Cisco Prime Optical 10.5 Installation Guide
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Cisco Systems, Inc.
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Installation Overview

Introduction

Cisco Prime Optical is a carrier-class, multitechnology management system that integrates the end-to-end management of traditional transport networks and new carrier packet transport networks. It helps to maintain the integrity of existing services as well as deliver interactive, content-based services and high-bandwidth applications.

Prime Optical manages the entire Cisco optical portfolio, including:

- Metro core
- Metro dense wavelength-division multiplexing (DWDM)
- Metro edge and access products
- Carrier Packet Transport (CPT) System products
- Cisco Network Convergence System (NCS)

Prime Optical also serves as a foundation for integration into a larger overall Operations Support System (OSS) environment by providing northbound gateway interfaces to higher-layer management systems.

Advantages and Limitations of an Embedded Oracle Database

Prime Optical is available in two different solutions: Embedded Oracle Database and Not Embedded Oracle Database. Installing Prime Optical with an embedded Oracle database offers the following advantages:

- The Prime Optical installer checks all prerequisites and installs Oracle automatically. The installation includes any required Oracle patches.
- Improved security: The oracle user account, SYSDBA Oracle credentials, and Prime Optical database user credentials are hidden and can be changed and used only by Cisco for troubleshooting and configuration.
- User-friendly tools let you browse the schema.
- Redo logs and archive files are reorganized to save disk space.
- You can restore the database to the most recent backup or to a saved checkpoint.
- The database has automatic resilience, including automatic checks of problems, health checks, and automatic management of tablespace fragmentation.
With an embedded Oracle database, you cannot:

- Change the credentials of the `oracle` user, Oracle SYSDBA user, or Prime Optical database user.
- Use third-party tools to connect to the Prime Optical Oracle database.
- Modify the Oracle installation (for example, by patching it).
- Use the Oracle Enterprise Manager to manage the database.

Prime Optical Integration with Cisco Prime Central

You can use Prime Optical as a standalone product or with Prime Central. After Prime Optical is integrated with Prime Central, it cannot be reverted to standalone mode.

To integrate Prime Optical with Prime Central after Prime Optical has been installed in standalone mode, follow the procedure described in “Configuring Application Managers as Suite Components” in the *Cisco Prime Central 1.4.1 Quick Start Guide*.

**Note**

If you are installing Prime Optical with Prime Central, the Domain Name Service (DNS) must be enabled on the machine where Prime Optical is being installed. If the machine cannot resolve hostnames into IP addresses through DNS, Prime Optical registration will fail.


What’s New in Prime Optical Installation Guide 10.5

**Table 1-1 What’s New in Prime Optical Installation Guide 10.5**

<table>
<thead>
<tr>
<th>Feature Update</th>
<th>Description</th>
<th>For More Information, See...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle 12c Support</td>
<td>Prime Optical 10.5 support Oracle 12c support.</td>
<td><a href="#">Oracle Licensing for Prime Optical, page 2-19</a></td>
</tr>
<tr>
<td>RHEL 6.6 and 7.1 Support</td>
<td>Support for Red Hat Enterprise Linux (RHEL) 6.6 and 7.1, server 64-bit</td>
<td><a href="#">Prime Optical Server and Database Requirements, page 2-1</a></td>
</tr>
</tbody>
</table>

Features Removed

**Table 1-2 Features Removed**

<table>
<thead>
<tr>
<th>Feature Update</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displaying Chinese Characters</td>
<td>This feature is removed in 10.5 as the Chinese characters are displayed by default.</td>
</tr>
</tbody>
</table>
Overview of Installation and Upgrade

The following steps describe the typical Prime Optical installation workflow.

**Step 1** Check your system requirements before you install Prime Optical or upgrade select data from an earlier release. See Chapter 2, “Installation Requirements.”

**Step 2** To ensure a successful installation or upgrade, use one of the checklists provided for your installation scenario as described in Installation Scenarios and Checklists, page 1-3. The checklists are for your reference throughout the installation process. You might find it helpful to print the appropriate checklist and check off each task as you complete it. For upgrading selected data from a previous Cisco Transport Manager (CTM) or Prime Optical release, follow the steps described in Chapter 6, “Upgrading Prime Optical.”

**Note** Before performing a fresh installation, remove all previous CTM or Prime Optical installations including softlinks.

**Step 3** Start the Prime Optical client; see Chapter 7, “Starting the Prime Optical Client”

### Installation Scenarios and Checklists

To ensure a successful installation or upgrade, use the checklist provided for the installation or upgrade scenario that applies to your setup. To help you keep track of the steps in the installation process, print the appropriate checklist from the PDF, which shows the section number where you will find each task, and check off each task as you complete it.

**Note** You must complete all the steps in a particular section before proceeding to another section.

The following checklists are available:

- Checklist for Installing Prime Optical and an External Database on the Same Workstation
- Checklist for Installing Prime Optical and an Embedded Database on the Same Workstation
- Checklist for Installing Prime Optical and an External Database on Separate Workstations
- Checklist for Installing Prime Optical and an Embedded Database on Separate Workstations
- Checklist for Migrating Selected Optical Data from Your Existing CTM or Prime Optical Server

Table 1-3 lists the tasks for installing Prime Optical and an external database on the same workstation.
Table 1-3  Checklist for Installing Prime Optical and an External Database on the Same Workstation

<table>
<thead>
<tr>
<th>Task Complete?</th>
<th>Task</th>
<th>Complete the Steps Described in...¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Verify that your system meets all the hardware and software</td>
<td>Prime Optical Server and Database Requirements, page 2-1</td>
</tr>
<tr>
<td></td>
<td>requirements.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Enable SSH to execute commands on the Prime Optical database</td>
<td>Enabling SSH on the Prime Optical Server and Database Workstation, page 3-1</td>
</tr>
<tr>
<td></td>
<td>workstation to install Prime Optical.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Configure <strong>yum</strong> commands for Linux servers.</td>
<td>Configuring yum Commands on the Server, page 3-2</td>
</tr>
<tr>
<td></td>
<td>4. Configure your system for the installation.</td>
<td>Preparing the Environment for a Single-Server Installation, page 3-3</td>
</tr>
<tr>
<td></td>
<td>5. Prepare for the Oracle installation.</td>
<td>Oracle Prerequisites, page 4-1</td>
</tr>
<tr>
<td></td>
<td>6. Install Oracle 12c with the Cisco Response File.</td>
<td>Installing the Oracle 12c Software with the Response File (*.rsp) Provided by Cisco, page 4-3</td>
</tr>
<tr>
<td></td>
<td>7. Download any necessary Oracle patches.</td>
<td>Downloading and Installing the Required Oracle 12c Patches for Linux Platforms, page 4-5</td>
</tr>
<tr>
<td></td>
<td>8. Install the Prime Optical server and database.</td>
<td>Installing Prime Optical and Oracle on the Same Workstation, page 5-1</td>
</tr>
</tbody>
</table>

¹ To help you keep track of the steps in the installation process, print the appropriate checklist from the PDF, which shows the section number where you will find each task, and check off each task as you complete it.

Table 1-4 lists the tasks for installing Prime Optical and an embedded database on the same workstation.

Table 1-4  Checklist for Installing Prime Optical and an Embedded Database on the Same Workstation

<table>
<thead>
<tr>
<th>Task Complete?</th>
<th>Task</th>
<th>Complete the Steps Described in¹...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Verify that your system meets all the hardware and software</td>
<td>Prime Optical Server and Database Requirements, page 2-1</td>
</tr>
<tr>
<td></td>
<td>requirements.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Enable SSH to execute commands on the Prime Optical database</td>
<td>Enabling SSH on the Prime Optical Server and Database Workstation, page 3-1</td>
</tr>
<tr>
<td></td>
<td>workstation to install Prime Optical.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Configure <strong>yum</strong> commands for Linux servers.</td>
<td>Configuring yum Commands on the Server, page 3-2</td>
</tr>
<tr>
<td></td>
<td>4. Configure your system for the installation.</td>
<td>Preparing the Environment for a Single-Server Installation, page 3-3</td>
</tr>
<tr>
<td></td>
<td>5. Install the Prime Optical server and database.</td>
<td>Installing Prime Optical and Oracle on the Same Workstation, page 5-1</td>
</tr>
</tbody>
</table>
1. To help you keep track of the steps in the installation process, print the appropriate checklist from the PDF, which shows the section number where you will find each task, and check off each task as you complete it.

Table 1-5 lists the tasks for installing Prime Optical and an external database on separate workstations.

<table>
<thead>
<tr>
<th>Task Complete?</th>
<th>Task</th>
<th>Complete the Steps Described in…</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Complete</td>
<td>Verify that both workstations meet all the hardware and software requirements.</td>
<td>Prime Optical Server and Database Requirements, page 2-1</td>
</tr>
<tr>
<td>2. Complete</td>
<td>Enable SSH to execute commands on the Prime Optical database workstation to install Prime Optical.</td>
<td>Enabling SSH on the Prime Optical Server and Database Workstation, page 3-1</td>
</tr>
<tr>
<td>3. Complete</td>
<td>Configure \texttt{yum} commands for Linux workstation.</td>
<td>Configuring yum Commands on the Server, page 3-2</td>
</tr>
<tr>
<td>4. Complete</td>
<td>Configure your system for the installation.</td>
<td>Preparing the Environment for a Dual-Server Installation, page 3-4</td>
</tr>
<tr>
<td>6. Complete</td>
<td>Prepare the database workstation for the Oracle installation.</td>
<td>Oracle Prerequisites, page 4-1</td>
</tr>
<tr>
<td>7. Complete</td>
<td>Install Oracle 12c with the Cisco Response File on the database workstation.</td>
<td>Installing the Oracle 12c Software with the Response File (*.rsp) Provided by Cisco, page 4-3</td>
</tr>
<tr>
<td>8. Complete</td>
<td>Apply the necessary Oracle patches.</td>
<td>Downloading and Installing the Required Oracle 12c Patches for Linux Platforms, page 4-5</td>
</tr>
<tr>
<td>9. Complete</td>
<td>Install the Prime Optical database.</td>
<td>Installing the Prime Optical Database, page 5-6</td>
</tr>
<tr>
<td>11. Complete</td>
<td>Configure the server workstation for the Prime Optical server installation.</td>
<td>Verifying the Environment for the Prime Optical Server Installation, page 3-6</td>
</tr>
<tr>
<td>12. Complete</td>
<td>Install the Prime Optical server on the server workstation.</td>
<td>Installing the Prime Optical Server on the Prime Optical Server Workstation, page 5-9</td>
</tr>
<tr>
<td>13. Complete</td>
<td>(Optional) Update the Prime Optical database parameters for a dual-server installation.</td>
<td>(Optional) Updating the Prime Optical Configuration for a Dual-Server Installation with Dedicated Connection Between Servers, page 5-12</td>
</tr>
</tbody>
</table>

\textbf{Note} This step is required only if the server and database workstations have a dedicated connection between them.
1. To help you keep track of the steps in the installation process, print the appropriate checklist from the PDF, which shows the section number where you will find each task, and check off each task as you complete it.

Table 1-6 lists the tasks for installing Prime Optical and an embedded database on separate workstations.

**Table 1-6** Checklist for Installing Prime Optical and an Embedded Database on Separate Workstations

<table>
<thead>
<tr>
<th>Task Complete?</th>
<th>Task</th>
<th>Complete the Steps Described in...(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Verify that your database workstation meets all the hardware and software requirements.</td>
<td>Prime Optical Server and Database Requirements, page 2-1</td>
</tr>
<tr>
<td>2.</td>
<td>Enable SSH to execute commands on the Prime Optical database workstation to install Prime Optical.</td>
<td>Enabling SSH on the Prime Optical Server and Database Workstation, page 3-1</td>
</tr>
<tr>
<td>3.</td>
<td>Configure <strong>yum</strong> commands for Linux workstation.</td>
<td>Configuring yum Commands on the Server, page 3-2</td>
</tr>
<tr>
<td>4.</td>
<td>Configure your system for the installation.</td>
<td>Preparing the Environment for a Dual-Server Installation, page 3-4</td>
</tr>
<tr>
<td>6.</td>
<td>Install the Prime Optical database.</td>
<td>Installing the Prime Optical Database, page 5-6</td>
</tr>
<tr>
<td>7.</td>
<td>Verify that your server workstation meets all the hardware and software requirements.</td>
<td>Prime Optical Server and Database Requirements, page 2-1</td>
</tr>
<tr>
<td>10.</td>
<td>Install the Prime Optical server on the server workstation.</td>
<td>Installing the Prime Optical Server on the Prime Optical Server Workstation, page 5-9</td>
</tr>
<tr>
<td>11. (Optional)</td>
<td>Update the Prime Optical database parameters for a dual-server installation.</td>
<td>(Optional) Updating the Prime Optical Configuration for a Dual-Server Installation with Dedicated Connection Between Servers, page 5-12</td>
</tr>
</tbody>
</table>

**Note** This step is required only if the server and database workstations have a dedicated connection between them.

1. To help you keep track of the steps in the installation process, print the appropriate checklist from the PDF, which shows the section number where you will find each task, and check off each task as you complete it.

Table 1-7 shows the task for migrating selected optical data from your existing CTM or Prime Optical server.
You cannot perform a full upgrade from an earlier CTM or Prime Optical release.

### Table 1-7 Checklist for Migrating Selected Optical Data from Your Existing CTM or Prime Optical Server

<table>
<thead>
<tr>
<th>Task Complete?</th>
<th>Task</th>
<th>Complete the Steps Described in 1...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Migrate selected optical data from your existing CTM 8.5, 9.0, 9.1, 9.2, or Prime Optical 9.3, 9.3.1, 9.5, 9.6, 9.6.3, 9.8, 10.0 and 10.3 server.</td>
<td>Chapter 6, “Upgrading Prime Optical.” With the wizard, you can migrate a subset of an existing database to a newly installed Prime Optical server. You cannot migrate the entire database with this approach.</td>
</tr>
</tbody>
</table>

1. To help you keep track of the steps in the installation process, print the appropriate checklist from the PDF, which shows the section number where you will find each task, and check off each task as you complete it.
Installation Requirements

This chapter describes what is required to install Prime Optical, the components that come with Prime Optical, and how to calculate the total number of Oracle Named User Plus licenses required for your Prime Optical server and client installations. It contains the following topics:

- Prime Optical Server and Database Requirements, page 2-1
  - Server Specifications, page 2-3
  - Disk Space and Partition Specifications, page 2-4
  - VMware Support, page 2-8
  - Ports and Protocols, page 2-9
  - TCP Ports for SOCKS Proxy Server, page 2-16
- Prime Optical Client Requirements, page 2-17
  - Remote Application Software with the Prime Optical Client, page 2-18
- Oracle Licensing for Prime Optical, page 2-19
- Prime Optical-Supported Third-Party Tools, page 2-22

Although Cisco makes every attempt to ensure the availability of third-party hardware and software platforms specified for Prime Optical, Cisco reserves the right to change or modify system requirements due to third-party vendor product availability or changes that are beyond Cisco’s control.

Prime Optical Server and Database Requirements

The Prime Optical server runs on any of the platforms listed in Table 2-1.

The Prime Optical server must run on a dedicated workstation. Any application that is not explicitly listed in this section as being required or supported by Prime Optical, cannot be installed on the dedicated Prime Optical server workstation.
Table 2-1    Supported Platforms and Operating Systems

<table>
<thead>
<tr>
<th>Platform</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Unified Computing System (UCS) B series</td>
<td>Red Hat Enterprise Linux (RHEL) 6.5, 6.6 and 7.1, server 64-bit (with or without VMware ESXi version 5.5 and 6.0)</td>
</tr>
<tr>
<td>Cisco UCS C series</td>
<td></td>
</tr>
</tbody>
</table>

1. Refer to the appropriate UCS compatibility matrix to verify which RHEL release is supported by each platform.

Note

- Prime Optical is not validated against required file systems (/oracle, /db01, /db02, /db03, /db04, /db05) of the Network File System (NFS) type.
- If you are installing Prime Optical with Prime Central, Domain Name System (DNS) must be enabled on the Prime Optical server.

Table 2-2 lists the items required to install the Prime Optical server.

Table 2-2    Items Required to Install the Prime Optical Server

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime Optical installation USB drive or ISO images</td>
<td>—</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux (RHEL) 6.5, 6.6 and 7.1 64-bit</td>
<td>To install Prime Optical on RHEL server, the yum command must be properly configured and the yum repository must be available. See, Configuring yum Commands on the Server, page 3-2 and RHEL Documentation for more information.</td>
</tr>
<tr>
<td>Sun Microsystems Java Development Kit (JDK) Standard Edition version 1.7.0_80</td>
<td>• JDK is installed automatically for the Prime Optical server and Prime Optical GateWay/CORBA.</td>
</tr>
<tr>
<td>Oracle 12c software</td>
<td>• The Oracle product is available on CD or in .cpio file format.</td>
</tr>
<tr>
<td>For Linux: 10404530</td>
<td>• Oracle patches are available in .zip file format.</td>
</tr>
<tr>
<td></td>
<td>• See, Downloading and Installing the Required Oracle 12c Patches for Linux Platforms, page 4-5.</td>
</tr>
<tr>
<td>Oracle 12c licenses</td>
<td>Oracle licenses can be purchased either for the server processor or for named users. For more information on Oracle named users, see Oracle Licensing for Prime Optical, page 2-19.</td>
</tr>
<tr>
<td>GNU tar</td>
<td>Prime Optical uses GNU tar to extract files from archives. GNU must be installed on the Prime Optical server workstation. The Prime Optical server supports the latest version of GNU tar.</td>
</tr>
</tbody>
</table>

1. Refer to the appropriate UCS compatibility matrix to verify which RHEL release is supported by each platform.
Server Specifications

The following tables show recommended hardware specifications for installing the Prime Optical server, and the resulting maximum number of Network Elements (NEs) the server manages for each configuration.

If the Prime Optical server and Oracle database are installed on separate workstations, both workstations must meet the hardware requirements shown in the following tables. Table 2.3 lists the minimum processor requirements.

It is possible to use and configure disk arrays for database storage with any type of Redundant Array of Inexpensive Disks (RAID) layout. You can do so only if the disk throughput is equal to or higher than the throughput calculated for internal disks.

