



CHAPTER 3

Plan

Introduction to Plan

In the Plan phase, you evaluate Cisco technologies that address your business needs. Gather information about your business and technical environment that will feed into the high-level design. Then, create a business case for the IP telephony for enterprise and midmarket system that provides the best return on your investment.



Tip

You can navigate to any topic on this tab by using the tab navigation pane at the left of the content pane. This navigation pane contains the table of contents (TOC) for the active tab.

Before You Begin

Understand the features and functions of IP telephony for enterprise and midmarket applications. Start with the [Enterprise Overview](#) and the [System Release Notes](#). Then, review the deployment models to understand your options.

When You Are Done

You have defined and created the following:

- Your business and system requirements
- A list of components and applications that match the requirements
- A project plan based on those requirements including a proposed, high-level design

Major Concepts and Tasks in This Process

- [Planning Concepts](#)
- [Planning Tasks](#)

Planning Concepts

This topic presents planning concepts. It is assumed that your network will be a converged network that combines voice, data, and video and that you have decided on one of network types discussed in the [Internetwork Design Guide](#). You should also review the information contained in the [Market Descriptions](#) topic.

The primary planning considerations that drive the planning stage are: types of deployment, whether it will be a new installation or migration to new installation with existing equipment; application availability based on your networking needs for multimedia and voice, security, redundancy, fault tolerance, and the costs associated with your needs.

Your goal is to minimize costs while delivering service that does not compromise established availability and performance requirements. These issues are essentially at odds. Any increase in availability and performance must generally be reflected as an increase in cost. As a result, you must carefully weigh the relative importance of resource availability, performance constraints, variables, and overall cost.

**Note**

The concepts discussed in this topic are meant to be a high-level overview of considerations and not meant to be a definitive set of rules.

The concepts that you should review are as follows:

- [Deployment Types](#)
- [Cost of Ownership](#)
- [Redundancy](#)
- [Capacity and QoS](#)
- [Security](#)

Deployment Types

The deployment types to consider are as follows:

- New Installation
 - Greenfield—Completely new installation of the Cisco Unified Communications system, using no existing equipment.
 - Legacy—New installation of the Cisco Unified Communications system combined with existing legacy equipment, such as TDM PBXs and third-party adjuncts, which may require long-term co-existence and integration or eventual migration to the new installation.
 - Brownfield—Existing Cisco Unified Communications system, which requires an upgrade and migration from a previous system release to the current system release.
- Single-Stage Upgrade
 - Using existing hardware—All components in the network start at the base release set and all components can be upgraded to the target release set within a single maintenance window.
 - Using new hardware (flash-cut or shrink-and-grow)—A parallel network should be built using new hardware and pre-staged with configuration to support the existing production network.
- Multistage System Upgrade
 - Using existing hardware (hybrid system)—The components in individual sites can be upgraded from the base release set to the target release set in stages, during separate maintenance windows.
- Multisite Migration with Independent Site Upgrade

- Using an hybrid network with interworking release sets—Components are upgraded on a site-by-site basis during separate maintenance windows. At the completion of each maintenance window, a hybrid network exists within the multiple sites that have components operating on the base release set; or components that are operating on the target release set; or components that are a hybrid system as described in Multistage System Upgrade.

For more information about deployment types, see the [System Installation and Upgrade for IP Telephony for Enterprise and Midmarket: Cisco Unified Communications System](#).

Cost of Ownership

Information system budgets can run into millions of dollars. As large organizations increasingly rely on electronic data for managing business activities, the associated costs of computing resources continue to rise. With this in mind, your basic network plan should include the following:

- Environmental consideration—Include the location of hosts, servers, terminals, and other end nodes; the projected traffic for the environment; and the projected costs for delivering different service levels.
- Performance constraints—Consider network reliability, traffic throughput, and host and client computer speeds. For example, network interface cards and hard drive access speeds.
- Internetworking variables—Include the network topology, line capacities, packet flow assignments, redundancy and fault tolerance factors, backward compatibility (co-existence and interoperability), and security.

