Cisco Unified Communications Solution: Medium-Sized Companies (250 to 1500 employees)

Cisco® Unified Communications is an integrated, world-class set of communications products and services that uniquely addresses the needs of medium-sized businesses. It transforms and optimizes your business—now and in the future—by transparently integrating voice, video, data, security, and mobility into a single, smart, and affordable communications solution. Cisco Unified Communications works with your existing business applications and infrastructure to create a "human network"—where your business moves with you, security is everywhere, and your information is always available—whenever and wherever it's needed. Every transaction is more valuable. Everyone is more efficient. All communications are more effective, more mobile, and highly secure.

A Cisco Unified Communications system resides on a single, converged voice, video, and data network that delivers the highest level of security because security is built right into the network. This open platform gives you superior investment protection and lets you easily integrate critical applications from Cisco and other industry leaders. New mobility capabilities transform mobile devices into true business tools that extend effective communications and effortless collaboration to everyone in your organization. Products are easy to use and manage with robust management tools.

Cisco Powered Network member service providers can also deliver and manage this solution for businesses that are resource-constrained or could benefit from capital and operational savings.

The following blueprints provide examples of how you can build a Cisco Unified Communications solution that meets your specific business needs. These blueprints are based on Cisco's extensive experience in creating networks for successful medium-sized businesses.

Cisco 2800 Series Integrated Services Routers

Cisco 2800 Series Integrated Services Routers meet the unified communications needs of small and medium-sized businesses (SMBs) and enterprise branch offices while delivering an industry-leading level of security within a single routing platform. Cisco Unified Communications Manager Express is an optional solution embedded in Cisco IOS® Software that provides call processing for Cisco IP phones, including wired and cordless wireless phones. This solution is designed for businesses with data-connectivity requirements that are interested in deploying a converged IP telephony solution for up to 96 IP phones. By adding a Cisco Unity® Express Advanced Integration Module (AIM) or network module to this solution, small offices and branch offices can take advantage of a complete, all-in-one data, voice processing, voicemail, and automated attendant system. With Cisco 2800 Series routers, businesses can securely deploy data, voice, and unified communications on a single platform for their small-to-medium-sized branch offices, helping them streamline their operations and lower their network costs.

Cisco 3800 Series Integrated Services Routers

Cisco 3800 Series Integrated Services Routers meet the unified communications needs of small, medium-sized, and large branch offices while delivering industry-leading security within a single routing platform. By embedding voice services inside the router, Cisco provides businesses with maximum deployment flexibility, plus higher densities for stations, trunks, and conferencing.

Cisco 3800 Series routers complement award-winning Cisco Unified Communications, which supports wired and wireless phones. Cisco Unified Communications Manager Express is available as an optional feature set embedded within Cisco IOS Software. This solution is ideal for businesses that want to decrease costs and complexity by converging their voice and data networks. By adding a Cisco Unity Express AIM or network module to this solution, small offices and branch offices can take advantage of a complete, all-in-one data, voice processing, voicemail, and automated attendant system.

Call Processing

Cisco Unified Communications Manager Express

Cisco Unified Communications Manager Express is embedded in Cisco IOS Software and provides call processing for Cisco IP phones. This solution enables the widely deployed portfolio of Cisco integrated Services Routers and multiservice access routers to deliver telephony features that meet the requirements of the small or medium-sized office. With Cisco Unified Communications Manager Express, businesses can scale IP telephony to a small or medium-sized site with a solution that is simple to deploy, administer, and maintain. Cisco Unified Communications Manager Express is best suited for businesses that are looking for a low-cost, reliable, feature-rich telephony solution for up to 240 users. Its many system and convergence features include:

- Paging
- Intercom
- Integration with Microsoft CRM
- Basic automatic call distribution (ACD)
- Survivability for Cisco Unified Communications Manager

Some of the new features included with Cisco Unified Communications Manager Express 4.1 include:

- Session Initiation Protocol (SIP) line side enhancements
- Support for Cisco Unified IP Phone 7911G, 7941G, 7961G, 7970G, and 7971G SIP load
- Support for Cisco Unified IP Phone 7931G
- DN status (busy/idle) with presence subscribe for Cisco Unified Communications Manager Express endpoints
- Support for Cisco Unified CallConnector
- Click-to-dial capability

For added resiliency, businesses can use the Hot Standby Routing Protocol (HSRP) between two different Cisco Unified Communications Manager Express routers or use Cisco Unified Survivable Remote Site Telephony (SRST) on one of the routers.

Table 1 lists the number of IP phones supported by each Cisco integrated Services Router platform running Cisco Unified Communications Manager Express.

Table 1. Number of IP Phones Supported per Router Platform Running Cisco Unified Communications Manager Express

Router Platform	Number of IP Phones Supported
Cisco 2801	24
Cisco 2811	36
Cisco 2821	48
Cisco 2851	96
Cisco 3825	168
Cisco 3845	240

Cisco Unified Communications Manager

Cisco Unified Communications Manager is the software-based call-processing component of Cisco Unified Communications for SMBs and enterprises. This software extends enterprise telephony features and capabilities to packet telephony network devices such as IP phones, media processing devices, voice over IP (VoIP) gateways, and multimedia applications. Additional data, voice, and video services such as unified messaging, multimedia conferencing, collaborative contact centers, and interactive multimedia response systems interact with Cisco Unified Communications through Cisco Unified Communications Manager open telephony APIs.

The Cisco Unified Communications Manager solution offers high resiliency and redundancy for mission-critical communications. Branch offices use Cisco Unified SRST or Cisco Unified Communications Manager Express to provide a subset of call processing capabilities to remote users in the event of a WAN failure. For centralized resiliency, businesses can create a cluster of multiple Cisco Unified Communications Manager servers, which can be managed as a single system. A unique industry capability, Cisco Unified Communications Manager clustering aggregates the power of multiple, distributed Cisco Unified Communications Manager systems, enhancing the scalability and accessibility of the servers to phones, gateways, and applications.

Cisco Unified Communications Manager now provides a choice of operating system: either a Windows-based sever or an appliance model. The appliance comes with a single firmware image that includes both the underlying operating system and the Communications Manager application. Access to the appliance is accomplished via GUIs. The latest release of Communications Manager can be purchased as a bundled appliance with Cisco Unity Connection.

To enhance the security of the appliance, Cisco Security Agent comes pre-loaded, and a host-based firewall has been added, along with IP Security (IPsec) connectivity between all cluster members.

Some of the new features of Cisco Unified Communications Manager are:

- Database and feature resiliency for loss of publisher
- Commercial features: do not disturb (DND), intercom and message-waiting indicator (MWI) audio notification
- Secure conferencing
- Silent observing/monitor recording
- SIP licensing for third-party IP phones

Cisco Unified Survivable Remote Site Telephony

Cisco offers a cost-effective, reliable solution for providing continuous unified communications services to branch offices using Cisco Unified SRST. A unique, industry-first capability embedded in Cisco IOS Software running on Cisco routers, Cisco Unified SRST provides feature-rich call processing redundancy for centralized Cisco Unified Communications Manager or Communications Manager Express deployments, while taking advantage of the existing network infrastructure. If the WAN link to the remote office fails and the connection to Cisco Unified Communications Manager is lost, branch office phones are automatically redirected to the Cisco Unified SRST branch router, which takes over and provides a core/critical subset of the functions provided by Cisco Unified Communications Manager—minimizing the impact to the business. Once the disrupted WAN link is restored, the phones automatically reregister with the original Cisco Unified Communications Manager—no manual intervention is required.

If the router servicing IP phones using Cisco Unified Communications Manager Express is interrupted, the Cisco Unified SRST router takes over and provides a core/critical subset of the features until connectivity is restored. Once the connection is restored, the phones automatically register back to the Cisco Unified Communications Manager Express router.

Table 2 lists the number of IP phones and directory numbers supported by each integrated Services Router platform running Cisco Unified SRST.

Table 2. Number of IP Phones Supported per Router Platform Running Cisco Unified SRST

Router Platform	Number of IP Phones/ Directory Numbers Supported
Cisco 2801	24 IP phones/120 directory numbers
Cisco 2811	36 IP phones/144 directory numbers
Cisco 2821	48 IP phones/192directory numbers
Cisco 2851	96 IP phones/255 directory numbers
Cisco 3825	336 IP phones/960 directory numbers
Cisco 3845	720 IP phones/960 directory numbers

Voicemail and Unified Messaging

Cisco Unity Express

Cisco Unity Express enables SMBs and enterprise branch offices to cost-effectively integrate voicemail and automated attendant services inside Cisco routers for a lower total cost of ownership and increased employee productivity. An essential component of the Cisco Unified Communications portfolio of products, Cisco Unity Express provides:

- Affordable messaging and greeting services for increased customer service and rich employee communications
- Integrated voice mail; support for Internet Mail Access Protocol (IMAP4) client access
- Scalability from 4 to 16 concurrent voicemail or auto attendant calls and 12 to 250 mailboxes
- Support for Cisco Unified Communications Manager
- Message notification
  - E-mail
  - Phone
  - Short Message Service (SMS)
  - E-page
  - Numeric page

- Intuitive telephone prompts and a GUI for fast, convenient voicemail and auto attendant administration
- Deployment flexibility with Cisco Unified Communications Manager Express, Cisco Communications Manager, and Cisco Unity systems
- Interactive voice response (IVR) integration
- Unified client support

Available as a network module or advanced integration module, Cisco Unity Express is a simple addition to Cisco 2800 Series and 3800 Series routers.

Cisco Unity Connection

Cisco Unity Connection combines integrated messaging, speech recognition, and call-routing rules into an easy-to-manage system for organizations with up to 3000 users.

Cisco Unity Connection transparently integrates messaging and speech components with your data network to provide continuous global access to calls and messages. These advanced, convergence-based communications services help you use voice commands to place calls or listen to messages in "hands-free" mode and check voice messages from your desktop, either integrated into an e-mail inbox or from a Web browser. Cisco Unity Connection also features robust automated-attendant functions that include intelligent routing and easily customizable call-screening and message-notification options.

Built on a platform that is easy to install and maintain, Cisco Unity Connection provides an intuitive system administration interface based on a Web browser, dramatically simplifying the installation, support, and ongoing management of your system and ultimately lowering your organization's total cost of ownership.

Optional Applications

Cisco Unified Contact Center Express

Cisco Unified Contact Center Express meets the needs of individual departments, branch offices, or SMBs that are planning to deploy an entry-level or midmarket contact center solution. Designed for formal and informal contact centers, Cisco Unified Contact Center Express delivers sophisticated call routing, contact management, and administration features. It offers ease of installation, configuration, and application hosting.

Cisco Unified Contact Center Express enhances the efficiency of any contact center organization by simplifying the integration of business applications, easing agent administration, increasing agent flexibility, and allowing more efficient network hosting. These features help reduce business costs and improve customer response

for your contact center. This single-server, integrated "contact center in a box" gives you independence in agent location, improves agent scalability, and provides powerful ACD features, such as conditional routing, call-in-queue and expected-wait-time messages, enterprise data displays, real-time data, and historical reporting together with IVR services. IVR and computer telephony integration (CTI) help callers quickly reach the person they need to contact. Cisco Unified Contact Center Express provides true integration of ACD and IVR functions and offers a single, integrated service creation environment.

