



# Implement

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- [Introduction to Implementation, page 1](#)
- [Order Equipment, page 2](#)
- [Install and Configure System Components, page 2](#)
- [Introduction to Troubleshooting, page 9](#)
- [Conduct User Acceptance Test, page 21](#)

## Introduction to Implementation

The goal of implementation is to introduce the new system into the network with the least amount of disruption and the highest level of interoperability with the existing network. To minimize downtime, an essential component of this process is the implementation plan.

### Before You Begin

Understand how to implement Cisco Unified Communications. For more information, see [Cisco Unified Communications Implementation](#).

Before you begin installing components, have a completed implementation plan from the detailed design. Use the equipment list and site specification from the detailed design to do the following:

- Order and stage equipment
- Perform detailed site survey
- Create site-specific installation guidelines

In your implementation plan, include:

- Deployment strategy
- Network maps and topology diagrams
- Installation and commissioning tests
- Site survey results
- List of all devices to be implemented

- Installation guidelines
- Configuration worksheets
- Test and turn-up plan

#### When You Are Done

All components are installed and ready to configure.

#### Major Tasks in This Process

- Order Equipment
- Install and Configure System Components
- Conduct User Acceptance Test
- Preparing Your Network for Troubleshooting and Recovery

## Order Equipment

This topic includes links to ordering guides and descriptions of tools used to choose ordering options.

## Quote Builder Tool

The Quote Builder tool is a solutions quoting application for Cisco Unified Communications products. Quote Builder is available to specialized partners and Cisco employees.

With Quote Builder, users can build a system quote with design documents to aid in the implementation of the solution. Quote Builder also validates designs for common deployments. Quote Builder generates a bill of materials, a network diagram, and design guides for deployment. To access Quote Builder, go to the following URL:

<http://www.cisco.com/web/partners/index.html>

This site contains many resources for Channel and Solution partners.

## Ordering Guides

[Ordering guides](#) for most Cisco Collaboration Systems products are available for Cisco partners, Cisco sales staff, and Cisco service providers.

## Install and Configure System Components

When implementing a Cisco Collaboration System, create a site-specific plan for your team. Describe what to install and configure. In your plan, list the referenced product-specific installation guides in the [Component Installation and Configuration Guides, on page 3](#).

Your plan helps you manage timelines for implementing equipment and scheduling outages. Include an installation schedule, and a test plan to verify that the operation conforms to the design objectives.

This section provides information about the components of the Cisco Collaboration Systems Release 11.0(1) for Collaboration deployment. It does not describe installation procedures for individual components. For links to the complete documentation set for each system component, see the [Component Resources Documentation for Collaboration](#) topic in the Resource Library chapter.

## Performing Your System Installation

### Before You Begin

See [Preparing for Your System Installation](#) in the Plan chapter to plan your overall strategy.

### Install Collaboration Software Components

Once you have your installation plan and preparations in place, perform your system installation. Follow the guidelines and sequence in the individual product installation and configuration guides.

See [Component Installation and Configuration Guides, on page 3](#) for links to component installation and upgrade documentation.

For system configuration examples, and other system implementation topics, see the documentation wiki at [http://docwiki.cisco.com/wiki/Unified\\_Communications\\_System\\_Implementation](http://docwiki.cisco.com/wiki/Unified_Communications_System_Implementation).

## Component Installation and Configuration Guides

The following table provides references to installation and configuration documents for the components that are part of Cisco Collaboration Systems Release 11.0(1) for Collaboration.

*Table 1: Component Installation and Configuration Documentation*

| Components   | Documentation Title  |
|--|--|
| <b>Call Control</b>  |  |
| Cisco Unified Communications Manager                         | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">Configuration Guides</a></li><li>• <a href="#">Maintain and Operate</a></li></ul> |
| Cisco Unified Communications Manager IM and Presence Service | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">Configuration Guides</a></li><li>• <a href="#">Maintain and Operate</a></li></ul> |
| Cisco Business Edition 6000                                  | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li></ul>   |

| <b>Components</b>                              | <b>Documentation Title</b>   |
|--|--|
| Cisco Business Edition 7000                    | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> </ul>   |
| Cisco Unified Communications Manager Express   | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul> |
| Cisco Unified Survivable Remote Site Telephony | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> </ul>   |
| <b>Contact Center</b>                          |  |
| Cisco MediaSense                               | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Programming Guides</a></li> </ul>   |
| <b>Conferencing</b>                            |  |
| Cisco TelePresence Management Suite            | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul> |
| Cisco TelePresence Management Suite Extensions | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul> |
| Cisco TelePresence Server                      | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul> |
| Cisco TelePresence Conductor                   | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul> |

