



## **QUICK START GUIDE**



### **Cisco Prime Optical 10.7 Quick Start Guide**

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# 1 About This Guide

This guide will get you quickly up and running with Prime Optical 10.7. This guide provides steps that lead you through a new installation for a single-server setup with an embedded database. The purpose of this guide is to quickly get you up and running with Prime Optical 10.7.

## Assumptions and Limitations of This Guide

If your Prime Optical deployment differs from what is described in these assumptions, see the [Cisco Prime Optical 10.7 Installation Guide](#) or contact your Cisco account representative for assistance with planning and installing Prime Optical.

The guide assumes the following:

- This is a new Prime Optical Linux installation, not an upgrade from a previous version.
- The Prime Optical server and database will be installed on one workstation.
- The Prime Optical embedded database, not an external database, will be used.
- You are familiar with the following products and topics:
  - Basic internetworking terminology and concepts
  - Network topology and protocols
  - Microsoft Windows 7 and Windows 8
  - Red Hat Enterprise Linux (RHEL) administration
  - UNIX environment
  - Oracle database administration
  - Telecommunications Management Network (TMN) architecture model

This guide does not cover the following:

- Integration
- Customization
- Package download
- Advanced configuration (for example, polling)
- High availability
- External database
- GateWay/CORBA installation

## 2 Installation Requirements


Review the prerequisites and recommendations for the hardware and software you need to support your Prime Optical deployment. These recommendations are based on the assumptions and target setup for this guide, as described in [System Requirements, page 3](#). If your network setup is not covered by this guide, see the [Cisco Prime Optical 10.7 Installation Guide](#).

The following topics are covered:

- [System Requirements, page 3](#)
- [Server Requirements, page 3](#)
- [Ports and Protocols, page 6](#)
- [Client Requirements, page 11](#)

# System Requirements

Table 1 lists the platforms that are supported in Prime Optical.

 **Note** The Prime Optical server must run on a dedicated workstation. Any application that is not explicitly listed in Table 1 as being required or supported by Prime Optical cannot be installed on the dedicated Prime Optical server workstation.

**Table 1 Supported Platforms and Operating Systems**

Platform	Operating System
Cisco UCS B series <sup>1</sup>	RHEL 6.5, 6.6, 6.7, 6.8, 6.9, 7.1, and 7.2, server 64-bit
Cisco UCS C series	

1. See the appropriate [UCS compatibility matrix](#) to verify which RHEL release is supported by each platform.

Note the following:

- 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.
- Ensure to enter the host name of the server in small letters.
- To install Prime Optical on the RHEL server, the `yum` command must be properly configured and the `yum` repository must be available. See, [RHEL Documentation](#) for more information. Ensure that the system is registered on the Red Hat Network (RHN), or the RHEL DVD must be available to configure the `yum` repository properly.

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


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

Requirement	Notes
Prime Optical installation E Media	—
RHEL 6.5, 6.6, 6.7, 6.8, 6.9, 7.1, and 7.2, 64-bit	Enable the IPV6 networking option, to install Linux. <b>Note</b> Ensure that the hostname of the server in small letters.
Sun Microsystems Java Development Kit (JDK) Standard Edition version 1.7.0_151	JDK is installed automatically for the Prime Optical server and Prime Optical GateWay/CORBA.
Oracle 12c licenses	Oracle licenses can be purchased either for the server processor or for named users. For more information on Oracle named users, see the <a href="#">Cisco Prime Optical 10.7 Installation Guide</a> .
GNU tar	Prime Optical uses GNU tar to extract files from archives. GNU must be installed on the Prime Optical server workstation.

# Server Requirements

The following tables list hardware requirements for installing the Prime Optical server.

Table 3 lists the minimum processor requirements.

 **Note** 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 3 Minimum Processor Requirements**

Network Size	UCS B or C Series <sup>1</sup>
Small	2 x Intel Xeon 5620
Medium	2 x Intel Xeon 5620
Large	2 x Intel Xeon 5620
High end	2 x Intel Xeon 5640

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

Cisco tests the simulated network configurations using the Enterprise Edition Oracle database type listed in [Table 4](#). Your setup and performance might vary depending on the size of your network and the usage pattern of management tasks.