Some of the new features include:

- High availability
- Outbound option
- Wrap-up codes
- E-mail integration
- Support for Windows 2003
- Integration with Cisco Unified Communications Manager Express

Cisco Unified MeetingPlace Express

Cisco Unified MeetingPlace® Express promotes communication and collaboration by helping people meet from any place, at any time, and with anyone. Organizations can expand their market reach, improve operational effectiveness, and speed decisions by integrating virtual meetings into everyday communications. With just a phone and a Web browser, users can collaborate with co-workers, demonstrate products and services to customers, and deliver compelling presentations. Cisco Unified MeetingPlace Express helps enable highly productive virtual meetings by integrating meeting management and control capabilities directly into Web and Cisco Unified IP Phone interfaces. Some of the new features include:

- Ad-hoc video conferencing with Cisco Unified Communications Manager through Skinny Client Control Protocol (SCCP)
- Integration with Outlook for scheduled meetings
- Support for video conferencing support for both scheduled and reservationless meetings (SIP and H.323)

Cisco Unified CallConnector for Microsoft Dynamics CRM

Cisco Unified CallConnector for Microsoft Dynamics CRM integrates Cisco Unified Communications with the Microsoft Dynamics CRM Server to provide everyone in an SMB with an easy-to-use and more complete customer relationship management (CRM) solution. Cisco Unified CallConnector for Microsoft Dynamics CRM integrates

Cisco Unified Communications products with Microsoft Dynamics CRM Server at the desktop, without requiring additional hardware. In addition, the Microsoft CRM client uses Microsoft Outlook or Internet Explorer as the primary client for managing tasks and contacts.

Cisco Unified CallConnector for Microsoft Dynamics CRM is a client/server-based application that is highly configurable and supports the following primary features in Cisco Unified Communications environments that are using Microsoft CRM:

- Automatic detection and screen-pop searches of the CRM database for both incoming and outgoing phone calls
- Automatic creation of phone call activity records for incoming and outgoing calls with call duration tracking
- Click-to-dial capability from the Microsoft CRM user interface
- Multisite configuration capabilities with a geographically correct dialing configuration for each user
- Ability to easily pop associated Microsoft CRM customer service cases
- An easy-to-use search system that allows users to search by name or phone number and have access to contact records and associated support cases
- Integration with Cisco Unified Communications Manager, Cisco Unified Communications Manager Express, and Cisco Unified Contact Center Express
- Support for 20 different languages
- No need for an additional server

These features allow CRM users to personalize their interaction with callers, improving customer service. They also help enforce administrative policy for creating phone call activity records.

Cisco Unified CallConnector for Salesforce.com

Cisco Unified CallConnector for Salesforce.com integrates the Cisco Unified Communications system for SMBs with Salesforce.com's on-demand CRM services. The result is an easy-to-use, more complete on-demand (or hosted) CRM solution that helps you increase productivity and improve customer satisfaction. Salesforce's on-demand CRM solution promotes user adoption with quick and easy deployment, transparent seasonal upgrades, and secure access to customer information from anywhere.

Salesforce.com also integrates with popular Microsoft applications such as Outlook, Word, and Excel. Depending on your requirements, the Cisco Unified Communications and Salesforce.com CRM solution components can include:

- Salesforce SFA—Helps companies drive sales productivity, increase visibility, and expand revenue with easy-to-deploy applications for effectively managing salespeople and processes
- Salesforce Marketing—Enables closed-loop marketing so busy teams can quickly execute, manage, and analyze the results of multichannel campaigns
- Cisco Unified IP Phones—Combine the power of data networks with the convenience and ease of use of telephones
- Cisco Unified Communications Manager or Communications Manager Express—Enables quick, efficient, feature-rich call processing in midmarket companies and branch offices

The following features illustrate some of the benefits of integrating Cisco Unified Communications and Salesforce.com:

- For inbound customer calls to your Cisco Unified IP Phones, employees can immediately view the customer's recent activity history, outstanding follow-up tasks, sales opportunities, service level agreements, and more, in just a few clicks.
- Outbound calls can easily be placed using the click-to-dial ability from the Salesforce.com user interface, or directly from the Cisco Unified IP Phone. Regardless of how they are initiated, the calls are automatically tracked and logged with the customer record in Salesforce.com.
- Home-based workers and remote sales teams using Cisco Unified IP Phones and an Internet-connected PC have access to the same integrated telephony Salesforce.com tools as those working in the main office.
- Salesforce.com's on-demand business services provide a platform for you to customize and develop features for your own use. You can incorporate telephony capabilities such as voice, presence awareness, collaboration, conferencing, and video with the suite of Salesforce.com's on-demand business applications.

Cisco IP Communicator

Cisco IP Communicator is a software-based application that delivers enhanced telephony support through PCs, offering the latest technology and advancements available with IP communications today. This application gives computers the same capabilities as IP phones, providing high-quality voice calls on the road, in the office, or from anywhere that users have access to the corporate network.

Cisco IP Communicator is designed to meet diverse customer needs as a supplemental telephone when traveling or using a telecommuting device or primary desktop telephone. When using Cisco IP Communicator remotely, users can receive calls on their office extension, plus they benefit from access to the same familiar phone services they have in the office.

Cisco IP Communicator offers the following benefits:

- Extensive features that are nearly the same as those of Cisco Unified IP Phones
- Transparent integration with Cisco Unified Video Advantage
- Solution for workers requiring softphone capabilities only
- Use of Cisco Unified Communications Manager and Cisco Unified Communications Manager Express—no additional servers or hardware is required
- Support for SIP

Cisco IP Communicator provides a software-based IP phone for laptops, offering the features of a Cisco IP phone:

- Enables user mobility, allowing employees to work in the office, in a hotel, at home, or in an Internet café
- Decreases costly dependency on mobile phones and hotel phones when traveling
- Offers a solid VoIP solution for a home office

Cisco Unified Video Advantage

Cisco Unified Video Advantage brings video telephony capability to Cisco Unified IP Phones, providing Cisco Unified IP Phone and Cisco IP Communicator users with the ability to add video to their communications experience. With Cisco Unified Video Advantage, video telephony is as easy as making a phone call.

Cisco Unified Video Advantage is a video telephony solution comprising the Cisco Unified Video Advantage software application, and the Cisco VT Camera II. With the Cisco Unified Video Advantage camera attached to a PC through a USB connection colocated with a Cisco Unified IP Phone or Cisco IP Communicator, users can place and receive video calls on their IP communications network. Users make calls from their Cisco Unified IP Phones using familiar phone interfaces, and the calls are enhanced with video on a PC, without requiring any extra button-pushing or mouse-clicking.

Cisco Unified Video Advantage offers the following advantages:

- Provides the ability to add high-quality video to rich telephony features
- Offers transparent integration with a desktop Cisco Unified IP Phone or with Cisco IP Communicator for a familiar phone interface
- In combination with Cisco IP Communicator, enables you to get a foothold in accounts that are not ready to deploy IP phones

Cisco Unified Mobility

Cisco Unified Mobility makes it easy for workers to keep in touch with the business at hand, whether they're at their desks or mobile. It includes Cisco Mobile Connect mobility services to extend the benefits of Cisco Unified Communications to workers at any location. This application server integrates with Cisco Unified Communications Manager to intelligently manage, filter, route, and place calls between a worker's IP phone and remote mobile phone. With Cisco Unified Mobility, a worker can receive and place business calls from the devices most convenient for the task without interrupting calls, whether in the office, in transit, or at a remote location. Cisco Unified Mobility helps IT and telecom managers better serve the communications needs of their mobile workers, enabling them to take advantage of the Cisco Unified Communications network resources available with Cisco Unified Communications Manager.

Cisco Unified Personal Communicator

Cisco Unified Personal Communicator transparently integrates a wide variety of applications and services, connecting users to a rich set of Unified Communications tools. Using dynamic presence information, users can check the availability of colleagues in real time, reducing "phone tag" and improving productivity. Users can easily search existing directories to quickly locate important contacts and voice messages. Video calling and Web conferencing can be used to collaborate more effectively with colleagues. With Cisco Unified Personal Communicator enables users to connect to important communications tools virtually anywhere, anytime to enable smarter, more effective communications. The solution lets users:

- Access powerful productivity tools to streamline communications and simplify training
- Use reachability and presence indicators to increase productivity, reduce phone tag, and speed problem resolution
- Use video to exchange ideas "face-to-face"
- Escalate communications methods for more effective interactions with voice, video, and Web conferencing
- Communicate anywhere, anytime

Cisco Unified Presence

Cisco Unified Presence offers an environment that enables next-generation services and features. It adds value to a Cisco Business Communications Solution by providing unique user experiences and application connectivity.

Cisco Unified Presence Services allow customers to leverage the benefits of SIP to deploy differentiated services in their business communications environment. SIP is attractive as a signaling standard because it can connect and control communications sessions between applications, independent of media type or the function performed by the end applications. It provides the methods to connect, signal, and control sessions. In that sense, SIP is quite different from a "functionally based" signaling protocol, such as QSIG, which is used not only to establish sessions, but also to define the specific features those sessions can support. The distinction is important—it greatly affects interoperability and flexibility. As a peer-to-peer protocol, the intelligence involved in SIP-enabled applications is distributed to endpoints and other components, not central-ized in a single call-control component. New features can be added without upgrading infrastructure components such as proxy servers, and developers do not require inti-mate knowledge of the SIP infrastructure in order to write SIP-enabled applications.

Cisco Unified Videoconferencing 3515 Multipoint Control Unit (MCU)

The Cisco Unified Videoconferencing 3515 Multipoint Control Unit (MCU) is a cost-effective solution for any organization that wants to deploy videoconferencing in a low-volume video conferencing environment. Each system is self-contained and can support up to either 12 or 24 simultaneous video endpoints in one or more conferences.

During a multipoint conference, the Cisco Unified Videoconferencing 3515 MCU mixes the audio and video from conference participants and distributes the result to the rest of the conference population. It offers two modes of video display: voice-activated video selection and continuous presence. In a voice-activated conference, participants see a full screen of the person who is actively speaking. As the speaker changes from one location to the next, the video follows to show the new speaker. In a continuous-presence conference, the display shows video of 2 to 16 participants, depending on the preferences of the conference moderator. When more participants are involved, one of the screen positions becomes voice-activated.