Table 2-3 Minimum Processor Requirements

<table>
<thead>
<tr>
<th>Network Size</th>
<th>UCS B or C Series1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>2 x Intel Xeon 5620</td>
</tr>
<tr>
<td>Medium</td>
<td>2 x Intel Xeon 5620</td>
</tr>
<tr>
<td>Large</td>
<td>2 x Intel Xeon 5620</td>
</tr>
<tr>
<td>High end</td>
<td>2 x Intel Xeon 5640</td>
</tr>
</tbody>
</table>

1. Prime Optical has been tested on a UCS C210 M2 system.

Cisco tests the simulated network configurations listed in Table 2.4. Your setup and performance might vary depending on the size of your network and the usage pattern of management tasks.

Table 2-4 Minimum Memory Requirements for the Prime Optical Server Installation

<table>
<thead>
<tr>
<th>Network Size</th>
<th>Oracle Database Type</th>
<th>RAM</th>
<th>No. of Network Partitions1</th>
<th>Maximum No. of NEs2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Enterprise Edition</td>
<td>8 GB</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note:</td>
<td>8 GB of RAM is required for the small size, but Cisco recommends 16 GB.</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Enterprise Edition</td>
<td>16 GB</td>
<td>1</td>
<td>500</td>
</tr>
<tr>
<td>Large</td>
<td>Enterprise Edition</td>
<td>32 GB</td>
<td>4</td>
<td>2000</td>
</tr>
<tr>
<td>High end</td>
<td>Enterprise Edition</td>
<td>96 GB</td>
<td>8</td>
<td>5000</td>
</tr>
</tbody>
</table>

1. In Prime Optical 10.5, a single NE service (or a single network partition) can support up to 750 nodes.

A high-end network supports any combination of up to 5000 nodes, 8 network partitions, and 750 nodes per network partition. For example, 6 NE services with 750 nodes + 1 NE service with 500 nodes (6 x 750) + (1 x 500) = 5000.

A large network supports any combination of up to 2000 nodes, 4 network partitions, and 750 nodes per network partition. For example, 4 NE services with 500 nodes (4 x 500), 2 NE services with 750 nodes + 1 NE service with 500 nodes ((2 x 750) + (1 x 500) = 2000).
2. These numbers assume you are using fully equipped ONS 15454 MSPP nodes (for example, 12 OC-48, 2 TCC, and 1 XC10G with up to 2 links and 48 SONET cross-connections per node). Note that these numbers should be used as a guideline, and vary depending on the software and hardware configuration of your NEs.

The following list describes the server configuration parameters and the effect of changes in each parameter on the maximum number of NEs the server can manage:

- **Network Size**—If the network size increases, more resources are reserved for the higher number of NEs to be managed.
- **RAM**—The server can manage more NEs as the RAM increases. The server can manage fewer NEs as the RAM decreases.
- **Number of Network Partitions**—For each network partition, the server reserves resources for the higher number of NEs to be managed. The server can manage more NEs as the number of network partitions increases. The server can manage fewer NEs as the number of network partitions decreases.

### Disk Space and Partition Specifications

The following tables show disk space and partition requirements for optical NEs based on network size and performance management (PM) data collection status.

- The minimum disk space is the total space required for /, swap, /cisco, /oracle, /db01, /db02, /db03, /db04, and /db05. (The minimum disk space does not include /ctm_backup or the optional partitions /db01_rd and /db02_rd.)
- The maximum disk space is the total space required for /, swap, /cisco, /oracle, /db01, /db02, /db03, /db04, /db05, /db01_rd, /db02_rd, and /ctm_backup.

**Note**
- We recommend that you use the partition sizes described in this section. Prime Optical performance degrades if you do not use the recommended partition sizes.
- To improve database performance and maximize data input/output, configure a dedicated disk array with the following setup:
  - Dynamic multipathing (DMP) to parallelize the file system access.
  - Raid 0 (striping) to optimize the disk input data.
- Prime Optical is a high-transaction application, which causes high I/O throughput for Oracle redo logs. We recommend that you reserve dedicated system controllers for file systems—including the optional /db01_rd and /db02_rd file systems—that manage redo logs.

**Caution**
- For large and high-end networks, if you do not follow the preceding disk striping recommendations, the I/O might create a critical bottleneck and cause an unexpected Prime Optical shutdown.
### Table 2-5  Disk Space and Partition Requirements for Installing the Prime Optical Server and Oracle on the Same Workstation—PM Collection Enabled

<table>
<thead>
<tr>
<th>Network Size</th>
<th>Disk Space</th>
<th>/</th>
<th>swap¹</th>
<th>/cisco²</th>
<th>/oracle</th>
<th>/db01</th>
<th>/db02</th>
<th>/db03</th>
<th>/db04</th>
<th>/db05³</th>
<th>/db01_rd (optional)</th>
<th>/db02_rd (optional)</th>
<th>/ctm_backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>150 GB (min)</td>
<td>12 GB</td>
<td>12 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>12 GB</td>
<td>6 GB</td>
<td>40 GB</td>
<td>30 GB</td>
<td>8 GB</td>
<td>1 GB</td>
<td>1 GB</td>
<td>101 GB</td>
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<tr>
<td></td>
<td>253 GB (max)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Medium</td>
<td>268 GB (min)</td>
<td>12 GB</td>
<td>24 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>16 GB</td>
<td>16 GB</td>
<td>90 GB</td>
<td>70 GB</td>
<td>10 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>208 GB</td>
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<td></td>
<td>480 GB (max)</td>
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<td></td>
</tr>
<tr>
<td>Large</td>
<td>478 GB (min)</td>
<td>12 GB</td>
<td>48 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>20 GB</td>
<td>26 GB</td>
<td>190 GB</td>
<td>140 GB</td>
<td>12 GB</td>
<td>3 GB</td>
<td>3 GB</td>
<td>394 GB</td>
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<td></td>
<td>878 GB (max)</td>
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</tr>
<tr>
<td>High end</td>
<td>890 GB (min)</td>
<td>12 GB</td>
<td>96 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>24 GB</td>
<td>50 GB</td>
<td>360 GB</td>
<td>300 GB</td>
<td>18 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>758 GB</td>
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<tr>
<td></td>
<td>1656 GB (max)</td>
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<td></td>
</tr>
</tbody>
</table>

1. Use swap when creating the partition. Do not use /swap.
2. 10 GB is required for /cisco, but 20 GB is strongly recommended.
3. Do not increase the recommended size for /db05. Doing so can severely impact Prime Optical performance.

### Table 2-6  Disk Space and Partition Requirements for Installing the Prime Optical Server and Oracle on the Same Workstation—PM Collection Disabled

<table>
<thead>
<tr>
<th>Network Size</th>
<th>Disk Space</th>
<th>/</th>
<th>swap¹</th>
<th>/cisco²</th>
<th>/oracle</th>
<th>/db01</th>
<th>/db02</th>
<th>/db03</th>
<th>/db04</th>
<th>/db05³</th>
<th>/db01_rd (optional)</th>
<th>/db02_rd (optional)</th>
<th>/ctm.backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>95 GB (min)</td>
<td>12 GB</td>
<td>12 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>12 GB</td>
<td>6 GB</td>
<td>8 GB</td>
<td>7 GB</td>
<td>8 GB</td>
<td>1 GB</td>
<td>1 GB</td>
<td>40 GB</td>
</tr>
<tr>
<td></td>
<td>137 GB (max)</td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Medium</td>
<td>130 GB (min)</td>
<td>12 GB</td>
<td>24 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>16 GB</td>
<td>16 GB</td>
<td>12 GB</td>
<td>10 GB</td>
<td>10 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>62 GB</td>
</tr>
<tr>
<td></td>
<td>196 GB (max)</td>
<td></td>
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</tr>
<tr>
<td>Large</td>
<td>186 GB (min)</td>
<td>12 GB</td>
<td>48 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>20 GB</td>
<td>26 GB</td>
<td>20 GB</td>
<td>18 GB</td>
<td>12 GB</td>
<td>3 GB</td>
<td>3 GB</td>
<td>90 GB</td>
</tr>
<tr>
<td></td>
<td>282 GB (max)</td>
<td></td>
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</tr>
</tbody>
</table>
Table 2-6 "Disk Space and Partition Requirements for Installing the Prime Optical Server and Oracle on the Same Workstation—PM Collection Disabled (continued)"

<table>
<thead>
<tr>
<th>Network Size</th>
<th>Disk Space</th>
<th>/</th>
<th>swap¹</th>
<th>/cisco²</th>
<th>/oracle</th>
<th>/db01</th>
<th>/db02</th>
<th>/db03</th>
<th>/db04</th>
<th>/db05³</th>
<th>/db01_rd (optional)</th>
<th>/db02_rd (optional)</th>
<th>ctm_backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>High end</td>
<td>282 GB</td>
<td>12 GB</td>
<td>96 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>24 GB</td>
<td>50 GB</td>
<td>28 GB</td>
<td>24 GB</td>
<td>18 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>136 GB</td>
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<td></td>
<td>426 GB</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

1. Use swap when creating the partition. Do not use /swap.
2. 10 GB is required for /cisco, but 20 GB is strongly recommended.
3. Do not increase the recommended size for /db05. Doing so can severely impact Prime Optical performance.

Table 2-7 "Disk Space and Partition Requirements for the Prime Optical Server when Installing the Prime Optical Server and Oracle on Separate Workstations"

<table>
<thead>
<tr>
<th>Network Size</th>
<th>Total Disk Space</th>
<th>/</th>
<th>swap¹</th>
<th>/cisco²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>44 GB</td>
<td>12 GB</td>
<td>12 GB</td>
<td>20 GB</td>
</tr>
<tr>
<td>Medium</td>
<td>56 GB</td>
<td>12 GB</td>
<td>12 GB</td>
<td>24 GB</td>
</tr>
<tr>
<td>Large</td>
<td>80 GB</td>
<td>12 GB</td>
<td>12 GB</td>
<td>48 GB</td>
</tr>
<tr>
<td>High end</td>
<td>128 GB</td>
<td>12 GB</td>
<td>96 GB</td>
<td>20 GB</td>
</tr>
</tbody>
</table>

1. Use swap when creating the partition. Do not use /swap.
2. 10 GB is required for /cisco, but 20 GB is strongly recommended.

Table 2-8 "Disk Space and Partition Requirements for the Oracle Database Server when Installing the Prime Optical Server and Oracle on Separate Workstations—PM Collection Enabled"

<table>
<thead>
<tr>
<th>Network Size</th>
<th>Disk Space</th>
<th>/</th>
<th>swap¹</th>
<th>/cisco</th>
<th>/oracle</th>
<th>/db01</th>
<th>/db02</th>
<th>/db03</th>
<th>/db04</th>
<th>/db05³</th>
<th>/db01_rd (optional)</th>
<th>/db02_rd (optional)</th>
<th>ctm_backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>150 GB</td>
<td>12 GB</td>
<td>12 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>12 GB</td>
<td>6 GB</td>
<td>40 GB</td>
<td>30 GB</td>
<td>8 GB</td>
<td>1 GB</td>
<td>1 GB</td>
<td>101 GB</td>
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<tr>
<td></td>
<td>253 GB</td>
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<td></td>
</tr>
<tr>
<td>Medium</td>
<td>268 GB</td>
<td>12 GB</td>
<td>24 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>16 GB</td>
<td>16 GB</td>
<td>90 GB</td>
<td>70 GB</td>
<td>10 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>208 GB</td>
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<td>480 GB</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>478 GB</td>
<td>12 GB</td>
<td>48 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>20 GB</td>
<td>26 GB</td>
<td>190 GB</td>
<td>140 GB</td>
<td>12 GB</td>
<td>3 GB</td>
<td>3 GB</td>
<td>394 GB</td>
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<td>878 GB</td>
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<tr>
<td>High end</td>
<td>890 GB</td>
<td>12 GB</td>
<td>96 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>24 GB</td>
<td>50 GB</td>
<td>360 GB</td>
<td>300 GB</td>
<td>18 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>758 GB</td>
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<td></td>
<td>1656 GB</td>
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</tr>
</tbody>
</table>

Cisco Prime Optical 10.5 Installation Guide
1. Use swap when creating the partition. Do not use /swap.

<table>
<thead>
<tr>
<th>Network Size</th>
<th>Disk Space</th>
<th>/</th>
<th>swap¹</th>
<th>/cisco²</th>
<th>/oracle</th>
<th>/db01</th>
<th>/db02</th>
<th>/db03</th>
<th>/db04</th>
<th>/db05</th>
<th>/db01_rd (optional)</th>
<th>/db02_rd (optional)</th>
<th>/ctm_backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>95 GB (min)</td>
<td>12 GB</td>
<td>12 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>12 GB</td>
<td>6 GB</td>
<td>8 GB</td>
<td>7 GB</td>
<td>8 GB</td>
<td>1 GB</td>
<td>1 GB</td>
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<td></td>
<td>137 GB (max)</td>
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<tr>
<td>Medium</td>
<td>130 GB (min)</td>
<td>12 GB</td>
<td>24 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>16 GB</td>
<td>16 GB</td>
<td>12 GB</td>
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</tr>
<tr>
<td>Large</td>
<td>186 GB (min)</td>
<td>12 GB</td>
<td>48 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>20 GB</td>
<td>26 GB</td>
<td>20 GB</td>
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<td></td>
</tr>
<tr>
<td>High end</td>
<td>282 GB (min)</td>
<td>12 GB</td>
<td>96 GB</td>
<td>20 GB</td>
<td>10 GB</td>
<td>24 GB</td>
<td>50 GB</td>
<td>28 GB</td>
<td>24 GB</td>
<td>18 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>136 GB</td>
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<tr>
<td></td>
<td>426 GB (max)</td>
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<td></td>
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</tr>
</tbody>
</table>

1. Use swap when creating the partition. Do not use /swap.

2. 10 GB is required for /cisco, but 20 GB is strongly recommended.

Note the following PM assumptions for optical NEs:

- In a small network, PM data collection assumes 30 days of storage for PM data collected across 200 NEs, assuming an average of 200 interfaces per NE, up to a maximum of 40,000 interfaces (includes logical and physical interfaces).

- In a medium network, PM data collection assumes 30 days of storage for PM data collected across 500 NEs, assuming an average of 100 interfaces per NE, up to a maximum of 40,000 interfaces (includes logical and physical interfaces).

- In a large network, PM data collection assumes 30 days of storage for PM data collected across 2000 NEs, assuming an average of 100 interfaces per NE, up to a maximum of 200,000 interfaces (includes logical and physical interfaces).

- In a high-end network, PM data collection assumes 30 days of storage for PM data collected across 5000 NEs, assuming an average of 100 interfaces per NE, up to a maximum of 500,000 interfaces (includes logical and physical interfaces).

**Ctm_backup Directory Size**

The ctm_backup directory is a repository used by the oracle user to back up the following categories of information:

- Prime Optical database backup and export dump.
Chapter 2      Installation Requirements

Prime Optical Server and Database Requirements

- Configuration files.
- Database ARCHIVELOG files.

The **oracle** user must have read/write permissions to avoid a database backup failure. The database could block if ARCHIVELOG files are not moved to the /ctm_backup directory.

We recommend that the /ctm_backup size be equivalent to the sum of the single database partitions (that is, the sum of /oracle, /db01, /db02, /db03, /db04, /db05, and—if configured—/db01_rd and /db02_rd).

---

**Note**

- The final /ctm_backup size is also related to the ARCHIVELOG files.
- The /ctm_backup directory can be a symbolic link to a user-defined directory and must have read/write permissions.

---

**VMware Support**

Prime Optical can run on a virtual machine (VM) on VMware vSphere version 5.5 or 6.0. VM RAM, disk and partitioning requirements must comply with the same requirements for a nonvirtualized setup based on system size.

Prime Optical is also delivered as a virtual appliance for medium size installation. See Installing the Prime Optical Virtual Appliance, page 9-1 for more information.

---

**Note**

VM performance can be affected if there are multiple VMs running on the same host. Consult your system administrator on the VMware configuration and requirements needed for your Prime Optical installation. Depending on the load, it may require a dedicated server or a virtualized one. See the VMware vSphere documentation for performance guidelines.

---

When installing Prime Optical on a virtual machine, do the following:

Step 1 Assign RAM as listed in Table 2-4.

Step 2 Follow disk space and partition requirements as listed in Disk Space and Partition Specifications, page 2-4.

Step 3 Configure VM vCPU settings. Refer to VMware vSphere documentation for performance guidelines on vCPU settings.

As a general guideline, we suggest you configure two vCPUs for every 500 nodes. This is based on a UCS C210 M2 machine, with a dual-socket, multicore 2.93GHz processor in a medium network Prime Optical setup during Cisco internal validation.

Step 4 Confirm that the /etc/hosts file exists inside the guest OS of the VM and that the hostname (with and without a domain) is associated to the proper IP address and not to the loopback IP 127.0.0.0.

Example of a correct entry in the /etc/hosts file:

```
127.0.0.1 localhost.localdomain localhost
::1 localhost6.localdomain6 localhost6
10.58.65.195 vm-rh-01.cisco.com vm-rh-01
```

Example of an incorrect entry in the /etc/hosts file:

```
127.0.0.1 vm-rh-01 localhost.localdomain localhost
```
::1 localhost6.localdomain6 localhost6

where the hostname vm-rh-01 is associated to the loopback address 127.0.0.1.

**Note**  The file can be wrong if the VM OS was installed without network connectivity.

---

**Ports and Protocols**

Figure 2-1 illustrates the classification of communication ports and protocols used in Prime Optical.

![Figure 2-1 Classification of Prime Optical Communications](image)

See Table 2-10 for a description of each type of communication port and protocol.

<table>
<thead>
<tr>
<th>Port and Protocol Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client-Server Communication Ports and Protocols</td>
<td>Used for the communication between the Prime Optical clients and the Prime Optical server.</td>
</tr>
<tr>
<td>Client-Database Communication Ports and Protocols</td>
<td>Used for the communication between the Prime Optical clients and the Prime Optical database. The database can be installed on the same workstation where the Prime Optical server is installed or on a different workstation.</td>
</tr>
</tbody>
</table>
Chapter 2      Installation Requirements

Prime Optical Server and Database Requirements

Client-Server Communication Ports and Protocols
Prime Optical uses the following protocols for client-server communication (Figure 2-2):

- Common Object Request Broker Architecture (CORBA)—Object Management Group’s open, vendor-independent architecture and infrastructure that computer applications use to work together over networks.
- Java Management Object and Configuration Object (JMOCO)—Cisco-proprietary, TCP/IP-based request/response protocol.
- Telnet—A standard Internet protocol that provides terminal emulation using the TCP/IP protocols.