| <b>Components</b>                             | <b>Documentation Title</b>   |
|---|--|
| Cisco TelePresence MCU 5300 Series            | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate Guides</a></li> <li>• <a href="#">End-User Guides</a></li> </ul> |
| Cisco Collaboration Meeting Rooms (CMR)       | <ul style="list-style-type: none"> <li>• <a href="#">Configuration Guides</a></li> </ul>   |
| <b>Enterprise Edge</b>                        |  |
| Cisco TelePresence Video Communication Server | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul>   |
| Cisco Expressway Series                       | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul>   |
| Cisco Unified Border Element                  | <ul style="list-style-type: none"> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul>   |
| <b>Server Applications</b>                    |  |
| Cisco Emergency Responder                     | <ul style="list-style-type: none"> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul>   |
| Cisco Unified Attendant Consoles              | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul>   |
| <b>Cloud Applications</b>                     |  |
| Cisco WebEx Meetings Server                   | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul>   |

| <b>Components</b>                   | <b>Documentation Title</b>   |
|-------------------------------------|--|
| Cisco WebEx Meeting Center          | <ul style="list-style-type: none"> <li>• Configuration Guides</li> <li>• Maintain and Operate</li> </ul>   |
| <b>Voicemail and Messaging</b>      |  |
| Cisco Unity Connection              | <ul style="list-style-type: none"> <li>• Install and Upgrade Guides</li> <li>• Configuration Guides</li> <li>• Maintain and Operate Guides</li> <li>• End-User Guides</li> </ul> |
| Cisco Unity Express                 | <ul style="list-style-type: none"> <li>• Install and Upgrade Guides</li> <li>• Configuration Guides</li> <li>• Maintain and Operate</li> </ul>                                   |
| <b>Endpoints</b>                    |  |
| Cisco DX Series                     | <ul style="list-style-type: none"> <li>• Install and Upgrade Guides</li> <li>• Maintain and Operate</li> </ul>   |
| Cisco TelePresence System EX Series | <ul style="list-style-type: none"> <li>• Install and Upgrade Guides</li> <li>• Maintain and Operate</li> </ul>   |
| Cisco TelePresence System 500       | <ul style="list-style-type: none"> <li>• Install and Upgrade Guides</li> <li>• Configuration Guides</li> </ul>   |
| Cisco TelePresence IX5000 Series    | <ul style="list-style-type: none"> <li>• Install and Upgrade Guides</li> <li>• Maintain and Guides</li> </ul>  |
| Cisco TelePresence MX Series        | <ul style="list-style-type: none"> <li>• Install and Upgrade Guides</li> <li>• Configuration Guides</li> <li>• Maintain and Operate</li> </ul>                                   |

| Components                             | Documentation Title  |
|--|--|
| Cisco TelePresence SX Series           | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">Configuration Guides</a></li><li>• <a href="#">Maintain and Operate</a></li></ul>                 |
| Cisco TelePresence System 1100         | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li></ul>   |
| Cisco TelePresence Integrator C Series | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">Configuration Guides</a></li><li>• <a href="#">Maintain and Operate</a></li></ul>                 |
| Cisco TelePresence Precision 60 Camera | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">Maintain and Operate</a></li></ul>  |
| Cisco IP Phone 7800 Series             | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">Programming Guides</a></li><li>• <a href="#">Maintain and Operate</a></li></ul>                   |
| Cisco IP Phone 8800 Series             | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">Configuration and Programming Guides</a></li><li>• <a href="#">Maintain and Operate</a></li></ul> |
| Cisco Jabber for Android               | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">End-User Guides</a></li></ul>   |
| Cisco Jabber iPhone and iPad           | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">End-User Guides</a></li></ul>   |
| Cisco Jabber for Mac                   | <ul style="list-style-type: none"><li>• <a href="#">Install and Upgrade Guides</a></li><li>• <a href="#">End-User Guides</a></li></ul>   |