Cisco Unified Communications Solution

This section provides easy-to-use blueprints that show how Cisco Unified Communications can be deployed for businesses with up to 1500 IP phones. These blueprints are based on Cisco's extensive experience in creating networks for successful medium-sized companies, and are formulated according to the number of IP phones deployed:

Infrastructure Blueprints:

Cisco Unified Communications Solution Blueprint:
Overview of Headquarters, Remote Site, and Teleworker Connectivity

Cisco Unified Communications Solution Blueprint:
Headquarters (up to 96 users) with Multiple Branches (up to 96 Users) and Distributed Local Call Processing

Cisco Unified Communications Solution Blueprint:
Headquarters (more than 96 users) with Multiple Branches (up to 96 Users) and Distributed Local Call Processing

Cisco Unified Communications Solution Blueprint:
Headquarters Providing Centralized Call Processing for a Small Branch (up to 24) with SRST as Backup

Cisco Unified Communications Solution Blueprint:
IP Communications Integration with Legacy PBX Equipment at Headquarters

Applications Blueprints:

Cisco Unified Communications Solution Blueprint:
 Video Conferencing Integration

Cisco Unified Communications Solution Blueprint:
Audio, Video, and Data Collaboration Integration

Cisco Unified Communications Solution Blueprint:
Presence Integration

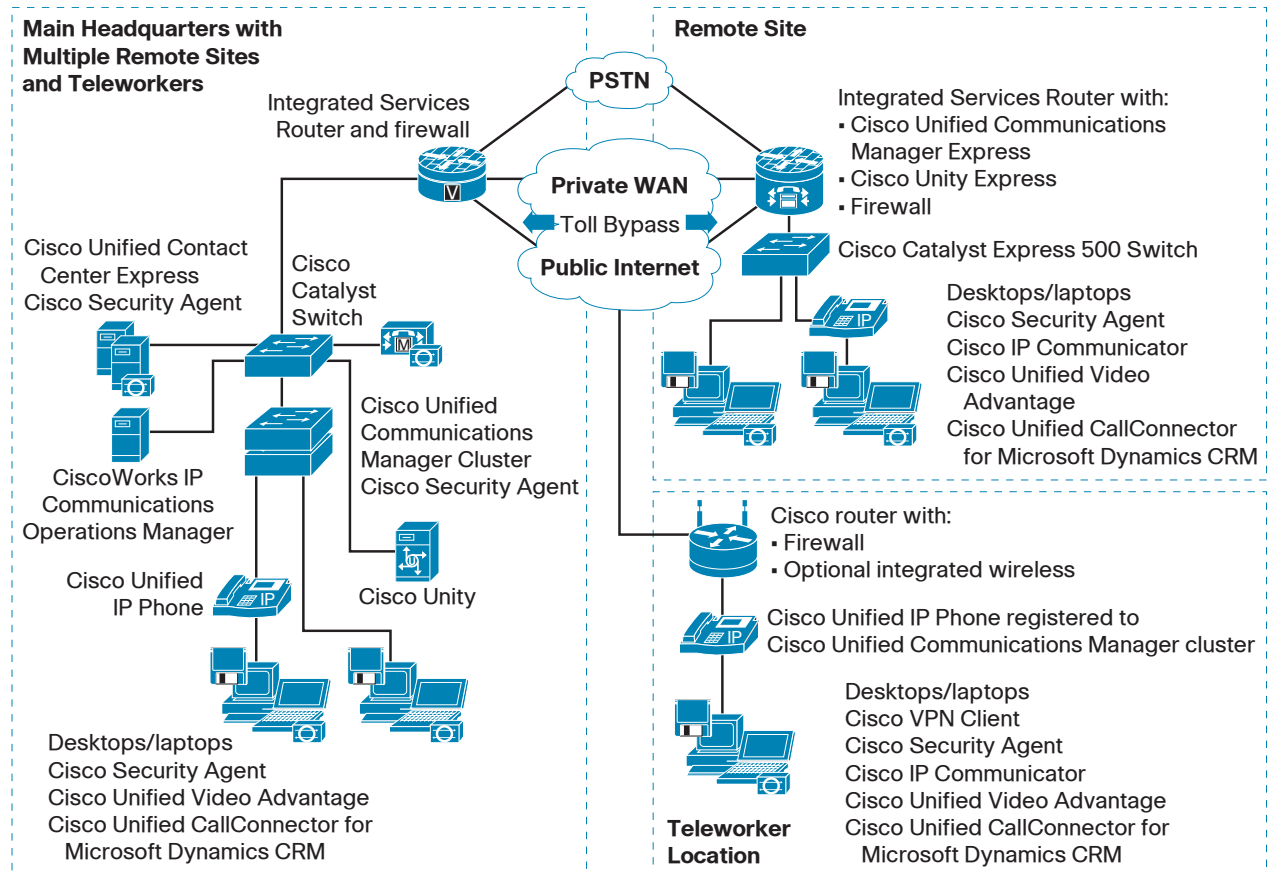**Cisco Unified Communications Solution Blueprint:**
CRM Integration

These blueprints are intended to be an educational resource and a starting point in planning your solution; they are not final recommendations from Cisco. To determine the deployment most appropriate for your company, we suggest that you work with a Cisco representative, Cisco channel partner, or solutions provider.

Cisco Unified Communications Solution: Overview of Headquarters, Remote Site, and Teleworker Connectivity
Infrastructure Blueprints

The Cisco Unified Communications infrastructure is built using Cisco Unified Communications Manager or Cisco Unified Communications Manager Express. Cisco Unified Communications Manager offers a full set of business telephony features and a complete IP-based applications portfolio that includes Unified Communications, IP contact centers, and advanced conferencing services. Cisco Unified Communications Manager Express with Cisco Unity Express is a cost-effective, all-in-one voice solution based on Cisco integrated Services Routers.

General Design Considerations
- Flexible architecture allows you to design:
  - Centralized call-processing architecture by having the Cisco Unified IP Phones register to the Cisco Unified Communications Manager cluster or Cisco Unified Communications Manager Express at the main headquarters site
  - Distributed call-processing architectures provide flexibility by letting the Cisco Unified IP Phones register to a Cisco Unified Communications Manager or Cisco Unified Communications Manager Express at the remote site
- Toll bypass saves toll charges between the headquarters site and remote sites
- Virtual LANs (VLANs) logically separate voice and data traffic to ensure quality of service (QoS) for voice traffic
- For a centralized solution, your WAN should have sufficient bandwidth for voice traffic and QoS should be implemented

Figure 1. Cisco Unified Communications Solution Blueprint: Overview of Headquarters, Remote Site, and Teleworker Connectivity

- Cisco encrypted voice and signaling protocols create a secure Cisco Unified Communications network; Cisco Security Agent protects Cisco Unified Communications Manager, corporate servers, and end-user PCs from malicious attacks
- Integrated Services Routers provide Cisco IOS security features to secure the network perimeter from unauthorized access and malicious attacks

Headquarters Router

Cisco 3825 Integrated Services Router
The Cisco 3825 Integrated Services Router provides the following support for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone businesses for up to 168 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 336 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
- Security
  - On-board encryption
  - Support of up to 2000 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco Network Admission Control (NAC)
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four high-density WAN interface card (HWIC) slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WAN interface cards (WICs), voice WAN interface cards (VWICs), and voice interface cards (VICs)
- Integrated Gigabit Ethernet ports with copper and fiber support
- Optional Layer 2 switching support with Power over Ethernet (PoE); supports the 36-port Cisco EtherSwitch® module (NMD-36ESW)
- Optional integrated wireless access point

Optional Headquarters Router

Cisco 3845 Integrated Services Router
The Cisco 3845 Integrated Services Router provides the following support for medium-sized businesses currently supporting or planning to grow to 240 Cisco Unified IP Phones:

- Voice
  - Analog and digital voice call support
  - Optional voicemail support
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 240 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 720 Cisco Unified IP Phones
- Security
  - On-board encryption
  - Support of up to 2500 VPN tunnels with the AIM-HPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services at full T3/E3 rates
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Integrated Gigabit Ethernet ports with copper and fiber support
- Optional Layer 2 switching support with PoE (as an option); supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Option integrated wireless access point

Remote Site with up to 48 Cisco Unified Communications Manager Express Cisco Unified IP Phones

Cisco 2821 Integrated Services Router

The Cisco 2821 Integrated Services Router provides the following support for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone businesses with up to 48 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 48 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
  - Dedicated extension voice module slot
- Security
  - On-board encryption
  - Support of up to 1500 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Two integrated 10/100/1000 Ethernet/Fast Ethernet/Gigabit Ethernet ports
- Optional Layer 2 switching support with PoE
- Optional integrated wireless access point

With Cisco Unified Communications Manager Express and Cisco Unity Express, the Cisco 2821 router can provide both the voice and data services needed for most sites requiring up to 48 Cisco Unified IP Phones. Security can be easily enabled by upgrading Cisco IOS Software—no forklift upgrade of the router is required.

Remote Site with up to 96 Cisco Unified Communications Manager Express Cisco Unified IP Phones

Cisco 2851 Integrated Services Router

The Cisco 2851 Integrated Services Router provides the following support for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 96 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 96 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
  - Dedicated extension voice module slot
- Security
  - On-board encryption
  - Support of up to 1500 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Two integrated 10/100/1000 Ethernet/Fast Ethernet/Gigabit Ethernet ports
- Optional Layer 2 switching support with PoE; supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point

As remote sites grow, businesses expect their PBXs to grow with them. With the Cisco 2851 Integrated Services Router, remote sites can support up to 96 Cisco Unified IP Phones with Cisco Unified Communications Manager Express and up to 250 voice mailboxes with Cisco Unity Express. No router upgrade is required.

Teleworker

Cisco 870 Series routers offer:

- High performance for broadband access in small offices
- Enhanced security, including:
  - Stateful Inspection Firewall
  - IP Security (IPsec) VPNs (Triple Data Encryption Standard [3DES] or Advanced Encryption Standard [AES])
  - Intrusion prevention system (IPS)
  - Antivirus support through Cisco NAC and enforcement of secure access policies
- 4-port 10/100 Ethernet/Fast Ethernet managed switch with VLAN support
- Secure WLAN 802.11b/g option with use of multiple antennas
- Easy setup, deployment, and remote management capabilities through Web-based tools and Cisco IOS Software

Cisco 870 Series routers support all small office connectivity needs, including:

- Fast Ethernet
- ADSL
- ADSL over ISDN
- G.SHDSL

The teleworker's Internet connection would determine which Cisco 870 Series router would be used.

Applications

- Cisco Unified Communications Manager
- Cisco Unity
- Cisco Unified Communications Manager Express
- Cisco Unity Express

Additional Features for Cisco Unified Communications Manager Express and Cisco Unified Communications Manager

- Cisco IP Communicator
- Cisco Unified Video Advantage
- Cisco Unified Wireless IP Phones
- Cisco Unified MeetingPlace Express
- Cisco Unified CallConnector for Microsoft CRM
- Cisco Unified Videoconferencing
- Cisco Unified Contact Center Express

Additional Features for Cisco Unified Communications Manager

- Cisco Unified MeetingPlace
- Cisco Unified Presence
- Cisco Unified Personal Communicator

Additional Features for Cisco Unified Communications Manager Express

- Cisco Unified CallConnector for Salesforce.com
- Cisco Unified CallConnector for Microsoft Office Suite

Additional Notes

Cisco Unified Communications Manager Express licensing is the same as for Cisco Unified SRST. If a change in centralized call processing solutions is required, it can be accomplished at no additional charge for hardware or software.