![Figure 2-2 Client-Server Communication](image.png)

Inbound ports are for operations initiated by the Prime Optical client and then directed to the Prime Optical server. Outbound ports are for operations initiated by the Prime Optical server and then directed to the Prime Optical client.

See Table 2-11 for client-server port and protocol information:

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 (configurable)</td>
<td>Inbound</td>
<td>TCP</td>
<td>HTTP</td>
<td>Web Server</td>
<td>Apache HTTP port</td>
</tr>
<tr>
<td>443 (configurable)</td>
<td>Inbound</td>
<td>TCP</td>
<td>HTTPS</td>
<td>Web Server</td>
<td>Apache HTTP port</td>
</tr>
</tbody>
</table>
Chapter 2  Installation Requirements

Table 2-11  Prime Optical Client to Prime Optical Server Ports (continued)

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>61626 (configurable)</td>
<td>Inbound</td>
<td>TCP</td>
<td>ActiveMQ</td>
<td>JMS Broker</td>
<td>ActiveMQ broker port</td>
</tr>
<tr>
<td>30000</td>
<td>Inbound</td>
<td>TCP</td>
<td>CORBA</td>
<td>SMSService</td>
<td>Service Manager port</td>
</tr>
<tr>
<td>CORBA IIOP Listener Port</td>
<td>Inbound</td>
<td>TCP</td>
<td>CORBA</td>
<td>CTC-Based Network Services</td>
<td></td>
</tr>
<tr>
<td>10023-10086</td>
<td>Inbound</td>
<td>TCP</td>
<td>Telnet</td>
<td>SMSService</td>
<td>Telnet port</td>
</tr>
<tr>
<td>3000-3200</td>
<td>Outbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>ONS1530x NE Service</td>
<td>ONS 1530x SNMP trap forwarding to Cisco Edge Craft (CEC)</td>
</tr>
<tr>
<td>Dynamic (configurable)</td>
<td>Inbound</td>
<td>TCP</td>
<td>CORBA</td>
<td>Orchestration Service</td>
<td></td>
</tr>
</tbody>
</table>

Client-Database Communication Ports and Protocols

The Prime Optical client establishes connections with the database using Java Database Connectivity (JDBC), the industry standard for database-independent connectivity between Java programming languages and databases. The Prime Optical client uses JDBC to communicate directly with the Prime Optical database, independently from the Prime Optical server.

See Table 2-12 for client-database port and protocol information:

Table 2-12  Prime Optical Client to Prime Optical Database Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1521</td>
<td>Inbound</td>
<td>TCP</td>
<td>JDBC</td>
<td>Oracle Listener</td>
<td>Database listener port</td>
</tr>
</tbody>
</table>

Client-NE Communication Ports and Protocols

The Prime Optical client can launch Cisco Transport Controller (CTC) and Cisco Edge Craft (CEC) as external applications. The ports and protocols used by these application are detailed in their end-user documentation.

OSS CORBA Client Communication (Northbound) Ports and Protocols

Figure 2-3 shows the port and protocol communication between the OSS CORBA Client and Prime Optical server.

Figure 2-3  Prime Optical Server-OSS CORBA Communication
Table 2-13 lists the ports and protocols used for communication between the Prime Optical server workstation and the OSS CORBA client workstation.

### Table 2-13 Prime Optical Server to OSS CORBA Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic</td>
<td>Inbound/Outbound</td>
<td>TCP</td>
<td>CORBA</td>
<td>CORBAGWService</td>
<td>CORBA notification: ports are assigned randomly by the operating system; however, the notification service can be configured to specify a pool of ports.</td>
</tr>
<tr>
<td>14005</td>
<td>Inbound</td>
<td>TCP</td>
<td>CORBA</td>
<td>Name Service</td>
<td>CORBA naming service</td>
</tr>
<tr>
<td>20001</td>
<td>Inbound</td>
<td>TCP</td>
<td>CORBA</td>
<td>Notification Service</td>
<td>CORBA notifications</td>
</tr>
<tr>
<td>20100</td>
<td>Inbound</td>
<td>TCP</td>
<td>CORBA</td>
<td>CORBAGWService</td>
<td>EMS session port</td>
</tr>
</tbody>
</table>

### Server-Database Communication Ports and Protocols

The Prime Server clients establish database connections using the following protocols (Figure 2-4):
- JDBC—Enables connectivity between Java programming languages and databases.
- SSH—Enables the Prime Optical server to execute commands on the database workstation.

### Figure 2-4 Prime Optical Server Client-Database Communication

![Diagram](Diagram.png)

Table 2-14 lists the ports and protocols used for communication between the Prime Optical server and database.

### Table 2-14 Prime Optical Server to Prime Optical Database Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Inbound</td>
<td>TCP</td>
<td>SSH</td>
<td>SSH Daemon</td>
<td>Standard SSH port for secure shell</td>
</tr>
<tr>
<td>1521</td>
<td>Inbound</td>
<td>TCP</td>
<td>JDBC</td>
<td>Oracle Listener</td>
<td>Database listener port</td>
</tr>
</tbody>
</table>

### Loopback Connections (Server to Server) Ports and Protocols

The Prime Optical server establishes the internal connections listed in the following table. Although operating system commands (for example, netstat) show services listening on these ports, they do not need to be opened on a firewall because there is no incoming connection on these ports from other hosts.

The following table lists the ports and protocols used for loopback connections.
Table 2-15  Loopback Connections

<table>
<thead>
<tr>
<th>Port</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1099</td>
<td>TCP</td>
<td>Java RMI</td>
<td>Tomcat</td>
<td>Java RMI registry service</td>
</tr>
<tr>
<td>2181</td>
<td>TCP</td>
<td>Zookeeper Atomic</td>
<td>Zookeeper</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Broadcast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8005</td>
<td>TCP</td>
<td>Tomcat shutdown</td>
<td>Tomcat</td>
<td>Tomcat shutdown port</td>
</tr>
<tr>
<td>8009</td>
<td>TCP</td>
<td>AJP</td>
<td>Apache Web Server, Tomcat</td>
<td>Connection between the web server and Tomcat</td>
</tr>
<tr>
<td>9443</td>
<td>TCP</td>
<td>HTTPS</td>
<td>Tomcat</td>
<td>Tomcat SSL connection</td>
</tr>
<tr>
<td>27613</td>
<td>TCP</td>
<td>Proprietary</td>
<td>All Services</td>
<td>JMOCO port</td>
</tr>
</tbody>
</table>

Southbound Communication Ports and Protocols

The following tables list the ports that the Prime Optical server uses to communicate with NEs (Figure 2-5).

- CTC-Based NE Ports (without ML cards)
- CTC-Based NE Ports (with ML cards)
- Cisco ONS 15216 Ports
- Cisco ONS 15305 Ports (non-CTC-Based)
- Cisco CTC-Based ONS 15305 R3.0 Ports

Inbound ports are for operations initiated by the node and then directed to the Prime Optical server. Outbound ports are for operations initiated by the Prime Optical server and then directed to the node.

The following table lists CTC-based NE ports without Multi-Layer (ML) cards.
### Table 2-16  CTC-Based NE Ports (without ML cards)

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>57790</td>
<td>Outbound</td>
<td>TCP</td>
<td>CORBA</td>
<td>CTC-Based</td>
<td>CORBA listener port on the NE's control card. Defaults to 57791 if secure mode is enabled on the NE. The port is configurable via NE explorer. For more information, see the section on viewing and changing the network address for CTC-Based NEs in the Cisco Prime Optical user guide.</td>
</tr>
<tr>
<td></td>
<td>(configurable)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORBA listener port on Prime Optical server (callback)</td>
<td>Inbound</td>
<td>TCP</td>
<td>CORBA</td>
<td>CTC-Based</td>
<td>Dynamic To make the port static, see the section on CTC IIOP Port configuration in the Cisco Prime Optical user guide.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>Outbound</td>
<td>TCP</td>
<td>HTTP</td>
<td>CTC-Based</td>
<td>—</td>
</tr>
<tr>
<td>161</td>
<td>Outbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>CTC-Based</td>
<td>—</td>
</tr>
<tr>
<td>162</td>
<td>Inbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>SNMP Trap Service</td>
<td>—</td>
</tr>
<tr>
<td>443</td>
<td>Outbound</td>
<td>TCP</td>
<td>HTTPS</td>
<td>CTC-Based</td>
<td>Port 443, active if configured on the NE. This port is only available in NE release 6.0 and later. Prime Optical tries to communicate on this port regardless of whether the NE supports HTTPS. If this port is blocked, it could cause long NE initialization times.</td>
</tr>
<tr>
<td>2361</td>
<td>Outbound</td>
<td>TCP</td>
<td>TL1</td>
<td>CTC-Based</td>
<td>TL1 port on the NE's control card.</td>
</tr>
<tr>
<td>3082</td>
<td>Outbound</td>
<td>TCP</td>
<td>TL1</td>
<td>CTC-Based</td>
<td>TL1 port on the NE's control card.</td>
</tr>
<tr>
<td>4083</td>
<td>Outbound</td>
<td>TCP</td>
<td>TL1</td>
<td>CTC-Based</td>
<td>TL1 port on the NE's control card.</td>
</tr>
</tbody>
</table>

The following table lists CTC-based NE ports with ML cards.
The ports and protocols listed in Table 2-17 are used in addition to the ones listed in the previous table.

### Table 2-17  CTC-Based NE Ports (with ML cards)

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>20xx</td>
<td>Outbound</td>
<td>TCP</td>
<td>Telnet</td>
<td>CTC-Based</td>
<td>ML cards: L2 Service Resync port. From any port on Prime Optical to port 20xx on the NE, where xx is the ML card slot number.</td>
</tr>
<tr>
<td>40xx</td>
<td>Outbound</td>
<td>TCP</td>
<td>Telnet</td>
<td>CTC-Based</td>
<td>ML cards: L2 Service Resync port when the shell access is set to secure. From any port on Prime Optical to port 40xx on the NE, where xx is the ML card slot number.</td>
</tr>
<tr>
<td>7200</td>
<td>Inbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>CTC-Based</td>
<td>—</td>
</tr>
<tr>
<td>7209</td>
<td>Outbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>CTC-Based</td>
<td>—</td>
</tr>
<tr>
<td>7210</td>
<td>Inbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>CTC-Based</td>
<td>—</td>
</tr>
</tbody>
</table>

Table 2-18 lists Cisco ONS 15216 ports.

### Table 2-18  Cisco ONS 15216 Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Outbound</td>
<td>TCP</td>
<td>Telnet CLI</td>
<td>Cisco ONS 15216</td>
</tr>
<tr>
<td>69</td>
<td>Inbound</td>
<td>UDP</td>
<td>TFTP</td>
<td>Cisco ONS 15216</td>
</tr>
<tr>
<td>161</td>
<td>Outbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>Cisco ONS 15216</td>
</tr>
<tr>
<td>162</td>
<td>Inbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>SNMP Trap Service</td>
</tr>
<tr>
<td>3083</td>
<td>Outbound</td>
<td>TCP</td>
<td>TLI</td>
<td>Cisco ONS 15216</td>
</tr>
<tr>
<td>8023</td>
<td>Outbound</td>
<td>TCP</td>
<td>Telnet CLI</td>
<td>Cisco ONS 15216</td>
</tr>
</tbody>
</table>

Table 2-19 lists Cisco ONS 15305 (non-CTC-based) ports.

### Table 2-19  Cisco ONS 15305 Ports (non-CTC-Based)

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Outbound</td>
<td>TCP</td>
<td>Telnet CLI</td>
<td>Cisco ONS 15305</td>
</tr>
<tr>
<td>161</td>
<td>Outbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>Cisco ONS 15305</td>
</tr>
<tr>
<td>4500-4510</td>
<td>Inbound</td>
<td>TCP</td>
<td>Proprietary</td>
<td>Cisco ONS 15305</td>
</tr>
</tbody>
</table>

Table 2-20 lists Cisco ONS 15305(CTC-based) ports.
### Table 2-20 Cisco CTC-Based ONS 15305 R3.0 Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Transport Protocol</th>
<th>Application Protocol</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Outbound</td>
<td>TCP</td>
<td>Telnet CLI</td>
<td>Cisco ONS 15305 R3.0</td>
</tr>
<tr>
<td>80</td>
<td>Outbound</td>
<td>TCP</td>
<td>HTTP</td>
<td>Cisco ONS 15305 R3.0</td>
</tr>
<tr>
<td>161</td>
<td>Outbound</td>
<td>UDP</td>
<td>SNMP</td>
<td>Cisco ONS 15305 R3.0</td>
</tr>
<tr>
<td>4500-4510</td>
<td>Inbound</td>
<td>TCP</td>
<td>Proprietary</td>
<td>Cisco ONS 15305 R3.0</td>
</tr>
<tr>
<td>12345</td>
<td>Outbound</td>
<td>TCP</td>
<td>Proprietary</td>
<td>Cisco ONS 15305 R3.0</td>
</tr>
<tr>
<td>17476</td>
<td>Inbound</td>
<td>TCP</td>
<td>Proprietary</td>
<td>Cisco ONS 15305 R3.0</td>
</tr>
</tbody>
</table>

### TCP Ports for SOCKS Proxy Server

Table 2-21 lists the TCP ports to use in a sockets network proxy protocol (SOCKS) server configuration. This information is helpful when setting up a firewall routing table.

### Table 2-21 TCP Ports to Open in a SOCKS Proxy Server Configuration

<table>
<thead>
<tr>
<th>Port</th>
<th>Inbound or Outbound</th>
<th>Protocol</th>
<th>Application Protocol</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1080</td>
<td>Inbound on firewall/SOCKS proxy host</td>
<td>TCP</td>
<td>SOCKS v5</td>
<td>The port is configurable and is used for the connection between the Prime Optical client host and the firewall host.</td>
</tr>
<tr>
<td>10023–10086</td>
<td>Inbound (Prime Optical server host)</td>
<td>TCP</td>
<td>Telnet</td>
<td>Used for the connection between the Prime Optical client host and the Prime Optical server host.</td>
</tr>
<tr>
<td>80</td>
<td>Inbound (Prime Optical server host)</td>
<td>TCP</td>
<td>HTTP</td>
<td>Used for the connection between the Prime Optical client host and the Prime Optical server host.</td>
</tr>
<tr>
<td>All CTC ports, for CTC cross-launch</td>
<td>Inbound on the NE that CTC is connected to</td>
<td>TCP</td>
<td>—</td>
<td>Used for the connection between the Prime Optical client host and the subnetwork that contains the NE that CTC is trying to reach.</td>
</tr>
</tbody>
</table>
Prime Optical Client Requirements

To launch the Prime Optical client, you must have a Linux or Windows PC. Memory, CPU, and disk requirements are reported in Table 2-22.

The delta RAM and delta CPU must be counted for each additional launched client.

Table 2-22 Minimum Requirements for the Prime Optical Client

<table>
<thead>
<tr>
<th>Platform</th>
<th>Delta RAM(^1,2)</th>
<th>Delta CPU Speed</th>
<th>Disk Space Without CEC(^3)</th>
<th>Disk Space with CEC</th>
<th>Other(^4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux workstation</td>
<td>512 MB</td>
<td>240 MHz</td>
<td>730 MB</td>
<td>760 MB</td>
<td>• RHEL 5.8, 6.5, 6.6 and 7.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Mozilla Firefox 17 (for RHEL 5.8, and 6.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Mozilla Firefox 31 (for RHEL 6.5 only)</td>
</tr>
<tr>
<td>Pentium 4 class PC</td>
<td>512 MB</td>
<td>240 MHz</td>
<td>630 MB</td>
<td>700 MB</td>
<td>• Microsoft Windows 7 (32- and 64-bit), Windows 8 with Service Pack 2, or Windows Server 2003 Enterprise Edition with Terminal Services, each with graphics support for 16-bit color or higher.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Microsoft Internet Explorer 9.0 and 10.0 with JavaScript enabled, or Google Chrome 43.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Microsoft Windows 2003 patch number KB928388 for the 2007 Daylight Saving Time.</td>
</tr>
</tbody>
</table>

1. If you plan to run multiple Prime Optical client sessions on a single client workstation, add 512 MB of RAM and 240 MHz CPU for each additional Prime Optical client.
2. Memory requirements are for Prime Optical client software only. For cross-launched applications such as Cisco Transport Controller (CTC) or Cisco Edge Craft (CEC), see the CTC or CEC documentation.
3. Disk space requirements are for Prime Optical and CEC client software only.
4. If you are installing Prime Optical with Prime Central, DNS must be enabled on the machine where Prime Optical is installed. If the machine cannot resolve hostnames into IP addresses through DNS, Prime Optical registration will fail.

Note: CPO Login fails to load images sometimes when User logins using Google Chrome Versions later than 43. Reloading or refreshing the page again works.

Java Runtime Engine (JRE) 1.7.0_45 or 10.7.0_51 must be installed on the client machine. If the client does not start, check that the JNLP files (Java Web Start) are associated with the correct javaws executable in the browser.

We strongly recommend that you launch the Prime Optical client on a workstation separate from the Prime Optical server. Launching the Prime Optical client and server on the same workstation consumes server resources and could degrade performance.
Table 2-23 shows the maximum number of simultaneous Prime Optical client sessions.

<table>
<thead>
<tr>
<th>Network Size</th>
<th>Max. No. of simultaneous Prime Optical Client Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>30</td>
</tr>
<tr>
<td>Medium</td>
<td>60</td>
</tr>
<tr>
<td>Large</td>
<td>100</td>
</tr>
<tr>
<td>High end</td>
<td>100</td>
</tr>
</tbody>
</table>

Remote Application Software with the Prime Optical Client

Client launch and operation are supported by the following remote application software:

- Citrix Presentation Server 4.0.