| Components   | Documentation Title  |
|--|--|
| Cisco Jabber for Windows                             | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configure</a></li> <li>• <a href="#">Maintain and Operate</a></li> </ul>      |
| <b>Service Management</b>                            |  |
| Cisco Prime Collaboration Provisioning and Assurance | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade</a></li> <li>• <a href="#">Configure</a></li> <li>• <a href="#">Maintain and Operate</a></li> <li>• </li> </ul> |
| Cisco Prime Collaboration Deployment                 | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Administration Guide</a></li> </ul>   |
| Cisco Prime License Manager                          | <ul style="list-style-type: none"> <li>• <a href="#">Maintain and Operate</a></li> </ul>   |
| <b>Communication Gateways</b>                        |  |
| Cisco IOS 15.5 M&T                                   | <ul style="list-style-type: none"> <li>• <a href="#">Configuration Guides</a></li> </ul>   |
| Cisco IOS XE 3S                                      | <ul style="list-style-type: none"> <li>• <a href="#">Configuration Guides</a></li> </ul>   |
| Cisco 2900 Series Integrated Services Routers        | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> </ul>   |
| Cisco 3900 Series Integrated Services Routers        | <ul style="list-style-type: none"> <li>• <a href="#">Install and Upgrade Guides</a></li> <li>• <a href="#">Configuration Guides</a></li> </ul>   |
| Cisco 4400 Series Integrated Services Routers        | <ul style="list-style-type: none"> <li>• <a href="#">Configuration Guides</a></li> </ul>   |
| Cisco Services-Ready 910 Service Module              | <ul style="list-style-type: none"> <li>• <a href="#">Configuration Guides</a></li> </ul>   |

## Software Versions and System Caveats

For specific information on product software versions used, see [Cisco Collaboration Systems Release Compatibility Matrix](#). For compatibility information before Collaboration Systems Release 10.5, refer to the [Compatibility Tool](#).

For specific information on system limitations and known caveats, see the [Collaboration System Release Notes for Cisco Collaboration Systems Release 11.0\(1\)](#).

## Configuration Examples

Sample configuration commands for test bed infrastructure components that are involved in the call flows are in downloadable zip files in [Configuration Command Files for Collaboration Systems](#).

System-level configuration examples are available on the Cisco DocWiki at [http://docwiki.cisco.com/wiki/Category:IP\\_Telephony\\_System\\_Configurations](http://docwiki.cisco.com/wiki/Category:IP_Telephony_System_Configurations).

## Introduction to Troubleshooting

This topic describes how to develop a system-level troubleshooting methodology as you install and configure a Cisco Collaboration Systems network for the first time. It also provides recommendations for preparing and documenting the network that may assist you in diagnosing and isolating problems when they occur. This topic contains the following sections.

## System Troubleshooting Methodology

The Implementation phase of your network deployment is an excellent time to develop a methodology for troubleshooting the network as a whole. Troubleshooting networking equipment at a system level requires solid detective skills. When a problem occurs, the list of potential suspects is long. You must collect detailed information and systematically narrow the list of potential causes to determine the root problem. This topic does not provide step-by-instructions for resolving problems that occur during network installation. Instead, this topic describes sound methods for troubleshooting your network using the following general steps.

### Gather Information on the Problem

Problems are typically discovered and reported by one of the following types of users:

- External customers dialing into a call center to order products, obtain customer service, and so forth.
- Internal agents receiving incoming calls from a call queue or initiating outbound collection calls to customers.
- Internal users using administrative phones to call employees in other company locations or PSTN destinations performing basic actions such as call transfers and dialing into conferences.

As the network administrator, collect sufficient information from these users to allow you to isolate the problem. Detailed, accurate information makes this task easier. The following table lists recommended questions to ask users when they report a problem. As you turn up your network, you may consider putting

these questions in an on-line form. A form encourages users to provide more details about the problem and also puts them into the habit of looking for particular error messages and indicators. Capturing the information electronically also permits you to retrieve and re-examine this information in the future, if the problem repeats itself.

