Cisco Unified Application Environment

Platform Architecture Guide

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Overview

The Cisco Unified Communications Platform Architecture Guide is designed to help business and IT professionals at all levels, from executive management through software developers and network engineers, understand the technical value and business advantages that can be realized by enhancing an existing Cisco Unified Communications platform by integrating a Cisco Unified Application Environment to create more robust communication and collaboration applications and services. The guide focuses on three key areas: Communications Infrastructure, IP Telephony and Unified Communications Applications.

The platform architecture guide provides detailed insights into the Cisco Unified Communications Solution developed to support enterprise operations across different industry sectors. The focus of the architecture guide is to introduce the Cisco Unified Application Environment and to identify the core components that comprise a standard Cisco Unified Communications Solution, describe typical platform architectures that can be implemented across manufacturing, retail, healthcare and financial services industries and provide examples of the functional capabilities that can be realized by implementing a Cisco Unified Communications Solution. Each solution diagram is presented in generic format to illustrate required Cisco infrastructure, licenses and communication delivery options to implement a Cisco Unified Communications Solution in an N_1 environment.

Scope

This document describes the system and components used to build a Cisco Unified Communication Solution, and it gives recommendations on how to combine those components into an effective solution for your enterprise.

The following topics are *not* covered in this platform guide:

- Installation and configuration of any Cisco Unified Communications Solution components listed in Table 1.0. For more information about these Cisco products, refer to the online product documentation available at cisco.com.
- Cisco Unified Communications Solution programming guidelines.
- Best practices for Cisco Unified Communications Solution implementations.
- Design guidelines for Cisco Unified Communications Solution common infrastructure and IP Telephony solutions.

Cisco Unified Communication Solution

The Cisco Unified Communications Solution is comprised of products and services that span Cisco's vast array of Unified Communications portfolio offerings. At a high level, the solution provides organizations with a number of key benefits across the enterprise that present the opportunity to:

- Streamline business processes by building full-featured applications for converged voice, video and data networks using the first integrated, end-to-end runtime and development platform for unified communications
- Extensible provider framework shields developers from voice complexity
- Abstraction layer simplifies and provides flexibility in telephony protocols
- Framework reduces training and development time
- Single standard application container (similar to a J2EE application server but for IP communications software) provides a common platform that developers, quality assurance (QA), and operations staff can share to manage the reliability, scalability, capacity, and performance of all packaged and custom unified communications applications
- Maximize investments in Cisco technology by leveraging new feature sets and functionality
- Increase operational performance and productivity
- Reduce production times associated with design change or production management decisions

Table 1.0 identifies the systems and applications that comprise a typical Cisco Unified Communications Solution. While not every system and application listed below is required to implement a Cisco Unified Communication Solution there is a core set of Cisco components that are required in any Cisco Unified Communications Solution architecture. However, the enterprise components used in a Cisco Unified Communications Solution may vary greatly depending upon the type of industry and size of business in scope.

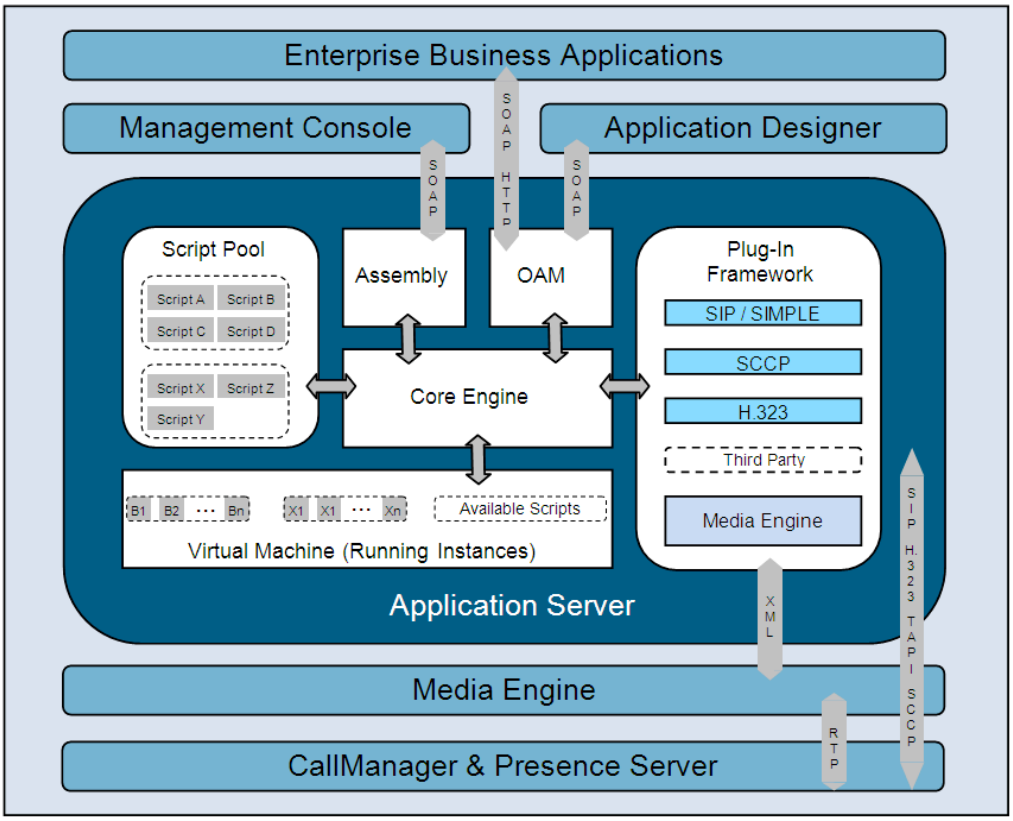
Table 1.0 Cisco Unified Communications Solution Components