The hardware requirements for the remote application depend on the number of clients that the system must export, calculated with the following formula:

Target RAM = base RAM + (delta RAM x number of clients)

Target CPU = base CPU + (delta CPU x number of clients)

where:

- base RAM—Amount of RAM required by the remote application software.
- base CPU—Amount of CPU required by the remote application software.
- delta RAM—Amount of RAM required for each additional client.
- delta CPU—Amount of CPU required for each additional client.

Citrix and Windows Server 2003 Terminal Services

The following figure shows the environment for a remote Citrix Presentation Server or Windows Server 2003 Terminal Server. In this example, the GUI application server and the presentation server reside on the same workstation.
In this example, the hardware requirements for 10 clients are:

- CPU = base CPU + (240 MHz x 10)
- RAM = base RAM + (512 MB x 10)

**Note**
For the base RAM and base CPU requirements, refer to the documentation for:
- Windows Server 2003 Enterprise Edition with Terminal Services
- Citrix Presentation Server 4.0

Oracle Licensing for Prime Optical

**Note**
Prime Optical comes with an embedded database. If the database is accessed only by Prime Optical, there is no need for licensing. However, if other applications need to access the Oracle database used by Prime Optical, then the database needs to be licensed.
Oracle Licensing for Prime Optical

This section explains how to calculate the total number of Oracle Named User Plus licenses required for your Prime Optical server and client installations. This section describes with examples the Oracle Enterprise Edition database edition.

Note
See the Oracle website for detailed information about Oracle licensing definitions and requirements.

Oracle’s technology products, including the Oracle database required for use with Prime Optical, are licensed using one of two possible metrics: Processor and Named User Plus. Which metric to use normally depends on which will result in a lower price for the database. If for some reason the number of database users cannot be counted, the Processor metric must be used. However, in a Prime Optical environment, database users normally can be counted.

- **Processor**—This metric is defined as the number of processors on the server on which the Oracle database is installed or running. This option must be used in environments in which software users cannot easily be identified or counted (not normally the case in a Prime Optical environment).

  Note
  For the purpose of counting the number of processors, a multicore chip with \( n \) cores is determined by multiplying \( n \) cores by a core processor licensing factor of 0.75. All cores on all multicore chips for each licensed program for each core processor licensing factor listed above are aggregated before multiplying by the appropriate core processor licensing factor. All fractions of a number are rounded up to the next whole number.

- **Named User Plus**—This metric is used in environments in which users can be identified and counted. Named User Plus includes both human-operated and automated devices. All human-operated and automated devices that access the program must be licensed. A Named User Plus license may access the program on any instances on which it is deployed, provided that the minimum license requirement on each server is met.

In the context of a Prime Optical environment, *human-operated device* means any device operated by a user who has direct or indirect access to Prime Optical. Direct access is gained through a user account on Prime Optical that allows access through the Prime Optical client GUI. Indirect access is possible through a user account on a higher-layer OSS, which in turn communicates with Prime Optical through Prime Optical GateWay/CORBA. Automated users include the NEs managed by Prime Optical and the Prime Optical server itself.

Oracle Enterprise Edition requires a minimum of 25 Named User Plus licenses per processor or the total number of actual users, whichever number is higher.
The following figure shows an example Prime Optical environment to illustrate identifying the human and automated database users that must be counted.

**Figure 2-7   Example Prime Optical Environment**

In the example shown in Figure 2-7 there are two independent Prime Optical servers and Oracle database instances. There are four NEs, one of which is managed by both Prime Optical servers. There is one direct Prime Optical user and one indirect user. So in this example the total number of Oracle named users is as follows:

- **Prime Optical servers**: 2*  
- **NEs**: 4**  
- **Prime Optical users**: 1**  
- **Higher-layer OSS users**: 1  

Total Named User Plus: $8 = 2 + 4 + 1 + 1$

*Because of the self-monitor feature of Prime Optical, a Prime Optical server itself is considered an automated user of the database and is therefore counted.

**A Named User Plus license entitles the user to access Oracle on any instances where it is deployed. So if a user has access to multiple Prime Optical servers, only a single license is needed per user. Also, if an NE is managed by multiple Prime Optical servers, only a single license is needed per NE.

This example explains how to count the named users, but the number of named users required is the larger of either 1) the actual count or 2) the required minimum.
Oracle Enterprise Edition

Oracle Database Enterprise Edition (EE) provides improved scalability performance. The two major features in this release are:

- The Oracle partitioning option
- An increased maximum number of supported CPUs

Note: Oracle EE requires a separate license.

Prime Optical with Oracle EE Calculation (Example A)

A service provider has 800 NEs and a data center with 10 Prime Optical client workstations. 100 employees in the data center are authorized to use the Prime Optical client. Some of the employees in the data center share the same Prime Optical account (username/password). Prime Optical is running on a Sun V880 with 8 processors, with only one core and 32 GB of RAM.

- Named User Plus: 1) Minimum = 8 processors x 25 users/processor = 200 or 2) Count = 800 licenses for NEs + 100 licenses for data center personnel + 1 Prime Optical server = 901

Result: 901 Named User Plus licenses are required

- Processor: 8 processor licenses

If the processors are UltraSPARC IV and IV+ (dual core), the calculation for processor licensing is:

- Processor: (8 x 2) x 0.75 = 12 processor licenses

Prime Optical with Oracle EE Calculation (Example B)

The same service provider as in the previous example decides to enable Prime Optical GateWay/CORBA and connect to a higher-layer OSS that handles inventory management. There are 20 employees in the data center authorized to access the inventory system; 5 of them are also Prime Optical users (that is, they are a subset of the 100 Prime Optical users identified in the previous example). In this case, the total number of users are:

95 Prime Optical-only users + 15 inventory system-only users + 5 Prime Optical/inventory system users or 115 users.

As a result of adding the OSS and related users, the total number of named users increases from 901 to 916.

Prime Optical-Supported Third-Party Tools

See the Cisco Prime Optical 10.5 Open Source Documentation for a list of third-party components shipped with Prime Optical 10.5.
Preparing for the Installation

This chapter describes how to set up the environment for installation. To ensure a successful installation, use the checklist provided in Installation Scenarios and Checklists, page 1-3 for the installation setup that applies to you. Print the appropriate checklist from the PDF and check off each task as you complete it.

This section contains the following information:

- Enabling SSH on the Prime Optical Server and Database Workstation, page 3-1
- Configuring yum Commands on the Server, page 3-2
- Preparing the Environment for a Single-Server Installation, page 3-3
- Preparing the Environment for a Dual-Server Installation, page 3-4
- ISO Image or OVA Package Verification, page 3-6

Note
Before performing a fresh installation, remove all previous Cisco Transport Manager or Prime Optical installations including softlinks.

Enabling SSH on the Prime Optical Server and Database Workstation

Enable the SSH service before starting the Prime Optical server and database installation.

To verify that SSH is enabled:

Step 1
As a root user, enter the following command to start the SSH service on the Prime Optical server workstation:

```
service sshd start
```

Step 2
Edit the `/etc/sshd/sshd_config` file on the Prime Optical server workstation and change the PermitRootLogin value to `yes`.

Step 3
Enter the following command on the Prime Optical server workstation to make the changes take effect:

```
service sshd restart
```

Step 4
If you are installing the Prime Optical server and database on two different workstations, repeat the preceding steps on the Prime Optical database workstation.
Note
Make sure that the file /etc/hosts contains the following row:

\texttt{ipaddress hostname}

where \texttt{ipaddress} and \texttt{hostname} are the IP address and the hostname of the local servers.

## Configuring yum Commands on the Server

To install the required Red Hat Package Manager (RPM) utility for the Linux server and database, you must enable \texttt{yum} commands.

\textbf{Before you begin}

Ensure that \texttt{yum} command is properly configured and that the yum repository is available. Enter the following command to verify that at least one valid repository is configured:

\begin{verbatim}
#yum repolist
\end{verbatim}

If yum is not configured, you can register your system on Red Hat Network (RHN) or configure yum on a local repository.

\textbf{Note}

If yum is configured on RHEL registration, ensure that the system has access to the external network.

\textbf{Note}

You must require the RHEL DVD to configure yum on a local repository.

To configure \texttt{yum} commands on a local repository:

Create a local.repo file in /etc/yum.repos.d directory and configure the local.repo file to the RHEL DVD.

\textbf{Step 1}

Copy the proper local.repo file template from \texttt{DVD-mount-point}/Disk1 to /etc/yum.repos.d directory. You can find a local.repo template for RHEL5.x and for RHEL6.x in Disk1 of the Prime Optical installation DVD.

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

\begin{verbatim}
 cp <DVD-mount-point>/Disk1/local.repo.5x /etc/yum.repos.d/local.repo
\end{verbatim}

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

\begin{verbatim}
 cp <DVD-mount-point>/Disk1/local.repo.6x /etc/yum.repos.d/local.repo
\end{verbatim}

For RHEL 7.x installation, use the following command:

\begin{verbatim}
 cp <DVD-mount-point>/Disk1/local.repo.7x /etc/yum.repos.d/local.repo
\end{verbatim}

\textbf{Step 2}

Open your /etc/yum.repos.d/local.repo file and follow instructions to mount RHEL DVD and configure yum local repository on RHEL DVD.
Preparing the Environment for a Single-Server Installation

This section describes how to prepare the environment for Prime Optical server and Oracle database installation on the same server.

Verify the following:

- The `ping` command is included in your path environment variable.
- A reliable network connection is available for an installation on a remote workstation.
- You have reviewed Chapter 2, “Installation Requirements.”

Step 1: Log in as a root user.

Step 2: Enter the following command to verify that the disk directories shown in Table 3-1 exist:

```
ls -l /
```

Table 3-1 Disk Directories

<table>
<thead>
<tr>
<th>Directory</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>/cisco</td>
<td>Used for Prime Optical installation. It includes .jar files, executable shell scripts, and so on.</td>
</tr>
<tr>
<td>/db01</td>
<td>Used for the Oracle system tablespace.</td>
</tr>
<tr>
<td>/db01_rd</td>
<td>Used as an optional partition for the redo logs.</td>
</tr>
<tr>
<td>/db02</td>
<td>Used for the base data tablespace, alarm data tablespace, and event data tablespace.</td>
</tr>
<tr>
<td>/db02_rd</td>
<td>Used as an optional partition for the redo logs.</td>
</tr>
<tr>
<td>/db03</td>
<td>Used for the Prime Optical Prime data tablespace.</td>
</tr>
<tr>
<td>/db04</td>
<td>Used for the Prime Optical index tablespace.</td>
</tr>
<tr>
<td>/db05</td>
<td>Used for the Prime Optical archived and undo tablespace.</td>
</tr>
<tr>
<td>/ctm_backup</td>
<td>Used for the backed-up database and configuration files.</td>
</tr>
<tr>
<td>/oracle</td>
<td>Used for Oracle software.</td>
</tr>
<tr>
<td>/tftpboot</td>
<td>Used for the TFTP directory.</td>
</tr>
</tbody>
</table>

**Note**: The `/ctm_backup` partition is required for backups.

**Note**: Disk partitioning is not required for `/tftpboot`, but the directory is required.

1. To optimize system performance, see Disk Space and Partition Specifications, page 2-4.
2. The `/ctm_backup` directory can be a symbolic link to a storage device.
3. If you are installing Prime Optical with an external database, if the `oracle` user does not have read/write permission, backup and restore operations will fail. Verify that the `/ctm_backup` directory has Oracle_user:dba ownership, as defined in Installing the Oracle 12c Software with the Response File (*.rsp) Provided by Cisco, Step 3. If a symbolic link is on the storage device, verify that the command is implemented correctly. See Ctm_backup Directory Size, page 2-7.

Step 3: Check the content of the file `/etc/sysconfig/ctm.conf`.

If the file contains SELINUX=enforcing, you must change it to SELINUX=disabled (SELinux is fully disabled) or SELINUX=permissive (prints warnings instead of enforcing), and then reboot the server.

Step 4: Disable the firewall on the server by entering one of the following commands:

```
chkconfig iptables off
```

or

```
service iptables stop
```
Step 5  If you are installing Prime Optical and an external database, see Table 1-3, “Checklist for Installing Prime Optical and an External Database on the Same Workstation,” on page 4 for the next task.

If you are installing Prime Optical and an embedded database, see Table 1-4, “Checklist for Installing Prime Optical and an Embedded Database on the Same Workstation,” on page 4 for the next task.

Preparing the Environment for a Dual-Server Installation

This section describes how to prepare the environment for Prime Optical server and Oracle database installation on separate Red Hat Linux servers.

There are two scenarios for installing the Prime Optical server and Oracle on separate servers:

- Standard dual-server installation.
- Dual-server installation with a dedicated connection between servers (for example, a cross-cable connection).

The following figure illustrates the standard dual-server installation. Server 1 is the Prime Optical server and Server 2 is the database server.

Note  The Prime Optical server, Prime Optical client, and Prime Optical database work only with IPv4 addresses. IPv6 is not supported.

Figure 3-1  Standard Dual-Server Installation
The following figure illustrates the dual-server installation with a dedicated connection between servers.

![Dual-Server Installation with a Dedicated Connection Between Servers](image)

Before performing a dual-server installation, complete the tasks described in the following topics:

- Enabling SSH on the Prime Optical Server and Database Workstation, page 3-1
- Verifying the Environment for the Prime Optical Database Installation, page 3-5
- Verifying the Environment for the Prime Optical Server Installation, page 3-6

## Verifying the Environment for the Prime Optical Database Installation

This section describes how to verify that the appropriate settings are configured on the Prime Optical database.

### Step 1
Log in as a root user.

### Step 2
Enter the following command to verify that the disk directories shown in Table 3-2 exist:

```bash
ls -l /
```

### Table 3-2 Disk Directories

<table>
<thead>
<tr>
<th>Directory</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>/db01</td>
<td>Used for the Oracle system tablespace.</td>
</tr>
<tr>
<td>/db01_rd</td>
<td>Used as an optional partition for the redo logs.</td>
</tr>
<tr>
<td>/db02</td>
<td>Used for the basedata tablespace, alarndata tablespace, and eventdata tablespace.</td>
</tr>
<tr>
<td>/db02_rd</td>
<td>Used as an optional partition for the redo logs.</td>
</tr>
<tr>
<td>/db03</td>
<td>Used for the Prime Optical Primedata tablespace.</td>
</tr>
<tr>
<td>/db04</td>
<td>Used for the Prime Optical index tablespace.</td>
</tr>
<tr>
<td>/db05</td>
<td>Used for the Prime Optical archived and undo tablespace.</td>
</tr>
<tr>
<td>/ctm_backup</td>
<td>Used for the backed-up database and configuration files.</td>
</tr>
</tbody>
</table>

**Note** The /ctm_backup partition is required for backups.

1. To optimize system performance, see Disk Space and Partition Specifications, page 2-4.
2. The /ctm_backup directory can be a symbolic link to a storage device.
3. If you are installing Prime Optical with an external database, if the oracle user does not have read/write permission, backup and restore operations will fail. Verify that the /ctm_backup directory has Oracle_user:dba ownership, as defined in Installing the Oracle 12c Software with the Response File (*.rsp) Provided by Cisco. If a symbolic link is on the storage device, verify that the command is implemented correctly. See Ctm_backup Directory Size, page 2-7.
ISO Image or OVA Package Verification

Before installing Cisco Prime Optical, you need to verify the ISO image or OVA package. Download the product installation file (OVA or ISO), its signature, and the certificate file to a separate Unix/Linux system and perform the following steps:

Step 3 Check the content of the file /etc/sysconfig/selinux.
If the file contains SELINUX=enforcing, you must change it to SELINUX=disabled or SELINUX=permissive, and then reboot the server.

Step 4 Disable the firewall on the server by entering one of the following commands:

```
chkconfig iptables off
or
service iptables stop
```

Step 5 If you are installing Prime Optical and an external database, see Table 1-5, “Checklist for Installing Prime Optical and an External Database on Separate Workstations,” on page 5 for the next task.
If you are installing Prime Optical and an embedded database, see Table 1-6, “Checklist for Installing Prime Optical and an Embedded Database on Separate Workstations,” on page 6 for the next task.
**Step 1** If you do not have **openssl** installed, download and install it (see http://www.openssl.org).

**Step 2** Place the following files in a temporary directory:
- The product file to be verified (*.iso or *.ova).
- The signature file (*.signature) that is packaged with the product file.
- The certificate files (*.pem).

**Step 3** Move to the temporary directory and execute the following command:

```
openssl dgst -sha512 -verify cert-file -signature sig-file product-file
```

Where:

- `cert-file` is the Cisco Prime Optical certificate file
- `sig-file` is the Cisco Prime Optical signature file
- `product-file` is the Cisco Prime Optical ISO file or OVA image to be verified

**Step 4** If the result is **Verified OK**:
- For a product ISO file, proceed with the installation (you do not have to perform any more steps as part of this validation procedure).
- For an OVA package, proceed to **Step 5**.

**Step 5** (OVA package only) Verify the publisher and certificate chain using the VMware vSphere client.

a. Verify that Cisco Systems is the publisher
   - In the vSphere client, choose File > Deploy OVF Template.
   - Browse to the OVA installation file (*.ova) and select it, then click Next.
   - Check whether the Publisher field in the OVF Template Details window displays Cisco Systems, Inc with a green check mark next to it.

   **Note**
   - Do not validate the image using the information in the Vendor field as this field does not authenticate Cisco Systems as the publisher.
   - Do not proceed if the Publisher field displays No certificate present. This indicate that the image is not signed or the file is not from Cisco Systems or it has been tampered with. Contact your Cisco representative.

b. Check the certificate chain.
   - In the OVF Template Details window, click the Cisco Systems, Inc. hyperlink in the Publisher field.
   - In the Certificate window, click the Certification Path tab.
   - In the Certification Path tab (which lists the certificate chain), ensure that the Certification Path area displays Cisco Systems, Inc. and the Certificate Status displays The certificate is OK.
ISO Image or OVA Package Verification

The ISO Image or OVA Package Verification is valid only if the OVA/OVF file is obtained as a BU Digital download through cisco.com.
Installing and Patching Oracle

The Oracle procedures described in this chapter should be performed only as directed in the checklist provided in Installation Scenarios and Checklists, page 1-3 for the installation setup that applies to you. Print the appropriate checklist from the PDF and check off each task as you complete it.