**Table 2: Questions to Ask Users When They Report Problems**

| Ask this Question...  | To Determine...  |
|---|--|
| <b>Did something fail or did something simply perform poorly?</b> | Whether the issue relates to system degradation or a connectivity failure. An example of a failure is when a user dials a phone number and hears fast busy tone. An example of a performance problem is when a user dials into a conference call and hears "choppy" audio when other parties speak. Quality of service or performance issues require a different approach than connectivity or operational problems. You still isolate the potential sources of the problem, but you typically use performance management tools instead of log files.                      |
| <b>Which device were you trying to use?</b>                       | The device type, model, and version of software installed. It is also critical to capture the IP address assigned to the device, and its MAC address. If the case of IP phones, determining the phone's active Cisco Unified Communications Manager (Unified Communications Manager) server is also important. On Cisco Unified IP Phones, these important network values can be displayed by pressing the Settings button and choosing the Network Configuration option from the menu.  |
| <b>Did it ever work?</b>  | If a device was recently installed and the problem occurred while making it work for the first time, or if the device was operating normally before the problem occurred. If the device was newly installed, the problem is most likely due to improper configuration or wiring of that particular device. Problems with devices that are already up and running can typically be traced back to one of two causes: (a) the users modifying their devices, such as changing their configuration or upgrading software, or (b) a change or failure elsewhere in the network |
| <b>Exactly which actions did you perform?</b>                     | The steps that led up to the problem, including which buttons were pressed and in which order. Capturing this information in detail is important so that you can consistently reproduce the problem.   |

| Ask this Question...  | To Determine...   |
|---|---|
| <b>Which error messages appeared or which announcements did you hear?</b>   | The visual and audio indicators of the problem. Ask users to provide the exact text that appears and any error codes in either an email or on-line form. If the error indication was audible, ask users to write down the announcements they heard, the last menu options they were able to successfully choose, or the tones they heard when the call failed.  |
| <b>Which time did the problem occur?</b>  | The date and time to compare against entries in log files. If the problem occurred on a Cisco Unified IP Phone, make certain the user provides the time stamp that appears on their phone's display. Several Cisco components in a network may capture the same problem event in separate log files, with different ID values. In order to correlate log entries written by different components, compare the time stamps to find messages for the same event. Cisco Unified IP Phones synchronize their date and time with their active Unified Communications Manager server. If all Cisco components in the network use Network Time Protocol (NTP) to synchronize with the same source, then the time stamps for the same problem messages match in every log file. |
| <b>What is the number of the phone you used and what was the phone number you called?</b>   | If the problem relates to a WAN or PTSN link, or a Unified Communications Manager dial plan issue. Ask the user the phone number they dialed (called number) and determine if the destination was within their site, another site within the corporate network, or a PSTN destination. Because the calling number (the number of the phone used) sometimes affects call routing, capture this number as well.   |
| <b>Did you try to perform any special actions, such as a transfer, forward, call park, call pickup, or meet-me conference? Is the phone set up to automatically perform any of these actions?</b> | If the problem is not directly related to the calling number or called number but rather to the supplementary service setup on Unified Communications Manager. If the problem is at the destination phone the user tried to reach by transferring or forwarding the call.   |
| <b>Did you attempt the same action on another device?</b>   | If the problem isolated to that user's device or represents a more widespread network problem. If the user cannot call from their phone, ask the user to call to the same destination using a phone in a nearby office.   |

## Isolate Points of Failure

After collecting information on the symptoms and behavior of the problem, to narrow the focus of your efforts:

- Identify the specific devices involved in the problem.
- Check the version of software running on each device.
- Determine if something has changed in the network.
- Verify the integrity of the IP network.

### Identify Devices Involved in the Problem

In large- to medium-sized networks, it is crucial to identify the specific phones, routers, switches, servers, and other devices that were involved in a reported problem. Isolating these devices allows you to rule out most equipment within the network and focus your time and energy on suspect devices. To help you isolate which devices were involved in a problem, two types of information can prove invaluable:

- **Network topology diagrams:** It is recommended that you have one or more diagrams that show the arrangement of all Cisco Collaboration products in your network. These diagrams illustrate how these devices are connected and also capture each device's IP address and name. You may want to also have a spreadsheet or database of the latter information. This information can help you visualize the situation and focus on the devices that may be contributing to the reported problem. See [Network Topology Diagrams](#) for recommendations on how to prepare these diagrams.
- **Call flow diagrams:** Cisco equipment, including Unified Communications Manager servers, typically provide detailed debug and call trace log files. To interpret the log files, it is useful to understand the signaling that occurs between devices as calls are set up and disconnected. Using the network topology, call flow diagrams, and log files, you can trace how far a call progressed before it failed and identify which device reported the problem. Examples of using call flow diagrams for problem isolation are shown in [Additional Sites and Services](#).