Cisco Unified Communications Solution:
Headquarters (up to 96 Users) with Multiple Branches (up to 96 Users) and Distributed Local Call Processing
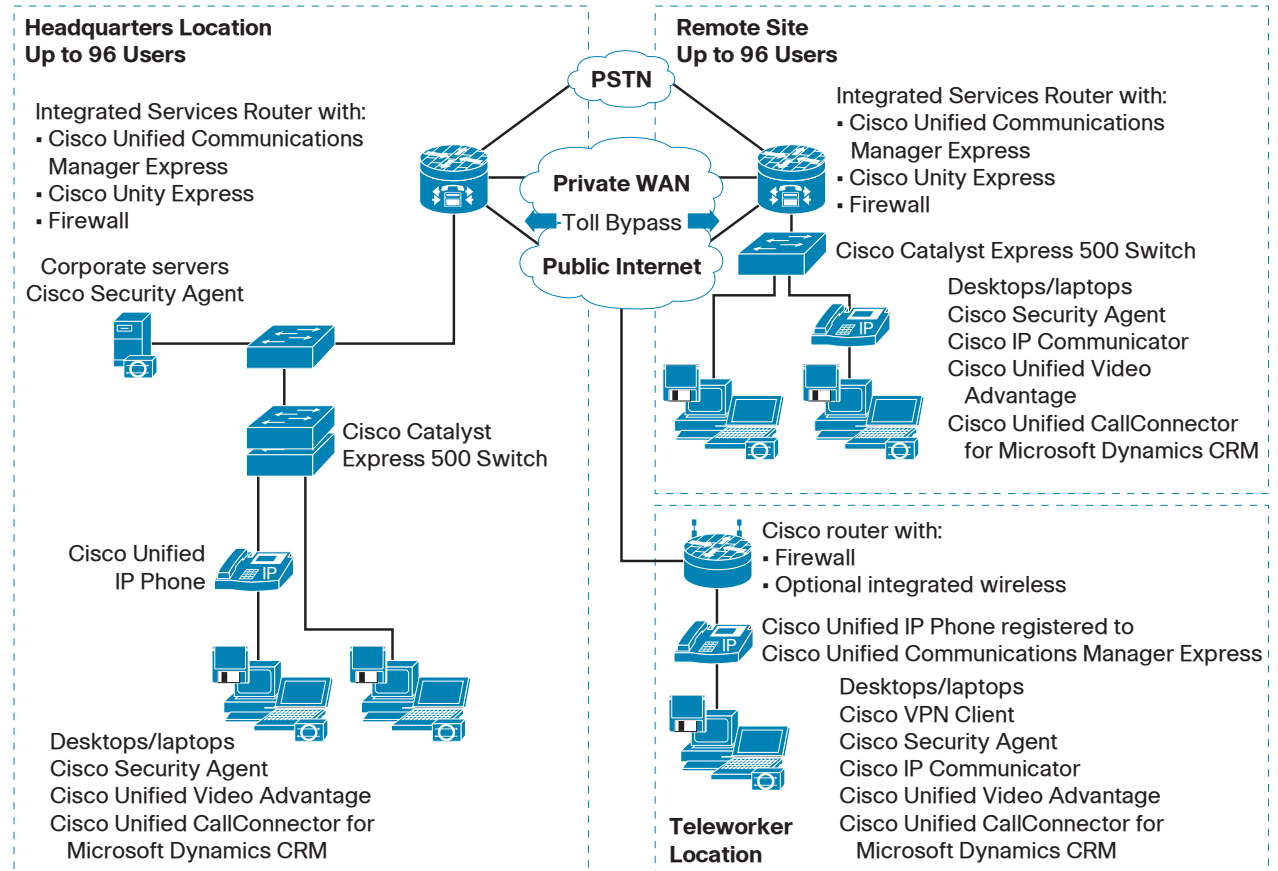
Infrastructure Blueprints

Cisco Unified Communications Manager Express with Cisco Unity Express is an all-in-one voice solution based on Cisco integrated services routers. It can be used to support a single site or can be networked across the WAN for both Cisco Unified Communications Manager Express networking and Cisco Unity Express Networking.

Specific Design Considerations

- Distributed call-processing architectures provide flexibility by allowing Cisco Unified IP Phones to register to Cisco Unified Communications Manager Express locally at each site
- For individual office locations with less than 96 users, Cisco Unified Communications Manager Express is a cost-effective, lower-maintenance option
- Cisco Unity Express allows you to network voice mailboxes together for companywide distribution
- Cisco Unified Communications Manager Express and Cisco Unity Express can be administered through a network-connected PC with a Web browser
- If video conferencing is needed, Cisco Unified Video Advantage will require the Cisco Unified Communications Manager platform
- Cisco 1700 XM Series, 2600 XM Series, and 3700 XM Series access routers can be used in a Cisco Unified Communications Manager Express architecture

Figure 2. Cisco Unified Communications Solution Blueprint for Headquarters (up to 96 Users) with Multiple Branches (up to 96 Users) and Distributed Local Call Processing

Headquarters Location
Up to 96 Users

Integrated Services Router with:
- Cisco Unified Communications Manager Express
- Cisco Unity Express
- Firewall

Corporate servers
Cisco Security Agent

Cisco Catalyst Express 500 Switch

Cisco Unified IP Phone

Desktops/laptops
Cisco Security Agent
Cisco Unified Video Advantage
Cisco Unified CallConnector for Microsoft Dynamics CRM

PSTN

Private WAN
Toll Bypass
Public Internet

Remote Site
Up to 96 Users

Integrated Services Router with:
- Cisco Unified Communications Manager Express
- Cisco Unity Express
- Firewall

Cisco Catalyst Express 500 Switch

Desktops/laptops
Cisco Security Agent
Cisco IP Communicator
Cisco Unified Video Advantage
Cisco Unified CallConnector for Microsoft Dynamics CRM

Cisco router with:
- Firewall
- Optional integrated wireless

Cisco Unified IP Phone registered to Cisco Unified Communications Manager Express

Desktops/laptops
Cisco VPN Client
Cisco Security Agent
Cisco IP Communicator
Cisco Unified Video Advantage
Cisco Unified CallConnector for Microsoft Dynamics CRM

Teleworker Location

Up to 96 Cisco Unified Communications Manager Express
Cisco Unified IP Phones

Cisco 2851 Integrated Services Router

The Cisco 2851 Integrated Services Router provides the following support for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 96 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 96 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
  - Dedicated extension voice module slot
- Security
  - On-board encryption
  - Support of up to 1500 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Two integrated 10/100/1000 Ethernet/Fast Ethernet/Gigabit Ethernet ports
- Optional Layer 2 switching support with PoE; supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point

With the addition of Cisco Unified Communications Manager Express and Cisco Unity Express, the Cisco 2851 is able to provide voice services for up to 96 Cisco Unified IP Phones. Integrated security options enable you to place the router at the Internet edge to provide safe, secure voice services.

Up to 96 Cisco Unified Communications Manager Express
Cisco Unified IP Phones

Cisco 3825 Integrated Services Router

The Cisco 3825 Integrated Services Router provides the following support for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 168 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 336 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
- Security
  - On-board encryption
  - Support for up to 2000 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for majority of existing AIMs, network modules, WICs, VWICs, and VICs
- Integrated Gigabit Ethernet ports with copper and fiber support
- Optional Layer 2 switching support with PoE; supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point

The Cisco 3825 Integrated Services Router supports up to 168 Cisco Unified IP Phones and 250 Cisco Unity Express voice mailboxes, enabling scalable growth. Deploying a Cisco Unity server can provide support for more than 250 voice mailboxes, while enabling SMBs to take advantage of unified messaging.

Teleworker

Cisco 870 Series integrated Services Routers offer:

- High performance for broadband access in small offices
- Enhanced security, including:
  – Stateful Inspection Firewall
  – IPsec VPNs (3DES or AES)
  – IPS
  – Antivirus support through Cisco NAC and enforcement of secure access policies
- 4-port 10/100 managed switch with VLAN support
- Secure WLAN 802.11b/g option with use of multiple antennas
- Easy setup, deployment, and remote management capabilities through Web-based tools and Cisco IOS Software

Cisco 870 Series routers support a variety of small office connectivity options, including:

- Fast Ethernet
- ADSL
- ADSL over ISDN
- G.SHDSL

The teleworker's Internet connection would determine which Cisco 870 Series router would be used.

Applications

- Cisco Unified Communications Manager Express
- Cisco Unity Express

Additional Features for Cisco Unified Communications Manager Express

- Cisco Unified Video Advantage
- Cisco IP Communicator
- Cisco Unified Wireless IP Phones
- Cisco Unified CallConnector for Microsoft CRM
- Cisco Unified CallConnector for Salesforce.com
- Cisco Unified CallConnector for Microsoft Office Suite
- Cisco Unified Contact Center Express

Cisco Unified Communications Solution:
Headquarters (More than 96 Users) with Multiple Branches (up to 96 Users) and Distributed Local Call Processing
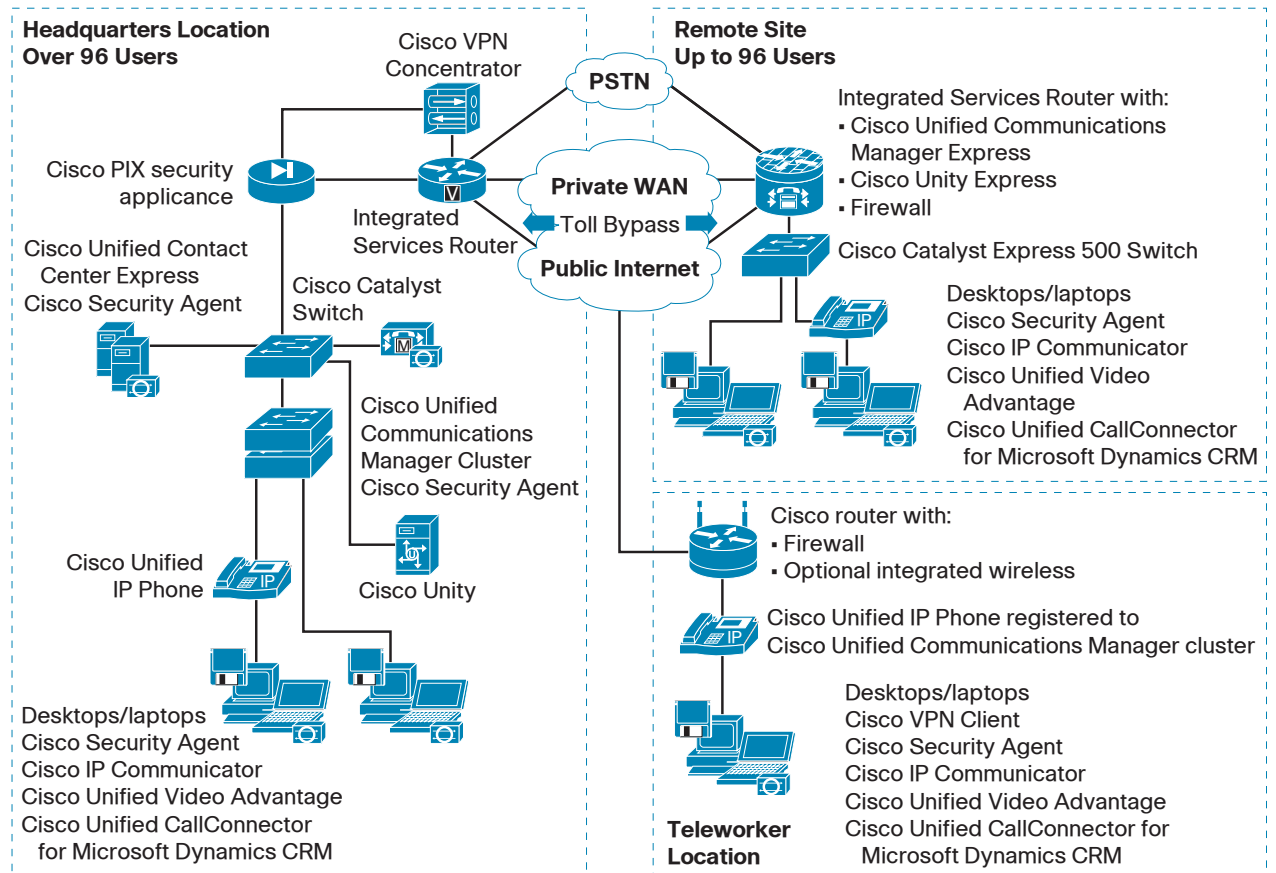
Infrastructure Blueprints

Cisco Unified Communications Manager provides the capability for distributed call processing. With this product, you can distribute the call-processing load of your system across multiple sites. In addition to implementing distributed call processing, you can use Cisco Unified Communications Manager groups to establish redundancy. Cisco Unity is a powerful Unified Communications solution that provides advanced, convergence-based communications services on a platform that offers the utmost in reliability, scalability, and performance.