- Oracle 12c is available only for a 64-bit architecture.
- Use the information in this section in conjunction with the Oracle documentation available on the Oracle website.

Oracle Prerequisites

This section describes how to create or update an existing oracle user before you install Oracle 12c. Also, before you install Oracle 12c, verify that:

- Oracle is not running.
- The Cisco Prime Optical installation DVD is in the drive, or the Cisco Prime Optical installation ISO is mounted.

Creating a New Oracle User

Follow these steps to create a new oracle user:

Step 1 Enter the following command to create a UNIX group for database administrators:

```
groupadd -g 3303 dba
```

Step 2 Enter the following command to create a UNIX group for installation of the Oracle software:

```
groupadd -g 3304 oracle
```
Step 3  Enter the following command to create a UNIX account to own the Oracle software:

`groupadd oinstall`

`useradd -g oinstall -G dba -m -s /bin/csh -d /cporacle oracle`

**Caution**
Do not enter /oracle for the home directory.

Step 4  Enter the following command to change the oracle user password:

`passwd oracle`

Step 5  Enter the new password and then reenter it to confirm it.

### Updating an Existing Oracle User

Follow these steps if an oracle user already exists:

Step 1  As a root user, enter the following commands to create and update to the new home directory:

`mkdir /cporacle`

`chown oracle:oinstall /cporacle`

`chmod 700 /cporacle`

Step 2  As a root user, enter the following command to change the home directory/cporacle:

`usermod -d /cporacle oracle`

### Setting Shell Limits for an Oracle User

Follow these steps to set the shell limits for an oracle user:

Edit the file `/etc/security/limits.conf` file by adding the following parameters:

```
oracle hard memlock unlimited
oracle hard nofile 65536
oracle hard nproc 16384
oracle soft nofile 65536
oracle soft nproc 16384
oracle soft memlock unlimited
```

Add the following parameters only if Prime Optical is installed with optusr at runtime:

```
optusr soft nofile 65536
optusr hard nofile 65536
optusr soft nproc 16384
optusr hard nproc 16384
```

**Note**
Do not add optusr settings if Prime Optical user at runtime is root.
Installing the Oracle 12c Software with the Response File (*.rsp) Provided by Cisco

To install Oracle 12c, follow these steps:

**Step 1** Enter the following command to copy the default profile to the Oracle home directory:
```
cp <DVD-mount-point>/Disk1/oracle.cshrc /cporacle/.cshrc
```

**Step 2** Enter the following command:
```
cp <DVD-mount-point>/Disk1/oracle12_entrp_linux.rsp /oracle
```

**Step 3** Enter the following commands to change ownership of the Oracle software directories:
```
chown -R oracle:dba /oracle
chown -R oracle:dba /cporacle
chown -R oracle:dba /db01
chown -R oracle:dba /db02
chown -R oracle:dba /db03
chown -R oracle:dba /db04
chown -R oracle:dba /db05
chown -R oracle:dba /ctm_backup
```

**Step 4** If you are using db01_rd or db02_rd, enter the following commands to change ownership of the Oracle software directories:
```
chown -R oracle:dba /db01_rd
chown -R oracle:dba /db02_rd
```

**Step 5** Enter the following command to add read-write permissions:
```
chmod +rw /cporacle/.cshrc
```

**Step 6** Follow the preinstallation steps in the *Oracle 12c Installation Guide for Linux*, available on the Oracle website. Note the following constraints:
- No RAC configuration
- No ASM configuration
- Linux 64-bit
- No Oracle application server

**Step 7** Enter the following command to log in as the *oracle* user:
```
su - oracle
```

**Step 8** Depending on the distribution media of the Oracle software, change to the directory where the runInstaller application is located. For example, if you are using a DVD, enter:
```
 cd /dvd/dvd0
```

**Step 9** Enter the following command to set the display on your terminal:
```
setenv DISPLAY <hostname-or-IP-address>:0.0
```

**Step 10** Enter the following command to verify that the display is set correctly:
```
echo $DISPLAY
```
In the command output, you should see:
If you are using an xterm window or a remote host, as a root user enter the following command to enable the xterm connection from clients:

```
xhost +
```

**Step 11** Enter the following command to start the Oracle installer:

```
./runInstaller -silent -responseFile /oracle/oracle12_enterp_linux.rsp &
```

When this step is complete, you will be prompted to run several shell scripts as root. Instead, press the Enter key to return to the prompt.

---

**Note**

- If you do not have the Oracle installation media, see your Oracle documentation for instructions on how to download and extract the correct software for the installation.
- When carrying out the steps in this section, see the *Oracle Content Database Installation Guide* on the Oracle website.

**Step 12** Enter the following commands to create the local/bin directory:

```
cd /oracle/product/12.1.0/
mkdir -p local/bin
```

If you were prompted to run the `/oracle/product/12.1.0/root.sh` script, log in to another terminal window as a root user and do the following:

a. Enter the following command:

```
cd /oracle/product/12.1.0/
```

b. Enter the following command to run the `root.sh` script:

```
./root.sh
```

**Step 13** Because the client static library is not generated during installation, you must do the following to generate and link your applications to the client static library:

a. Go back to the terminal window where you are logged in as the `oracle` user.

b. Enter the following command to generate the client static library:

```
$ORACLE_HOME/bin/genclntst
```

**Step 14** As the `oracle` user, enter the following commands to relink Oracle:

```
> setenv ORACLE_HOME /oracle/product/12.1.0/
> $ORACLE_HOME/bin/relink all
```
Downloading and Installing the Required Oracle 12c Patches for Linux Platforms

See the Oracle installation documentation to install the patches listed in Table 4-1. You must install the Oracle patches in the exact order shown.

<table>
<thead>
<tr>
<th>Installation Order</th>
<th>Patch Number</th>
<th>Package Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux</td>
<td>1</td>
<td>6880880 p6880880_121010_Linux-x86-64.zip</td>
<td>Installs Oracle 12.1.0.1.8.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>20831110 p20831110_121020_Linux-x86-64.zip</td>
<td>Install the Oracle Security Patch (PSU:12.1.0.2.4)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>21068507 p21068507_121020_Linux-x86-64.zip</td>
<td>Install the Oracle Java VM Patch (PSU:12.1.0.2.4)</td>
</tr>
</tbody>
</table>
Installing Prime Optical

This chapter describes how to install Cisco Prime Optical 10.5 with an Oracle 12c database. To ensure a successful installation, use the checklist provided in the Installation Scenarios and Checklists, page 1-3 for the installation setup that applies to you. Print the appropriate checklist from the PDF and check off each task as you complete it.

This section contains the following topics:

- Installing Prime Optical and Oracle on the Same Workstation, page 5-1
- Installing Prime Optical and Oracle on Separate Workstations, page 5-6
- Troubleshooting the Installation, page 5-13
- Improving the Performance of the Oracle Database, page 5-14

Note

- If you want to migrate select optical data from your existing Cisco Transport Manager (CTM) or Prime Optical server, see Chapter 6, “Upgrading Prime Optical”.
- You must use the Prime Optical installation ISO images for the installation. If you manually copy the installer to a storage disk, the installation could fail because of missing permissions in the installation scripts.
- The license for Prime Optical GateWay/CORBA is sold separately. If you are using this feature in a production environment, you must purchase a license.

Installing Prime Optical and Oracle on the Same Workstation

This section describes how to install the Prime Optical server and Oracle 12c on Red Hat Linux server.

Note

- As you perform the procedure in this section, refer to the Installation Scenarios and Checklists, page 1-3.
- For installation problems, see Troubleshooting the Installation, page 5-13.

Before You Begin

- Complete the task described in Enabling SSH on the Prime Optical Server and Database Workstation, page 3-1.
- Complete the task described in Preparing the Environment for a Single-Server Installation, page 3-3.
Step 1  Log in as a root user.

Step 2  Enter the following command to set the DISPLAY variable:

```bash
setenv DISPLAY hostname-or-IP-address:0.0
```

Step 3  Enter the following command to verify that the display is set correctly:

```bash
echo $DISPLAY
```

In the command output, you should see:

```
hostname-or-IP-address:0.0
```

Step 4  If you are using an xterm window or a remote host, enter the following command to enable the xterm connection from the clients:

```bash
xhost +
```

Step 5  Insert the Cisco Prime Optical Server installation DVD - Linux into the DVD drive.

Step 6  If you have the Cisco Prime Optical server installation ISO image instead of the DVD media, enter the following commands to mount it:

```bash
mkdir /mnt
mount -p loop PRIME_OPTICAL_10.5.0.0_214.iso /mnt
```

Step 7  Navigate to the Disk1 directory and enter the following command to commence the installation:

```bash
./setup.sh
```

**Caution**  Make sure that the /tmp directory has at least 10 GB of free space. If not, use a different directory.

The following happens:

The setup program searches for Sun Microsystems JDK version 1.7.0_80 on your workstation.

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 8  In the Introduction window, click Next.

Step 9  In the License Agreement window, read the license agreement and click the I accept the terms of the license agreement radio button. Click Next.

Step 10  In the Configure the Server and Database window, do the following:

a.  From the list of Prime Optical installation types, choose the Prime Optical server and database radio button to install the Prime Optical server along with the database.

b.  Verify that the correct hostname or IP address is shown for the Prime Optical server, then click Next.

For proper configuration, a fully qualified domain name must be provided.

**Note**  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.

Step 11  In the Configure the Database window, choose one of the following:
• **Embedded**—Installs Prime Optical with an embedded database. The archivelog mode must be
disabled by default and can be changed. The other fields in the window are disabled. Proceed to the
next window.

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.)

• **Not Embedded**—Installs Prime Optical with an external database. This is the default.

  a. Enter an Oracle SID.

  b. Specify if you want to install the Oracle database in ARCHIVELOG mode by selecting the
     appropriate radio button.

  c. Click **Next**.

**Step 12** In the OS Users window, do the following:

  a. Select the username of the Prime Optical OS user.

     • **root**—Default option. Allows only the root user to operate Prime Optical.

     • **optusr**—This allows a user other than root to operate Prime Optical. If this option is selected,
       the following rules apply:

       – Only the **optusr** can start or stop the Prime Optical server.

       – The root user will still be the only user that can install and uninstall Prime Optical.

       – The following processes will still be executed by root: Web Apache Server and
         SNMPTrapService.

     **Note** The password for optusr is Ctm123!. You can change the password later using the following
     command: **passwd -u optusr**

  b. Enter the following information for an external database installation:

     • Username. The default is cporacle.

     • Home Directory. The default is /cporacle.

     **Caution** Do not enter /oracle as the Oracle home directory. An error appears if /oracle is entered.

**Step 13** In the Select Network Configuration window, specify the size of your network (see Table 2-4, “Minimum
Memory Requirements for the Prime Optical Server Installation,” on page 3 for network size options and
the number of NEs supported), then click **Next**.

**Step 14** In the Oracle Pre-Installation Checks window, the setup program checks the RAM, swap, and temp
directory sizes. The window indicates whether you have enough space to install Prime Optical and
Oracle, and whether any required packages are missing. Review the preinstallation checks, then click
**Next**.

**Step 15** 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.
Step 16 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 the installation or quit and fix the problem before proceeding.

Step 17 In the Optional Features window, you can choose additional features from the following options:

- **Install Prime Optical in a High Availability Setup**
  To obtain the Cisco Prime Optical High Availability Installation Guide, contact your Cisco account representative. If you choose to install Prime Optical in a High Availability setup, provide details in the Second High Availability Server field. If optusr has been chosen 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 only for root users)

Specific installation windows are displayed, depending on the additional features you select in the Optional Features window. If you do not need to select any additional feature, click Next and go to Step 20.

Step 18 If you selected the Install Sudo Software option, in the Prime Optical Group Information & Sudo Installation window, do the following:

a. Enter the name of the UNIX group to which you want to assign administrator privileges.

b. To install sudo, check the Install Prime Optical Sudo check box. If you do not want to install sudo, uncheck the check box.

c. Click Next.

Step 19 If you selected the Configure FTP (ONS15216 EDFA3) option, in the FTP Information window, 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
Installing Prime Optical and Oracle on the Same Workstation

- FTP directory
  b. Check or uncheck the **Create new FTP account** check box. If checked, the install 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 20**

In the Destination Folder window, specify where you want to install the Prime Optical server. The default directory is `/cisco/PrimeOpticalServer`. You can click **Change** to choose a different destination. After you specify your destination, 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**.
- Do not specify a mount point as the target installation directory for the Prime Optical server installation; otherwise 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 `/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 window shows the items that will be installed. Click **Install**.

Depending on your system performance, it might take 35 to 50 minutes to install Prime Optical and the Oracle database.

**Step 21**

If SSH is not configured, a warning message appears.
  a. Click **Continue** to configure SSH. A terminal window appears.
  b. Enter the root password and follow the prompts to configure the SSH connection. The installation continues.

**Step 22**

The Web Server Installation Summary window summarizes the results of the Web Server installation. Click **Next**.

**Step 23**

The Install Complete window summarizes the results of the installation. Click **Done**.

**Caution**

Do not close the terminal or reboot the host before the following message is displayed:

```plaintext
Prime Optical installation is complete.
```

**Step 24**

As a root user, enter the following command to reboot the system. The Prime Optical server starts automatically after rebooting:

```plaintext
init 6
```

After the server reboot, it might take up to 20 minutes for the Prime Optical server to come up.
To verify that the Prime Optical server is running, enter the `opticalctl status` command after the server reboots.

The `opticalctl status` command displays the Prime Optical server version running as 10.5, followed by the build number. In the command output, you must see two instances of “CTM Server,” “SnmpTrapService,” “SMService,” “Apache Web Server,” “TOMCAT,” and “OrchestrationService.” This indicates that the server is running.

---

**Installing Prime Optical and Oracle on Separate Workstations**

This section describes how to install the Prime Optical server and Oracle 12c on separate Red Hat Linux servers.

**Before You Begin**

- Complete the tasks described in one of the following checklists to ensure a successful installation:
  - Checklist for Installing Prime Optical and an External Database on Separate Workstations in Table 1-5 on page 1-5.
  - Checklist for Installing Prime Optical and an Embedded Database on Separate Workstations in Table 1-6 on page 1-6.

  Print the appropriate checklist from the PDF and check off each task as you complete it.

- For installation problems, see Troubleshooting the Installation, page 5-13.

---

**Installing the Prime Optical Database**

**Tip**

Use the checklist provided in Installation Scenarios and Checklists, page 1-3 to identify when this task should be performed.

**Before You Begin**

- Complete the task described in Enabling SSH on the Prime Optical Server and Database Workstation, page 3-1.
- If you are installing Prime Optical with an external database, verify that Oracle is installed in the /oracle directory.

**Step 1**
Log in as root user on the Prime Optical Database workstation.

**Step 2**
Enter the following command to set the DISPLAY variable:

```
setenv DISPLAY hostname-or-IP-address:0.0
```

**Step 3**
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 4** If you are using an xterm window or a remote host, enter the following command to enable the xterm connection from the clients:

```
xhost +
```

The default path is (Linux) /usr/bin

**Step 5** Insert the Cisco Prime Optical Server installation DVD into the DVD drive.

**Step 6** If you have the Cisco Prime Optical server installation ISO image instead of the DVD media, enter the following commands to mount it:

```
mkdir /mnt
mount -o loop PRIME_OPTICAL_10.5.0.0_214.iso /mnt
```

**Step 7** Navigate to the Disk1 directory and enter the following command to start the installation:

```
./setup.sh
```

**Caution** Make sure that the /tmp directory has at least 10 GB of free space. If not, use a different directory.

This command begins the installation. The following happens:

The setup program searches for Sun Microsystems JDK version 1.7.0_80 on your workstation.

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 8** In the Introduction window, click Next.

**Step 9** In the License Agreement window, read the license agreement and click the I accept the terms of the license agreement radio button. Click Next.

**Step 10** In the Configure the Server and Database window, do the following:

a. From the list of Prime Optical installation types, choose the Prime Optical database only radio button to install the Prime Optical database.

b. Verify that the correct hostname is shown for the Prime Optical database, then click Next.

**Note** The Server field is disabled in this case, as only the database is being installed.

**Step 11** In the Configure the Database window, choose one of the following:

- **Embedded**—Installs Prime Optical with an embedded database, the rest of the fields in the window become disabled, and you can move to the next window.

  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.)

- **Not Embedded**—Installs Prime Optical with an external database.

  a. Enter an Oracle SID.

  b. Specify if you want to install the Oracle database in ARCHIVELOG mode by clicking the appropriate radio button.
c. Click **Next**.

**Step 12** In the OS Users window, do the following:

a. Choose a username of the Prime Optical OS User from the Username drop-down list.
   - **root**—Default option. Allows only the root user to operate Prime Optical.
   - **optusr**—Allows a user other than root to operate Prime Optical. If this option is selected, the following rules apply:
     - Only the optusr can start or stop the Prime Optical server.
     - The root user will still be the only user that can install and uninstall Prime Optical.
     - The following processes will still be executed by root: Web Apache Server and SNMPTrapService.

| Note | The password for optusr is Ctm123!. You can change the password later using the following command: `passwd -u optusr`

b. Enter the following information for an external database installation:
   - Username. The default is cporacle.
   - Home Directory. The default is /cporacle.

| Caution | Do not enter /oracle as the Oracle home directory. An error appears if /oracle is entered.

If the configuration is detected on the workstation, the following message appears:

See the Prime Optical Installation Guide for details before to proceed with the installation.

You must cancel the current installation and relaunch the installation.

**Step 13** In the Select Network Configuration window, specify the size of your network, then click **Next**.

**Step 14** In the Oracle Pre-Installation Checks window, the setup program checks the RAM, swap, tmp, and oracle directory sizes. The window indicates whether you have enough space to install Prime Optical and Oracle, and whether any required packages are missing. Review the preinstallation checks, then click **Next**.

**Step 15** 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.

**Step 16** 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_installChecks.log. To continue the installation, click Continue. To cancel the installation and fix the problem, click Cancel.

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

**Step 17** In the Destination Folder window, specify where you want to install the required files. The default directory is /cisco/PrimeOpticalServer. You can click Change to choose a different destination. After you specify your destination, click **Next**.

**Step 18** In the Pre-Installation Summary window, click **Install** to create the Prime Optical database.
If SSH is not configured, a warning message appears.

