



# Cisco Unified Communications System Overview

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The Cisco Unified Communications system securely integrates voice, video, and other collaborative data applications into intelligent network communications solutions. This system, which includes IP telephony, unified communications, rich-media conferencing, IP video broadcasting, and customer contact solutions, takes full advantage of the power, resiliency, and flexibility of an IP network. The elements of this system were designed, developed, documented and tested as part of a comprehensive, end-to-end Unified Communications System.

The Cisco Unified Communications system reduces the cost and complexity associated with managing multiple and remote sites, meets stringent quality of service (QoS) requirements, and provides optimal availability and security when deployed as part of a converged network. In addition, the solution interoperates with existing time-division multiplexing (TDM)-based systems and enterprise business applications, allowing organizations to migrate to full-featured IP Communications while maintaining existing technology investments.

This topic provides an overview of the key features and benefits of Cisco Unified Communications. It includes these sections:

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## System Definition

The Cisco Unified Communications system is designed for a single, secure, converged network. Part of an integrated, comprehensive Cisco architecture, the communications applications reside “in” the network, not “on” the network, and can easily incorporate emerging business processes, applications, and new devices. Applications can be deployed in a single instance, rather than in multiple instances, and managed services offerings further increase deployment flexibility. Standards-based Cisco Unified Communications products let organizations migrate based on business needs, not technical limitations, to keep pace with new technology.

## System Release Strategy

The Cisco Unified Communications system includes the following types of releases:

- Major release—Marks the beginning of a major new release version. This release type typically is based on a major release of at least one of these components: Cisco Unified Call Manager, Cisco Unity, Cisco Unified MeetingPlace, Cisco Customer Response Solutions.
- Minor release—Adds features and fixes to an existing major release. This release type can consist of revisions to existing components and new versions of components.
- Maintenance release—Contains bug fixes for one or more of the components. This release type is based on an existing major or minor release.

## Service Offerings

Using the Cisco Lifecycle Services approach, Cisco Systems and its partners offer a broad portfolio of end-to-end services. These services are based on proven methodologies for deploying, operating, and optimizing Unified Communications solutions. Planning and design services, for example, can help you meet aggressive deployment schedules and minimize network disruption during implementation. Operate services reduce the risk of communications downtime with expert technical support. Optimize services enhance solution performance for operational excellence. Cisco and its partners offer a system-level service and support approach that can help you create and maintain a resilient, converged network that meets your business needs.

## Career Certifications

The Cisco Certified Voice Professional (CCVP) certification and related certifications are designed for IT professionals who are responsible for integrating voice technology into underlying network architectures. Individuals who earn a CCVP certification can help create a telephony solution that is transparent, scalable, and manageable. Earning a CCVP certification validates a robust set of skills in implementing, operating, configuring, and troubleshooting a converged IP network. The certification content focuses on many components of the Cisco Unified Communications system, including Cisco Unified CallManager, quality of service (QoS), gateways, gatekeepers, IP phones, voice applications, and utilities on Cisco routers and Cisco Catalyst switches.

## Solution Bundling

In addition to providing traditional solution ordering, where you choose the individual components and quantities that you require, the Cisco Unified Communications system provides flexible bundling options. A bundled solution simplifies the way in which you order applications and services and makes it easy to add options.

## Intelligent Information Network

The Cisco Intelligent Information Network facilitates the evolution of networking to systems. It allows the network to be used as a strategic asset and provides capabilities that include:

- **Cisco Discovery Protocol (CDP)**—A simple broadcast protocol that devices use to advertise their presence, it operates in the background and facilitates communication between a Cisco Unified IP Phone plugged into a network and the network switch.
- **QoS**—Cisco provides an end-to-end solution to ensure quality of service. QoS starts at the phone and LAN distribution layer, where packets are classified and marked as high priority traffic. Traffic markings originating from Cisco Unified IP Phones are automatically trusted by the Cisco switch infrastructure, which typically remarks traffic from nontrusted end user workstations. Configuration is made easier through Cisco AutoQoS, which automatically handles a range of tasks traditionally done manually, including classifying applications, generating policies, configuring the proper QoS configurations, monitoring and reporting to test QoS effectiveness, and enforcing service-level consistency.

