

This section contains the following information:

- [Preinstallation Checklist](#)
- [Local Redundancy Configuration Installation Checklist](#)

Preinstallation Checklist

Before you install the Prime Optical HA solution in a local redundancy configuration, complete the field in [Table 4-1](#). The information will assist you in completing the installation.

[Table 4-1](#) is the preinstallation checklist for a local redundancy configuration.

Table 4-1 Preinstallation Checklist for a Local Redundancy Configuration

Information	Primary Cluster	
Primary site name:		
Local cluster name:		
Local cluster number:		
Prime Optical Virtual IP address:		
	Primary Server	Secondary Server
Hostname:		
IP address:		
Public interface device 1:		
Public interface device 2:		
Private interface device 1:		
Private interface device 2:		



Note

Private interface devices are dedicated to the heartbeat connection.

Local Redundancy Configuration Installation Checklist

To help you keep track of the steps in the installation process, print the checklist from the PDF, which shows the section number where you will find each task, and check the appropriate cells in [Table 4-2](#) as you complete each step in the HA installation configuration process. In the cells where N/A is displayed, the step is not applicable for the primary and secondary server.

[Table 4-2](#) is the local redundancy configuration checklist.

Table 4-2 Local Redundancy Configuration Checklist

	Description	See...	Primary Server	Secondary Server
New Installation				
1	Mount shared storage on primary server and configure virtual IP address	Setting the Environment for Installation, page 4-3	x	
2	Run server and database installation wizard.	Installing Prime Optical, page 4-7	x	
3	Install HA RPM files.	Installing the HA Package, page 4-11	x	

Table 4-2 Local Redundancy Configuration Checklist (continued)

	Description	See...	Primary Server	Secondary Server
4	Configure HA on Linux	<ul style="list-style-type: none"> • Editing the Agent Configuration File, page 4-12 • Editing the Logging Configuration File, page 4-13 • Editing the RHCS Configuration File, page 4-13 	x	x Note Only to copy RHCS configuration file.
5	Start the cluster	<ul style="list-style-type: none"> • Starting the Cluster, page 4-16 • Starting RHCS Services, page 4-16 • Starting ctm_services on the Primary Server, page 4-17 • Verifying Cluster Status on the Standby Node, page 4-17 	x	
6	Install Multicast Heartbeat Services	<ul style="list-style-type: none"> • Installing the Multicast Heartbeat Services Package, page 4-17 • Editing the multicastConfig.ini File, page 4-19 • Editing the logMulticast.ini File, page 4-19 • Starting the Multicast HeartBeat Services, page 4-20 • Configuring the MultiCast Heartbeat Services on the Secondary Server, page 4-20 	x	x

Setting the Environment for Installation

In this procedure you will mount the shared disks between the primary and secondary servers and configure the shared virtual IP address that will be used during installation and runtime.

Step 1 On the primary server, mount the external disk that is shared between the primary and secondary servers to the appropriate mountpoints. See [Table 2-4](#) and [Table 2-5](#) for disk space and partition requirements.

For example:

```
mount /dev/sde /db01
mount /dev/sdf /db02
mount /dev/sdg /db03
mount /dev/sdh /db04
mount /dev/sdi /db05
mount /dev/sdj /ctm_backup
mount /dev/sdk /cisco
mount /dev/sdt /oracle
```

**Note**

- You can enter the **fdisk** command to view and confirm which disks are available and connected to the disk array: **fdisk -l**.
- Verify that /cisco, /oracle, /db01, /db02, /db03, /db04, /db05, and /ctm_backup are mounted correctly. Enter the **df -h** command to verify that the file systems are mounted on the primary server.

Step 2 Enter the following command to enable the virtual IP address that will be used during the HA solution runtime. This is the shared IP address mounted to an interface on the primary server.

```
ifconfig interface virtual-IP-address netmask netmask
```

For example:

```
ifconfig eth0:1 10.58.65.22 netmask 255.255.255.0
```

You can verify if the IP address was configured correctly by issuing the **ifconfig** command. The IP address for the interface should be displayed in the inet addr field.

Verifying Packages and yum setup

Verify that the following packages are installed on the primary and secondary servers:

The RHCS packages—Available on the Red Hat Enterprise Linux (RHEL) CD under the /cluster directory. See [Installation Requirements](#) for supported RHEL version.