**Step 19**

Do the following:

a. Click **Continue** to configure SSH.

b. In the terminal window, enter the root password and follow the prompts to configure the SSH connection. The installation continues.

**Caution**

Verify that PermitRootLogin is set to Yes in the `/etc/ssh/sshd_config` configuration file.

**Step 20**

In the Install Complete window, click **Done**.

**Caution**

Do not close the terminal or reboot the host before the following message is displayed:

`Prime Optical installation is complete.`

**Step 21**

As a root user, enter the following command to reboot the system:

`init 6`

**Step 22**

Enter the following command to verify that the Oracle database and listener are running:

`ps -ef | grep ora`

The command output displays the `tnslsnr` and `ora_{...}_Oracle-SID` processes.

### Installing the Prime Optical Server on the Prime Optical Server Workstation

**Tip**

Use the checklist provided in *Installation Scenarios and Checklists, page 1-3* to identify when this task should be performed.

**Before You Begin**

Complete the task described in *Enabling SSH on the Prime Optical Server and Database Workstation, page 3-1*.

**Step 1**

Log in as a root user.

**Step 2**

Enter the following command to set the `DISPLAY` variable:

```
setenv DISPLAY hostname-or-IP-address:0.0
```

**Step 3**

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 4**

If you are using an xterm window or a remote host, enter the following command to enable the xterm connection from the clients:

```
xhost +
```
The default path is /usr/bin

Step 5 Insert the Cisco Prime Optical Server installation DVD into the DVD drive.

Step 6 If you have the Cisco Prime Optical server installation ISO image instead of the DVD media, enter the following commands to mount it:

```
mkdir /mnt
mount -p loop PRIME_OPTICAL_10.5.0.0_214.iso /mnt
```

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

Step 7 Navigate to the Disk1 directory and enter the following command to start the installation:

```
./setup.sh
```

Caution Make sure that the /tmp directory has at least 10 GB of free space. If not, use a different directory.

The following happens:

The setup program searches for Sun Microsystems JDK version 1.7.0_80 on your workstation.

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 8 In the Introduction window, click Next.

Step 9 In the License Agreement window, read the license agreement and click the I accept the terms of the license agreement radio button. Click Next.

Step 10 In the Configure the Server and Database window, do the following:

a. From the list of Prime Optical installation types, choose the Prime Optical server only radio button to install the Prime Optical server.

b. Verify that the correct hostname or IP address is shown for the Prime Optical server.

c. Enter the correct hostname for the database, then click Next. For proper configuration, a fully qualified domain name must be provided.

Step 11 In the OS Users window, do the following:

a. Choose a username of the Prime Optical OS User from the drop-down list:

- root—Default option. Allows only the root user to operate Prime Optical.
- optusr—This allows a user other than root to operate Prime Optical. If this option is selected, the following rules apply:
  - Only the optusr can start or stop the Prime Optical server.
  - The root user will still be the only user that can install and uninstall Prime Optical.
  - The following processes will still be executed by root: Web Apache Server and SNMPTrapService.

Note The password for optusr is Ctm123!. You can change the password later using the passwd -u optusr command.
b. Enter the user name for an external database OS User. The default is cporacle.

\[\text{Note} \quad \text{You must provide the same user name as that configured on the database machine.}\]

If the configuration is detected on the workstation, the following message appears:

See the Prime Optical Installation Guide for details before to proceed with the installation.

c. Click Next.

Step 12 In the Select Network Configuration window, specify the size of your network, then click Next.

Step 13 In the Optional Features window, you can choose additional features from the following options:

- Install Prime Optical in a High Availability Setup
  
  If you choose to install Prime Optical in a High Availability setup, provide details in the Second High Availability Server field. If optusr has been chosen 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)

Specific installation windows are displayed, depending on the additional features you select in the Optional Features window. If you do not need to select any additional feature, click Next and go to Step 25.

Step 14 If you selected the Install Sudo Software option, in the Prime Optical Group Information & Sudo Installation window, do the following:

a. Enter the name of the UNIX group to which you want to assign administrator privileges.

b. To install sudo, check the Install Prime Optical Sudo check box. If you do not want to install sudo, uncheck the check box.

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

c. Click Next.

Step 15 If you selected the Configure FTP (ONS15216 EDFA3) option, in the FTP Information window, do the following to configure an FTP account for software download operations:

\[\text{Note} \quad \text{NE types that require FTP configuration are:}\]

- 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 install 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 16**

In the Destination Folder window, specify where you want to install the Prime Optical server. The default directory is `/cisco/PrimeOpticalServer`. You can click **Change** to choose a different destination. After you specify your destination, click **Next**.

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 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, it creates a symbolic link automatically.

**Step 17**

The Pre-Installation Summary window shows the items that will be installed. Click **Install**.

**Step 18**

If SSH is not configured, a warning message appears.

a. Click **Continue** to configure SSH. A terminal window appears.

b. Enter the root password and follow the prompts to configure the SSH connection. The installation continues.

---

**Note**

You will have to provide the root password thrice.

---

**Caution**

Verify that `PermitRootLogin` is set to `Yes` in the `/etc/ssh/sshd_config` configuration file.

**Step 19**

The Web Server Installation Summary window summarizes the results of the Web Server installation. Click **Next**.

**Step 20**

The Install Complete window summarizes the results of the installation. Click **Done**.

---

*(Optional)* Updating the Prime Optical Configuration for a Dual-Server Installation with Dedicated Connection Between Servers

Perform the following:

---

**Note**

It is necessary to perform a standard dual server installation before executing the changes described in the section.
Step 1 Log in as a root user on the Cisco Prime Optical server workstation as shown in Figure 3-2.

Step 2 Apply the following changes to the /opt/CiscoTransportManagerServer/cfg/CTMServer.cfg configuration file. See Figure 3-2 for more information.

```
db-config=manual
db-host=IPv4 address_4
db-location=IPv4 address_4:SID:PORT
```

IPv4 address_4 is the IP address of the dedicated link of the Cisco Prime Optical Database workstation.

**Note** Do not make any changes to the SID, PORT and alt-db-host values.

Step 3 Enter the following command to setup the Secure Shell configuration for the oracle user chosen during Prime Optical installation:

```
ssh -q -F /opt/secure/ssh_config oracle_user@IPv4_address_4 ls
```

Step 4 Login as root user in the Cisco Prime Optical database workstation.

Step 5 Change the directory to /oracle/product/12.1.0/network/admin/.

Step 6 Edit the listener.ora file and add the following string after the (IPv4 address_2) database workstation public address section:

```
ADDRESS= (PROTOCOL= TCP)(Host= IPv4_address_4)(Port= 1521)
```

Step 7 Edit the tnsnames.ora file and replace IPv4 address_2 (public address) with IPv4 address_4.

Step 8 Enter the following commands to restart the Oracle listener:

```
su - oracle_user -c "lsnrctl stop"
su - oracle_user -c "lsnrctl start"
```

## Troubleshooting the Installation

You can use all of the following to troubleshoot your installation:

- **Prime Optical server log files**—Located in the /opt/CiscoTransportManagerServer/log directory.
- **UNIX commands**:
  - `netstat`—Shows the state of all sockets, all routing table entries, and all physical and logical interfaces.
  - `snoop`—Captures and inspects network packets. This command is available only on Solaris operating systems.
  - `vmstat`—Reports virtual memory statistics.
- **Prime Optical installation log files** are located in /temp_CTM.
Prime Optical Installation Fails Before the Database Is Created

If the Prime Optical installation fails before the database is created, do the following before reinstalling:

- Use the `ps -ef | grep setup` command to verify that the previous installation is not running. The installation script is setup.sh. If the installation process is still running even after you exit InstallAnywhere, terminate the installation with the `kill -9 pid` command, where `pid` is the process identifier that is returned by the `ps -ef | grep setup` command.

- Verify that the /tmp directory is not full. During the Prime Optical installation, the /tmp directory is used to store a temporary copy of the installation scripts and the JRE used for installation. Use the `df -h` command to check if there is enough space on the other file systems (for example, in the /opt directory).

- Make sure that you follow the installation procedures explicitly. Even minor steps, such as creating the /tftpboot directory, must be completed. If you deviate from the documented installation procedures, you will encounter problems during installation.

- If you are not installing Prime Optical from the DVD media or ISO images—for example, if you are installing Prime Optical from your hard drive—make sure that all of the required scripts and files are available and have the correct ownership and permissions.

You can use the /temp_CTM for debugging when a new Prime Optical installation fails.

Prime Optical Installer Hangs or Quits

Check the disk space in the root and user installation directories. Also, check the disk space in the /tmp and /temp_CTM directories. If disk space is not a problem, check for available RAM.

SQL Errors

SQL problems occur when there is no connection to Oracle or there are Oracle command syntax violations in SQL.

Check the log or err files in the /temp_CTM directories and do one of the following:

- Check whether the /opt/Cisco*Server/cfg/CTMServer.cfg file exists.
- Make sure that the database password is correct. Use the password to connect to the external Oracle database.

Improving the Performance of the Oracle Database

In Prime Optical, redo logs are stored on a different disk to maximize I/O data transfers and speed up all database operations. This configuration is recommended on large and high-end networks that manage a large number of NEs.

Two partitions are created to support the configuration: /db01_rd and /db02_rd. The partitions are located on different physical disks and different I/O controllers. You can add the /db01_rd partition only, or you can add both /db01_rd and /db02_rd. In a dual-server scenario, the partitions are created on the Prime Optical database workstation.
No user action is required if the /db01_rd and /db02_rd partitions are already present at the time of installation. The Prime Optical installer configures the redo logs.

To configure the Oracle redo logs:

**Step 1** Log in as the Prime Optical user (root or optusr) on the workstation where the Prime Optical server is installed.

**Step 2** Enter the following command to shut down the Prime Optical server. (In a dual-server scenario, enter the following command only on the Prime Optical server workstation.)

```bash
opticalctl stop
```

**Step 3** Enter the following commands to run the configuration script, where `small`, `medium`, `large`, and `highend` represent the size of the network selected during the Prime Optical installation. (In a dual-server scenario, enter the following commands only on the Prime Optical database workstation.)

```bash
cd Prime Optical-installation-directory/bin
./rd_log_config.sh {small | medium | large | highend}
```

The script shuts down the Oracle database, configures the redo logs, and restarts the Oracle database.

**Step 4** Enter the following command to start the Prime Optical server. (In a dual-server scenario, enter the following command only on the Prime Optical server workstation.)

```bash
opticalctl start
```
Upgrading Prime Optical

You cannot perform a full upgrade from an earlier Cisco Transport Manager (CTM) or Prime Optical release.

This section describes how to use the Cisco Prime Optical 10.5 Data Migrator wizard to migrate selected data from CTM R8.5 or later to Prime Optical 10.5. With the wizard, you can migrate a subset of an existing database to a newly installed Prime Optical 10.5 server.

The following are the benefits and limitations of the Data Migrator wizard:

- Reduces the migration time and provides a safer, easier migration.
- Lets you migrate the following data:
  - Core tables and database pruning policy information.
  - Service states and configurations, including CORBA and SNMP gateway states and configurations.
  - Users, user profile information, and CORBA and SNMP gateway users.
  - (Optional) Managed NEs, NE logical grouping information, network partition information, security information to authenticate to nodes, Domain Explorer and Subnetwork Explorer map coordinates, basic NE service configuration, and PM service states.
  - (Optional) Manual links and Layer 1 circuits with user data.
  - (Optional) VLAN customer-related information, Layer 2 topologies, and QoS templates.
- Does not migrate NE configuration backup (memory backup) files. You must manually back up these files. The files are located under the installation directory/admin.
- Does not migrate PM data.
- Does not migrate alarm data.

As a root user, install and run the tool on the same server where the Prime Optical database is installed. The tool prepares a newly installed Prime Optical 10.5 server to use the same data as the earlier server used.

In the bottom right corner of the wizard screens, the memory footprint progress bar shows the rate of available memory compared to the allocated memory; for example: “Available: x MB of y MB.” The “Request garbage collection” tool lets you free up memory when the amount of data is greater than what is expected, and the running task is taking too long to complete.
Overview of the Upgrade Process Using the Data Migrator Wizard

Using the Data Migrator wizard to upgrade from CTM R8.5, R9.0, R9.1, R9.2, Prime Optical 9.3, 9.3.1, 9.5, 9.6, 9.6.3, or 9.8, 10.0, 10.3 to Prime Optical 10.5 involves the following process:

1. (Optional) Perform a full backup or export of your earlier database so that it can be restored if there are any upgrade issues.

2. Install the Data Migrator wizard on any server in the same network as the Prime Optical server. (See Installing the Data Migrator Wizard, page 6-2.)

3. Use the Data Migrator wizard to export a subset of database data from the CTM R8.5, R9.0, R9.1, R9.2, or Prime Optical 9.3, 9.3.1, 9.5, 9.6, 9.6.3, 9.8, 10.0, 10.3 to Prime Optical 10.5 server that you want to upgrade. (See Using the Data Migrator Wizard to Export the Database, page 6-3.)

4. Uninstall the previous CTM or Prime Optical release.

Note You can restore the backup files after the Prime Optical 10.5 installation is complete.

5. Install Prime Optical 10.5 from scratch. (See Chapter 5, “Installing Prime Optical.”)

6. Use the Data Migrator wizard to import selected database data to the new Prime Optical 10.5 database. (See Using the Data Migrator Wizard to Import Data, page 6-5.)

Installing the Data Migrator Wizard

As a root user, do the following:

Step 1 Insert the Cisco Prime Optical Server installation DVD into the DVD drive.

Step 2 Enter the following commands to mount the ISO image if you have the Cisco Prime Optical server installation ISO image instead of the DVD media:

```
mkdir /mnt
PRIME_OPTICAL_10.5.0.0_214.iso /mnt
```

Step 3 Navigate to the DataMigrator directory and copy the Data Migrator tar file to a local folder.

Step 4 Enter the following commands to extract the .tar archive contents:

```
cd local-folder/DataMigrator
tar xvf DataMigrator*.tar
```

Step 5 Enter the following commands to run the installer:
Step 6  At the Introduction screen, click Next.
Step 7  At the Choose Installation Folder screen, specify where you want to install the Data Migrator wizard. The default folder is $HOME/DataMigrator. You can click Choose to choose a different destination. After you specify your destination, click Next.
Step 8  The Preinstallation Summary screen shows the items that will be installed and the disk space required. Click Install.
Step 9  The Installing Data Migrator screen tracks the progress of the installation.
Step 10 The Installation Complete screen summarizes the results of the installation. Click Done.

After installation, the directory structure contains a folder with the DataMigrator executable script.

Using the Data Migrator Wizard to Export the Database

Step 1  Enter the following command to verify whether the Prime Optical server is running:
```bash
cd Disk1
./install.sh
```
If the Prime Optical server is running, enter the following command to stop it:
```bash
opticalctl stop
```
Step 2  Navigate to the installation folder (for example, /tmp/DataMigrator/bin) and run the DataMigrator.sh executable.
Step 3  The Data Migrator wizard opens. Do the following:
   a.  (Optional) To view the supported versions that are available for export, click Show Migration Matrix. The Supported Migration Paths dialog box opens, listing the valid migration versions. After reviewing the supported migration paths, click Close.
   b.  From the Migration Mode drop-down list, choose Export.
   c.  Click OK.

Note  For Embedded database, the Oracle SID is CTM for 8.5 through 9.6.3, and optdb for 9.8, 10.0, 10.3 and 10.5.

Step 4  In the Database Connection screen, specify details of the database from which you want to export data. Do the following:
   a.  If the release from which you want to export data has an embedded database, check the Server uses an embedded database check box.

   When the Server uses an embedded database check box is checked:
   – You cannot edit any fields in the Connection Properties area except for the instance name.
   – The hostname is set to the current machine’s name.
   – The port number is set to 1521, which is the default for an embedded database and cannot be changed.
Using the Data Migrator Wizard to Export the Database

- The Username and Password fields are cleared. After you click the **Connect** button, the Username and Password fields are filled in if the Data Migrator wizard can find those properties in the CTMServer.cfg configuration file.

b. If the release from which you want to export data does *not* use an embedded database, verify that the **Server uses an embedded database** check box is unchecked.

When the **Server uses an embedded database** check box is unchecked:
- You can edit all fields in the Connection Properties area.
- The Username and Password fields are restored to their default values.
- Enter the hostname in the Hostname field.
- Enter the port number in the Port Number field. The default port number is 1521.
- Enter values in the remaining fields, or accept the defaults.

c. Click **Connect**. The progress bar at the bottom of the screen tracks the progress of the operation. (To cancel the operation, click the **X** icon to the right of the progress bar.)

After the connection succeeds, the Connection State area shows the state as “Connected.” The version, size, and installed modules are retrieved from the database and displayed.

d. Click **Next**.

**Step 5** If you receive the following prompt, shut down the server and reconnect to the database, then click **OK**:

*The server is still running on the selected server. The connection to the database will be closed. Before continuing, you must shut down the server and then reconnect to the database.*

---

**Caution** It is important that you shut down the server and reconnect to the database before proceeding to the next step.

---

**Step 6** In the Open dialog box, select the directory and the .zip archive where you want to store the exported data, then click **Open**.

**Step 7** The File Selection screen displays the selected archive file and the estimated time to complete the export process. Click **Next**.

---

**Note** Before clicking **Next**, based on the estimated time that the process will take, you can either decide to continue, or you can go back using the **Back** button and modify your selections appropriately.

---

**Step 8** In the Export screen, click **Start**. All data categories are exported and compressed.

A progress bar at the bottom-right corner of the screen tracks the progress of the export. You can quit exporting at any time by clicking the **X** button next to the progress bar.

The table summarizes the results of the export. For each data category, the table lists the exported database tables, the number of rows exported, and the length of time the export took.

**Step 9** Click **Exit**.

**Step 10** At the prompt “The operation is complete,” click **OK**.
Using the Data Migrator Wizard to Import Data

**Note**
You can import data only on a newly installed Prime Optical server. You cannot import data on a Prime Optical server if its database has already been populated with users, Network Elements and so on.