Specific Design Considerations

- Distributed call-processing architectures provide flexibility by letting Cisco Unified IP phones register to either a standalone Cisco Unified Communications Manager cluster at each site or Cisco Unified Communications Manager Express at the remote site
- A distributed call-processing architecture is recommended for remote sites with sub-optimal WAN connections to headquarters
- Multilevel administration access provides multiple levels of security to Cisco Unified Communications Manager administration
- Cisco Unified Communications Manager clusters facilitate two types of redundancy: database replication and device failover and fallback

Figure 3. Cisco Unified Communications Solution: Headquarters (More than 96 Users) with Multiple Branches (up to 96 Users) and Distributed Local Call Processing

Headquarters Location Over 96 Users

Cisco VPN Concentrator

PSTN

Cisco PIX security appliance

Integrated Services Router

Private WAN
Toll Bypass
Public Internet

Cisco Unified Contact Center Express
Cisco Security Agent

Cisco Catalyst Switch

Cisco Unified Communications Manager Cluster
Cisco Security Agent

Cisco Unified IP Phone

Cisco Unity

Desktops/laptops
Cisco Security Agent
Cisco IP Communicator
Cisco Unified Video Advantage
Cisco Unified CallConnector
   for Microsoft Dynamics CRM

Remote Site Up to 96 Users

Integrated Services Router with:
- Cisco Unified Communications Manager Express
- Cisco Unity Express
- Firewall

Cisco Catalyst Express 500 Switch

Desktops/laptops
Cisco Security Agent
Cisco IP Communicator
Cisco Unified Video Advantage
Cisco Unified CallConnector
   for Microsoft Dynamics CRM

Cisco router with:
- Firewall
- Optional integrated wireless

Cisco Unified IP Phone registered to Cisco Unified Communications Manager cluster

Desktops/laptops
Cisco VPN Client
Cisco Security Agent
Cisco IP Communicator
Cisco Unified Video Advantage
Cisco Unified CallConnector for Microsoft Dynamics CRM

Teleworker Location

Headquarters Router

Cisco 3825 Integrated Services Router

The Cisco 3825 Integrated Services Router provides the following support for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 168 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 336 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
- Security
  - On-board encryption
  - Support for up to 2000 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Integrated Gigabit Ethernet ports with copper and fiber support
- Optional Layer 2 switching support with PoE; supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point

Optional Headquarters Router

Cisco 3845 Integrated Services Router

The Cisco 3845 Integrated Services Router provides the following support for medium-sized businesses currently supporting or planning to grow to 240 Cisco Unified IP Phones:

- Wire-speed performance for concurrent services such as security and voice, and advanced services at full T3/E3 rates
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Integrated Gigabit Ethernet ports with copper and fiber support
- Optional Layer 2 switching support with PoE (as an option); supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point
- Security
  - On-board encryption
  - Support for up to 2500 VPN tunnels with the AIM-HPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Voice
  - Analog and digital voice call support
  - Optional voicemail support
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 240 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 720 Cisco Unified IP Phones

Remote Site with up to 96 Cisco Unified Communications Manager Express Cisco Unified IP Phones

Cisco 2851 Integrated Services Router

The Cisco 2851 Integrated Services Router provides the following support for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 96 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 96 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
  - Dedicated extension voice module slot
- Security
  - On-board encryption
  - Support for up to 1500 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Two integrated 10/100/1000 Ethernet ports
- Optional Layer 2 switching support with PoE; supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point

With the addition of Cisco Unified Communications Manager Express and Cisco Unity Express, the Cisco 2851 is able to provide voice services for up to 96 Cisco Unified IP Phones.

Remote Site with up to 96 Cisco Unified Communications Manager Express Cisco Unified IP Phones

Cisco 3825 Integrated Services Router

The Cisco 3825 Integrated Services Router provides the following support for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 168 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 336 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
- Security
  - On-board encryption
  - Support for up to 2000 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for majority of existing AIMs, network modules, WICs, VWICs, and VICs
- Integrated Gigabit Ethernet ports with copper and fiber support
- Optional Layer 2 switching support with PoE; supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point

The Cisco 3825 Integrated Services Router supports up to 168 Cisco Unified IP Phones and 250 Cisco Unity Express voice mailboxes, enabling businesses to benefit from a scalable remote site solution.

Teleworker

Cisco 870 Series integrated Services Routers offer:

- High performance for broadband access in small offices
- Enhanced security, including:
  – Stateful Inspection Firewall
  – IPsec VPNs (3DES or AES)
  – IPS
  – Antivirus support through Cisco NAC and enforcement of secure access policies
- 4-port 10/100 managed switch with VLAN support
- Secure WLAN 802.11b/g option with use of multiple antennas
- Easy setup, deployment, and remote management capabilities through Web-based tools and Cisco IOS Software

Cisco 870 Series routers support a variety of small office connectivity options, including:

- Fast Ethernet
- ADSL
- ADSL over ISDN
- G.SHDSL

The teleworker's Internet connection would determine which Cisco 870 Series router would be used.

Applications

- Cisco Unified Communications Manager
- Cisco Unified Communications Manager Express
- Cisco Unity Express
- Cisco Unity

Additional Features for Cisco Unified Communications Manager

- Cisco Unified IP Phone 7985G Video Phone

Additional Features for Cisco Unified Communications Manager and Cisco Unified Communications Manager Express

- Cisco Unified Video Advantage
- Cisco IP Communicator
- Cisco MeetingPlace Express
- Cisco Unified Wireless IP Phones
- Cisco Unified CallConnector for Microsoft CRM
- Cisco Unity Connection
- Cisco Unified Contact Center Express

Additional Features for Cisco Unified Communications Manager Express

- Cisco Unified CallConnector for Salesforce.com
- Cisco Unified CallConnector for Microsoft Office Suite

Additional Notes

Cisco Unified Communications Manager Express licensing is the same as for Cisco Unified SRST. If a centralized call processing solution is required, businesses can deploy one at no additional charge for hardware or software.
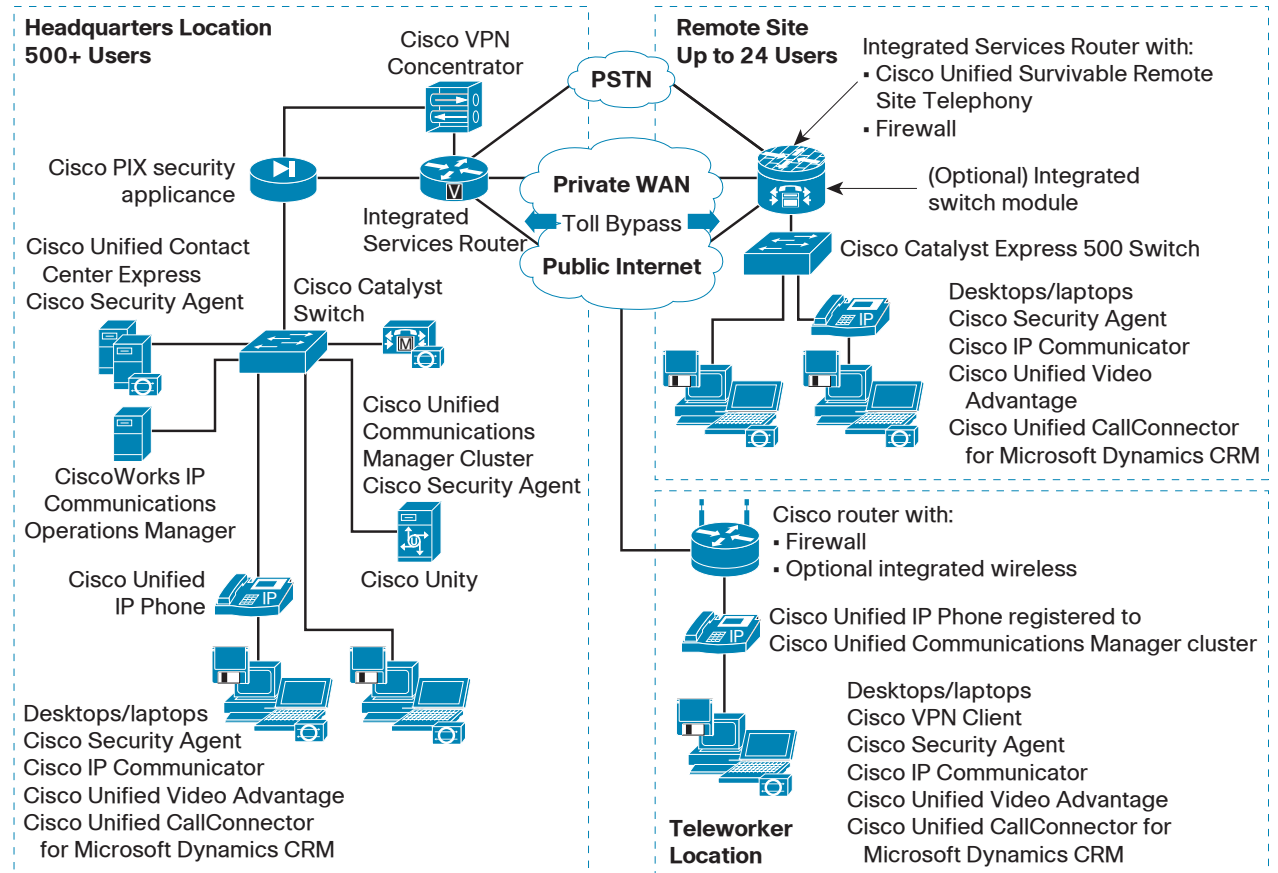
Cisco Unified Communications Solution:
Headquarters Providing Centralized Call Processing for a Small Branch (up to 24) with SRST as Backup

Infrastructure Blueprints

The clustering feature of Cisco Unified Communications Manager distributes call processing across the infrastructure of a converged IP network. Clustering facilitates redundancy, transparently shares resources and features, and enables system scalability. Small-office sites preclude most medium-sized businesses from deploying dedicated call-processing servers. Cisco Unified SRST provides a rich feature set in back-up mode and is a cost-effective solution that is simple to deploy, administer, and maintain.