- The list of packages includes:
 - cman
 - rgmanager
 - openais
 - modcluster
 - ricci
 - luci
 - cluster-cim
 - cluster-snmp
 - system-config-cluster (only for RHEL 5.8)
- rgmanager-2.0.52-9.el5.x86_64.rpm

Step 1 Verify that the required packages are installed. Enter one of the following commands:

```
rpm -q pkg
```

or

```
yum info pkg
```

The output displays the package details. If a required package is not installed, an error will appear.

Step 2 Use the **yum** command to install the Linux package. The **yum** command checks all the dependencies from other packages. If you have an active connection to the Red Hat website, all dependent packages are automatically installed on the server. For more information, see the Red Hat website.

If you do not have an active connection to the Red Hat website, do the following:

- a. Mount the RHEL DVD or ISO file. See [Installation Requirements](#) for supported RHEL version. For example:

```
mount -o loop -t iso9660 /mnt/redhat/rhel-server-5.8-x86_64.iso /iso
```

where `/mnt/redhat/rhel-server-5.8-x86_64.iso` is the Red Hat ISO file.

- b. Enter the following commands to get the media ID:

```
view /iso/.discinfo
cat /iso/.discinfo
```

Here is an example of the output:

```
1269263646.691048
Red Hat Enterprise Linux Server 5.7
x86_64
1,2,3,4,5,6
Server/base
Server/RPMS
Server/pixmaps
```

The media ID in the preceding example is 1269263646.691048.

- c. Copy the proper `local.repo` file template from `DVD-mount-point/Disk1` to `/etc/yum.repos.d` directory.

For RHEL 5.x installation, use the following command:

```
cp DVD-mount-point/Disk1/local.repo.5x /etc/yum.repos.d/local.repo
```

For RHEL 6.x installation, use the following command:

```
cp DVD-mount-point/Disk1/local.repo.6x /etc/yum.repos.d/local.repo
```

Open and follow the instructions in the `local.repo` file.

Step 3 Enter the following command to verify that the local repository has been set up correctly:

```
yum repolist
```

Output similar to the following is displayed:

```
Loaded plugins: rhnplugin, security
Local | 1.3 kB 00:00
Local/primary | 868 kB 00:00
Local 3116/3116
localHA | 1.3 kB 00:00
localHA/primary | 6.1 kB 00:00
localHA 32/32
repo id repo name status
Local Local Media Repo enabled: 3,116
localHA Local HA Media Repo enabled: 32
rhel-x86_64-server-5 Red Hat Enterprise Linux (v. 5 for 64-bit x86_64) enabled: 14,137
repolist: 17,285
```

Step 4 Enter the following command for all the missing packages:

```
yum install <name_of_rpm_file>
```

For example, for rgmanager, enter the following command:

```
yum localinstall rgmanager-2.0.52-9.el5.x86_64
```

- Step 5** The cman and rgmanager configurations are enabled after you boot the server. To verify that cman and rgmanager are enabled, enter the following commands:

```
chkconfig --list cman
chkconfig --list rgmanager
```

The following output appears when cman or rgmanager is enabled (levels 2, 3, 4, and 5 show the on state):

```
cman 0:off 1:off 2:on 3:on 4:on 5:on 6:off
rgmanager 0:off 1:off 2:on 3:on 4:on 5:on 6:off
```

When cman or rgmanager is not enabled, all the levels show the off state.

- Step 6** Enter the following commands to enable the package:

```
chkconfig --level 2345 cman on
chkconfig --list cman
chkconfig --level 2345 rgmanager on
chkconfig --list rgmanager
```

- Step 7** Enter the following command to check the openais service status:

```
service openais status
```

If the service is running, enter the following command to stop the openais service.

```
service openais stop
```

- Step 8** Enter the following command to confirm that the openais service is not automatically started at boot time:

```
chkconfig openais --list
```

The result should look like this:

```
openais 0:off 1:off 2:off 3:off 4:off 5:off 6:off
```

- Step 9** If any of the levels are set to on, enter the command to disable the service. For example, if levels 2,3,4, and 5 are set to on, enter the following command:

```
chkconfig --level 2345 openais off
```

Installing Oracle 11g (for Oracle Not Embedded Database Setup)

To install Oracle 11g, follow these steps:

- Step 1** Install Oracle 11g. Complete [Oracle Prerequisites, page A-1](#) and [Installing the Oracle 11g Software with the Response File \(*.rsp\) Provided by Cisco, page A-3](#).
- Step 2** Complete [Downloading and Installing the Required Oracle 11g Patch for 64-Bit Linux Platforms, page A-5](#).