As traffic flows through the access layer, priority queuing and buffer management ensure that real-time traffic is prioritized over less time-critical data. Where bandwidth is most restricted, across the WAN, the Cisco solution provides RSVP for reserving the bandwidth needed for voice. Fragmentation and interleaving of large blocks of data ensure a steady stream of voice traffic, and voice packet header compression minimizes bandwidth consumed.

- **VLAN**—When a Cisco Unified IP Phone boots up on the IP network, it advertises its presence using CDP, and it requests an IP address lease from a DHCP server. The Cisco LAN switch learns of the new phones via CDP and automatically reconfigures to add that port to the VLAN used for voice. With this feature, the LAN infrastructure can distinguish a phone from a PC and does not require manual configuration every time a phone is added, moved, or removed.
- **Wireless**—Cisco wireless access points allow Cisco wireless phone users to roam a campus without losing voice connectivity. If a user roams to a different site, the system will discover the new physical location for emergency 911 information purposes.
- **Power over Ethernet (POE)**—Eliminates the need for local power connections for every phone. Cisco switches can be configured with redundant power supplies connected to uninterruptible power supplies in a data center to ensure that the power to the phone is preserved, even when local power for other equipment at the desk is lost. Most Cisco Unified IP Phone models support the industry-standard 802.3af power and the Cisco pre-standard inline power.
- **Gigabit Ethernet (GigE)**—Allows certain Cisco Unified IP Phone models to take advantage of a the emerging Gigabit Ethernet LAN infrastructure.

# Business Productivity Applications

The Cisco Unified Communications system provides a wide array of applications that enhance business and organizational productivity and efficiency. These applications offer capabilities that include:

- Rich-media conferencing—Cisco Unified MeetingPlace provides intuitive interfaces for setting up, attending, and managing meetings. Extensive voice, video using Cisco Unified Videoconferencing, and web conferencing capabilities enable a range of meeting applications, including highly-collaborative meetings, training sessions, and presentations.
- Messaging—Cisco Unity provides users with access to voice, e-mail, and fax messages from a Cisco Unified IP Phone or from a PC. These solutions combine unified messaging with personal productivity tools to help manage communications quickly and conveniently.
- Common interface—Cisco Unified Personal Communicator is a presence-based desktop application that provides a focal point for phone services, directory services, messaging, and conferencing.
- Personal productivity—Cisco Personal Assistant is a telephony application that streamlines communications by helping users manage how and where they can be reached. This application is easy to use and customize without special training or system administrator assistance. Cisco Personal Assistant offers personal call rules, speech recognition, enhanced text-to-speech (TTS) functionality, and productivity services for Cisco Unified IP Phones.
- Cisco Unified Presence Server—The focal point of all status processing, including attributes and capabilities. It links the various knowledge within each application to provide a ubiquitous and broad view of a defined user within the Cisco Unified Communications system.

# Customer Interaction Network

The Cisco Customer Interaction Network component provides a single, integrated platform for all contact center locations. It is a distributed, IP-based customer-service infrastructure that easily integrates with legacy contact center platforms and networks, providing multi-channel services and integration with customer relationship management applications.