### Check Software Release Versions for Compatibility

After you have identified which devices may be involved in the problem, verify that the version of software running on each device is compatible with the software running on every other device. As part of Cisco Collaboration Systems Release 11.0(1) verification, Cisco has performed interoperability and load testing on simulated network environments running specific software versions. The [Cisco Collaboration Systems Release Compatibility Matrix](#) lists the compatible product software release versions for Cisco Collaboration Systems Releases.

If the combination of releases installed in your network does not match the values in the Compatibility Matrix, it does not necessarily mean that the combination is invalid. To check interoperability for a specific device and software release, locate and review its Release Notes. Release Notes contain up-to-date information on compatibility between the product and various releases of other products. This document also describes open caveats, known issues that may cause unexpected behavior. Before beginning extensive troubleshooting work, examine the Release Notes to determine if you are experiencing a known problem that has an available workaround.



#### Note

To locate individual product release notes for Cisco Collaboration Systems Release 11.0(1) components, see [Product Documentation](#).

**Note**

The open caveat information in the Release Notes contains links to the Bug Search. The Bug Search requires that you are a Cisco partner or a registered Cisco.com user with a Cisco service contract. To access the Bug Search, go to the <http://tools.cisco.com/bugsearch//>

### Determine If Network Changes Have Occurred

Before you focus on the particular device or site where the problem occurred, it may be useful to determine if a change was made to surrounding devices. If something has been added, reconfigured or removed from elsewhere in the network, that change may be the source of the problem. It is recommended that you track changes to the network such as:

- New phones added
- Modifications to Cisco Unified Communications Manager call routing settings, such as new directory numbers, route patterns, and dial rules to support new sites or devices
- Changes to port configurations on switches, routers, or gateways (new equipment, wiring changes, or new port activation)
- Changes to IP addressing schemes (such as adding new subnets) that may have affected route tables

### Verify the IP Network Integrity

Always remember that Cisco Collaboration equipment relies on a backbone IP network. Many connectivity problems are not caused by configuration errors or operational failures on Cisco devices, but rather by the IP network that interconnects them. Problems such as poor voice quality are typically due to IP network congestion. Call failures between locations may be the result of network outages due to disconnected cables or improperly configured IP route tables.

Before assuming that call processing problems result from Cisco Collaboration devices themselves, check the integrity of the backbone IP network. Keep the OSI model in mind as you perform these checks. Start from the bottom, at the physical layer, by checking that end-to-end cabling. Then verify the status of Layer 2 switches, looking for any port errors. Move from there to confirm that the Layer 3 routers are running and contain correct routing tables. Continue up the OSI stack to Layer 7, the application layer. To resolve problems occurring at the top levels of the stack, a protocol analyzer (or “sniffer”) may be useful. You can use sniffer to examine the IP traffic passing between devices and also decode the packets. Sniffers are useful for troubleshooting errors between devices that communicate using Media Gateway Control Protocol (MGCP) or Session Initiation Protocol (SIP).

## Apply Tools to Determine the Problems Root Cause

After you have eliminated the IP network as the source of the problem and you have isolated the specific Cisco Collaboration components involved, you can start applying the many diagnostic tools provided by Cisco components.

The Table lists the troubleshooting documentation available for most components in a collaboration network. This summary table is provided for reference only. The procedures in [Troubleshooting Daily Operations](#) specify when to use each tool and provide links to the troubleshooting instructions in each component’s documentation where appropriate.

**Table 3: Component Troubleshooting Tools and Documentation**

| <b>Component</b>   | <b>Documentation</b>   |
|--|--|
| <b>Call Control</b>  |  |
| Cisco Unified Communications Manager                         | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides for Cisco Unified Communications Manager</a></li> </ul>                |
| Cisco Unified Communications Manager IM and Presence Service | <ul style="list-style-type: none"> <li>• <a href="#">Error and System Messages</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul> |
| Cisco Business Edition 6000                                  | <ul style="list-style-type: none"> <li>• <a href="#">Support</a></li> </ul>  |
| Cisco Business Edition 7000                                  | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>  |
| Cisco Unified Communications Manager Express                 | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul>    |
| Cisco Unified Survivable Remote Site Telephony               | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>  |
| <b>Contact Center</b>  |  |
| Cisco MediaSense   | <ul style="list-style-type: none"> <li>• <a href="#">End-User Guides</a></li> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>             |
| <b>Conferencing</b>  |  |
| Cisco TelePresence Management Suite                          | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul>    |
| Cisco TelePresence Management Suite Extensions               | <ul style="list-style-type: none"> <li>• <a href="#">General Information</a></li> </ul>  |
| Cisco TelePresence Server                                    | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul>    |