**Table 4 Minimum Memory Requirements for the Prime Optical Server Installation**

Network Size	RAM	No. of Network Partitions <sup>1,2</sup>	Maximum No. of Network Element (NEs) <sup>1,3</sup>
Small	8 GB <b>Note</b> 8 GB of RAM is required for the small size, but Cisco recommends 16 GB.	1	200
Medium	16 GB	1	500
Large	32 GB	4	2000
High end	96 GB	8	5000

1. See the [Cisco Prime Optical 10.7 Installation Guide](#) for calculation examples.
2. In Prime Optical 10.7, 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 ( $[6 \times 750] + [1 \times 500] = 5000$ ). 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 ( $4 \times 500$ ), 2 NE services with 750 nodes + 1 NE service with 500 nodes ( $[2 \times 750] + [1 \times 500]$ ).
3. 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 they 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 Requirements

[Table 5](#) and [Table 6](#) show disk space and partition requirements for 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.

**Caution**

Prime Optical performance degrades if you do not use the recommended partition sizes. We recommend that you use the partition sizes described here.

- 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 that 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 5** *Disk Space and Partition Requirements—PM Collection Enabled*

Network Size	Disk Space	/	swap <sup>1</sup>	/cisco <sup>2</sup>	/oracle	/db01	/db02	/db03	/db04	/db05 <sup>3</sup>	/db01_rd (optional)	/db02_rd (optional)	/ctm_backup
Small	160 GB (min)	12 GB	12 GB	20 GB	20 GB	12 GB	6 GB	40 GB	30 GB	8 GB	1 GB	1 GB	101 GB
	253 GB (max)												
Medium	278 GB (min)	12 GB	24 GB	20 GB	20 GB	16 GB	16 GB	90 GB	70 GB	10 GB	2 GB	2 GB	208 GB
	480 GB (max)												
Large	488 GB (min)	12 GB	48 GB	20 GB	20 GB	20 GB	26 GB	190 GB	140 GB	12 GB	3 GB	3 GB	394 GB
	878 GB (max)												
High end	900 GB (min)	12 GB	96 GB	20 GB	20 GB	24 GB	50 GB	360 GB	300 GB	18 GB	4 GB	4 GB	758 GB
	1656 GB (max)												

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

**Table 6** *Disk Space and Partition Requirements—PM Collection Disabled*

Network Size	Disk Space	/	swap <sup>1</sup>	/cisco <sup>2</sup>	/oracle	/db01	/db02	/db03	/db04	/db05 <sup>3</sup>	/db01_rd (optional)	/db02_rd (optional)	/ctm_backup
Small	105 GB (min)	12 GB	12 GB	20 GB	20 GB	12 GB	6 GB	8 GB	7 GB	8 GB	1 GB	1 GB	40 GB
	137 GB (max)												

**Table 6 Disk Space and Partition Requirements—PM Collection Disabled (continued)**

Network Size	Disk Space	/	swap <sup>1</sup>	/cisco <sup>2</sup>	/oracle	/db01	/db02	/db03	/db04	/db05 <sup>3</sup>	/db01_rd (optional)	/db02_rd (optional)	/ctm_backup
Medium	140 GB (min)	12 GB	24 GB	20 GB	20 GB	16 GB	16 GB	12 GB	10 GB	10 GB	2 GB	2 GB	62 GB
	196 GB (max)												
Large	196 GB (min)	12 GB	48 GB	20 GB	20 GB	20 GB	26 GB	20 GB	18 GB	12 GB	3 GB	3 GB	90 GB
	282 GB (max)												
High end	292 GB (min)	12 GB	96 GB	20 GB	20 GB	24 GB	50 GB	28 GB	24 GB	18 GB	4 GB	4 GB	136 GB
	426 GB (max)												

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

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 main categories of information:

- Prime Optical database backup and export dump
- Configuration files
- Database ARCHIVELOG files

The Oracle user must have read/write permissions or the database backup will fail. The database could be blocked if the ARCHIVELOG files cannot be 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).

The /ctm\_backup directory can be a symbolic link to a user-defined directory and must have read/write permissions.

## Ports and Protocols

For more information on Ports and Protocols, see chapter 2 of the [Cisco Prime Optical 10.7 installation guide](#).

### Client-Server Communication Ports and Protocols

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 7](#) for client-server port and protocol information.