- Step 3** Edit the listener.ora file by replacing the newdbname parameter with the Oracle SID (the default is *CTM*) and the Prime Optical hostname parameter with the hostname or IP address of the workstation where the Prime Optical database will run.



Note There are multiple instances of *newdbname*. You must replace all instances with the Oracle SID.

Installing Prime Optical

To install Prime Optical:



Note This installation is performed only on the primary server because the primary and secondary servers share the disk array where the Prime Optical server and database are installed.

- Step 1** Log in as the root user.
- Step 2** Enter the following command to verify that the display is set correctly:
- ```
echo $DISPLAY
```
- In the command output, you should see:
- ```
hostname-or-IP-address:0.0
```
- Step 3** If you are using an xterm window or a remote host, enter the following command to enable the xterm connection from the clients:

```
xhost +
```

- Step 4** Enter the following command for Linux only if the device is not automatically mounted:

- a. Check if the USB device is discovered by OS and enter the following command:

```
fdisk -l
```

The fdisk output is as follows:

```
Disk /dev/sda: 1167.9 GB, 1167996223488 bytes
255 heads, 63 sectors/track, 142000 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1    *           1          13        104391   83  Linux
/dev/sda2                14       142000    1140510577+  8e  Linux LVM

Disk /dev/sdd: 32.0 GB, 32027705344 bytes
64 heads, 32 sectors/track, 30544 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes
Disk /dev/sdd doesn't contain a valid partition table
```

- b. Mount the USB device and enter the following command:

```
mount -t ext3 <USB device> /<USB-mount-point>
```

For example:

Step 5 Enter the following commands to mount the ISO image:

```
mount -t ext3 /dev/sdd /media
cd /media/<USB-mount-point>/PrimeOptical_10
mount -o loop PRIME_OPTICAL_10_LNX.iso /mnt
```



Note You can also replace the /mnt directory with a different mount point.

Step 6 Enter the following command to start the installation:

```
cd /mnt
/mnt/Disk1/setup.sh
```

The following happens:

1. The setup program searches for Sun Microsystems JDK Version 1.7.0_65 on your workstation.
2. For Linux, if the installed release is not Red Hat 5.x or Red Hat 6.x, the following message appears:

```
WARNING: Installed Linux version (`cat /etc/redhat-release`) is different from the
required one.
Do you want to Continue? [y] :
```

If you enter **y**, the following message appears:

```
Continuing Cisco Prime Optical server installation.
```

If you enter **n**, the installation quits.

The Cisco Prime Optical Server Installation wizard appears. Wait for up to 90 seconds while the following message appears:

```
Continuing Cisco Prime Optical Server Installation.
```

Step 7 At the Introduction screen, click **Next**.

Step 8 At the License Agreement screen, read the license agreement and click the **I accept the terms of the license agreement** radio button. Click **Next**.

Step 9 At the Configure the Server and Database screen, do the following:

- a. From the list of Prime Optical installation types, select the **Prime Optical server and database** radio button to install the Prime Optical server along with the database.
The Database field is disabled when the server and database are installed on the same workstation. Prime Optical automatically uses the server hostname or IP address.
- b. Type the Virtual IP or related hostname for the Prime Optical Server and then click **Next**.

Step 10 At the Configure the Database screen, select **Embedded** to install Prime Optical with an embedded database.

When you select Embedded as the Oracle database installation type, the rest of the fields in the screen become disabled, and you can move to the next screen.

Step 11 The following message appears:

```
This installation will remove any previous Oracle database installed on the server.
If you do not want to continue, click Cancel.
```

Click **Continue** to delete the previous Oracle version and continue the installation. (If you click **Cancel**, the installation quits.)

Step 12 At the OS Users screen, choose the root user from the drop-down list. (The password for optusr is Ctm123!. You can change the password later using the **passwd -u optusr** command.)

Step 13 At the Select Network Configuration screen, specify the size of your network and then click **Next**.
At the Oracle Pre-Installation Checks screen, the setup program checks the RAM, swap, and temp directory sizes. The screen indicates whether you have enough space to install Prime Optical and Oracle, and whether any required packages are missing.

