



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. Create a business case for the contact center solution that provides the best return on your investment.

Before You Begin

Understand the features and functions of contact center applications. Start with the [Planning Concepts](#) and the [System Release Notes for Contact Center: Cisco Unified Communications System, Release 7.0\(1\)](#). Then review the business requirements, deployment models, and sites to understand the options that are available for your specific environment.

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](#)
- [Define Case Studies](#)

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](#).

The primary planning considerations that drive the planning stage are: types of deployment, whether it will be a new installation, a migration to an installation with existing equipment, or an upgrade from a previous release to the current release; 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 are 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](#)
- [Define Case Studies](#)
- [Understand Your Call Flows](#)

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 a 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 Contact Center: 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 at <http://www.cisco.com/go/safe>. For more details about Cisco integrated network security solutions, see the following resources:

- [Security Solutions and Products](#)
- [Enhanced Security for Unified Communications](#)
- [Networking Professionals Connection](#)

Define Case Studies

System testing uses case studies to define and validate the interoperability and stability of components that comprise a complete and optimized Cisco Unified Communications system. The system test includes installing, configuring, and testing contact center hardware and software that are designed to work together in a predictable, effective, and reliable manner.

See [Use Case Studies to Define Your Business Requirements](#) for financial and retail business case studies.

Use Case Studies to Define Your Business Requirements

Cisco Systems has defined real-world business requirements in two case studies that utilize the contact center system. The business requirements for each case study were created in a test environment in order to validate the contact center solution for these business models.

The first case study is a financial firm with distributed call centers. The second case study is a large distribution and retail company. Both case studies define business requirements, agent profiles, and call flows that are typically used by these business models.

Review these case studies to understand how the contact center system meets real-world business needs.

Financial Business Case Study

This case study is a financial firm with distributed call centers, including outsourcer call centers. The case study overview includes:

- [Business Requirements](#)
- [Sample Call Flows](#)

For additional information on financial markets, see the following URL:

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

Retail Business Case Study

This case study is a large retail and distribution company that supports "business to business" and consumer retail call center operations for its customers. The case study overview includes:

- [Business Requirements](#)
- [Sample Call Flows](#)

For additional information on retail call center operations, see the following URL:

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

Call Flow Models

The call flows that are deployed by the sample businesses are as follows:

- Test Bed 1—Unified IP IVR (Unified Communications Manager Post-Routed calls) for the financial business model that is representative of the banking industry call center operations.
- Test Bed 2—Parent and Child calls for outsourced call center services.
- Test Bed 3—Unified CVP (CVP Post-Routed calls) for the retail business model that is representative of the retailing industry call center operations.

The case study methodology is continued for each PPDIIO process by using the deployment models and sites that were developed for testing.

- [Review Tested Deployment Models](#) is continued on the Design tab.
- [Install and Configure System Components](#) is continued on the Implement tab.
- [Operating Contact Center Systems](#) continues tested call flows on the Operate tab.
- [Failover and Redundancy](#) is continued on the Optimize tab.

Understand Your Call Flows

Call flow analysis is an important part of determining your business requirements. Call flows show you how your calls are handled physically, which drives your equipment requirements. Call flows also help to determine the network routing plan. For sample call flows that are discussed in the context of case studies, see [Test Case Studies](#).

Sample call flows were tested and verified in three separate test setups in the contact center environment: Test Bed 1, Test Bed 2, and Test Bed 3.

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](#)
- [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

Consider the following factors in your call center:

- Collect requirements
 - Assess user requirements
 - Identify functionality requirements
- Call center operations
 - Number of sites
 - Agents and types of services
 - Types of calls, call treatment, and call handling
 - Busy hour calls attempts (BHCA) rate
- Call flows
- Installation and upgrade requirements
 - Installation and configuration information
 - Upgrade and migration information

Review [Step 1: Review Your Requirements](#) in the Deployment Model chapter of 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.

Call Center Operations

Review the business case studies in [Test Case Studies](#) for information on customer business requirements such as number of sites, agent profiles, types of calls, call handling and call treatment options, and sample call flows.

Call Flows

See the [Understand Your Call Flows](#) topic.

Planning a System Installation

See the [Plan and Prepare for Your System Installation](#) topic.

For installation and configuration checklists and documents, see the [Installation and Configuration Checklists](#) topic on the Implement tab.

For a list of installation and configuration documents for the software and hardware components that are part of the Cisco Unified Communications family of contact center products, see the [Component Installation and Configuration Guides](#) topic on the Implement tab.

Planning a System Upgrade

See the [Plan and Prepare for Your System Upgrade](#) topic.