| <b>Component</b>                              | <b>Documentation</b>   |
|---|--|
| Cisco TelePresence Conductor                  | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> </ul>   |
| Cisco TelePresence MCU                        | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul>  |
| Cisco Collaboration Meeting Rooms (CMR)       | <ul style="list-style-type: none"> <li>• <a href="#">General Information</a></li> </ul>  |
| <b>Enterprise Edge</b>                        |  |
| Cisco TelePresence Video Communication Server | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul>  |
| Cisco Expressway Series                       | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul> |
| Cisco Unified Border Element                  | <ul style="list-style-type: none"> <li>•</li> </ul>  |
| <b>Server Applications</b>                    |  |
| Cisco Emergency Responder                     | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul>  |
| Cisco Unified Attendant Consoles              | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul>  |
| <b>Cloud Applications</b>                     |  |
| Cisco WebEx Meetings Server                   | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> </ul>   |
| Cisco WebEx Meeting Center                    | <ul style="list-style-type: none"> <li>• <a href="#">Field Notes</a></li> </ul>  |
| <b>Voicemail and Messaging</b>                |  |

| Component                           | Documentation   |
|-------------------------------------|---|
| Cisco Unity Connection              | <ul style="list-style-type: none"> <li>• Error and System Messages</li> <li>• Password Recovery Procedure for Cisco Unity Connection</li> <li>• Troubleshooting Guides</li> <li>• Troubleshooting TechNotes</li> </ul>  |
| Cisco Unity Express                 | <ul style="list-style-type: none"> <li>• Troubleshooting Guides</li> <li>• Troubleshooting TechNotes</li> </ul>   |
| <b>Endpoints</b>                    |   |
| Cisco IP Phones                     | <ul style="list-style-type: none"> <li>• End-User Guides <ul style="list-style-type: none"> <li>◦ Cisco IP Phone 7800 Series</li> <li>◦ Cisco IP Phone 8800 Series</li> </ul> </li> <li>• Cisco IP Phone Administration Guides for Cisco Unified Communications Manager, "Troubleshooting and Maintenance" chapters <ul style="list-style-type: none"> <li>◦ Cisco IP Phone 7800 Series</li> <li>◦ Cisco IP Phone 8800 Series</li> </ul> </li> <li>• Error Message Decoder</li> <li>• Output Interpreter</li> </ul> |
| Cisco DX Series                     | <ul style="list-style-type: none"> <li>• Cisco Desktop Collaboration Experience DX650 Data Sheets</li> <li>• Cisco Desktop Collaboration Experience DX70 Data Sheets</li> <li>• Cisco Desktop Collaboration Experience DX80 Data Sheets</li> </ul>  |
| Cisco TelePresence System EX Series | <ul style="list-style-type: none"> <li>• Troubleshooting Guides</li> <li>• Troubleshooting TechNotes</li> </ul>   |

| <b>Component</b>                                     | <b>Documentation</b>  |
|--|---|
| Cisco TelePresence System 500                        | <ul style="list-style-type: none"> <li>• <a href="#">Field Notices</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul>          |
| Cisco TelePresence IX5000                            | <ul style="list-style-type: none"> <li>• <a href="#">Support</a></li> </ul>   |
| Cisco TelePresence MX Series                         | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul> |
| Cisco TelePresence SX Series                         | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Field Notices</a></li> </ul>             |
| Cisco TelePresence System 1100                       | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>   |
| Cisco TelePresence Integrator C Series               | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul> |
| Cisco TelePresence Precision 60 Camera               | <ul style="list-style-type: none"> <li>• <a href="#">Support</a></li> </ul>   |
| Cisco Jabber for Android                             | <ul style="list-style-type: none"> <li>• <a href="#">End-User Guides</a></li> </ul>   |
| Cisco Jabber iPhone and iPad                         | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>   |
| Cisco Jabber for Mac                                 | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>   |
| Cisco Jabber for Windows                             | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>   |
| <b>Service Management</b>                            |   |
| Cisco Prime Collaboration Provisioning and Assurance | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>   |
| Cisco Prime Collaboration Deployment                 | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>   |