Step 14 Review the preinstallation checks and then click **Next**.

- If errors are discovered during the check sizes phase of the preinstallation checks, the following message appears, and the installation quits:

```
An error occurred during the pre-installation check.
/temp_CTM/report_oracle_pre_install_checks.log.
The installation has been canceled.
```

Check the log file, correct any errors noted in the file, and restart the installation.

- During the check packages phase of the preinstallation checks, the following message appears:

```
A warning occurred during the preinstallation check. See
/temp_CTM/report_oracle_pre_install_checks.log. To continue the installation, click
Continue. To cancel the installation and fix the problem, click Cancel.
```

You can choose to continue installation, or quit and fix the problem before proceeding.

Step 15 At the Optional Features screen, you can choose additional features from the following options:

- Install Prime Optical in a High Availability Setup

If you choose this option, provide details in the Second High Availability Server field. If you chose optusr as the Prime Optical user, the following message appears:

```
The Prime Optical OS user must be the root user for High Availability setup. Click
Continue to proceed, or click Cancel to change the selection.
```

If you choose to continue, the Prime Optical user is automatically changed to root.

- Configure FTP (ONS15216 EDFA3)
- Install Sudo Software (available for root users only)

Step 16 If you selected the Install Sudo Software option, at the Prime Optical Group Information & Sudo Installation screen, do the following:

- Enter the name of the UNIX group to which you want to assign administrator privileges.
- To install sudo, check the **Install Prime Optical Sudo** check box. If you do not want to install sudo, uncheck the check box.



Note If you already installed and configured sudo with rules in a file different from /etc/sudoers (for example, if you created a custom sudo configuration in the /user/local/etc/sudoers file), then you must copy the rules from /etc/sudoers to /user/local/etc/sudoers at the end of the installation.

- Click **Next**.

Step 17 If you selected the Configure FTP (ONS15216 EDFA3) option, at the FTP Information screen, do the following to configure an FTP account for software download operations:



Note NE types that require FTP configuration are:

- Cisco ONS15216 EDFA3

- Cisco ONS15305 with release lower than 3.0 (CEC-based 15305 NEs)

a. Enter the following information:

- Username
- Password
- Confirm Password
- FTP directory

b. Check or uncheck the **Create new FTP account** check box.

If checked, the installation script automatically creates the FTP user on the Prime Optical server workstation. If unchecked, it is assumed that an FTP user already exists on the Prime Optical server workstation.

c. Click **Next**.

Step 18 At the Destination Folder screen, install the Prime Optical server in the default directory. The default directory is `/cisco/PrimeOpticalServer`. Click **Next**.



Note If the destination directory that you specified is a new directory, you will receive the message, “The specified directory does not exist. Do you want to create it?” Click **Yes**.



Caution

Do not specify a mount point as the target installation directory for the Prime Optical server installation, or the installation data will be lost when the workstation restarts. You must create a dedicated Prime Optical subdirectory. For example, if `/cisco` is the mount point for the disk partition `/dev/dsk/c0t0d0s5`, you cannot specify `/cisco` as the Prime Optical installation directory. Instead, specify a dedicated subdirectory such as `as/cisco/PrimeOpticalServer`.



Caution

Do not delete any instances of `/opt/CiscoTransportManagerServer` from your Prime Optical file structure. Prime Optical checks for the `/opt/CiscoTransportManagerServer` directory or a symbolic link to it. If Prime Optical cannot find the `/opt/CiscoTransportManagerServer` directory or a symbolic link, Prime Optical creates a symbolic link automatically.

The Pre-Installation Summary screen shows the items that will be installed.

Step 19 Click **Install**.

Depending on your system performance, it might take 35 to 50 minutes for Linux operating systems. If SSH is not configured, a warning message appears.

Step 20 Click **Continue**; in the terminal window that appears, enter the root password and follow the prompts to configure the SSH connection.

The installation continues.

Step 21 In the Web Server Installation Summary window, click **Next**.

The Install Complete window summarizes the results of the installation.

Step 22 Click **Done**.

**Caution**

Do not close the terminal or reboot the host before the following message is displayed:
Prime Optical installation is complete.

Step 23 Enter the following command to safely remove the USB drive from the workstation:

```
umount /mnt
```

Step 24 Enter the following command to shut down the interface:

```
ifconfig interface down
```

For example:

```
ifconfig eth0:1 down
```

Step 25 On the secondary server, log in as the root user.