Specific Design Considerations

- Cisco Unified SRST in Cisco IOS Software lets medium-sized companies extend high-availability Cisco Unified Communications to their small branch offices
- The Cisco Unified SRST solution used at the remote site provides a rich feature set in backup mode and is a cost-effective solution that is simple to deploy, administer, and maintain
- Cisco IP Communicator gives teleworkers the option to use a softphone from their PC instead of a physical IP phone handset; even if QoS is not supported by the local ISP, voice quality is typically very good

Figure 4. Cisco Unified Communications Solution Blueprint: Headquarters Providing Centralized Call Processing for a Small Branch (up to 24) with SRST as Backup

Headquarters Router

Cisco 3825 Integrated Services Router

The Cisco 3825 Integrated Services Router provides the following support for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 168 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 336 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
- Security
  - On-board encryption
  - Support for up to 2000 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Integrated Gigabit Ethernet ports with copper and fiber support
- Optional Layer 2 switching support with PoE; supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point

Optional Headquarters Router

Cisco 3845 Integrated Services Router

The Cisco 3845 Integrated Services Router provides the following support for medium-sized businesses currently supporting or planning to scale up to 240 Cisco Unified IP Phones:

- Wire-speed performance for concurrent services such as security and voice, and advanced services at full T3/E3 rates
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Integrated Gigabit Ethernet ports with copper and fiber support
- Optional Layer 2 switching support with PoE (as an option); supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point
- Security
  - On-board encryption
  - Support for up to 2500 VPN tunnels with the AIM-HPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Voice
  - Analog and digital voice call support
  - Optional voicemail support
  - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 240 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 720 Cisco Unified IP Phones

Remote Site with Fewer than 25 Cisco Unified SRST Cisco Unified IP Phones

Cisco 2801 Integrated Services Router

The Cisco 2801 Integrated Services Router, with the proper Cisco IOS Software release, provides the following benefits to the medium-sized customer:

- Mid/high-density, high-performance services
  - Voice: Mid/high-density analog/digital voice with IP communications and voicemail; Cisco Unified Communications Manager Express or Cisco Unified SRST support for up to 24 Cisco Unified IP Phones
  - Security: Onboard encryption, up to 800 VPN tunnels (AIM); Cisco IOS Firewall, NAC, IPS, or content security
- Integrated dual 10/100 Ethernet/Fast Ethernet ports
- Optional integration of Layer 2 switching with PoE
- Enhanced modularity and investment protection
- Flexible expansion (two HWIC slots), additional concurrent services
- Existing WIC, VIC, VWIC, and AIM support
- Scalable services deployment and availability features
- Optional integrated wireless access point

With Cisco Unified SRST, the Cisco 2801 router is able to provide telephony services for up to 24 Cisco Unified IP Phones during a failure.

Remote Site with Fewer than 25 Cisco Unified SRST Cisco Unified IP Phones

Cisco 2811 Integrated Services Router

The Cisco 2811 Integrated Services Router provides the following features for medium-sized businesses:

- Voice
  - Optional support for Cisco Unified Communications Manager Express for local call processing in a standalone business for up to 36 Cisco Unified IP Phones
  - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 36 Cisco Unified IP Phones
  - Optional voicemail support
  - Analog and digital voice call support
- Security
  - On-board encryption
  - Support for up to 1500 VPN tunnels with the AIM-EPII-PLUS module
  - Antivirus defense support through Cisco NAC
  - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Wire-speed performance for concurrent services such as security and voice, and advanced services
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Two integrated 10/100 Ethernet/Fast Ethernet ports
- Optional Layer 2 switching support with PoE
- Optional integrated wireless access point

The Cisco 2811 router can support up to 36 Cisco Unified IP Phones during a failure with Cisco Unified SRST. With additional enhanced features, especially security upgrades, this is a powerful upgrade for a remote site.

Due to combined voice and data processing requirements it is sometimes necessary to upgrade to the Cisco 2811 Integrated Services Router.

Teleworker

Cisco 870 Series Integrated Services Routers offer:

- High performance for broadband access in small offices
- Enhanced security, including:
  - Stateful Inspection Firewall
  - IPsec VPNs (3DES or AES)
  - IPS
  - Antivirus support through Cisco NAC and enforcement of secure access policies
- 4-port 10/100 Ethernet/Fast Ethernet managed switch with VLAN support
- Secure WLAN 802.11b/g option with use of multiple antennas
- Easy setup, deployment, and remote management capabilities through Web-based tools and Cisco IOS Software

Cisco 870 Series routers support a variety of small office connectivity options, including:

- Fast Ethernet
- ADSL
- ADSL over ISDN
- G.SHDSL

The teleworker's Internet connection would determine which Cisco 870 Series router would be used.

Applications

- Cisco Unified Communications Manager
- Cisco Unified SRST
- Cisco Unity Express
- Cisco Unity

## Additional Features for Cisco Unified Communications Manager

- Cisco Unified Video Advantage
- Cisco Unified Contact Center Express Edition
- Cisco MeetingPlace Express
- Cisco Unity Connection
- Cisco IP Communicator
- Cisco Unified Videoconferencing
- Cisco Unified Wireless IP Phones
- Cisco Unified CallConnector for Microsoft Dynamics CRM

Cisco Unified Communications Solution:
Unified Communications Integration with Legacy PBX Equipment at Headquarters
Infrastructure Blueprints

Blueprints

Cisco Unified Communications Manager can integrate with legacy PBX systems, providing a migration path for the medium-sized business to a full Cisco Unified Communications Manager environment. This can help organizations reduce telephone operating expenses by facilitating the phased migration from time-division multiplexing (TDM)-based PBX networks to a fully converged Cisco Unified Communications infrastructure.

Specific Design Considerations

- Verify that signaling and protocol standards are supported by the legacy PBX and voicemail systems to ensure interoperability
- Freeze additional expenditures to upgrade and "hybridize" outdated PBX technology; PBX trunk cards will communicate directly with an IP voice gateway
- Cisco Unity can provide voicemail functions to all users on almost all legacy PBX systems
- Cisco Unified IP Phones can be used with most legacy voicemail systems until Cisco Unity is phased in

Figure 5. Cisco Unified Communications Solution: Unified Communications Integration with Legacy PBX Equipment at Headquarters
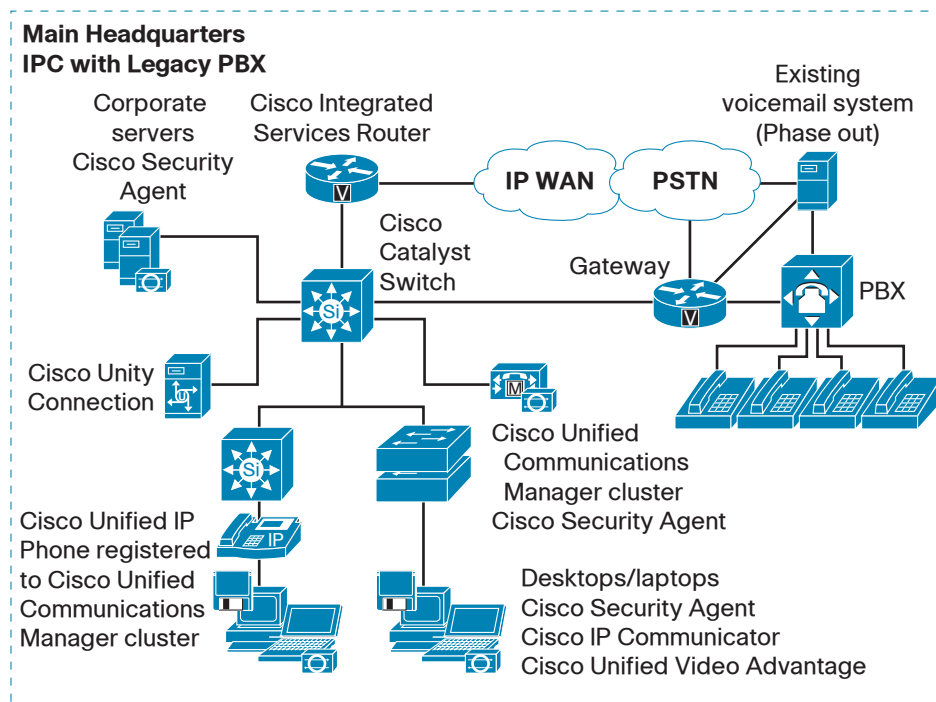
Cisco 3845 Integrated Services Router

The Cisco 3845 Integrated Services Router provides the following support for medium-sized businesses currently supporting or planning to grow to 240 Cisco Unified IP Phones:

- Wire-speed performance for concurrent services such as security and voice, and advanced services at full T3/E3 rates
- Enhanced investment protection through increased modularity
- Increased density through four HWIC slots
- Enhanced network module slot
- Support for more than 90 existing and new modules
- Support for most existing AIMs, network modules, WICs, VWICs, and VICs
- Integrated Gigabit Ethernet ports with copper and fiber support
- Optional Layer 2 switching support with PoE (as an option); supports the 36-port Cisco EtherSwitch module (NMD-36ESW)
- Optional integrated wireless access point
- Security
    - On-board encryption
    - Support for up to 2500 VPN tunnels with the AIM-HPII-PLUS module
    - Antivirus defense support through Cisco NAC
    - Intrusion prevention, stateful Cisco IOS Firewall support, and many other essential security features
- Voice
    - Analog and digital voice call support
    - Optional voicemail support
    - Optional support for Cisco Unified Communications Manager Express for local call processing in standalone business for up to 240 Cisco Unified IP Phones
    - Optional Cisco Unified SRST support for local call processing in small enterprise branch offices for up to 720 Cisco Unified IP Phones

Applications

- Cisco Unified Communications Manager
- Cisco Unity

Additional Features for Cisco Unified Communications Manager

- Cisco Unified Video Advantage
- Cisco Unified MeetingPlace Express
- Cisco Unified Contact Center Express Edition
- Cisco Unified IP Phone 7985G
- Cisco Unified Mobility
- Cisco IP Communicator

Cisco Unified Communications Solution: Video Conferencing Integration

Cisco Unified Communications Manager turns a video call into a phone call and video conferencing into an easy process for any Cisco Unified IP Phone user. A video IP phone or a video-enabled IP phone, using Cisco Unified Video Advantage, can talk to any other video endpoint in or out of the network just by dialing their phone number.