Redundancy

Redundancy is critical considering the number of vital business applications running on the network. If you have a distributed network with several access layers to remote offices, and you have a failure from the distribution layer to the core without redundancy, you have loss of network service for a large number of people. If you have redundancy in the distribution layer and the core, you can potentially lose one or more circuits without disturbing service to any particular group of users. Depending on the application, you may also need some redundancy from the access layer to the distribution layer.

Because of redundancy, if you drop a link at any one point in the network, every remote group or user still has a path to get back to the core. Even if you cut off the connection from one of the distribution switches back to the core, you still have access to the core for every user.

For more information on redundancy planning, see the [Redundancy and Load Sharing Design Guide](#).

Capacity and QoS

Capacity and QoS are major considerations in a converged network and effect one another. QoS is needed to prevent applications from using more than a fair share of bandwidth and degrading the performance of other applications. At the WAN interface, QoS is needed to allocate expensive wide area capacity among applications.

Bandwidth and QoS requirements are easy to figure in a multilayered design because the traffic flow is fairly predictable. You can also have end-to-end QoS in a multilayered design. End-to-end QoS is critical when you have real-time applications, such as a voice conversation or video presentation, and you have

non-real time applications that can interfere with the real-time applications. For example, if the real-time and non-real time applications arrive at the same layer at the same time, the network must pass the real-time packets first, as well as keep latency and jitter low. QoS end-to-end is the answer.

Consider Call Admission Control (CAC) as an alternative to QoS. CAC limits the amount of traffic allowed onto the network at the ingress point. Because you know that the network will be congested at various times during the day, you can disallow additional traffic by using CAC. Also consider using traffic shaping techniques using a traffic shaping devices. A combination of QoS, CAC and traffic shaping will provide optimal performance for applications on a converged network.

Managing link speed mismatches is the last element of traffic management. The mismatches, called chokepoints or bottlenecks, are a basic design issue whenever a large capacity link generates traffic destined for a low capacity link. To avoid the mismatches, carefully analyze the traffic and the device capabilities, then upgrade the interface (if needed) and apply a combination of CAC and QoS.

For more information on QoS, see the [Enterprise QoS Solution Reference Network Design Guide](#).

Security

Cisco recommends multiple layers of security technologies to prevent a single configuration error from jeopardizing the security of the network. Cisco also recommends operational processes that ensure prompt application of software patches, timely installation of new security technologies, and performance of regular security audits and assessments.

As you begin to design your network, rank the importance of your network assets and services by considering these factors:

- What keeps you in business?
- How do you make money?
- Does loss of data or privacy equal lost money?
- What about regulatory compliance?
- How do you protect your critical data?
- Where does voice fit?

Then consider the potential threats to your business, which may include:

- Toll fraud
- Eavesdropping
- Address spoofing
- Fake caller identity
- Media tampering
- Denial of service
- SPAM, SPIT (SPAM over IP telephony), and SPIM (SPAM over Instant Messaging)

In addition to the operational processes, advanced security technologies should be reviewed and considered. Security technologies can be categorized as follows:

- Network security
 - Virtual LANs (VLANs)
 - Access control lists (ACLs),
 - Stateful firewalls with protocol aware inspection

- Virtual Private Networks (VPNs)
- QoS
- Dynamic Address Resolution Protocol (ARP) inspection
- Dynamic Host Configuration Protocol (DHCP) snooping
- Port security
- Network intrusion prevention
- Host security
 - Cisco Security Agent
 - Third-party anti-virus software
 - Host-based firewalls
 - Hardened operating systems
- User authentication, authorization, and accounting security
 - Phone image authentication
 - Multilevel administration privileges
 - Call detail reporting

For more information about Cisco end-to-end security designs, see the [SAFE Blueprint](#). For more details about Cisco integrated network security solutions, see the following resources:

- www.cisco.com/en/US/products/hw/vpndevc/
- www.cisco.com/go/secureuc
- www.cisco.com/go/netpro

Planning Tasks

The following overview shows the high-level tasks of the planning process:

- [Determine Your Business Requirements](#)
- [Use Planning Tools and Templates](#)
- [Understand Your Deployment Options](#)
- [Identify System Components](#)
- [Review Release Matrix](#)
- [Collect and Analyze Data](#)
- [Create High-Level Design](#)
- [Plan and Prepare for Your System Installation](#)
- [Plan and Prepare for Your System Upgrade](#)

Determine Your Business Requirements

Two important factors that drive your business requirements are:

- Size of your business, see [Market Descriptions](#)

- Requirements for installation and upgrade, see:
 - [Plan and Prepare for Your System Installation](#)
 - [Plan and Prepare for Your System Upgrade](#)
 - [Install and Configure System Components](#)
 - [Performing a System Upgrade](#)
 - [Additional Sites and Services](#)

Review [Step 1: Determine Your Requirements](#) of the Deployment Methodology chapter in the Cisco Unified Communications System Description.