**Table 7** *Prime Optical Client to Prime Optical Server Ports*

Port	Inbound or Outbound	Transport Protocol	Application Protocol	Service	Notes
80 (configurable)	Inbound	TCP	HTTP	Web Server	Apache HTTP port
443 (configurable)	Inbound	TCP	HTTPS	Web Server	Apache HTTP port
61626 (configurable)	Inbound	TCP	ActiveMQ	JMS Broker	ActiveMQ broker port
27613 (configurable)	Inbound	TCP	Proprietary	CTMServer	JMOCO port
30000	Inbound	TCP	CORBA	SMSservice	Service Manager port
CORBA IIOP Listener Port	Inbound	TCP	CORBA	CTC-Based Network Services	—
10023-10086	Inbound	TCP	Telnet	SMSservice	Telnet port
3000-3200	Outbound	UDP	SNMP	ONS1530x NE Service	ONS 1530x SNMP trap forwarding to Cisco Edge Craft (CEC)
Dynamic (configurable)	Inbound	TCP	CORBA	Orchestration Service A	

## Client-Database Communication Ports and Protocols

The Prime Optical client uses Java Database Connectivity (JDBC) to communicate directly with the Prime Optical database, independently from the Prime Optical server.

See [Table 8](#) for client-database port and protocol information.

**Table 8** *Prime Optical Client to Prime Optical Database Ports*

Port	Inbound or Outbound	Transport Protocol	Application Protocol	Service	Notes
1521	Inbound	TCP	JDBC	Oracle Listener	Database listener port

## Client-NE Communication Ports and Protocols

The Prime Optical client can launch Cisco Transport Controller (CTC) and 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

[Table 9](#) lists the ports and protocols used for communication between the Prime Optical server workstation and the Operations Support System (OSS) CORBA client workstation.

**Table 9 Prime Optical Server to OSS CORBA Ports**

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

## Server-Database Communication Ports and Protocols

Table 10 lists the ports and protocols used for communication between the Prime Optical server and database.

**Table 10 Prime Optical Server to Prime Optical Database Ports**

Port	Inbound or Outbound	Transport Protocol	Application Protocol	Service	Notes
22	Inbound	TCP	SSH	SSH Daemon	Standard SSH port for secure shell
1521	Inbound	TCP	JDBC	Oracle Listener	Database listener port

## 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.

Table 11 lists the ports and protocols used for loopback connections.

**Table 11 Loopback Connections**

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

## Southbound Communication Ports and Protocols

The following tables list the ports that the Prime Optical server uses to communicate with NEs.



- [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](#)

Table 12 lists CTC-based NE ports without Multi-Layer (ML) cards.

**Table 12** *CTC-Based NE Ports (without ML cards)*

Port	Inbound or Outbound	Transport Protocol	Application Protocol	Service	Notes
57790 (configurable)	Outbound	TCP	CORBA	CTC-Based	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.
CORBA listener port on Prime Optical server (callback)	Inbound	TCP	CORBA	CTC-Based	Dynamic  <b>Note:</b> To make the port static, see the section on CTC IIOP Port configuration in the Cisco Prime Optical user guide.
80	Outbound	TCP	HTTP	CTC-Based	—
161	Outbound	UDP	SNMP	CTC-Based	—
162	Inbound	UDP	SNMP	SNMP Trap Service	—
443	Outbound	TCP	HTTPS	CTC-Based	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.
2361	Outbound	TCP	TL1	CTC-Based	TL1 port on the NE's control card.

**Table 12 CTC-Based NE Ports (without ML cards) (continued)**

Port	Inbound or Outbound	Transport Protocol	Application Protocol	Service	Notes
3082	Outbound	TCP	TL1	CTC-Based	TL1 port on the NE's control card
4083	Outbound	TCP	TL1	CTC-Based	TL1 port on the NE's control card

Table 13 lists CTC-based NE ports with ML cards.



**Note** The ports and protocols listed in Table 13 are used in addition to the ones listed in the previous table.

**Table 13 CTC-Based NE Ports (with ML cards)**

Port	Inbound or Outbound	Transport Protocol	Application Protocol	Service	Notes
20xx	Outbound	TCP	Telnet	CTC-Based	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.
40xx	Outbound	TCP	Telnet	CTC-Based	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.
7200	Inbound	UDP	SNMP	CTC-Based	—
7209	Outbound	UDP	SNMP	CTC-Based	—
7210	Inbound	UDP	SNMP	CTC-Based	—

Table 14 lists Cisco ONS 15216 ports.