| Component                                     | Documentation   |
|---|---|
| Cisco Prime License Manager                   | <ul style="list-style-type: none"> <li>• <a href="#">End-User Guides</a></li> </ul>   |
| <b>Communications Gateways</b>                |   |
| Cisco IOS 15.5 M&T                            | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>   |
| Cisco IOS XE 3S                               | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>   |
| Cisco 2900 Series Integrated Services Routers | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Guides</a></li> <li>• <a href="#">Troubleshooting TechNotes</a></li> </ul> |
| Cisco 3900 Series Integrated Services Routers | <ul style="list-style-type: none"> <li>• <a href="#">Troubleshoot and Alerts</a></li> </ul>   |
| Cisco 4400 Series Integrated Services Routers | <ul style="list-style-type: none"> <li>• <a href="#">Support</a></li> </ul>   |

## Preparing Your Network for Troubleshooting and Recovery

Before your network becomes operational, you can take several proactive steps to make troubleshooting easier, including:

- Produce network topology diagrams to help you isolate potential sources of problems.
- Synchronize the date and time on all servers.
- Set trace and logging levels on key devices so that diagnostic information is available when problems occur.
- Create IVR flowcharts that illustrate how calls are routed between agents and sites.

## Network Topology Diagrams

One of the first lines of defense is possessing current topology information. One of the most important pieces of topology information is a detailed network diagram (created using Microsoft Visio or a similar application). At a minimum, include the following information in your network topology diagrams:

- The name assigned to each major device (typically the DNS name)
- IP addresses for all devices in the network
  - Addresses for each router, core, and access switch

- Addresses for all telephony and application servers, including the IP address for each server in a Cisco Unified Communications Manager cluster
- DHCP address range for addresses assigned to endpoints such as IP phones and agent workstations
- Phone extension number ranges assigned to sets of agents or users, and the main inbound dial-up numbers for each location. This information is useful in resolving dial plan configuration errors.
- WAN IP and PSTN links between sites.

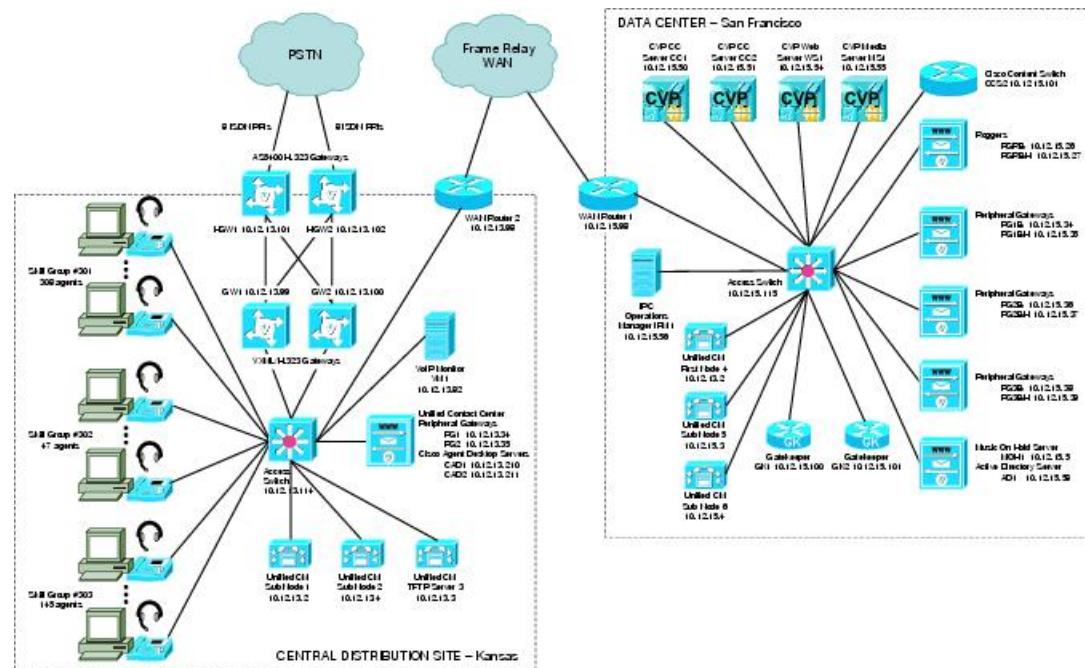
This information is critical for isolating which components are involved in a particular problem. For medium to large networks, you may want to take a “layered” approach in your diagrams. Create a high-level diagram that illustrates the overall physical layout of your network, including all sites and the links between them. Then for each site, create more diagrams that show detailed addressing information, port numbers, and dial plan configurations.