Platforms	Clients	Enterprise
Cisco Unified Application Environment	Cisco Unified Personal Communicator	Management Tools
Cisco Unified Communication Manager	Cisco Unified Mobile Communicator	Reporting Tools
Cisco Unity Voicemail	WebEx / WebEx Connect	Web Access
Cisco Unified MeetingPlace	IP Phones	Email
Cisco Unified Presence Server	Mobile Devices	Telephony Services
Cisco Unified SIP Proxy Server		

Cisco Unified Application Environment

In order to leverage the full capability of the Cisco Unified Communications Solution, Cisco has developed the Cisco Unified Application Environment. The Cisco Unified Application Environment is a complete platform for building IP telephony applications hosted within Cisco Unified Communications Manager deployments. Cisco Unified Application Environment allows enterprises to develop mission critical communications and collaboration applications that go well beyond the dial tone. Customers can develop, host and deploy an extensive array of applications to achieve any number of business objectives using Cisco Unified Application Environment in combination with Cisco Unified Communications Manager and other Cisco and 3rd party collaboration applications and platforms.

Figure 1.0 Cisco Unified Application Environment Product Architecture



Cisco Unified Application Environment is an umbrella term for three discrete products:

- Cisco Unified Application Server
- Cisco Unified Media Engine
- Cisco Unified Application Designer

Cisco Unified Application Server

Cisco Unified Application Server provides an extensible plug-in framework that shields developers from voice complexity, reduces training and development time, and easily supports industry-standard or proprietary protocols or interfaces. A virtual machine layer separates application logic from core call routing and manages calls from applications to the Cisco Unified Communications System to protect against immature protocol defects and developer threats due to inexperience or accidents.

In other words, you don't have to be an expert in Cisco Unified Communications Manager to develop cutting edge collaboration applications that run across Cisco Unified Communications Manager deployments. Cisco Unified Application Environment gives the enterprise total control of calls and media streams and reduces development and testing times by using powerful design patterns that are strictly enforced by the Cisco Unified Application Designer. Additionally, Cisco Unified Application Environment is completely extensible so if there isn't native support for a specific application or protocol, most likely it can be built in Cisco Unified Application Environment. In short, if .NET code can be written for the desired API then an extension can built for Cisco Unified Application Environment. In version 2.5 additional languages will be available.

Cisco Unified Media Engine

Cisco Unified Media Engine is a software-only media server that provides ready-to-use and sophisticated media processing capabilities for all applications built with the Cisco Unified Application Designer. The Cisco Unified Media Engine is responsible for performing many IVR related tasks such as playing text-to-speech, wav/vox files, recording streams to wav/vox files and seamless transcoding of G.711, G.723, G.729 and other protocols. Cisco Unified Media Engine delivers Speech Recognition (via Nuance), Voice Fingerprinting (via PerSay), conferencing of multiple streams and DTMF collection and processing.

IVR - The Cisco Unified Media Engine supports IVR functions such as playing prompts, recording audio, detecting and generating dual-tone multifrequency (DTMF) digits, and monitoring for silence and non-silence conditions. Additionally, developers can take advantage of complex termination and barge conditions when building applications to construct highly sophisticated IVR systems.