Step 26 Enter the following command to configure the virtual IP address used in [Setting the Environment for Installation](#):

```
ifconfig interface virtual-IP-address netmask netmask
```

For example:

```
ifconfig eth0:1 10.58.65.22 netmask 255.255.255.0
```

You can verify if the IP address was configured correctly by issuing the `ifconfig` command. The IP address for the interface should be displayed in the `inet addr` field.

Step 27 Verify that the `yum` repolist is available on the server, and then enter the following script from the `/temp_CTM` directory:

```
installHAServer.sh
```

A terminal window appears. Before continuing, perform a check on `/root/.ssh/known_hosts`.

Step 28 Enter the root password and follow the prompts to configure the SSH connection on the secondary server.

Step 29 Enter the following command to shut down the interface:

```
ifconfig interface down
```

For example:

```
ifconfig eth0:1 down
```

Installing the HA Package

To install the Prime Optical HA package, follow these steps:

Step 1 Insert the Cisco Prime Optical Server installation USB drive—Linux in your workstation.

**Note**

Wait for the automatic discovery of the device.

Enter the following command for Linux only if the device is not automatically discovered.

```
mount -t ext3 <USB device> /media/<USB-mount-point>
```

For Example:

```
mount -t ext3 /dev/sdd1 /media/<USB-mount-point>
```

Step 2 Enter the following commands to mount the ISO image:

```
cd /media/<USB-mount-point>/PrimeOptical_10
```

```
mount -o loop PRIME_OPTICAL_10_LNX.iso /mnt
```



Note

You can also replace the /mnt directory with a different mount point.

Step 3 Enter the following command to change to the HA RPMS directory.

```
cd /mnt/HA/RPMS/x86_64
```

Step 4 Enter the following command:

```
yum install --nogpgcheck HA-1.4-2.x86_64.rpm
```

The following output appears:

```
Preparing...##### [100%]
1: HA##### [100%]
Installation DONE!
```

If the installation was successful, you should see the directory structure when installation is complete. Navigate to /opt/CiscoTransportManagerServer/HA directory. See [HA Directory Structure, page 3-32](#) for more information on the directory structure.

Editing the Agent Configuration File

The agent configuration file allows you to configure the agents that RHCS uses. To edit the agent configuration file:

Step 1 Connect to the primary server. Enter the following command:

```
cd /opt/Cisco*Server/HA/cfg
```

Step 2 Edit the clusterConfig.ini file. Enter the following command:

```
vim clusterConfig.ini
```

Step 3 For local redundancy configuration, do the following:



Note

Only two fields need to be edited.

- a. Specify the cluster type. Replace `type=TODO_ClusterType` with **type=LOCAL**.
- b. Specify the network interface that Prime Optical uses to retrieve data from a monitored network element. Replace `interface=TODO_interface` with **interface=interface**.

For example:

```
interface=eth0.
```



Note This interface is a critical resource; we strongly recommend that you protect it by bonding interfaces on different NICs; for example, eth0, eth1, and bond0.

Step 4 Save the file.



Note For more information on the clusterConfig.ini file, see [Table 3-5 on page 3-23](#).

Editing the Logging Configuration File

When the cluster agent detects a failure in a resource, any critical error is mailed to a receiver that is configured in the logHAconf.ini file.

To edit the file:

Step 1 Connect to the primary server. Enter the following command:

```
cd /opt/Cisco*Server/HA/cfg
```

Step 2 Edit the logHAconf.ini file. Enter the following command:

```
vim logHAconf.ini
```

Step 3 Specify the mail receiver. Under the [handler_mail] header, replace <hostname> and <mail_address@<domain> in the following line:

```
args=('localhost', 'root@cpo<hostname>', ['<mail_address@<domain>'], 'CTM High Availability notification')
```

for example,

```
args=('localhost', 'root@cpo-local-cluster.cisco.com', ['jsmith@cisco.com'], 'CTM High Availability notification')
```

Step 4 Save the file.



Note For more information on the clusterConfig.ini file, see [Table 3-6 on page 3-25](#).

Editing the RHCS Configuration File

In /opt/Cisco*ver/HA/template there are three different cluster configuration template for local configuration:

- Cluster.conf.local

This is the base configuration without any fencing device. It is not recommended for the production environment.