#### Note

Frequent adds, changes, and upgrades to your network can quickly make these diagrams out-of-date. Inaccurate diagrams slow down the troubleshooting process and may lead to wrong diagnosis of the problem. Keep these diagrams as current as possible.

The Figure shows a typical high-level topology diagram for a medium-sized enterprise IP telephony network. Only device names and IP addresses are listed in the diagram.



## Synchronizing Server Date and Time

The best resources for diagnosing problems within your network are the debug and trace log files produced by individual Cisco devices. Tracing can be enabled on multiple devices and the log file output compared to isolate problems. To correlate messages for the same activity in different log files, compare the message time stamps and the source device MAC and IP addresses. There is no universal call ID value shared between

Cisco devices. Synchronize every device to the same date and time source so that the time stamps match. To accomplish this synchronization, set each device to obtain its date and time from the same Network Time Protocol (NTP) source.

For Cisco IOS-based devices (switches, routers or voice gateways), configure each device to act as an NTP client. Periodically poll a master NTP source using the following command:

```
ntp server ip-address [version number] [key keyid] [source interface] [prefer]
```

More IOS commands are available to establish a device as an NTP peer (operating as the master source for other devices), and set up NTP broadcasting instead of polling. See the [Using the Cisco IOS Command-Line Interface](#) chapter in the desired Configuration Guide for details about these IOS commands.

## Recommended Trace and Logging Settings

To have diagnostic information available to research problems, first configure devices in your network to capture signaling, processing, and other activity in log files.

### Cisco Unified Communications Manager Trace Settings

Trace settings for Cisco Unified Communications Manager servers are maintained using the Cisco Communications Manager Serviceability graphical interface. There are two ways to set trace logging levels for Unified Communications Manager services:

- **Customize trace levels for individual parameters:** This approach offers a high-degree of control and flexibility over the trace output. To use this approach you must understand not only the significance of each parameter, but also the impact of tracing on Unified Communications Manager server performance. For example, setting trace levels to “Error” has a minimal impact to CPU cycles. However, leaving the “Detail” level set for long periods of time may affect call processing. For instructions on setting individual trace levels, see the [Cisco Unified Serviceability Administration Guide, “Configuring Trace” chapter](#).
- **Apply predefined trace levels:** This approach allows you to quickly enable and disable tracing for each Unified Communications Manager service based on predefined levels. You can also use these default troubleshooting trace settings with customized settings to temporarily override your custom settings. For instructions on using the Troubleshooting Trace Settings option in the Cisco Unified Communications Manager Serviceability interface, see the [Cisco Unified Serviceability Administration Guide, “Configuring Troubleshooting Trace Setting Configuration” chapter](#).

### Debug Trace Settings for Unified IP IVR System

If you encounter any problems with the Unified CCX platform and Unified IP IVR system, turn on the following debug trace settings to generate debug logs:

- For Unified CCX platform issues: SS\_TEL, SS\_ICM, and LIB\_ICM.
- For JTAPI Client issues: Enable all Trace Levels and select all debug levels except MISC\_DEBUGGING.

However, turn off the trace settings if you experience any degradation in performance during heavy load situations.

# Conduct User Acceptance Test

After you configure and integrate the components with other Collaboration System applications, the field engineer prepares the system for the user acceptance test. You run test scripts and compare them against expected results. Note and address any variability in network performance before the user acceptance test.

To test the customer solution:

- Determine the user acceptance test parameters and deliverables and record in the user acceptance test plan.
- Conduct a prelaunch test—Using an incremental approach, test the solution against the system design in a low-risk environment with limited users. If the system is stable, the rollout pace is increased until the full implementation is operational.
- Have the customer sign the Ready-for-Use Acceptance Letter acknowledging that the acceptance test yielded satisfactory results.

# Train Users

The final stage of the Implement phase is to help ensure that the customer's system administration team and users are trained to take over system management.

Cisco offers several training and certification programs for customers to maximize the usage of their newly adopted systems. See [Using the Training Library](#) for more information on Cisco training websites and videos on demand (VODs).