Collecting Requirements

The following are suggested methods to use in gathering information to plan your network:

- **Assess User Requirements**—Users want applications to be available on demand in the network. The chief components of application availability are response time, throughput, and reliability. You can assess user requirements as follows:
 - Develop community profiles of what different user groups require. Although many users have roughly the same requirements of an electronic mail system, engineering groups using Windows terminals and Sun workstations in an NFS environment have different needs from PC users sharing print servers in a finance department.
 - Build a baseline for implementing an internetwork by interviewing groups, forming focus groups, or using surveys. Some groups might require access to common servers, while others might want to allow external access to specific internal computing resources. Formal surveys can be used to get a statistically valid reading of user sentiment regarding a particular service level or proposed internetworking architecture.
 - Conduct a test involving representative users in a lab environment. This is most applicable when evaluating response time requirements. As an example, you might set up working systems and have users perform normal remote host activities from the lab network. By evaluating user reactions to variations in host responsiveness, you can create benchmark thresholds for acceptable performance.
- **Identify Functionality Requirements**—After you understand your internetworking requirements, you can select the specific functionality that fits your environment, such as the level of application availability and the implementation costs for that availability. Fault tolerance and redundancy should be considered also.

Use Planning Tools and Templates

This topic includes planning tools and links to documents that provide guidelines for designing and configuring your IPT system. It also includes information on quoting and ordering Cisco Unified Communications products.

Solution Reference Network Design Documents

Solution Reference Network Design (SRND) documents provide guidelines, recommendations, and best practices for implementing IP telephony enterprise and midmarket network solutions. The following SRNDs are recommended for designing Cisco Unified Communications systems:

- [Cisco Unified Communications SRND Based on Cisco Unified Communications Manager 7.x](#)

- [Cisco Unified Communications SRND Based on Cisco Unified Communications Manager 6.x](#)
- [Cisco Unified Communications SRND Based on Cisco Unified Communications Manager 5.x](#)
- [Cisco Unified Communications Manager Express Solution Reference Network Design](#)
- [Cisco Unified Contact Center Express SRND Release 7.0](#)
- [Enterprise QOS System Solution Reference Network Design Guide](#)

**Note**

Additional SRND resources are available at http://www.cisco.com/en/US/netsol/ns742/networking_solutions_program_category_home.html.

Solution Expert Tool

Solution Expert is a web-based tool that assists in the design, configuration, quoting, and ordering of Unified Communications products. Solution Expert is available for Cisco sales and partner systems engineers who have Unified Communications specializations.

With the Solution Expert tool, users can generate a recommended solution based on their requirements. Users can modify the recommended configuration if desired. Solution Expert validates any changes when it presents the new solution. Solution Expert also generates a bill of materials with list pricing, a Visio diagram, and other design documentation. To access Solution Expert, go to the following URL. For an overview of how to use the tool, see the introductory PDF on the home page.

<http://www.cisco.com/go/sx>

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/quotebuilder/index.html>

Ordering Guides

[Ordering Guides](#) for most Cisco Unified Communications products are available for Cisco partners, Cisco sales staff, and Cisco service providers.

Understand Your Deployment Options

Review the [Deployment Models](#) chapter in the Cisco Unified Communications System Description for a guide to site models and see the [Deployment Models Component Summary](#) for a brief overview of each model.

Identify System Components

For a brief description of all the components that are available with Cisco Unified Communications System Test Release 7.0(1), refer to the [Component Overviews](#) chapter in the Cisco Unified Communications System Description.

See the [Install and Configure System Components](#) topics in the Implement tab for links to information that describe components that are specific to the IPT system.