- Cluster.conf.local.fenceipmi

This template contains a customizable configuration for fence device base in IPMI (Intelligent Platform Management Interface).

- Cluster.conf.local.fencevmware

This template contained a customizable configuration for fence based on VMWARE.

For details about fence device and configuration see the RHCS documentation.

Choose the template that match you environment and edit it substituting all the "TODO" tags.

To edit the RHCS file:

Step 1 Connect to the primary server. Enter the following command:

```
cd /opt/Cisco*Server/HA/template
```

Step 2 Edit the cluster.conf.local file. Enter the following command:

```
vim cluster.conf.local
```

Step 3 Replace all tags listed in [Table 4-3](#).

Table 4-3 RHCS Configuration Parameters

Tags	Description	Example
TODO_alias	Alias name of the cluster. It can be any string.	building1_cluster
TODO_name	Name of the cluster.	building1_cluster
TODO_Node1	Local cluster name on the primary server.	clusterA-abc.cisco.com
TODO_Node2	Local cluster name on the secondary server.	clusterB-abc.cisco.com
TODO_Failover_name	Failover domain name of the cluster.	building1_domain
TODO_VirtualIP	Enter the virtual IP address that was configured in Setting the Environment for Installation, page 4-3 .	10.58.65.22
TODO_NetMask	Enter the netmask used.	/24
TODO_Dev_cisco ¹	Enter the disk that you associated with /cisco. See example in Setting the Environment for Installation, page 4-3 .	/dev/sdk
TODO_Dev_oracle ¹	Enter the disk that you associated with /oracle. See the example in Setting the Environment for Installation, page 4-3 .	/dev/sdt
TODO_Dev_db01 ¹	Enter the disk that you associated with /db01. See the example in Setting the Environment for Installation, page 4-3 .	/dev/sde
TODO_Dev_db02 ¹	Enter the disk that you associated with /db02. See the example in Setting the Environment for Installation, page 4-3 .	/dev/sdf
TODO_Dev_db03 ¹	Enter the disk that you associated with /db03. See the example in Setting the Environment for Installation, page 4-3 .	/dev/sdg

Table 4-3 RHCS Configuration Parameters (continued)

Tags	Description	Example
TODO_Dev_db04 ¹	Enter the disk that you associated with /db04. See the example in Setting the Environment for Installation, page 4-3 .	/dev/sdh
TODO_Dev_db05 ¹	Enter the disk that you associated with /db05. See the example in Setting the Environment for Installation, page 4-3 .	/dev/sdi
TODO_Dev_ctm_backup ¹	Enter the disk that you associated with /ctm_backup. See the example in Setting the Environment for Installation, page 4-3 .	/dev/sdj

1. Be sure that the disk space meets the requirements listed in [Table 2-4](#) and [Table 2-5](#).

The following is an example of a cluster.conf.local file:

```
<?xml version="1.0"?>
<cluster alias="local" config_version="3" name="local">
  <fence_daemon clean_start="1" post_fail_delay="20" post_join_delay="6"/>
  <clusternodes>
    <clusternode name="vesuvio.cisco.com" nodeid="1" votes="1">
      <fence/>
    </clusternode>
    <clusternode name="bernina.cisco.com" nodeid="2" votes="1">
      <fence/>
    </clusternode>
  </clusternodes>
  <cman expected_votes="1" two_node="1"/>
  <fencedevices/>
  <rm log_level="7">
    <failoverdomains>
      <failoverdomain name="local_domain" nofailback="0" ordered="0"
restricted="1"/>
    </failoverdomains>
  <resources/>
    <service autostart="0" name="ctm_service" recovery="relocate">
      <ip address="10.58.65.22/24" monitor_link="1"/>
      <fs device="/dev/sdk" force_fsck="1" force_unmount="1" fstype="ext3"
mountpoint="/cisco" name="cisco" options="" self_fence="0"/>
      <fs device="/dev/sdt" force_fsck="1" force_unmount="1" fstype="ext3"
mountpoint="/oracle" name="oracle" options="" self_fence="0"/>
      <fs device="/dev/sde" force_fsck="1" force_unmount="1" fstype="ext3"
mountpoint="/db01" name="ora_db01" options="" self_fence="0"/>
      <fs device="/dev/sdf" force_fsck="1" force_unmount="1" fstype="ext3"
mountpoint="/db02" name="ora_db02" options="" self_fence="0"/>
      <fs device="/dev/sdg" force_fsck="1" force_unmount="1" fstype="ext3"
mountpoint="/db03" name="ora_db03" options="" self_fence="0"/>
      <fs device="/dev/sdh" force_fsck="1" force_unmount="1" fstype="ext3"
mountpoint="/db04" name="ora_db04" options="" self_fence="0"/>
      <fs device="/dev/sdi" force_fsck="1" force_unmount="1" fstype="ext3"
mountpoint="/db05" name="ora_db05" options="" self_fence="0"/>
      <fs device="/dev/sdj" force_fsck="1" force_unmount="1" fstype="ext3"
mountpoint="/ctm_backup" name="ctm_backup" options="" self_fence="0"/>
      <script file="/opt/CiscoTransportManagerServer/HA/bin/NtwIFAgent.py"
name="NTW_IF"/>
      <script file="/opt/CiscoTransportManagerServer/HA/bin/OracleAgent.py"
name="CTM_SID">
        <script file="/opt/CiscoTransportManagerServer/HA/bin/CtmAgent.py"
name="CTM_SRV">