- Intelligent contact routing and multi-channel automatic call distribution (ACD)—Enables interaction with customers via phone (inbound or outbound), web, e-mail or chat. The application provides call handling tailored to different classes of customers and to individual customers, providing flexible contact center operational profiles based on varying business needs.
- Voice and web self-service—Extracts and parses web content and presents this data to customers through a telephony interface, allowing simple transactional requests to be handled by the interactive voice response (IVR) system instead of by agents. This application provides self-service automation with automatic speech recognition (ASR) and TTS. It also performs *prompt-and-collect* functions to obtain user data such as passwords or account identification that it can then pass to contact center agents, and it delivers proactive notification users through e-mail, fax, pager, and short message service (SMS).
- Agent and supervisor options—Provide full support for agent or supervisor interaction using chat capabilities. Instant messaging offers the capability to communicate with any or all the agents on a supervisor's team. Other options include:
  - Agent status monitoring
  - Silent monitoring
  - Barge-in
  - Intercept

- Real-time and historical reporting
- ACD

## IP Communications

IP communications provides powerful and efficient voice, data, and video communications, and related capabilities. Key features include:

- Video telephony—Allows video calls to be placed and received over an IP telephony network using the familiar phone interface. Video endpoints support common call features such as forward, transfer, conference, and hold. Use of a single infrastructure also enables a unified dial plan and user directory for voice and video calls.
- Mobility—Provides for several forms of user mobility, including:
  - Extension Mobility—Allows users to access any phone in the Cisco Unified Communications network as their simply logging in to the phone. After log in, the phone assumes all of the user profile information, including line numbers, speed dials and service links.
  - Site/campus mobility—Allows users to access the Cisco Unified Communications network through the wireless Cisco Unified Wireless IP Phone 7920G.
  - Pervasive mobility—Provides seamless roaming between GSM public wireless networks and the Cisco Unified Communications network for users with Nokia E60, E61, and E70 dual-mode mobile phones.
- Emergency caller response/safety and security—Enables emergency calls in an IP network to be directed to the appropriate Public Safety Access Point (PSAP). In this way, emergency agencies can identify the location of 911 callers without a system administrator needing to keep location information current.

## Security

The Cisco Unified Communications system takes a layered approach to protecting against various attacks, including denial of service (DOS), privacy, and toll fraud. Security features include:

- Encryption of signaling and media—Ensures that the signaling and the actual phone conversations are protected against unintended interception by third parties.
- Catalyst Integrated Security Features (CISF)—Includes private VLANs, port security, DHCP snooping, IPSource Guard, secure ARP detection, and dynamic ARP inspection. These features protect the network against attacks such as man-in-the-middle attacks and other spoofing.
- Integration with firewalls—Ensures that system platforms are accessible only by authorized devices. The firewall acts as a guardian between all IP devices and the IPC system platforms, ensuring that only specific transactions are allowed.
- Secure platforms—Provides features, such as host-based intrusion detection, optional security scripts, and anti-virus software, that ensure that the platform is hardened against intruders and malicious code.
- Enhanced phone security features—Provides configurable levels of security. Options include configuring the phone to ignore Gratuitous Address Resolution Protocol (GARP) requests, disabling the PC port on the phone, disabling access to network configuration settings on a phone, and configuring a phone to accept only digitally signed firmware images.

# Deployment and Migration

The Cisco Unified Communications system is designed to be deployed efficiently and effectively. The solution offers:

- Flexible deployment models—Cisco Unified Communications supports LAN and WAN connectivity and can be configured for single-site or multi-site networks. Headquarters, contact centers, branch offices, and telecommuter configurations can be interconnected without geographic constraints. Call processing and administration can be centralized or distributed.
- Integration with existing equipment and networks—Cisco Unified Communications provides gateway support to enable integration and interoperability with existing call processing equipment, phones, and TDM networks. This capability ensures compatibility with and migration from legacy systems, and supports:
  - Integration with PBXs through QSIG, DPNSS, and PRI links
  - Integration with ACD platforms via CTI interface
  - Integration with legacy phones through gateways
  - Integration with TDM networks through gateways via T1, E1, and PRI links
- Open IP connectivity through SIP—Cisco Unified Communications provides enhanced support for SIP trunking (line side) and to a variety of SIP endpoints. An integrated Cisco Unified Presence Server provides user information and status and enables interconnection to popular messaging networks.
- High availability—Cisco Unified Communications networks can be built to meet high availability requirements as business needs dictate. Networks can be designed to ensure no single point of failure in either network topology or applications. Cisco Unified Survivable Remote Site Telephony (Unified SRST) allows remote branch offices to remain in service even when the WAN access link is lost.