Review Release Matrix

The Release Matrix (which includes the [Software Version Matrix](#) and the [Firmware Version Matrix](#)) lists all the components and their versions for a particular release. This is the recommended set of components and specific software versions that have been tested and verified for interoperability within a specific system release.

Collect and Analyze Data

Using available tools, system designers collect data on the network to assess network readiness.

Tasks for data collection and analysis include:

- Perform an infrastructure analysis—By obtaining floor plans and campus maps, including utilities and conduit systems, deficiencies in infrastructure can be identified.
- Perform a software gap analysis—Do a software gap analysis to address network management tools for the IP network.
- Perform initial traffic analysis—Collect data on all potential converged infrastructure traffic flows. Use station message detail recording (SMDR) and billing records to determine legacy call volumes and use network management tools to collect key statistics on your IP data network.

Create High-Level Design

Once data is collected and analyzed, record the results in the site survey and high-level design documents.

Plan and Prepare for Your System Installation

This topic provides the system-level information required to install IPT components in Cisco Unified Communications System Release 7.0(1).

- [Planning Your System Installation](#)
- [Preparing for Your System Installation](#)

Planning Your System Installation

This topic provides links to documentation for you to review before installation and includes types of installations and components that are included in the release sets, and describes installation strategies. See the following sections:

- [Scope of this Installation Documentation](#)
- [System Installation Overview](#)
- [Component Installation Overview](#)
- [System Installation Strategies](#)
- [Interoperability and Compatibility Portals](#)

When you have reviewed preinstallation planning, installation approach, and dependencies, go to [Preparing for Your System Installation](#). For information about the installation order and process, see [Performing Your System Installation](#) on the Implement tab.

Preparing for Your System Installation

This topic provides links to documentation for you to review before you install the Cisco Unified Communications System. It describes preinstallation tasks and the initial installation sequence. It also lists the components in the release set and provides information regarding the deployment of various components. See the following sections:

- [Before You Begin](#)
- [System Installation Approach](#)
- [Release Set Versions](#)
- [System Installation Dependencies](#)

When your installation plans are complete and you are ready to install components, go to [Performing Your Installation](#).

Plan and Prepare for Your System Upgrade

This topic provides links to documentation for you to review the system-level information required to upgrade IPT components from previous Unified Communications releases to Release 7.0(1).

- [Planning Your System Upgrade](#)
- [Preparing for Your System Upgrade](#)

Planning Your System Upgrade

This topic provides an overview of the upgrade process for IPT components, the software releases that are involved in the upgrade process, and the different upgrade strategies that can be used based on the size of the customer network.



Note

There may be more than one upgrade path available based on the software deployed in your specific environment. For more information, see [System Upgrade Paths](#).

This topic contains the following sections:

- [Release Sets](#)
- [Upgrade Roadmap](#)
- [Upgrade Overview](#)
- [System Upgrade Paths](#)

- [System Upgrade Strategies](#)

When your upgrade plan is in place and you are ready to upgrade, go on to [Performing a System Upgrade](#) on the Optimize tab.


Preparing for Your System Upgrade

This topic discusses information to review before the actual upgrade process, such as the general upgrade approach for the different IPT components, upgrade release versions of components involved in the upgrade, and release version compatibility. This topic contains the following sections:

- [System Upgrade Approach](#)
- [System Upgrade Dependencies](#)
- [Upgrade Release Versions](#)

When your upgrade plan is in place and you are ready to upgrade, go to [Performing a System Upgrade](#) on the Optimize tab.

Additional Sites and Services

Steps to Success is a Cisco methodology that outlines the tasks required to complete a successful customer engagement. Registered users can visit the [Steps to Success](#)  resource site for Cisco Unified Communications process flows.

Cisco Unified Communications Services is a Cisco service offering that provides engineering expertise and best practices.

- Registered users can visit the [Cisco Unified Communications Services](#)  partner site.
- Nonregistered users can visit the [Cisco Unified Communications Services](#) site.

Cisco Unified Communications System Demos

The Cisco Unified Communications system demonstration describes the various methods available for use by Cisco sales teams to demonstrate the Cisco Unified Communications system.

[Cisco Unified Communications System Demonstration Programs](#) **[Internal]**