**Step 1**
Enter the following command to verify whether the server is running:

```bash
opticalctl status
```

If the server is running, enter the following command to stop it:

```bash
opticalctl stop
```

**Step 2**
Navigate to the installation folder (for example, /tmp/DataMigrator/bin) and run the DataMigrator.sh executable.

**Step 3**
The Data Migrator wizard opens. Do the following:

- (Optional) To view the supported versions that are available for import, click **Show Migration Matrix**. The Supported Migration Paths dialog box opens, listing the valid migration versions. After reviewing the supported migration paths, click **Close**.
- From the Migration Mode drop-down list, choose **Import**.
- Click **OK**.

**Step 4**
In the Open dialog box, select the .zip archive file to import, then click **Open**.

**Step 5**
In the Archive Summary screen, review the details of the archive file to import. To select a different archive file to import, click the browse (…) button. The table summary shows the database tables that will be imported, including the data category and the number of rows in each table. Click **Next**.

**Step 6**
In the Categories screen, do the following:

- Select the categories to import. General, Services, and Users are mandatory categories; the NEs, L1 and L2 topologies are optional.
- (Optional) In the General category, click the **Setup** link to open the General Import Options dialog box. If desired, check the **Import pruning options** check box, then click **Apply**. The dialog box closes.
- (Optional) In the NEs category, click the **Setup** link to open the NE Import Options dialog box and specify additional setup options for the import. The dialog box has the following tabs:
  - NE Services—Allows you to tune the NE services of the target server after the import.
  - NEs— Allows you to change the NE state and disable automatic subnetwork grouping. (Automatic subnetwork grouping slows down the initial discovery of the new server).
  - Miscellaneous—Allows you to customize the import of user maps and equipment inventory notes.

After making your selections in the NE Import Options dialog box, click **Apply**. The dialog box closes.

- Click **Next**.

**Step 7**
In the Database Connection screen, specify details of the database to which you want to import data. Do the following:

- If the release to which you want to import data has an embedded database, check the **Server uses an embedded database** check box.
When the **Server uses an embedded database** check box is checked:

- You cannot edit any fields in the Connection Properties area except for the hostname and the instance name.
- The hostname is set to the current machine’s name.
- The port number is set to 1521, which is the default for an embedded database and cannot be changed.
- The Username and Password fields are cleared. After you click the Connect button, the Username and Password fields are filled in if the Data Migrator wizard can find those properties in the CTMServer.cfg configuration file.

**Note**
For Embedded database, the default Oracle SID is CTM for 8.5 through 9.6.3, and optdb for 9.8, 10.0, 10.3 and 10.5.

b. If the release to which you want to import data does not use an embedded database, verify that the **Server uses an embedded database** check box is unchecked.

When the **Server uses an embedded database** check box is unchecked:

- You can edit all fields in the Connection Properties area.
- The Username and Password fields are restored to their default values.
- Enter the hostname in the Hostname field.
- Enter the port number in the Port Number field. The default port number is 1521.
- Enter values in the remaining fields, or accept the defaults.

c. Click **Connect**. The progress bar at the bottom of the screen tracks the progress of the operation. (To cancel the operation, click the X icon to the right of the progress bar.)

After the connection succeeds, the Connection State area shows the state as “Connected.” The version, size, and installed modules are retrieved from the database and displayed.

d. Click **Next**.

**Step 8** If you receive the following prompt, shut down the server and reconnect to the database, then click **OK**: The server is still running on the selected server. The connection to the database will be closed. Before continuing, you must shut down the server and then reconnect to the database.

**Caution**
It is important that you shut down the server and reconnect to the database before proceeding to the next step.

**Step 9** In the Validation screen, do the following:

a. Click the **Start** button to validate the size, installed modules, and data on the selected destination server. The Result field shows whether the validation succeeded (Allowed) or failed (Impossible).

The following server sizes produce the following results:

<table>
<thead>
<tr>
<th>Original Server Size</th>
<th>Target Server Size</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Small</td>
<td>Allowed</td>
</tr>
<tr>
<td>Small</td>
<td>Medium</td>
<td>Allowed</td>
</tr>
</tbody>
</table>
Chapter 6  Upgrading Prime Optical

Using the Data Migrator Wizard to Import Data

b. In the Data Validation area > Details column, click the Details link to see why a particular table could not be imported. At the following prompt, click OK:

Table-name must be empty; it contains x row(s) instead.

Note To avoid this error, click Back, return to the Validation screen, and select a different server that has a new Prime Optical 10.5 installation.

c. Click Next.

Step 10 In the Import screen, click the Start button to import the data to the target database.

Step 11 The confirmation popup reminds you that if you have not done so already, you should run the export_full_db.sh script to make a backup copy of your current data before proceeding. (Without a backup copy of your data, you would need to completely reinstall the Prime Optical server if problems were to occur.) Click Yes at the following prompt:

This action will write the selected data to the target database. Make a copy of the current data using the export_full_db.sh tool.

Select Yes to proceed or No to cancel the operation.

Step 12 A progress bar tracks the progress of the import. (To cancel the operation, click the X icon to the right of the progress bar.)

The table summarizes the results of the import. For each data category, the table lists the imported database tables, the result of the housekeeping phase (purging old data to make room for the new data), the result of the data migration phase, and the length of time the import took.

<table>
<thead>
<tr>
<th>Original Server Size</th>
<th>Target Server Size</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Large</td>
<td>Allowed</td>
</tr>
<tr>
<td>Small</td>
<td>High end</td>
<td>Allowed</td>
</tr>
<tr>
<td>Medium</td>
<td>Small</td>
<td>Impossible</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium</td>
<td>Allowed</td>
</tr>
<tr>
<td>Medium</td>
<td>Large</td>
<td>Allowed</td>
</tr>
<tr>
<td>Medium</td>
<td>High end</td>
<td>Allowed</td>
</tr>
<tr>
<td>Large</td>
<td>Small</td>
<td>Impossible</td>
</tr>
<tr>
<td>Large</td>
<td>Medium</td>
<td>Impossible</td>
</tr>
<tr>
<td>Large</td>
<td>Large</td>
<td>Allowed</td>
</tr>
<tr>
<td>Large</td>
<td>High end</td>
<td>Allowed</td>
</tr>
<tr>
<td>High end</td>
<td>Small</td>
<td>Impossible</td>
</tr>
<tr>
<td>High end</td>
<td>Medium</td>
<td>Impossible</td>
</tr>
<tr>
<td>High end</td>
<td>Large</td>
<td>Impossible</td>
</tr>
<tr>
<td>High end</td>
<td>High end</td>
<td>Allowed</td>
</tr>
</tbody>
</table>
Caution

If a database table was not imported, click the Details link to show the reason for the failure. If errors occurred during the import, use the import_full_db.sh script to reimport the Prime Optical database. See the Cisco Prime Optical user guide section “Restoring the Prime Optical Database from the Previous Backup.”

Step 13
Click Exit.

Note
Due to change in the CPO 9.8 password encryption algorithm, all user passwords are reset to CTM123! (the default password) after the import, in the following cases:

- Data exported from CTM or Prime Optical 9.6.3 or earlier release, and imported on Prime Optical 9.8.
- Data exported from CTM or Prime Optical 9.8 or earlier release, and imported on Prime Optical 10.0.
- Data exported from CTM or Prime Optical 10.0 or earlier release, and imported on Prime Optical 10.3.
- Data exported from CTM or Prime Optical 10.3 or earlier release, and imported on Prime Optical 10.5.

You will be prompted to reset your password during the first login. You do not need to reset the password if the data is exported from Prime Optical 10.3 and imported to Prime Optical 10.5.

Uninstalling the Data Migrator Wizard

To uninstall the Data Migrator wizard, delete the folder where you installed the wizard. The default folder is $HOME/DataMigrator.
Starting the Prime Optical Client

This chapter describes how to start the Cisco Prime Optical 10.5 client and Cisco Edge Craft (CEC), which is the local craft application used to manage certain ONS 15305 NEs.

Note

- CEC is not supported on Windows 7 client workstations.
- CEC is an SNMP-based application. Before launching CEC, verify that the workstation performing the installation can reach the ONS 15305 devices through UDP port 161.

This section contains the following topics:

- Starting the Prime Optical Client, page 7-1
- Configuring a SOCKS Server, page 7-3
- Enable or Disable HTTP Directory Listing, page 7-3
- Customizing the Login Advisory Message, page 7-4
- Starting Cisco Edge Craft on Windows, page 7-4
- Starting Cisco Edge Craft on Linux, page 7-5
- Configuring Windows 7 to Launch Cisco Transport Controller, page 7-5
- Specifying the Default Browser to Display the Online Help, page 7-6
- Special Considerations when Proxy Server Is Enabled, page 7-6
- Setting Up Client-Server Encrypted Connections Through SSH Tunneling and SOCKS Proxy Forwarding, page 7-7

Starting the Prime Optical Client

The Prime Optical client uses Java Web Start technology. When the Prime Optical administrator updates or patches the server, the client is updated automatically.

Note

If launching the Prime Optical client from Linux, confirm that the xterm command is installed on the host. If the xterm command is not installed, you will not be able to launch CTC or TL1 and IOS consoles from NEs.

To launch the Prime Optical client:
**Step 1** Open a Prime Optical-supported web browser and enter the following URL:

https://server-hostname

where *server-hostname* is the hostname of the Prime Optical server.

**Step 2** Accept the self-signed, untrusted security certificates.

- In Firefox, if you accept the security certificates, they do not reappear upon subsequent logins.
- In Internet Explorer, if you accept the security certificates without placing them in the trusted certificate store, they reappear upon subsequent logins.

**Step 3** The first time you log in, enter the default username and password:

- **Username:** *SysAdmin*
- **Password:** *Ctm123!*

**Note** The username and password are case sensitive.

**Step 4** Click **OK** at the advisory message.

To customize the advisory message, see Customizing the Login Advisory Message, page 7-4.

By default, for security reasons you are prompted to change the password after you log in for the first time. The password complexity is configurable through the Prime Optical UI (*Control Panel > Security Properties* pane). By default, the password must:

- Contain at least six characters, but not more than 15 characters.
- Contain at least two alphabetic characters (A–Z, a–z). Of the alphabetic characters, at least one must be uppercase and one must be lowercase.
- Contain at least one numeric character (0–9).
- Contain at least one special character (+ # % , . ; & !). The default special character set is TL1+UNIX.
- Allow a special character as the first or last character.
- Allow a numeric character as the first or last character.
- Not contain the username or any circular shift of the username. An uppercase letter and its corresponding lowercase letter are considered equivalent. For example, if the username is Arthur, the password cannot contain the string arthur, rthur, hurth, urartha, or rathur.
- Differ from the old password by at least three characters. For example, if the old password is MikeBrady5!, the new password cannot be mikebrady5% because only the last character is different. However, the new password MikeBrady2!99 is acceptable because it differs from MikeBrady5! by three characters.

**Step 5** Change the password, and then click **OK**.

The Prime Optical Home page appears.

**Step 6** From the Prime Optical Home page menu, choose **Start** and click one of the following:

- **Domain Explorer**—Connects to the Prime Optical server directly (without going through a SOCKS server) and launches the Domain Explorer.
- **Domain Explorer (with SOCKS)**—Connects to a SOCKS server. To use this option, you must first configure a SOCKS v5 proxy server address and port value. If a SOCKS server is not configured, you will connect to the Prime Optical server directly. See Configuring a SOCKS Server, page 7-3 for information on how to configure a SOCKS server.
Chapter 7      Starting the Prime Optical Client

Configuring a SOCKS Server

To configure a SOCKS v5 proxy server address and port value to manage connectivity through network firewalls:

**Step 1** From the Home page, select Administration > SOCKS Table.

**Step 2** Click Add Row. Then, for the SOCKS host, enter the hostname or IP address and the TCP port number.

**Step 3** Click Save.

**Step 4** Click the radio button next to one of the rows and click Save as Default to save the selected SOCKS server settings for the next time you log in.

---

**Note** Each user has to select a default SOCKS server.

Enable or Disable HTTP Directory Listing

To enable HTTP directory listing for log, archive and CTC directory execute the following commands:

1. To enter in to the directory, enter the following command:
   ```
   cd /opt/cisco/PrimeOpticalServer/bin
   ```

2. To enable HTTP directory listing, enter the following command:
   ```
   ./http_directory_listing.sh -enable
   ```
To disable HTTP directory listing for log, archive and CTC directory execute the following commands:

1. To enter in to the directory, enter the following command:
   ```bash
cd /opt/cisco/PrimeOpticalServer/bin
```
2. To disable the directory listing, enter the following command:
   ```bash
./http_directory_listing.sh -disable
```

Customizing the Login Advisory Message

An advisory message is shown both before and after a user logs into Prime Optical. By default, this message reads as follows:

```
NOTICE: This is a private computer system. Unauthorized access or use may lead to prosecution.
```

To customize the login advisory message:

---

**Step 1** In a text editor, open the following file:
`/cisco/PrimeOpticalServer/tomcat/webapps/OpticalPortal/lib/xwt/nts/OpticalPortalProperties.js`

**Step 2** Update the advisory message entry with the desired text changes.

**Step 3** Save the changes.

**Step 4** Log out of the Prime Optical Home page, clear your browser cache, and log back in.

---

Starting Cisco Edge Craft on Windows

**Note**

CEC supports Cisco ONS15305 with releases lower than 3.0. CTC supports Cisco ONS15305 release 3.0 or later.

---

**Step 1** Choose **Start > Programs > Accessories > Command Prompt** to open a Windows DOS Command Prompt window.

**Step 2** Change directories to the `Prime Optical-home-directory/CiscoEdgeCraft/bin` directory.

**Step 3** Double-click the **CiscoEdgeCraft.exe** file. The Cisco Edge Craft login screen appears.

**Note**

It is not necessary to restart the workstation.

**Step 4** In the Cisco Edge Craft login window, do the following:

a. Enter the IP address of the NE that you want to connect to.

b. Ignore the User field.

c. Enter the Password string.

The password string represents the NE community string, which is set in the NE flash memory by using the command-line interface (CLI).
Starting Cisco Edge Craft on Linux

**Note**
CEC supports Cisco ONS15305 with releases lower than 3.0. CTC supports Cisco ONS15305 release 3.0 or later.

**Step 1**
Depending on the option you chose during installation, execute the link that you specified, or enter the following command:

```
/cisco/Prime Optical home-directory/CiscoEdgeCraft/bin/CiscoEdgeCraft
```

**Step 2**
In the Cisco Edge Craft login window, do the following:

a. Enter the IP address of the NE that you want to connect to.

b. Ignore the User field.

c. Enter a password string. The password string represents the NE community string, which is set in the NE flash memory by using the CLI.

d. Click **Logon**.

Configuring Windows 7 to Launch Cisco Transport Controller

If you plan to use Cisco Transport Controller (CTC) on a Windows 7 workstation, do the following:

**Step 1**
In Internet Explorer 10, disable the Protected Mode for a zone:

a. Choose **Tools > Internet Options**.

b. Click the **Security** tab.

c. Select the appropriate zone, then uncheck the **Enable Protected Mode** check box.

The Protected Mode status (“Protected Mode: On” or “Protected Mode: Off”) is visible in the bottom right corner of the IE status bar.

**Step 2**
Configure the security zone level to Medium.

**Step 3**
Disable automatic TCP tuning. To do this, open the CMD prompt and enter the following command:

```
netsh interface tcp set global autotuninglevel=disabled
```

**Note**
To reenable automatic tuning, enter:

```
netsh interface tcp set global autotuninglevel=normal
```
Specifying the Default Browser to Display the Online Help

In Windows, Prime Optical uses the default browser to display the online help. If you want to use a specific browser to launch the online help, make that the default browser for your workstation.

During testing, Cisco uses Internet Explorer, Mozilla Firefox, and Google Chrome to display the online help; other browsers have not been tested.

The online help for Cisco Edge Craft requires Adobe Acrobat Reader. Acrobat Reader is not required in your path environment variable, but the PDF file type must be associated with Acrobat Reader.

On Solaris, the online help for Cisco Edge Craft requires Adobe Acrobat Reader to be installed and included in your path environment variable.

If you cannot launch the online help, open a command prompt from another window and enter the xhost + command (/usr/bin [Linux]) and the full path name. Also, verify that the DISPLAY variable is set correctly.

Special Considerations when Proxy Server Is Enabled

If you are using a proxy-server enabled web browser, complete one of the following options, depending on your browser type.

For Internet Explorer, do the following:

Step 1 Choose Tools > Internet Options.
Step 2 Click the Connections tab.
Step 3 Click the LAN Settings button.
Step 4 Complete one of the following options:
   - Uncheck the Use a proxy server for your LAN check box.
   - If the Use a proxy server for your LAN check box must remain checked, click Advanced. Enter your server IP address in the Do not use proxy server addresses beginning with field. Separate each address with a semicolon.
Step 5 Click OK.
For Mozilla Firefox, do the following:

**Step 1** Choose **Edit > Preferences.**

**Step 2** Expand **Advanced** and choose **Proxies.**

**Step 3** Complete one of the following options:
- If you do not want to use a proxy, click **Direct connection to the Internet.**
- If you do not have a proxy location (URL), click **Manual proxy configuration.** In the No Proxy for field, enter the domains that you do not want to use a proxy for. Use a comma to separate domains.

**Step 4** Click **OK.**

---

**Setting Up Client-Server Encrypted Connections Through SSH Tunneling and SOCKS Proxy Forwarding**

This section describes how to configure the Prime Optical client to route all of its outbound network (TCP) connections to a SOCKS proxy server.

The proxy host must satisfy the following prerequisites:

- No firewall is present between the proxy host and the server host. In other words, the proxy host must be able to establish a connection on every port on the server host.
- A UNIX user has been created on the proxy host.

**Note** Cisco recommends that you avoid using the root UNIX user as the endpoint of the SSH tunnel.

- The Proxy host is SSH-enabled.
- The Proxy host supports SOCKS5.
- You have changed the AllowTcpForwarding property value in the /etc/ssh/sshd_config file to **yes** and then restarted the SSH service.