## Serviceability

The Cisco Unified Communications Solution includes a set of complementary products, solutions, and services to help centrally manage an entire deployment. Capabilities include:

- Resource Management Essentials (RME)—Allows network administrators to view and update the status and configuration of all Cisco devices, including switches, access servers, and routers, from anywhere on the network through a standard web client.

RME can rapidly and reliably deploy Cisco software images and view configurations of Cisco routers and switches.
- Cisco Unified Campus Manager—Provides graphical views of network topology and manages VLANs.
- Cisco Unified Operations Manager—Provides a unified view of the entire IP communications infrastructure and presents the current operational status of each element of the IP communications network. It continuously monitors the status of various IP communications elements, and provides diagnostic capabilities for troubleshooting and resolution.
- Cisco Unified Service Monitor—Provides a method for monitoring and evaluating the quality of IP communications-based telephony. It continuously monitors active calls and provides real-time notification if the voice quality of a call does not meet a pre-defined quality value.

- Cisco Voice Provisioning Tool (VPT)—Provides a unified set of provisioning interfaces and services that increase the efficiency of the initial setup and ongoing administration of Cisco CallManager and Cisco Unity. Cisco VPT provides a system-level approach to telephony management by combining the most common user attributes from multiple Cisco CallManager and Cisco Unity servers.
- CiscoWorks LAN Management Solution (LMS)—A suite of management tools that simplify configuring, administrating, monitoring, and troubleshooting Cisco networks. These tools provide an integrated system for sharing device information across applications, and offer capabilities that include:
  - Presentation of current operational status of an IP Communications deployment and service-level views of the network
  - Contextual diagnostic tools to assist with troubleshooting
  - Presentation of service-quality alerts by using the information available through Cisco Unified Service Monitor (when deployed)
  - Presentation of current information about connectivity- and registration-related outages that are affecting IP phones in the network, and information that identifies of the IP phones
  - Tracking of IP Communications devices and the IP phone inventory, tracking of IP phone status changes (providing reports that document move, add, and change operations on IP phones in the network)
  - Real-time notifications using SNMP traps, syslog notifications, and e-mail
  - Real-time voice quality monitoring and real-time voice quality alerts
  - Network discovery, topology views, end-station tracking, and VLAN management
  - Hardware and software inventory management, centralized configuration tools, and syslog monitoring
  - Network response time and availability monitoring and tracking
  - Real-time device, link, and port traffic management, analysis, and reporting
- Cisco Unified Communication Essential Operate service—Cisco hardware and software maintenance and support for Cisco voice applications. Support activities include:
  - Incident troubleshooting
  - Incident remediation
  - Network infrastructure device replacement
  - Access to applications software updates
  - Assistance using leading practices
- Cisco Unified Communications Select Operate Service—Proactive support for Cisco voice technologies that combines Cisco technical support with voice application monitoring and reporting. Support activities include:
  - Incident troubleshooting
  - Incident remediation
  - Provisioning monitoring solution
  - Monitoring and notification
  - Network infrastructure device replacement
  - Access to applications software updates
  - Assistance using leading practices

- Cisco Unified Communications Remote Management Service—Remote management service that provides comprehensive monitoring, issue resolution, and day-to-day management of voice applications and converged networks. Support and management activities include:
  - IPC system monitoring
  - Incident diagnosing
  - Defining remediation actions required to resolve incident
  - Incident resolution, which can include managing break/fix service request, applying software updates and patches, or managing hardware replacements
  - Day-to-day operational changes in a network, including logical move, adds, changes, and deletions
  - Daily backup configurations for Cisco OS, Cisco Catalyst OS, and servers
  - Reporting
  - Maintenance management of third-party equipment