Conferencing - Developers can take advantage of the native audio mixing capabilities of the Cisco Unified Media Engine when building applications. The Cisco Unified Media Engine performs n-way summing and supports coach and pupil connections for applications that require a whisper or training function.

Transcoding - The Cisco Unified Media Engine frees the developer from implementation concerns associated with transcoding and other media format-related concerns when building an application. The media engine automatically transcodes supported audio codecs when performing conferencing and other multistream operations.

TTS - The Cisco Unified Media Engine offers a sophisticated onboard TTS engine and provides sophisticated voice-generation capabilities. Developers can tune the TTS dictionary by adding their own pronunciations for words that should be pronounced differently and by using the Speech Synthesis Markup Language (SSML) developers can control the pronunciation of phrases in a fine-grained manner.

Speech recognition - Developers can use speech recognition when building applications, for example, to recognize a spoken account code rather than requiring a user to enter the account code on a telephone keypad. The Cisco Unified Media Engine natively supports the Nuance speech platform and the Grammar XML (GRXML) standard.

Speaker verification—Speaker verification can be used, for example, to authenticate a user based on voice rather than requiring the user to authenticate by using a telephone keypad to enter a numeric account code and PIN. This biometric voiceprint authentication capability greatly extends a developer's options when building applications. Voiceprint authentication frees users from having to remember PIN codes and provides the developer with a secure, fault-tolerant method for authenticating these users. The Cisco Unified Media Engine natively supports the Persay speech platform.

The physical location of the Cisco Unified Media Engine servers and Cisco Unified Application Server servers are primarily determined by the applications that will be residing on these servers. In some centralized deployment scenarios Cisco has advised that the Cisco Unified Application Server and Cisco Unified Media Engine servers be collocated in the branch offices (edge of the network) so as to keep the

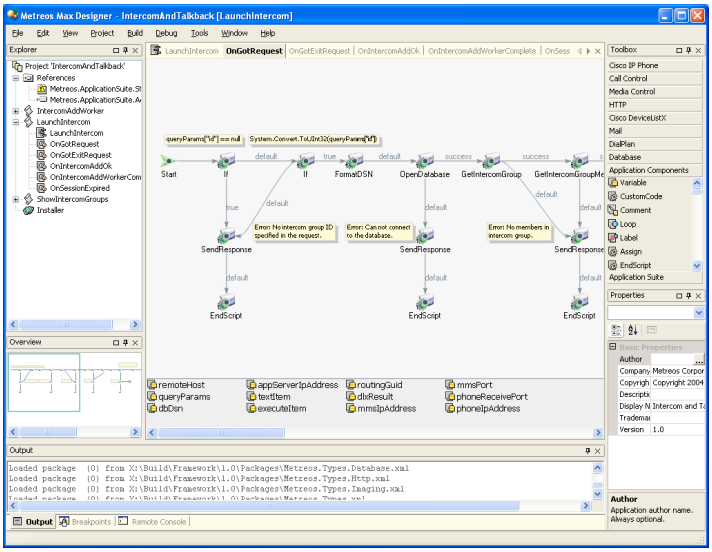
media close to the users and off the WAN to avoid excessive bandwidth consumption and ultimately service delivery delays.

Where bandwidth or WAN traffic is not a concern these servers can be collocated in a data center environment along with the Cisco Unified Communications Managers. Another deployment scenario is where the application server is centralized and the media engines are physically located at the edge of the network as media engines generally store and transfer many of the largest files and media streams that traverse the platform.