The following hosts are involved:

- Proxy host
- Client host, on which the Prime Optical client runs
- Server host, on which the Prime Optical server runs

**Figure 7-1** shows the route of a connection. Every outbound connection of the client host, instead of being sent directly to the server host, is tunneled to the SSH port 22 of the proxy. Alternatively, you can also configure the server host to act as a proxy host. If configured, the Secure Shell Daemon (SSHD) service runs on the server host.
Prime Optical Client on Windows (Using SSH Tunneling)

This procedure explains the steps involved in configuring the Prime Optical client route and all its outbound connections into an SSH tunnel. This SSH tunnel connection is between the client machine and the proxy host. At the end of this procedure, the client will begin to use SOCKS through an SSH tunnel.

**Step 1**
On the client machine, go to [http://www.putty.org](http://www.putty.org) and download the plink.exe file.

**Step 2**
Open a command prompt (cmd.exe), and then change directory to the location where plink.exe has been saved.

**Step 3**
Execute the following command:

```
plink -N -D proxy_port proxy_user@proxy_host
```

For example:

```
plink -N -D 10080 myuser@myproxyhost
```

**Note**
- The `proxy_user` user must exist on `proxy_host`. For security reasons, do not use root user for this purpose.
- Ensure that the `proxy_port` is not already in use on the client host. You can use the `netstat` command to verify if it is already in use.

**Step 4**
Enter the user’s password when prompted.

**Caution**
To avoid SSH being dropped, do not close the command prompt during the procedure or after the user has logged in.
Step 5  From the Prime Optical Home page, choose Start > Domain Explorer (with SOCKS) after specifying a default SOCKS server. For information on how to configure the SOCKS server settings, see Configuring a SOCKS Server, page 7-3.

Prime Optical Client on UNIX (using SSH tunneling)

This procedure explains the steps involved in configuring the Prime Optical client route and all its outbound connections into an SSH tunnel. This SSH tunnel connection is between the client machine and the proxy host. Use this procedure if the Prime Optical client is launched on Linux. At the end of this procedure, the client will begin to use SOCKS through an SSH tunnel.

Step 1  On the client machine, open a terminal window and enter the following command:

```
ssh -N -D proxy_port proxy_user@proxy_host
```

For example:

```
ssh -N -D 10080 myuser@myproxyhost
```

Note  The `proxy_user` user must exist on `proxy_host`. For security reasons, do not use root user for this purpose.

Step 2  Enter the user's password when prompted.

Caution  To avoid SSH being dropped, do not close the command prompt during the procedure or after the user has logged in.

Step 3  From the Prime Optical Home page, click Start > Domain Explorer (with SOCKS) after specifying a default SOCKS server. For information on how to configure the SOCKS server settings, see Configuring a SOCKS Server, page 7-3.
Setting Up Client-Server Encrypted Connections Through SSH Tunneling and SOCKS Proxy Forwarding
Changing the Prime Optical Server Host Name and IP Address

If Prime Optical is first installed in a test environment and then is ready to be installed in a production environment, you will want to change to change the server host name or IP address. This section describes how to change the host name or IP address of the Prime Optical server when Prime Optical and Oracle are on the same or separate servers.

Changing the IP Address and/or Hostname when Prime Optical and Oracle Are on the Same Server

To change the IP address and/or hostname of a standalone Prime Optical server with a single IP interface when Prime Optical and Oracle are on the same server, do the following:

Step 1 Log in to the Prime Optical server as a root user.
Step 2 As Prime Optical user (root or optusr), enter the following command to shut down the Prime Optical server:
   `opticalctl stop`
Step 3 Do the following:
   a. On GNOME, choose System > Administration > Network.
   b. Select the correct interface.
   c. Edit and save the interface properties (IP address, subnet mask, and default gateway).
Step 4 Do the following at application level:
   a. Execute the following command to update the IP address and/or the hostname in all the configuration files:
      `/opt/CiscoTransportManagerServer/bin/opt_sysconfig.sh`
   b. Provide the required information as prompted by the opt_sysconfig.sh that is an interactive script.
Step 5 Enter the following command to reboot the Prime Optical server:
   `# init 6`
Step 6 After the Prime Optical server has rebooted, enter the following command to verify that it has started:
   `# opticalctl status`
Changing the IP Address when Prime Optical and Oracle Are on Separate Servers

To change the IP address and/or hostname of the Prime Optical server when Prime Optical and Oracle are on separate servers, complete Changing the IP Address and/or Hostname when Prime Optical and Oracle Are on the Same Server, page 8-1 on both the Prime Optical server workstation and the Prime Optical database workstation. Apply the changes to the same files first on the database workstation, then on the server workstation.

Note: If only the hostname is being changed on the Prime Optical server, the changes need to be applied only to the Prime Optical server.
Installing the Prime Optical Virtual Appliance

You can deploy a preconfigured Prime Optical virtual appliance stored in Open Virtual Machine Format (OVF). The procedure involves deploying a ready-for-use virtual machine that has RHEL, Oracle, and Prime Optical installed and configured in it that is released as OVF/OVA file.

Information About Deploying the OVF Template

The Prime Optical virtual appliance is a preconfigured Prime Optical virtual machine with a single-server, Oracle-embedded database in a medium-size network configuration. It is configured with the user optusr. The default Prime Optical client username is SysAdmin and the password is Ctm123!. All the properties fields in the OVF template must have values. The entries and selections you make on the deployment configuration pages control which fields are required.

During initial power on, all input is validated. Once validated, the Prime Optical virtual appliance is installed, and the VM is configured and then rebooted.

VM Requirements

The requirements to deploy the Virtual Appliance (VA) are:

- VMWare setup ESXi 5.5 and 6.0
- 2 virtual CPU (vCPU)
- 16 GB memory
- 478 GB total disk space

VM Configuration

The configuration of the VM distributed in the OVA file is as follows:

- Prime Optical client default credentials: SysAdmin/Ctm 123!
- Prime Optical medium installation, single server, embedded Oracle, root user
- OS—RHEL 6.6 with basic server installation (no graphics)
- OS default credentials: root/cisco! (ssh access)
Customer is strongly recommended to change default credentials.

- Operating System configuration details: the local language is set to English (US)

Customer is suggested to check them and realign them based on specific configuration needs.

- RAM—16 GB
- Processors—2 virtual CPUs
- Disk 1 (/dev/sda), 38GB for /, swap
- Disk 2 (/dev/sdb), 106GB for /cisco, /db01, /db04,
- Disk 3 (/dev/sdc), 126GB for /oracle, /db02, /db03, /db05
- Disk 3 (/dev/sdd), 208 GB for /ctm_backup
- Total disk size is 478GB
- 4 disks (thin provisioning format)
- Disk Space and Partition Allocation—See Table 9-1 for more information on the disk space description for OVA installation.

Refer to Table 2-5 “Disk Space and Partition Requirements for Installing the Prime Optical Server and Oracle on the Same Workstation—PM Collection Enabled” for more information.

### Table 9-1 Disk Space Description for OVA Installation

<table>
<thead>
<tr>
<th>Disk Name</th>
<th>Disk Size</th>
<th>List of Partitions</th>
</tr>
</thead>
</table>
| Disk 1 (/dev/sda) | 38 GB | • /  
| | | • swap |
| Disk 2 (/dev/sdb) | 106 GB | • /cisco  
| | | • /db01  
| | | • /db04 |
| Disk 3 (/dev/sdc) | 126 GB | • /oracle  
| | | • /db02  
| | | • /db03  
| | | • /db05 |
| Disk 3 (/dev/sdd) | 208 GB | • /ctm_backup |

## Deploying the Prime Optical Virtual Appliance

You can deploy a preconfigured Prime Optical virtual appliance. This consists in deploying a ready for use virtual machine, already installed and configured with RHEL, Oracle and Prime Optical. It is distributed/released as OVF/OVA file (Open Virtual Machine Format).

### Before You Begin

- Make sure you have the Prime Optical installation USB drive—Linux.
• Make sure that the VMware setup is available and accessible via vSphere client (Consult your system administrator on the VMware configuration).

• Make sure that VMware setup can support the virtual machine to be deployed as a virtual appliance. Check the VM disk, memory, and CPU description (Consult your system administrator on the VMware configuration).

• Note the name for the VM, inventory location, host/cluster name, and disk format and location to store the VM virtual disks (Consult your system administrator on the VMware configuration).

**Note**

See “About Virtual Disk Provisioning Policies” in VMware vSphere documentation for disk format details.

To deploy the Cisco Prime Optical virtual appliance:

**Note**

Make sure to identify the network information of the VM to deploy such as the hostname, domain name, IP address, netmask/prefix, default gateway, and DNS.

---

**Step 1**

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

Wait for the automatic discovery of the device.

You can find the OVF file at the following location:

`/media/<USB-mount-point>/PrimeOptical_10_5_0/PrimeOptical10.5.ovf` file

**Step 2**

Start the VMware vSphere Client and enter the IP address or name of the host that needs to be directly managed.

**Step 3**

Enter the username and password of the VMware server.

**Step 4**

Click **Login**.

**Step 5**

Choose **File > Deploy OVF Template**.

**Step 6**

Navigate to the OVF template file (`va.ovf`), then click **Next**.

**Step 7**

Verify OVF details, and then click **Next**.

**Step 8**

Specify the virtual appliance name and location for the template that you are deploying, then click **Next**.

**Step 9**

Select the VM host or cluster on which you want to run the OVF template, then click **Next**.

**Step 10**

Navigate to and select the resource pool (if required) where you want to run the OVF template (check with the VMware setup administrator), and then click **Next**.

**Step 11**

Select a datastore to store the deployed OVF template, and then click **Next**.

On this page, the datastore is a logical repository that has already been configured on the destination cluster or host. Select a datastore that has enough space to store the VM and all its virtual disks.

**Step 12**

Select a disk format to store the virtual disks, and then click **Next**. See “About Virtual Disk Provisioning Policies” in VMware vSphere documentation for disk format details.

**Step 13**

Verify the details of the OVF file, the name of the virtual appliance, size, host, and storage details, then click **Finish** to start the deployment. Consult your system administrator for more information on the VMware setup.

This may take a while to complete. Check the progress bar in the Deploying Virtual Application window to monitor the task status.

After the deployment task has successfully completed, a confirmation window appears.
Step 14 Click Close.
   The virtual appliance that you deployed is listed under the host, in the left pane of the vSphere client.

Step 15 Enter the following commands to unmount the image file and free the device:

    umount /mnt
    losetup -d /dev/loop1

---

Booting and Configuring the Prime Optical Virtual Appliance

To boot and then configure the Prime Optical virtual appliance:

Step 1 After deploying the virtual appliance, select the virtual machine name in vSphere, right-click it and choose Open Console.

Step 2 Choose Power > Power On, and then click in the window.
   During initial boot of the newly deployed machine, you will be prompted to enter root (system) credentials (password is cisco!).
   The VM is reachable only through the console till the network configuration is done.

Step 3 Edit the /cisco/PrimeOpticalServer/cfg/va.cfg configuration file. The file content is reported below:

```
HOSTNAME va
IPADDR 10.58.65.196
GATEWAY 10.58.65.1
PREFIX 24
DNS 144.254.71.184
DOMAIN cisco.com
```
   The configuration file must be modified to set the target networking parameters of the VM.

Step 4 Edit and enter the hostname, IP address, gateway, prefix, DNS, and domain information in the /cisco/PrimeOpticalServer/cfg/va.cfg configuration file. Consult your system administrator on the VMware configuration for appropriate values.

Note Hostname must be unqualified hostname (va) and not fully qualified hostname (va.cisco.com). The hostname must be registered in DNS.

Step 5 Save and exit the file when you are done editing.

Step 6 Run the /opt/CiscoTransportManagerServer/bin/va_config.sh script and enter yes to apply the configuration.

Step 7 When you are prompted, reboot the VM.

Step 8 After reboot, the VM is reachable using SSH and Prime Optical will start to boot. It may take some time.

Step 9 For troubleshooting or configuration problems, view the /temp_CTM/va_cfg.log file.
Uninstalling Prime Optical

This chapter describes how to uninstall the Prime Optical server, the Prime Optical client, Cisco Edge Craft, and the Oracle software.

Uninstalling the Prime Optical Server

Uninstalling the Prime Optical server automatically uninstalls the Web Server, which cannot be uninstalled on its own.

Note

If Prime Optical is installed with an embedded database, the Oracle 12c software and Oracle operating system user are removed automatically along with the Prime Optical server.

Step 1

Log in to the Prime Optical server as a root user and enter the following command, where version is the specific version of the Prime Optical server that you want to uninstall:

```
/opt/CiscoTransportManagerServer/version/UninstallerData/IAUninstaller.sh
```

For example, enter the following command to uninstall Prime Optical 10.5:

```
/opt/CiscoTransportManagerServer10.5.0/UninstallerData/IAUninstaller.sh
```

Step 2

When prompted to confirm the uninstallation, be sure to type your response in all capital letters, or the installer will quit. Enter YES.

Uninstalling the Oracle 12c Software

Caution

If you remove the Oracle 12c software, you cannot use Prime Optical 10.5. Verify that you want to remove the Oracle 12c software before completing the following steps.

Note

If Prime Optical is installed with an embedded database, the Oracle 12c software is removed automatically along with the Prime Optical server. The following steps are not required.
Reverting to the Previous Database

To revert to the database as it was prior to the upgrade to Prime Optical 10.5, see the Cisco Prime Optical 10.5 User Guide section “Restoring the Database from the Previous Backup.”

Note

The revert procedure will result in loss of local database information stored after the upgrade. In other words, a reverse database migration is not supported; rather, a backup copy of the original database is used.
Next Steps

The following table lists the next steps, you need to perform to get started with Cisco Prime Optical. Procedures are high-level and intended for advanced users to get you up and running quickly. For more information and details, see the Cisco Prime Optical user guide.

<table>
<thead>
<tr>
<th>No.</th>
<th>High-Level Task</th>
<th>For More Information, See...</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Log in as SysAdmin to create a SuperUser account.</td>
<td>Creating a Prime Optical User</td>
</tr>
<tr>
<td>2.</td>
<td>Log in as SuperUser to configure the server NE user and password from the Control Panel.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If there are only ONS 15454 NEs or NCS2000 NEs with release 10.5 or higher, enter ROOT15 as the username.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If there are only ONS 15454 NEs with releases before 10.5, enter CISCO15.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If there are a mix of ONS 15454 NEs with releases 10.5 and earlier versions, you must first enter ROOT15 as the username and then configure the NE authentication credentials for releases earlier than 10.5 as CISCO15 using the NE Authentication tab. See &quot;Setting NE Authentication&quot; section in the Prime Optical user guide.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>(Optional) Configure automatic alarm acknowledgment from the Control Panel.</td>
<td>Configuring Application-Specific Parameters</td>
</tr>
<tr>
<td>4.</td>
<td>Enable NE automatic backup from the Control Panel.</td>
<td>Viewing and Modifying NE Service Properties</td>
</tr>
<tr>
<td>5.</td>
<td>Verify that the NE software version exists in the Supported Devices Table.</td>
<td>Cisco Prime Optical Supported Devices</td>
</tr>
<tr>
<td>6.</td>
<td>Add NEs and build the network.</td>
<td>Building the Network</td>
</tr>
<tr>
<td>7.</td>
<td>(Only for WSE management) Create Security Admin and Security Provisioner profiles(^3)</td>
<td>Creating a Prime Optical User</td>
</tr>
</tbody>
</table>

1. See the corresponding sections in the Cisco Prime Optical user guide.
2. If WSE cards are provisioned, in addition to creating a SuperUser account, you must create a Security Admin account. See User Profiles and Roles in the Prime Optical user guide for more information.

3. When WSE cards are provisioned, there are additional security profiles and privileges that should be created. See User Profiles and Roles in the Prime Optical user guide for more information on the function of each security profile.
Prime Optical and Sudo Commands

This section describes the commands that can be used during Prime Optical installation and troubleshooting.

### Prime Optical Commands

Table A-1 describes the Prime Optical commands that can be used during installation and troubleshooting. To issue each command, log in to the Prime Optical server workstation and enter the command on the command line.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>opticalctl start</td>
<td>A complete set of administrative command scripts is added to the application during installation. One command automatically starts the Prime Optical server processes every time the server is started. The server processes can also be started or stopped manually as necessary; the scripts are located in the /opt/CiscoTransportManagerServer/bin directory. The <code>opticalctl start</code> command sets the appropriate environment variables and starts the Prime Optical server. The amount of time it takes for the Prime Optical server to start varies based on the number of NEs in the configuration and the size of the database. Use <code>opticalctl start</code> only when the Prime Optical server has stopped. It can take from 0 to 5 minutes for the server processes to start after the <code>opticalctl start</code> command has finished execution. This is because NE services and gateway services (if enabled) are still initializing for all of the NEs that are deployed. Five minutes after entering the <code>opticalctl start</code> command, enter the <code>opticalctl status</code> command. By this time, the NE service corresponding to all the deployed NEs should have started.</td>
</tr>
<tr>
<td>opticalctl stop</td>
<td>The <code>opticalctl stop</code> command stops the Prime Optical server gracefully. The stop procedure shuts down the server and cleans all memory and connections. The overall process takes approximately 5 minutes.</td>
</tr>
</tbody>
</table>
Note

Only a Prime Optical root user (chosen during installation) can use sudo commands.

Sudo software (freeware) version 1.6.9 is bundled with the Prime Optical software. The sudo software enables nonroot UNIX users to run UNIX commands throughout the installation process. The following commands are available:

- `opticalctl start`
- `opticalctl stop`
- `opticalctl abort`
- `opticalctl status`
- `prune_auditlog.sh`
- `prune_errlog.sh`
- `prune_audittrail.sh`
- `prune_fm.sh`
- `prune_pm.sh`
- `prune_ne.sh`
- `prune_server_monitor.sh`
- `prune_admin_job_table.sh`
- `prune_ne_ipaddress.sh`

Note

You can still use the following legacy commands in Prime Optical:

- `ctms-start`
- `ctms-abort`
- `ctms-stop`
- `showctm`

If you selected the Install Sudo Software option during the Prime Optical server installation, the setup program prompts you to specify the name of the UNIX group to which you want to assign administrator privileges. By default, this group is set to the root group. If you specify a group other than root, the setup program verifies that the UNIX group exists on the system and adds entries to the `/etc/sudoers` file. Entries in this file reflect the commands that the specified UNIX group can run by using the `sudo` command.

To issue each command, log in to the Prime Optical server workstation as a root user or optusr and enter the command on the command line.