**Table 14 Cisco ONS 15216 Ports**

Port	Inbound or Outbound	Transport Protocol	Application Protocol	Service
23	Outbound	TCP	Telnet CLI	Cisco ONS 15216
69	Inbound	UDP	TFTP	Cisco ONS 15216
161	Outbound	UDP	SNMP	Cisco ONS 15216
162	Inbound	UDP	SNMP	SNMP Trap Service
3083	Outbound	TCP	TL1	Cisco ONS 15216
8023	Outbound	TCP	Telnet CLI	Cisco ONS 15216

Table 15 lists Cisco ONS 15305 (non-CTC-based) ports.

**Table 15** Cisco ONS 15305 Ports (non-CTC-Based)

Port	Inbound or Outbound	Transport Protocol	Application Protocol	Service
23	Outbound	TCP	Telnet CLI	Cisco ONS 15305
161	Outbound	UDP	SNMP	Cisco ONS 15305
4500-4510	Inbound	TCP	Proprietary	Cisco ONS 15305

Table 16 lists Cisco ONS 15305(CTC-based) ports.

**Table 16** Cisco CTC-Based ONS 15305 R3.0 Ports

Port	Inbound or Outbound	Transport Protocol	Application Protocol	Service
23	Outbound	TCP	Telnet CLI	Cisco ONS 15305 R3.0
80	Outbound	TCP	HTTP	Cisco ONS 15305 R3.0
161	Outbound	UDP	SNMP	Cisco ONS 15305 R3.0
4500-4510	Inbound	TCP	Proprietary	Cisco ONS 15305 R3.0
12345	Outbound	TCP	Proprietary	Cisco ONS 15305 R3.0
17476	Inbound	TCP	Proprietary	Cisco ONS 15305 R3.0

## TCP Ports for SOCKS Proxy Server

Table 17 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 17** TCP Ports to Open in a SOCKS Proxy Server Configuration

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

## Client Requirements

To install the Prime Optical client, you must have a Linux or Windows PC. Memory, CPU, and disk requirements are listed in Table 18.

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

**Table 18** Minimum Requirements for the Prime Optical Client

Platform	Delta RAM <sup>1,2</sup>	Delta CPU Speed	Disk Space Without CEC <sup>3</sup>	Disk Space with CEC	Other <sup>4</sup>
Linux workstation	512 MB	240 MHz	730 MB	760 MB	<ul style="list-style-type: none"> <li>RHEL 5.8, 6.5, 6.6, 6.8, 6.7, 7.1, and 7.2</li> <li>Mozilla Firefox 17 (for RHEL 5.8, and 6.2)</li> <li>Mozilla Firefox 31 (for RHEL 6.5 only)</li> <li>Mozilla Firefox 45 (for RHEL 6.6, 6.7, 6.8, 6.9, 7.1, and 7.2)</li> </ul>
Pentium 4 class PC	512 MB	240 MHz	630 MB	700 MB	<ul style="list-style-type: none"> <li>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</li> <li>Microsoft Internet Explorer 11.0 with JavaScript enabled, or Google Chrome 63 or Mozilla Firefox 57</li> <li>Microsoft Windows 8 and Windows 2003 patch number KB928388 for the 2007 Daylight Saving Time</li> </ul>

1. If you plan to run multiple Prime Optical client sessions on a single client workstation, add 512 MB of RAM and a 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.



**Caution**

Installing the Prime Optical client and server on the same workstation consumes server resources and could degrade performance. We strongly recommend that you install the Prime Optical client on a workstation separate from the Prime Optical server.

Table 19 shows the maximum number of simultaneous Prime Optical client sessions by network size.

**Table 19** Maximum Number of Simultaneous Prime Optical Domain Explorers connected with the server

Network Size	Max. No. of Prime Optical Client Sessions
Small	30
Medium	60
Large	100
High end	100

### 3 Preparing for Installation

Before installing Prime Optical, you must perform the following preinstallation tasks:

- [Enabling SSH on the Prime Optical Server and Database Workstation, page 13](#)
- [Configuring yum, page 13](#)

## Enabling SSH on the Prime Optical Server and Database Workstation

To enable you to install Prime Optical, the Prime Optical server must be able to use secure shell (SSH) to run commands on the database workstation.