Cisco Unified Application Designer

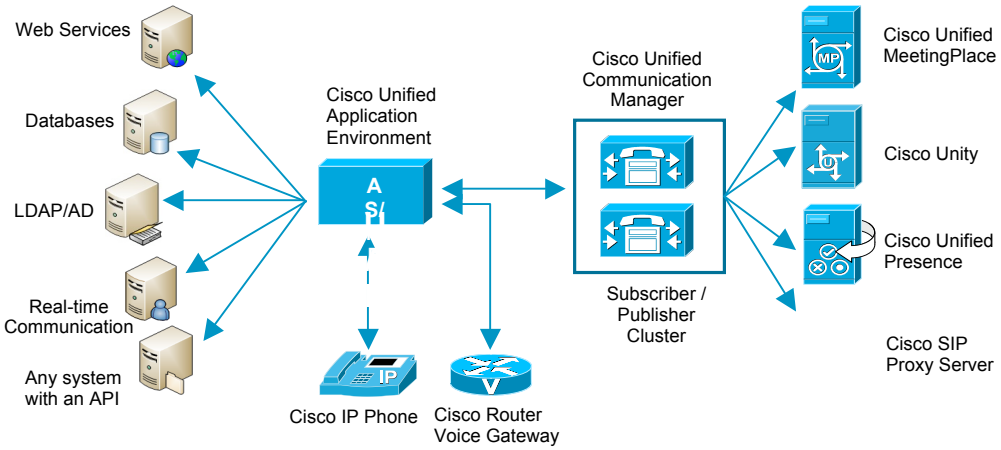
Cisco Unified Application Designer is an integrated development environment (IDE) that runs on a developer's PC. Tightly integrated to the application server single-click deployment of applications means minimal delay in development cycle, resulting in quick and efficient development practices. Cisco Unified Application Designer uses drag-and-drop graphical programming language for rapid and clear construction of application logic including developer flexibility with the freedom to drop into .NET code directly within the Cisco Unified Application Designer to satisfy the most rigorous of application requirements. Cisco Unified Application Designer has all the standard features associated with modern IDEs, such as compile-time checking and runtime-debugging.

Figure 2.0 Cisco Unified Application Designer IDE



Cisco Unified Communications Solution Architecture

Figure 3.0 Cisco Unified Communication Collaboration Solution Architecture



Cisco Unified Application Environment Architecture

Because Cisco Unified Application Environment can be deployed across a number of different Unified Communications environments, using different platform architectures, infrastructure and system level configurations, it becomes necessary to identify and discuss recommended architectures, infrastructure components, configurations and best practices. While there are some hard and fast rules to designing and deploying a scalable, highly available Cisco Unified Application Environment platform, there are also some areas that leave considerable room for creative interpretation to the designers, engineers and architects. The following section discusses the above topics and considerations in detail.

Architecture Sizing Considerations

Although Cisco Unified Application Environment performs relatively complex functions and feature sets it takes only about an hour to install the environment – excluding basic pre/post installation tasks. Cisco Unified Application Environment is supported only on Cisco hardware listed in Table 2.0 and only using the Microsoft Windows 2003 server operating system.

Table 2.0 Supported Cisco Servers

Cisco MCS Server Family	Cisco Unified Communications Manager Appliance	CPU	RAM
7845	MCS-7845-H1	2x Intel Xeon Processor (3.4Ghz)	4GB DDR2
	MCS-7845-I1		
	MCS-7845-H2	2x Intel Xeon 5140 Processor (Dual core 233GHz)	
	MCS-7845-I2		
7835	MCS-7835-I1	Intel Xeon (3.4GHz)	2GB DDR2
	MCS-7835-H2	2x Intel Xeon 5140 Processor (Dual core 2.33GHz)	
	MCS-7835-I2	Xeon 5140 Processor (Dual core 2.33GHz)	
7825	MCS-7825-H2	Intel P4 (3.4 GHz)	
	MCS-7825-H3	Intel P4 (3.4 GHz)	
	MCS-7825-I3	Intel P4 (3.4 GHz)	
	MCS-7825-I2	Intel P4 Pentium D 352 (3.2GHz)	
7816	MCS-7816-H3	Intel Celeron D 352 (3.2GHz)	
	MCS-7816-I3	Intel Celeron D 352 (3.2GHz)	

In addition to the hardware infrastructure listed in Table 2.0, specific environments must also be installed on the server in order to use the core Cisco Unified Application Environment components. Table 3.0 lists these environments. However, Cisco Unified Application Designer is an IDE and as such does not require the use of a Cisco 7800 series server, but rather can be run on any hardware that has 50MB of Disk space, has a Pentium 4 processor or faster, has at least 512MB of memory and contains the software listed in Table 3.0.

Table 3.0 Cisco Unified Application Environment Platform Requirements

Application Server	Media Engine	Application Designer
Windows 2003 Server	Windows 2003 Server	Windows 2000/2003/XP
.NET Framework v1.1		.NET Framework v1.1
JS2E v1.5		Microsoft Web Services Extensions
Apache v1.3 (with PHP)		
MySQL v4.1		

An important design consideration for the Cisco Unified Application Environment solution or any enterprise level solution is availability and redundancy. As detailed in Figure 3.0 the Cisco Unified Application Environment solution interacts with an extensive array of unified communications platforms and systems and as such it is important to understand how availability on one platform will impact other platforms within the same environment.