When two video IP phones (either Cisco Unified Video Advantage enabled IP phones or the Cisco Unified Video IP Phone 7985G) call each other, they create a peer-to-peer connection requiring no other resources. If it is necessary to add an additional person or persons to the call, creating a video conference, then the call is moved over to a multipoint control unit (MCU), which will host the video conference. In this type of conference, all users do not have to have a video device; it is possible to conference in audio-only users (a non-video-enabled IP phone). If the third person were to leave the conference, the call then becomes a peer-to-peer call again, releasing the MCU resources for someone else to use.
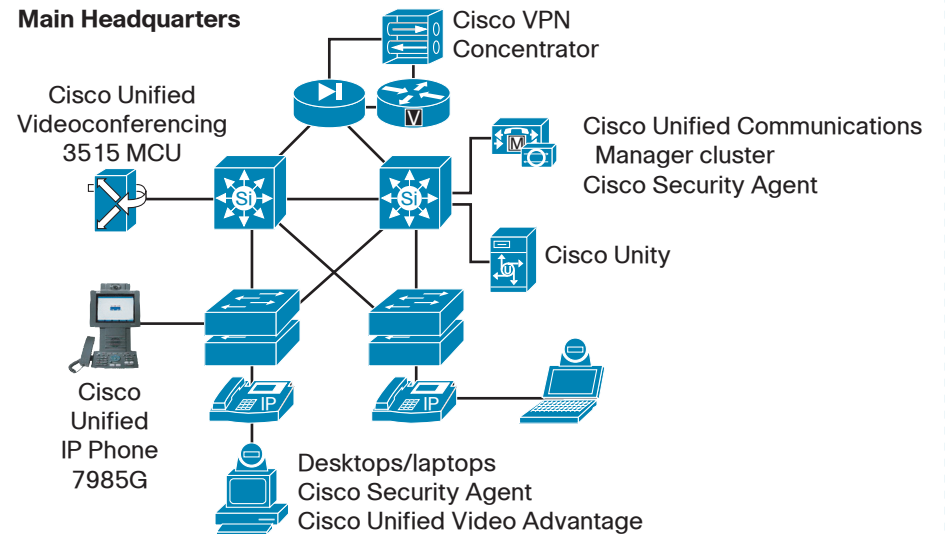
It is possible to bring external video users (video ISDN callers from the PSTN) into a video conference hosted at the company; this is accomplished through Cisco Unified Videoconferencing Gateways. These gateways enable legacy devices on the network and calls coming in or going out through the PSTN to connect to the IP video conference.

Cisco Unified Video Advantage

Cisco Unified Video Advantage brings video telephony to Cisco Unified IP Phones (Cisco Unified IP Phone 7900 Series and Cisco IP Communicator softphone application). It is a video telephony solution consisting of Cisco Unified Video Advantage software and Cisco VT Camera II, a video telephony USB camera. Users make calls from their Cisco Unified IP Phones using the familiar phone interface, and calls are displayed with video on their PCs without requiring any extra button-pushing or mouse-clicking.

Cisco Unified Video Advantage is intuitively designed, easy to use, and delivers convenient access to a host of features:

- Phone association choice—Users can choose to place Cisco Unified Video Advantage video calls with either a Cisco Unified IP Phone or Cisco IP Communicator
- Camera on/off—Users can choose to view incoming video only by turning off their camera

Main Headquarters

Cisco VPN Concentrator

Cisco Unified Videoconferencing 3515 MCU

Cisco Unified Communications Manager cluster
Cisco Security Agent

Cisco Unity

Cisco Unified IP Phone 7985G

Desktops/laptops
Cisco Security Agent
Cisco Unified Video Advantage

- Video check—Users can check their video before calls are placed or received
- Mute video on audio mute option—When users mute the audio on the phone, video is automatically muted until the audio is resumed
- Easy access to video controls—Controls for showing the console, video window options, and video window position are conveniently available from the video windows
- Video signal indicators—Quality of incoming and outgoing video signals are graphically displayed
- Connectivity and status indicators—Graphics indicate the state and availability of the connections to the associated phone device and camera, including muted calls and "no available video"

Cisco Unified IP Phone 7985G

The Cisco Unified IP Phone 7985G is a personal desktop video phone for the Cisco Unified Communications solution. Offering executives and managers a productivity-enhancing tool that makes instant, face-to-face communication possible from their offices, the Cisco Unified IP Phone 7985G has all the components to enable a video call: camera, LCD screen, speaker, keypad, and a handset, incorporated into one easy-to-use unit. As a result, a video call is just a phone call.

Design features:

- All-in-one system designed for personal video in any workspace
- Integrated 8.4-inch LCD
- Ergonomically correct camera and screen position
- Integrated keypad for both voice and video calls
- Softkeys for easy control of the video phone
- Handset, speakerphone, and headset jack
- Access to network data and services
- Online control from your User Options Webpages—Customize your phone's features by using a Web browser on your computer
- A comprehensive online help system—Obtain helpful tips, descriptions, and procedures directly from your phone

Cisco Unified Videoconferencing 3515 MCU

The Cisco Unified Videoconferencing 3515 Multipoint Control Unit facilitates face-to-face discussions among videoconference participants in different locations and from a wide variety of video-enabled devices. The Cisco Unified Videoconferencing 3515 MCU connects three or more H.323, SIP, or SCCP videoconference endpoints. When used with Cisco Unified Videoconferencing Gateway products, H.320 (ISDN) video conferencing endpoints can also participate in the conference.

The Cisco Unified Videoconferencing 3515 MCU offers numerous features and benefits, including:

- High-quality audio and video—The Cisco Unified Videoconferencing 3515 MCU supports a range of H.323 video and audio compression standards and codecs, including the latest H.264 video format for excellent video quality in multipoint conferences. In addition, the MCU has an encoder-per-port hardware architecture that provides high-performance audio and video transcoding capabilities.
- Ease of use—Video conferencing becomes as simple as dialing a telephone number. Individual numbers are set up for virtual conference rooms, and users need only dial the number of that room to become part of the meeting.
- Extensive conference management capabilities—Video conference users sometimes prefer to have direct control of the conference to manage the meeting flow. The Cisco Unified Videoconferencing 3515 MCU offers users and administrators a Web-based user interface, a dual-tone multifrequency (DTMF) interface from video endpoints or standard phones, and the ability to use the video endpoint remote control to control various aspects of the meeting.

Cisco Unified Videoconferencing 3522 and 3527 Gateways

The Cisco Unified Videoconferencing Gateways help enable H.323 users to dial out through the gateway to establish video conference calls at data rates ranging from 64 kbps to 2.0 Mbps. The gateways place calls over ISDN to establish a connection with a remote H.320 system or a voice-only telephone. The gateways also accept inbound ISDN calls from H.320 videoconference systems or telephones and then route those calls to an H.323 endpoint or IP-based MCU.

Cisco Unified Videoconferencing Gateways offer numerous features and benefits, including:

- Ease of use—Users employ familiar telephone-like dialing procedures to place video conference calls, whether from the IP or the ISDN network, making it easy for employees to start using video conferencing and reducing the need for help-desk personnel and onsite support staff
- High-quality video and audio—The Cisco Unified Videoconferencing 3522 and 3527 Gateways support the broad range of H.323 video, audio, and data communications standards, helping ensure high-quality video and audio during a video conference
- Affordability—Available in compact, preconfigured appliances to support even low numbers of video conference calls, the Cisco Unified Videoconferencing 3522 and 3527 Gateways provide an economical way to connect IP endpoints to ISDN networks in SMBs as well as to networks in remote offices of large organizations

Things to consider when planning the design:
When planning this type of design it is necessary to understand the current and future requirements and plan for them.

- If the current requirements are only for network point-to-point video calls, only the Cisco Unified IP Phone 7985G and/or the Cisco Unified Video Advantage solution is required.
- If video conferencing is a requirement, it is necessary to add the MCU to the solution. The amount of video conferencing expected in the future (as well as today) will designate which unit will be required.
- It is possible to add external users to the video conference; if they choose to use a video endpoint to enter into the conference, a video conference gateway will also be required. This gateway will also allow users to dial out and be a part of external video conferences.

Cisco Unified Communications Solution:
Audio, Video, and Data Collaboration Integration

Audio conferencing in organizations plays a large role in employee productivity. For instance; conferencing may enable employees to:

- Receive distanced-based training
- Share ideas
- Collaborate on projects

It is now possible to integrate much more into audio conferencing; for example:

- Data collaboration:
  – Sharing user applications on their desktop machines to truly collaborate on projects
  – Sharing of a user's desktop to receive help on an application or to demonstrate how they have set up the desktop
- Video conferencing:
  – Cut back on travel for face-to-face meetings
 – Delivering classroom-like training to employees without them leaving their desks

Cisco Unified MeetingPlace Express brings all this together and more. It is now possible to to offer employees audio, video, data collaboration, and other features, including:

- Instant messaging during a meeting to other meeting members
- Recording of an entire event, incuding the data collaboration
- Integration with Microsoft Outlook, which enables users to quickly and easily set up a Cisco Unified MeetingPlace Express meeting using the familiar Microsoft Outlook application. This feature sends participants all the Cisco Unified MeetingPlace information they will need to attend.

Cisco Unified MeetingPlace Express can take advantage of the video conferencing solution that discussed in the previous section. The Cisco Unified Videoconferencing 3515 MCU can support many different functions at the same time, including:

- Ad-hoc video conferencing
- Reservation-based video conferencing
- Cisco Unified Communications Manager and Cisco Unified Communications Manager Express Integration
- Cisco Unified MeetingPlace and MeetingPlace Express Integration
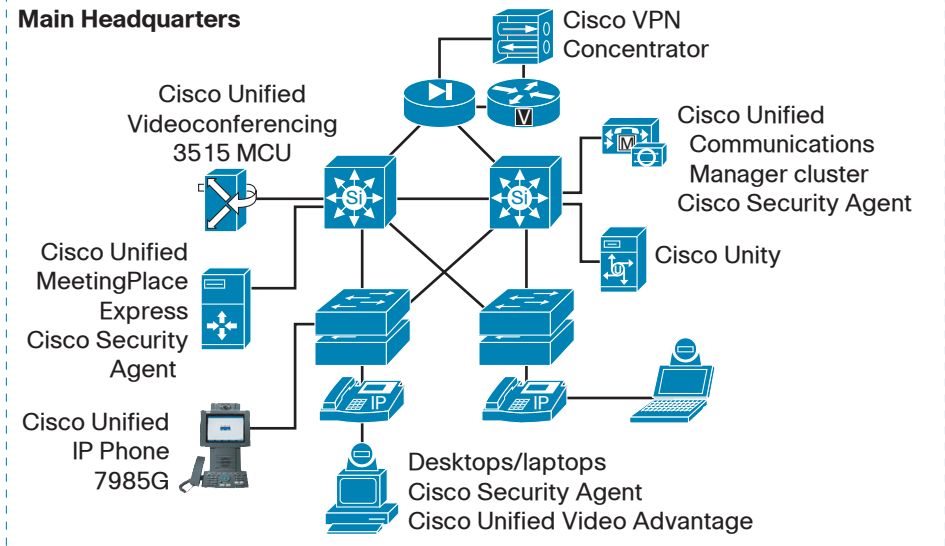
Things to consider when planning the design:

It is important to consider future requirements so that hardware replacement will not be necessary. Consider:

- Amount of sessions required at the same time
- High availability
- Scalability

As this is a conferencing solution, it is necessary to make sure that the previous installation of video includes conferencing. It is also important to make sure that the MCU can scale to the amount of video sessions that will be required during the conference. Video gateways should also be considered, as conferences can involve people outside the company.