To enable SSH:

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**Step 1** As the root user, enter the following command to start the SSH service:

```
service sshd start
```

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

**Step 3** Enter the following command on the Prime Optical 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.

Make sure that the file `/etc/hosts` contains the following row:

```
ipaddress hostname
```

where `ipaddress` and `hostname` are the IP address and the hostname of the local servers.

---

## Configuring yum

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

### Before You Begin

Ensure that the **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:

```
# yum repolist
```

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



---

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

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To configure **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.

---

**Step 1** Copy the proper `local.repo` file template from CPO tarball package after `untar` in `/ctm_backup/cpo107/Disk1` to `/etc/yum.repos.d` directory.

You can find a `local.repo` template for RHEL5.x, RHEL6.x and RHEL7.x in `Disk1` of the Prime Optical installation E Media.

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

```
cp /ctm_backup/cpo107/Disk1/local.repo.5x /etc/yum.repos.d/local.repo
```

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

```
cp /ctm_backup/cpo107/Disk1/local.repo.6x /etc/yum.repos.d/local.repo
```

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

```
cp /ctm_backup/cpo107/Disk1/local.repo.7x /etc/yum.repos.d/local.repo
```

**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

You must prepare the environment for Prime Optical server and Oracle database installation on the same server.

### Before You Begin

Verify the following:

- The `ping` command is included in your path environment variable.
- You have identified users and related UNIX groups to run Prime Optical UNIX commands.



**Note** This feature is available only if you choose root user instead of `optusr` as the Prime Optical user during installation.

**Step 1** Log in as the root user.

**Step 2** Enter the following command to verify that the disk directories shown in [Table 20](#) exist:

```
ls -l /
```

**Table 20** *Disk Directories*

Directory	Contents
<code>/opt</code>	Used for the Prime Optical installation. It includes <code>.jar</code> files, executable shell scripts, and so on.
<code>/db01</code>	Used for the Oracle system tablespace.
<code>/db01_rd<sup>1</sup></code>	Used as an optional partition for the redo logs.
<code>/db02</code>	Used for the Prime Optical base data tablespace, alarm data tablespace, and event data tablespace.
<code>/db02_rd<sup>1</sup></code>	Used as an optional partition for the redo logs.
<code>/db03</code>	Used for the Prime Optical data tablespace.
<code>/db04</code>	Used for the Prime Optical index tablespace.
<code>/db05</code>	Used for the Prime Optical archived and undo tablespace.
<code>/ctm_backup<sup>2</sup></code>	Used for the Prime Optical backed-up database and configuration files. <b>Note</b> The <code>/ctm_backup</code> partition is required for backups.
<code>/oracle</code>	Used for Oracle software.
<code>/tftpboot</code>	Used for the TFTP directory. <b>Note</b> Disk partitioning is not required for <code>/tftpboot</code> , but the directory is required.

1. To optimize system performance, see [Disk Space and Partition Requirements, page 4](#).

2. The `/ctm_backup` directory can be a symbolic link to a storage device.

**Step 3** Check the content of the `/etc/sysconfig/selinux` file.

If the file contains `SELINUX=enforcing`, do the following:

- a. Change the entry to `SELINUX=disabled` or `SELINUX=permissive`.
- b. Reboot the server.
- c. Disable the server by running one of the following commands:

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

---

## CPO Package or OVA Package Verification

Before installing Cisco Prime Optical, you need to verify the CPO tarball or the OVA tarball.

Download the product installation file (OVA tarball or CPO tarball), to a separate Unix/Linux system and perform the following steps:

---

**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 (OVA tarball or CPO tarball) and Untar the CPO or OVA tar file using the following command

```
tar -zxvf <PRIME_OPTICAL_10.7.0.0_202.tar.gz or PrimeOptical_10.7_OVF.tar.gz>
```

Now, you will find the TAR or OVF directory extracted in the same directory.

- Go to TAR or OVF directory and you will find CPO tarball or the OVF tarball, signature file (\*.signature) and certificate files (\*.der) extracted in the same directory.

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

```
openssl dgst -sha512 -keyform DER -verify cert-file -signature sig-file CPO tarball or OVA tarball
```

Where:

*cert-file* is the Cisco Prime Optical certificate file

*sig-file* is the Cisco Prime Optical signature file

*CPO tarball or OVF tarball* is the Cisco Prime Optical CPO file or OVA tarball to be verified

**Step 4** If the result is Verified OK:

- For a product CPO tarball file, proceed with the installation.
- For an OVA package, proceed with deployment of the OVA file.