```

```

                <script file="/opt/CiscoTransportManagerServer/HA/bin/apacheAgent.py"
name="CTM_APACHE" />
                </script>
            </script>
        </service>
    </rm>
</cluster>

```

Step 4 Locate the line that begins with `<service autostart`. In the recovery parameter, enter `relocate`. For example,

```
<service autostart="0" name="ctm_service" recovery="relocate">
```

Step 5 Save the file as `cluster.conf` file.

Step 6 Copy the modified `cluster.conf` file to the `/etc/cluster` directory on both the primary and secondary servers.

Starting the Cluster

The following sections describe the process of starting the cluster:

- [Starting RHCS Services, page 4-16](#)
- [Starting `ctm_services` on the Primary Server, page 4-17](#)
- [Verifying Cluster Status on the Standby Node, page 4-17](#)

Starting RHCS Services

To start RHCS services, follow these steps:

Step 1 Shut down the interface associated to virtual IP on the primary server that is managed by the cluster:

```
ifconfig vip-interface down
```

Step 2 Enter the following command to disable `dbora` services (which are on during installation):

```
chkconfig --del dbora
```

Step 3 Enter the following command on the primary server:

```
service cman start
```

Step 4 Enter the following command on the standby server:

```
service cman start
```

Step 5 Enter the following command on the primary server:

```
service rgmanager start
```

Step 6 Enter the following command on the standby server:

```
service rgmanager start
```


ctm_heartbeat automatically starts when you start rgmanager. On the primary server, ctm_heartbeat pings the standby server at startup to find out if the RHCS services (cman and rgmanager) are running. This check is performed three times, with a 10-second wait between attempts. If the three attempts fail, RHCS moves ctm_heartbeat to the failed state.

Starting ctm_services on the Primary Server

After you have successfully started RHCS services, you can start Prime Optical from the primary server. All resources used by Prime Optical are defined in the ctm_service in /etc/cluster/cluster.conf file.

To start ctm_services on the primary server:

-
- Step 1** Check the state of the cluster by executing the following command:

```
clustat
```

If ctm_service is not disabled, invoke it by executing the following command:

```
clusvcadm -d ctm_service
```

- Step 2** Start the ctm_service. Enter the following command:

```
clusvcadm -e ctm_service
```

The **clusvcadm -e ctm_service** command starts all Prime Optical resources. You can check the startup sequence detailed in the /var/log/message directory and the output of /opt/Cisco*Server/HA/log/cisco_agents_cluster.log (or the filename that you specified in the logHAgent.ini file when you configured logging).

- Step 3** Check the state of the cluster by executing the following command:

```
clustat
```

The **clustat** command output should show that the ctm_service has started.

Verifying Cluster Status on the Standby Node

Enter the following command to verify the status of the standby server:

```
clustat
```

The output should show that ctm_service has started on the primary server.

Installing the Multicast Heartbeat Services Package

Multicast Heartbeat services checks the healthy status between the cluster nodes and sends e-mail notifications when there are connection problems between nodes.

To install the Multicast Heartbeat Services package, follow these steps:

Step 1 Insert the Cisco Prime Optical Server installation USB drive—Linux in your workstation.