Cisco Unified Communications Solution: Presence Integration

Adding presence to a Cisco Unified Communications solution simply requires building on the infrastructure designed in the previous section. Currently, the infrastructure has the following equipment:

- Cisco Unified Communications Manager 6.0
- Cisco Unity 5.0
- Cisco Unified MeetingPlace Express 2.0
- Cisco Unified Video Advantage 2.0
- Cisco Unified IP Phones
- Cisco Unified Videoconferencing MCU
- Cisco Unified Videoconferencing Gateways (optional for legacy and ISDN integration)

The presence solution requires two additional components:

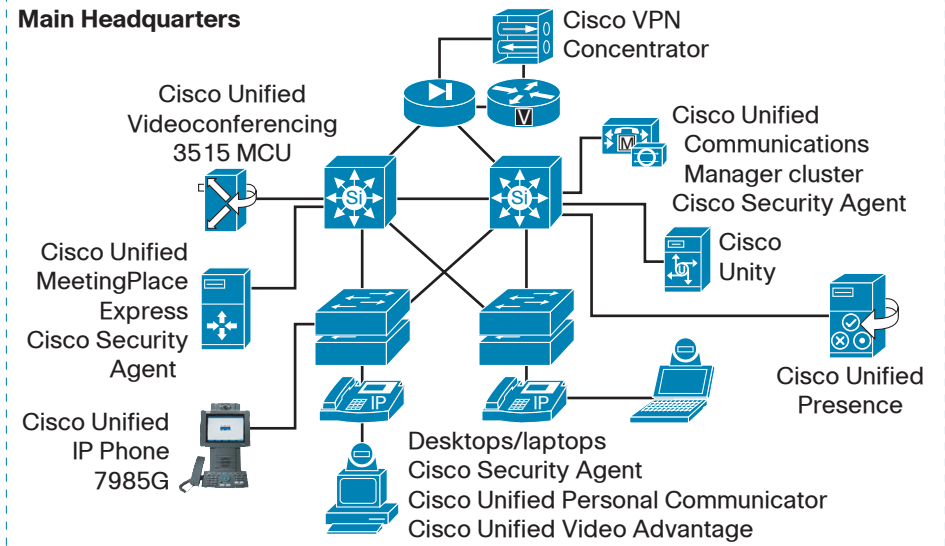- Cisco Unified Presence
- Cisco Unified Personal Communicator

In general, a presence solution requires the following products:

- Cisco Unified Communications Manager 5.x/6.x
- Cisco Unified Presence
- Cisco Unified Personal Communicator
- Lightweight Directory Access Protocol Version 3 (LDAPv3) server or Microsoft Ad (2000/2003)

This gives you basic presence features through Cisco Unified Personal Communicator, including phone presence (the ability to see if the person you are trying to contact is on the phone) and instant messaging.

The Cisco Unified MeetingPlace Express solution presented earlier can also help enable a variety of Cisco Unified Personal Communicator features.

Main Headquarters

Cisco VPN Concentrator

Cisco Unified Videoconferencing 3515 MCU

Cisco Unified Communications Manager cluster
Cisco Security Agent

Cisco Unity

Cisco Unified MeetingPlace Express
Cisco Security Agent

Cisco Unified Presence

Cisco Unified IP Phone 7985G

Desktops/laptops
Cisco Security Agent
Cisco Unified Personal Communicator
Cisco Unified Video Advantage

Cisco Unified Personal Communicator

Cisco Unified Personal Communicator provides many powerful communications features integrated with your desktop computer, including integrated corporate and local directories, click-to-call, voicemail playback, inbound call notification, and media escalation. By being able to control your communications from a single window, you can communicate more effectively and be more productive:

- Find contact information quickly by using Cisco Unified Personal Communicator to search both your existing corporate and personal (Microsoft Outlook 2003 and Apple Address Book) directories
- Click-to-call from the contact list and save time by not having to dial telephone numbers
- Make calls using the integrated softphone or use Cisco Unified Personal Communicator to control your Cisco Unified IP Phone on Cisco Unified Communications Manager
- View recent communications activities, such as who called you and when. View a list of your voice messages on screen, and click to play

Cisco Unified Communications Solution: Presence Integration

- Add communications media on demand. When on a call, you can quickly and easily add video or document sharing to enhance collaboration and meeting effectiveness.
- View a list of all participants on a conference call, eliminating the need for roll calls.
- Receive pop-up notifications of incoming calls. See who is calling and the call type—voice-only or video call—before you answer. You can accept the call if you are available or divert the call to voicemail with a simple mouse click.

Cisco Unified Presence

Cisco Unified Presence helps you deploy SIP technology to support new voice services in your enterprise environment. SIP enhances the voice network by providing a core set of behaviors for session establishment and control that can be applied in a wide array of features and services. In addition to core SIP support, Cisco Unified Presence uses SIP for Instant Messaging and Presence Leveraging Extensions (SIMPLE) technology to support both instant messaging and presence.

Cisco Unified Presence consists of a SIP presence engine and a SIP proxy function. The presence engine collects user presence information (such as busy, idle, away, or available status) as well as user capabilities (such as the ability to support voice, video, instant messaging, and Web collaboration) and compiles the data in a repository for each user. This repository is accessed by the applications and features that each user employs. Unique user rules and privacy can be applied by each user to ensure that only authorized applications and users have access to presence information.

Cisco Unified Presence offers numerous features and benefits, including:

- Standards-based SIP/SIMPLE network interface – Cisco Unified Presence provides a standards-based peering environment for any SIP- or SIMPLE-enabled applications and networks. In effect, any user status that is maintained in Cisco Unified Presence can be requested using the IETF standards for status and presence sharing.
- Cisco Unified Personal Communicator Network Interface – Cisco Unified Presence is required to support the core functions for Cisco Unified Personal Communicator, storing personal data such as status and capabilities for users, as well as their individual rules and preferences.
- Cisco Unified IP Phone Messenger network interface – The Cisco Unified IP Phone Messenger service is included with Cisco Unified Presence and provides Cisco Unified IP Phones with an instant messaging client complete with presence-enabled contacts lists.

- Microsoft Office Communicator interoperability – Cisco Unified Presence helps users with the Microsoft desktop environment to interoperate with Cisco Unified IP Phones connected to Cisco Unified Communications Manager. It supports Microsoft Office Communicator click-to-dial and phone monitoring functions with all the associated features.

Things to consider when planning the design:
As this is a presence solution, it is possible to connect with many different types of voice applications. Each application will either show the presence of that user (for example, "Already on the phone" or "Instant messaging not available for this user") or become part of the presence solution. When an application (such as conferencing) becomes part of a presence solution, it is possible to "drag and drop" the users into the conference. Applications include:

- Video
- Video conferencing
- Audio conferencing
- Voicemail
- Instant messaging

Each application will have pre-requisite requirements, for example:

Video conferencing will require:

- Video endpoint
- MCU
- Video gateway (if external connectivity is required)
- Cisco Unified MeetingPlace or Cisco Unified MeetingPlace Express, depending on the session requirements (this is only needed if the users would like full audio, video, and data collaboration)

It is important to understand the current and future needs of the customer to develop the right solution.
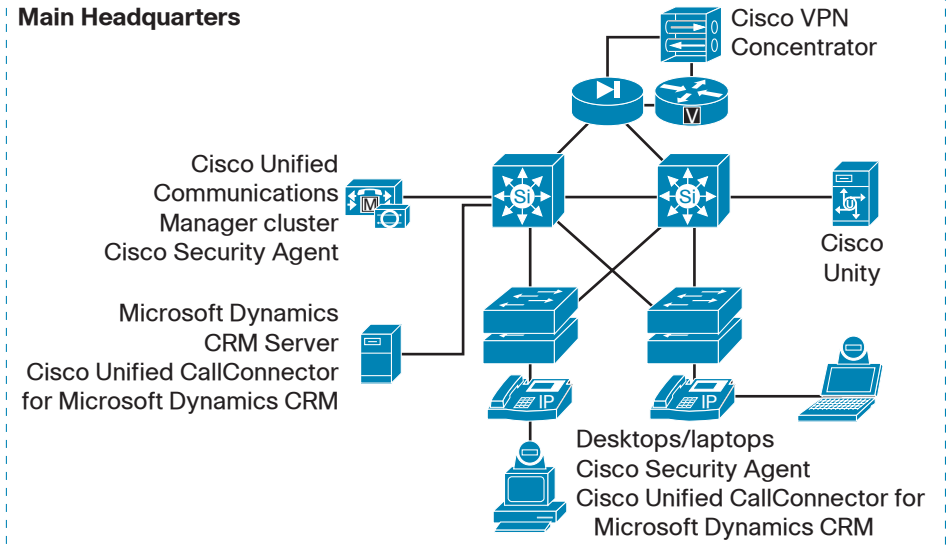
Cisco Unified Communications Solution: CRM Integration

Many vendors have created CRM applications, but few have the ability of scaling down to the SMB like Microsoft. Cisco has co-developed the Cisco Unified CallConnector for Microsoft Dynamics CRM with Microsoft to integrate their Dynamics CRM server into Cisco Unified Communications solutions. The Cisco Unified CallConnector for Microsoft Dynamics CRM currently supports the following features:

Feature	Description
Click-to-dial	Click-to-dial from within a Microsoft CRM contact record.
Screen pops	Provides screen pops of customer contact records or pre-populated phone call activity records.
Call tracking	Tracks and inserts call-related information automatically into phone call activity records, eliminating the need to manually enter call information.
Tracking call duration	Tracks the actual call duration and inserts the time into the Microsoft Dynamics CRM phone call activity record.
Pop associated customer service case	Associates Microsoft CRM Customer Service case with any incoming call or available contact.
Auto-detect platform	Detects integration automatically for Cisco Unified Communications Manager Express or Cisco Unified Communications Manager.
Cisco platforms supported	Integrates with Cisco Unified Communications Manager Express software releases 3.3, 3.4, and 4.0; Cisco Unified Communications Manager software releases 4.x and 5.x; and Cisco Unified Contact Center Express software release 4.0.
Microsoft platforms supported	Integrates with Microsoft Small Business Server 2003, Microsoft Windows Server 2003, Windows 2000 Professional, and Windows XP.

Main Headquarters

Cisco VPN Concentrator

Cisco Unified Communications Manager cluster
Cisco Security Agent

Microsoft Dynamics CRM Server
Cisco Unified CallConnector for Microsoft Dynamics CRM

Cisco Unity

Desktops/laptops
Cisco Security Agent
Cisco Unified CallConnector for Microsoft Dynamics CRM

The Cisco Unified CallConnector for Microsoft Dynamics CRM comprises software that is installed on the user's desktop or laptop and software that is installed on the Microsoft CRM Server. The software is supported on the following platforms:

· Microsoft Dynamics CRM Server 3.0
· Cisco Unified Communications Manager Express 3.2 or later
· Cisco Unified Communications Manager 4.0 or later
· Cisco Unified Contact Center Express 4.0 or later

Things to consider when planning the design:
The solution requires a Microsoft Dynamics CRM Server. It does not work with other CRM vendors at this time. The Cisco Unified CallConnector for Microsoft Dynamics CRM is a free download from Cisco.com; it does not require any licensing from Cisco. No additional server is needed.