For more information, see [Installing the Prime Optical Virtual Appliance](#) chapter of the [Cisco Prime Optical Installation Guide](#).

---

## 4 Installing Prime Optical

Installing Prime Optical on a single-server with an embedded database is a two-part process:

1. Prepare the server for installation.
2. Install Prime Optical

### Preparing the Server for Prime Optical Installation

Before you install Prime Optical, you must first connect to the server and, if using X server, verify the display settings.

To prepare the server for Prime Optical installation:

---

**Step 1** As the root user, launch a terminal on the server where you want to install Prime Optical. (If you logged in as a nonroot user, enter the `su` - command to become the 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

---

## Installing Prime Optical on the Server

As part of your Prime Optical installation, you will install the Prime Optical server and Oracle 12c database on the same RHEL server.

To install Prime Optical, do the following:

---

**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 +
```

**Step 5** Copy the CPO tarball in /ctm\_backup directory.

**Step 6** Untar the CPO tarball in /ctm\_backup.

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

```
./setup.sh
```

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\_151 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:
- 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.
  - 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 **Embedded**. If a previous version of Oracle is detected on your system, click **Continue** to delete it and continue the installation.

**Step 12** In the **Operating System User** window, select a user type, and then click **Next**. (For field descriptions, see [Table 21](#).)

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


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

A warning message appears during the preinstallation checks. If the installation continues, you can ignore the message; if the installation quits, see the topic on downloading and installing Oracle packages.

**Step 15** In the **Optional Features** window, choose additional features, and then click **Next**. (For field descriptions, see [Table 21](#).)

**Step 16** In the **Destination Folder** window, specify where you want to install the Prime Optical server, and then 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 specify a mount point as the target installation directory for the Prime Optical server installation, or the installation data will be lost when the workstation restarts. You must create a dedicated Prime Optical subdirectory. For example, if `/cisco` is the mount point for the disk partition `/dev/dsk/c0t0d0s5`, you cannot specify `/cisco` as the Prime Optical installation directory. Instead, specify a dedicated subdirectory such as `as/cisco/PrimeOpticalServer`.

---

 **Note** 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 either, it automatically creates a symbolic link.


---

**Step 17** In the **Pre-Installation Summary** window, click **Install**. If you get a message telling you that SSH is not configured, verify that `PermitRootLogin` is set to **Yes** in the `/etc/ssh/sshd_config` file, and then click **Continue**.

**Step 18** Enter the root password and follow the prompts to configure the SSH connection and continue the installation.

**Step 19** In the **Web Server Installation Summary** window, click **Next**,

**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 the root user, enter the following command to reboot the system and automatically start the Prime Optical server:  
`init 6`

After the server reboot, it might take up to 20 minutes for the Prime Optical server to come up.

---

## Explanations of Fields in the Installation Wizard

Table 21 describes the required information for your Prime Optical embedded database installation.

**Table 21** Fields in the Installation Wizard

Window	Field Descriptions
Operating System User	<ul style="list-style-type: none"> <li>• <b>root</b>—Default option. Allows only the root user to operate Prime Optical.</li> <li>• <b>optusr</b>—Allows a user other than root to operate Prime Optical. If this option is selected, the following rules apply: <ul style="list-style-type: none"> <li>– Only the optusr can start or stop the Prime Optical server.</li> <li>– The root user will still be the only user who can install and uninstall Prime Optical.</li> <li>– The following processes will still be executed by root: Web Apache Server and SNMPTrapService.</li> </ul> </li> </ul> <p><b>Note</b> The password for optusr is Ctm123!. You can change the password later using the <code>passwd -u optusr</code> command.</p>
<b>Optional Features</b>	
Install Prime Optical in a High Availability Setup	<p>If you choose to install Prime Optical in a High Availability setup, provide details in the <b>Second High Availability Server</b> field.</p> <p><b>Note</b> A message appears if optusr has been chosen as the Prime Optical user. The Prime Optical OS user must be the root user for High Availability setup. If you choose to continue, the Prime Optical user is automatically changed to root.</p>
Configure FTP (ONS15216 EDFA3)	<p>NE types that require FTP configuration are Cisco ONS15216 EDFA3 NEs.</p> <p>Do the following to configure an FTP account for software download operations:</p> <ol style="list-style-type: none"> <li>1. Enter the following information: <ul style="list-style-type: none"> <li>– Username</li> <li>– Password</li> <li>– Confirm Password</li> <li>– FTP directory</li> </ul> </li> <li>2. Check or uncheck the <b>Create new FTP account</b> check box. If checked, the FTP user is created automatically on the Prime Optical server workstation by the installation script. If unchecked, it is assumed that an FTP user already exists on the Prime Optical server workstation.</li> </ol> <p><b>Note</b> The FTP user is created in a locked state. Enter <code>passwd -u &lt;username&gt;</code> where username is the FTP username that you specified in Step 1.</p>
Install Sudo Software	<p>The Install Sudo Software option is available only for root users.</p> <p>Do the following:</p> <ol style="list-style-type: none"> <li>1. Enter the name of the UNIX group to which you want to assign administrator privileges.</li> <li>2. Check the <b>Install Prime Optical Sudo</b> check box.</li> </ol> <p><b>Note</b> If you already installed and configured sudo with rules in a file other than <code>/etc/sudoers</code> (for example, if you created a custom sudo configuration in the <code>/user/local/etc/sudoers</code> file), then you must copy the rules from <code>/etc/sudoers</code> to <code>/user/local/etc/sudoers</code> at the end of the installation.</p>

## Verifying the Installation

To verify that Prime Optical was installed correctly:

- 
- Step 1** Enter the `opticalctl status` command after the server reboots to verify that the server is running. The `opticalctl status` command displays the Prime Optical server version running as 10.7, followed by the build number. In the command output, you must see two instances of “Prime Optical Server,” “SnmpTrapService,” “SMService,” “Apache Web Server,” “TOMCAT,” and “OrchestrationService.” This indicates that the server is running.
- Step 2** Verify that the client launches. See [Launching the Client, page 19](#).
- 

## 5 Uninstalling Prime Optical

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/CiscoTransportManagerServerversion/UninstallerData/IAUninstaller.sh
```