Use Planning Tools and Templates

This topic includes planning tools and links to documents that provide guidelines for designing and configuring your contact center 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 enterprise networking 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 Contact Center Enterprise SRND Release 7.x](#)
- [Cisco Unified Contact Center Express SRND Release 7.0](#)
- [Cisco Unified Customer Voice Portal SRND Release 7.x](#)
- [Enterprise QoS System Reference Network Design](#)

**Note**


Additional SRND resources are available at <http://www.cisco.com/go/srnd>.

Solution Expert Tool

Solution Expert  is a web-based tool that assists in the design, configuration, quoting, and ordering of Cisco 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. For an overview of how to use the tool, see the introductory PDF on the home page.

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 that have been tested and verified for Cisco Unified Communications Release 7.0(1). See [Table 2-1](#) for a brief overview of each model.

The following deployment models were designed and tested as part of testing for the contact center environment:

- **Single site**—In this model, all the voice gateways, agents, desktops, IP Phones, and call processing servers such as Unified Communications Manager, Unified ICM, and Customer Response Solutions (CRS) and/or Unified CVP are located at the same site and have no WAN connectivity between any contact center software modules.
- **Multisite centralized**—In the multisite WAN model with centralized call processing, the Unified Communications Manager cluster resides at a central (or hub) campus and communication with remote offices occurs over the IP WAN. The central site or data center provides the call processing services and acts as the hub for the remote sites. This model also contains distributed voice gateways for locally dialed calls.
- **Multisite WAN distributed**—In the multisite WAN model with distributed call processing, typically some sites have their own Unified Communications Manager cluster and are interconnected with intercluster trunks (ICT Trunking). Similar to the multisite centralized model, sites in the multisite WAN distributed model are deployed with distributed voice gateways. Communication between sites occurs over the IP WAN.

- **Clustering Over IP WAN**—In the clustering over WAN (CoW) model, a single Unified Communications Manager cluster with its subscriber servers and Unified CCE components are split across multiple sites connected via a QoS-enabled WAN.

See also the [Define Case Studies](#) topic.

Identify System Components

For a brief description of all the components that are available with Cisco Unified Communications, see the [Cisco Unified Communications Component Overviews](#) chapter in the *Cisco Unified Communications System Description*.

The [Component Installation and Configuration Guides](#) topic links to information that describes components that are specific to the contact center.

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.

Use Bill of Materials (BOM) for hardware and software specifications that are compatible with contact center components:

- [Hardware and System Software Specification \(Bill of Materials\) for Cisco Unified ICM/Unified CC Enterprise & Hosted Editions](#)—Specifies the hardware and system software compatible with and required for Cisco Unified ICM and Cisco Unified Contact Center.
- [Hardware and System Software Specification for Cisco Unified Customer Voice Portal](#)—Provides platform hardware specifications and compatible third-party software version requirements across the major components of the Cisco Unified CVP solution.

Collect and Analyze Data

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

Tasks for data collection and analysis:

- **Perform an infrastructure analysis**—Obtain floor plans and campus maps, including utilities and conduit systems, to identify deficiencies in infrastructure.
- **Perform a software gap analysis**—Do a software gap analysis to address network management tools for the IP network.
- **Perform an 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.

The [Understand Your Call Flows](#) topic shows you how to use call flow data for your design.

Plan and Prepare for Your System Installation

This topic provides the system-level information required to install contact center 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 an overview of the primary components typically deployed in a contact center environment and the installation processes for contact center components. It also describes the types of installations and various installation strategies.

This topic contains the following sections:

- [Cisco Unified Communications System Overview](#)
- [Scope of this Installation Documentation](#)
- [System 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 for contact center components, see [Performing Your System Installation](#).

Preparing for Your System Installation

This topic provides information that you should review before the actual installation process such as the general installation approach, release set software and firmware versions of the contact center components being installed, and dependencies impacting system installation.

This topic contains the following sections:

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

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

Plan and Prepare for Your System Upgrade

This topic provides the system-level information required to upgrade contact center 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 contact center 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 based on the software deployed in your specific environment. For more information, see [System Upgrade Paths](#).

This topic contains the following sections:

- [Cisco Unified Communications System Overview](#)
- [Release Sets](#)
- [Upgrade Roadmap](#)
- [Upgrade Overview](#)
- [System Upgrade Paths](#)
- [System Upgrade Strategies](#)
- [Interoperability and Compatibility Portals](#)

To ensure that you have completed upgrade prerequisites for additional approach and dependencies, see [Preparing for Your System Upgrade](#).

For information about the upgrade order and process for contact center components, go to [Performing Your System Upgrade](#).

Preparing for Your System Upgrade


This topic discusses information to be aware of before the actual upgrade process such as the general upgrade approach for the different contact center components, upgrade release versions of components involved in the upgrade, and upgrade dependencies and considerations.

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 Your 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 Demonstrations are available in an online demo environment for use by Cisco field offices.

[Cisco Unified Communications System Demonstrations](#) [INTERNAL]