Note Wait for the automatic discovery of the device.

Enter the following command for Linux only if the device is not automatically discovered.

```
mount -t ext3 <USB device> /media/<USB-mount-point>
```

For example:

```
mount -t ext3 /dev/sdd1 /media/<USB-mount-point>
```

Step 2 Enter the following commands to mount the ISO image:

```
cd /media/<USB-mount-point>/PrimeOptical_10
```

```
mount -o loop PRIME_OPTICAL_10_LNX.iso /mnt
```



Note You can also replace the /mnt directory with a different mount point.

Step 3 Enter the following command to change to the HA RPMS directory.

```
cd /mnt/HA/RPMS/x86_64
```

Step 4 Enter the following command:

```
rpm -ivh --relocate /=opt MulticastHBSrv-1.4-2.x86_64.rpm
```

The following output appears:

```
Preparing...##### [100%]
1: MulticastHBSrv##### [100%]
Installation DONE!
```

Step 5 Copy the MulticastHBSrv-1.4-2.x86_64.rpm file to the /root directory of the secondary server.

Step 6 Enter the following command:

```
yum install-nogpgcheck MulticastHBSrv-1.4-2.x86_64.rpm
```

The following output appears:

```
Preparing...##### [100%]
1: MulticastHBSrv##### [100%]
Installation DONE!
```

After the rpm file is installed, a MulticastHeartBeat directory is created, containing the following files:

Table 4-4 MulticastHeartBeat Directory Files

Files	Description
MulticastHeartBeat.ph	Python script to probe the communication status of cluster servers.
MulticastHBService	Start, stop, and status operations.
multicastConfig.ini	Configuration file that sets the network interface and polling period to monitor the connection between nodes.

Table 4-4 MulticastHeartBeat Directory Files

Files	Description
logMulticast.ini	Log activity configuration file for the MulticastHBService service.
clusterModule.PY	Module that provides functions for cluster (RHCS) management; for example, starting, stopping, and retrieving status on the cluster.

Editing the multicastConfig.ini File

-
- Step 1** Connect to the primary server and navigate to the /opt/MulticastHeartBeat directory.
- Step 2** Edit the multicastConfig.ini file:
- ```
vim multicastConfig.ini
```
- Step 3** Replace the tags listed in [Table 4-5](#):

**Table 4-5** MulticastConfig.ini File Parameters

| Tags           | Description                                                                                                        |
|----------------|--------------------------------------------------------------------------------------------------------------------|
| TODO_Ifname    | Network interface used by the heartbeat service to monitor the connection between nodes; for example, eth1.        |
| TODO_othernode | The name associated to the multicast interface of the other node on the cluster; for example, node2-abc.cisco.com. |

- Step 4** Save the multicastConfig.ini file.
- 

## Editing the logMulticast.ini File

- 
- Step 1** Connect to the primary server and navigate to the /opt/MulticastHeartBeat directory.
- Step 2** Edit the logMulticast.ini file:
- ```
vim logMulticast.ini
```
- Step 3** Specify the mail receiver. Under the [handler_mail] header, replace <hostname> and <mail_address@<domain> in the following line:
- ```
args=('localhost', 'root@cpo<hostname>', ['<mail_address@<domain>'], 'Multicast interface heartbeat notification')
```
- For example:
- ```
args=('localhost', 'root@cpo-local-cluster.cisco.com', ['jsmith@cisco.com'], 'Multicast interface heartbeat notification')
```
- Step 4** Save the logMulticast.ini file.
-

Starting the Multicast HeartBeat Services

Step 1 Connect to the primary server and navigate to the /etc/init.d directory.

Step 2 Enter the following command to create a symbolic link:

```
ln -s /opt/MulticastHeartBeat/MulticastHBSERVICE
```

Step 3 Enter the following command to start the MulticastHBSERVICE on the primary server:

```
service MulticastHBSERVICE start
```

Configuring the MultiCast Heartbeat Services on the Secondary Server

Step 1 Connect to the secondary server.

Step 2 Follow the steps described in [Editing the multicastConfig.ini File, page 4-19](#) on the secondary server.



Note Be sure to enter values that are applicable to the secondary server.

Step 3 Follow the steps described in [Editing the logMulticast.ini File, page 4-19](#) on the secondary server.



Note Be sure to enter values that are applicable to the secondary server.