For example, enter the following command to uninstall Prime Optical 10.7:

```
/opt/CiscoTransportManagerServer10.7.0/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.
- 

## 6 Next Steps

### Launching the 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.

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 Prime Optical.
- Step 2** Accept the self-signed, untrusted security certificates. (If your browser is Internet Explorer, place the security certificates in the trusted certificate store; otherwise, they will reappear upon subsequent logins.)

**Step 3** The first time you log in, enter the case-sensitive username and password defaults:

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

**Step 4** When prompted, change the password, and then click **OK**. (For password complexity rules, see [Password Complexity Rules, page 20](#).)

**Step 5** From the **Prime Optical Home** page menu, choose **Start** and select a **Domain Explorer**.

If you choose the **SOCKS** option, you must 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 21](#) for information on how to configure a **SOCKS** server.



---

**Note** When Prime Optical is installed with Prime Central, you can launch the Domain Explorer from the Prime Central portal only.

---

**Step 6** Click **OK** at the advisory message.

After the **Java Web Start** window appears and downloads the **Domain Explorer**, one of the following may occur:

- If you are using Internet Explorer, the Prime Optical client is installed automatically.
- If you are using Mozilla Firefox, you are prompted to open the PrimeOptical.jnlp file or save it to your desktop. After you open and run the .jnlp file, the Prime Optical client is installed automatically.

If the client does not start, check that Java Runtime Engine (JRE) 1.7 (version less than 100) or 1.8 (version less than 100) is installed on the machine, and that Java Web Start is associated to the browser with the correct javaws.

---

## Password Complexity Rules

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, rthura, thurar, hurart, urarth, or rarthu.
- 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.

## 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, choose **Administration > SOCKS Table**.
- Step 2** Click **Add Row**, and then enter the hostname or IP address and the TCP port number for the SOCKS host.
- Step 3** Click **Save**.
- Step 4** Click the radio button next to the row with the SOCKS server settings you want to use the next time you log in, and click **Save as Default**. (Each user must select a default SOCKS server.)

## Getting Started with Prime Optical

These procedures will get you started quickly with using Prime Optical. These procedures are high-level and do not include field descriptions.

[Table 22](#) lists high-level tasks and the related topic in the Cisco Prime Optical 10.7 user guide where you can find more information.

**Table 22** *Tasks for Getting Started Using Prime Optical*

No.	High-Level Task	For More Information, See...
1.	Log in as SysAdmin to create a SuperUser account. <sup>1</sup>	<a href="#">Creating a Prime Optical User</a>
2.	Log in as SuperUser to configure the server NE user and password from the Control Panel. <ul style="list-style-type: none"><li>• If there are only ONS 15454 NEs or NCS2000 NEs with release 10.7 or higher, enter ROOT15 as the username.</li><li>• If there are only ONS 15454 NEs with releases before 10.7, enter CISCO15.</li><li>• If there are a mix of ONS 15454 NEs with releases 10.7 and previous version, you must first enter ROOT15 as the user name and then configure the NE authentication credentials for releases older than 10.7 as CISCO15 using the NE Authentication tab, see the "<a href="#">Setting NE Authentication</a>" section in the Prime Optical user guide.</li></ul>	<a href="#">Configuring Prime Optical Security Parameters</a>
3.	(Optional) Configure automatic alarm acknowledgment from the <b>Control Panel</b> .	<a href="#">Configuring Application-Specific Parameters</a>
4.	Enable NE automatic backup from the <b>Control Panel</b> .	<a href="#">Viewing and Modifying NE Service Properties</a>
5.	Verify that the NE software version exists in the Supported Devices Table.	<a href="#">Cisco Prime Optical Supported Devices</a>
6.	Add NEs and build the network.	<a href="#">Building the Network</a>
7.	(Only for WSE management) Create SecurityAdmin and SecurityProvisioner profiles <sup>2</sup>	<a href="#">Creating a Prime Optical User</a>

1. If WSE cards are provisioned, in addition to creating a SuperUser account, you must create a Security Admin account. See the [User Profiles and Roles](#) in the user guide for more information.

2. When WSE cards are provisioned, there are additional security profiles and privileges that should be created. See [User Profiles and Roles](#) in the user guide for more information on the function of each security profile.

## Creating a Prime Optical User Account



---

**Note** This functionality is disabled when Prime Optical is installed as part of Prime Central.

---

You must create a SuperUser account to start Prime Optical configuration.

To create a SuperUser account:

- 
- Step 1** In the Domain Explorer window, choose **Administration > Users**.
  - Step 2** In the Prime Optical Users table, choose **Edit > Create**.
  - Step 3** In the **Create New User** wizard, fill in the appropriate fields.
  - Step 4** Click **Next**. When you are finished adding new user accounts, click **Finish**.
- 

## Configuring a User for Server-to-NE Connection

To configure a user for the Prime Optical server to use to connect with NEs:

- 
- Step 1** In the **Domain Explorer** window, choose **Administration > Control Panel**.
  - Step 2** Click **Security Properties** and set the appropriate parameters. (If many tabs are displayed in the properties pane, click the arrow or **Show List** icons to view all available tabs.)
  - Step 3** Click **Save**.
- 

## (Optional) Configuring Automatic Alarm Acknowledgement

- 
- Step 1** In the **Domain Explorer** window, choose **Administration > Control Panel**.
  - Step 2** In the **Control Panel** window, click **UI Properties** to open the **UI Properties** pane.
  - Step 3** After making your selections, click **Save**.
- 

## Enabling Automatic NE Backup

Automatic backup is not available for all NEs.

To enable NE automatic backup:

- 
- Step 1** In the **Domain Explorer** window, choose **Administration > Control Panel**.
  - Step 2** In the **Control Panel** window, click **NE Service** to open the **NE Service** pane.
  - Step 3** Click the **NE Auto Backup** tab.
  - Step 4** Enter the necessary information.
  - Step 5** Click **Save**.

Changes take effect immediately; however, the backup already scheduled for the next 24 hours remains in effect. A backup with the new parameters will occur after the previously scheduled backup runs.

---

## Verifying NE Automatic Backup

To verify that Prime Optical is automatically backing up the NE, go to the Job Monitor table (**Administration > Job Monitor**), verify that the task is listed, and check its status.

If automatic backup for an NE failed, the task status will be “Failed.” This failure is logged in the Audit Log, and an alarm is generated.

## Verifying NE Support

To verify that an NE software version exists in the Supported Devices table, from the client, choose **Domain Explorer > Administration > Supported NE table**.

# 7 Related Documentation

See the *Cisco Prime Optical 10.7 Documentation Overview* for a list of Prime Optical guides.

# 8 Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see *What’s New in Cisco Product Documentation* at <http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>.

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