The following section discusses design considerations for platform component sizing, availability and redundancy in a Cisco Unified Communications Solution. However, these considerations represent a set of general best practices for Cisco Unified Application Environment in a Cisco Unified Communications Solution and will vary depending upon the overall architecture. While Cisco has taken great care to envision common design anomalies there is always the chance that oversight will occur and degrade the overall performance of the solution.

Availability and Clustering

The design and number of Cisco Unified Communications Managers in the Cisco Unified Communications Solution will directly impact the Cisco Unified Application Environment platform as the Cisco Unified Application Environment application server communicates directly with the Cisco Unified Communications Managers and its resident applications. If the Cisco Unified Communications Manager goes down the Cisco Unified Application Environment solution may become unavailable depending upon the overall solution architecture. Hence the need to multi-home Cisco Unified Application Environment to both active and hot standby Cisco Unified Communications Manager clusters is imperative. The Cisco Unified Communications solution should be designed along the same stringent requirements for availability as those for the Cisco Unified Communications Manager clusters. If the Cisco Unified Communications Managers are situated in a distributed environment so should the Cisco Unified Application Environment platform and its resident components.

Cisco Unified Application Environment needs to be thought of like you would think of any other generic server. For some applications and deployments a centralized setup may be best. For other applications a distributed setup would be preferred. Presently Cisco Unified Application Environment has a limited sense of clustering as certain resources are clustered and redundant whereas some applications and application management are not. The net result is that in any application deployment that involves N application servers (where N is greater than 1), all of the application setup and configuration needs to occur N times. Performance issues can arise based the types of low-level functions that are being executed on the server such as HTTP requests and incoming/outgoing calls by protocol.

Other Cisco Unified Communications platforms such as Cisco Unified Presence, Cisco Unity and Cisco Unified MeetingPlace may become unavailable and Cisco Unified Application Environment will still be able to serve voice, data and information, but on a limited basis depending upon which platform has experienced a failure. Designers and architects must decide which services are most critical to deliver to maintain established SLAs. Below are some high level best practices for the application server:

Application Servers should be clustered in a ring configuration - Standby servers should maintain an actively-replicated copy of the configuration database of their designated parent in addition to their individual database. All servers must be configured with the same applications and provider services.

Hot or warm standbys - A standby can function as an active server or it can be dormant. Device pool failover - On failure of parent, standby uses replicated DB info to register parent devices.

Recovery - When coming back online, standby releases registered devices and the parent re-registers them. A standard best practice is to use hot or warm standbys so that the application server can be brought down for maintenance while maintaining delivery services to the enterprise and customers.

Much of the redundancy of the Cisco Unified AE platform is based on the redundancy levels assigned to the Cisco Unified Communications Manager cluster. Cisco Unified Communications Managers use Cisco Unified Survivable Remote Site Telephony (SRST), an embedded Cisco IOS Software running on Cisco routers that provides feature-rich call processing redundancy for centralized Cisco Unified Communications Manager deployments. SRST is described is greater detail in the Cisco Unified Communications Manager section of this document.

The support for Cisco Unified Application Environment redundancy using SRST (with clustering) is subject to these limitations:

- Active calls that involve the failing server may or may not be terminated depending on the signaling protocol used and whether or not the call used media resources that were located on the failing appliance.
- All active application instances and related state information is lost during failover. Applications must take this into account when they are created by the application developer.
- A pair of servers can be both a master and stand-by server to each other. This configuration allows an administrator to place half of the devices to be registered on one server and the other half on the second server. When both servers are up, neither server is fully loaded. Only when a server is down is the other fully loaded. This allows minimum system resource usage during up times thereby creating optimum performance.
- Natively Cisco Unified Application Environment is unaware of SRST and in the event that the CallManagers are forced to resolve a communication failure between Cisco Unified Communications Manager or Cisco Unified Communications Manager clusters, Cisco Unified Application Environment is unable to recover the transmission data that was in process during the failure. However, depending upon the applications present within the Cisco Unified Application Environment, error recovery can be instantiated through application programming at any number of levels.

Figures 4.0 through 7.0 show the four main types of Cisco Unified Application Environment architectures.

Figure 4.0 Single Application Environment Integrated with Single Cisco Unified Communications Manager Cluster

- Only support one Cisco Unified Communications Manager.
- 100 and fewer simultaneous media streams recommended for production deployments.
- WAN not a consideration when located in the same physical environment.
- Redundancy is not required.

Depending upon the applications used in the application environment, Cisco recommends locating the Application Server and the Media Engine on different appliances where the maximum amount of media will be used on the Media Engine.

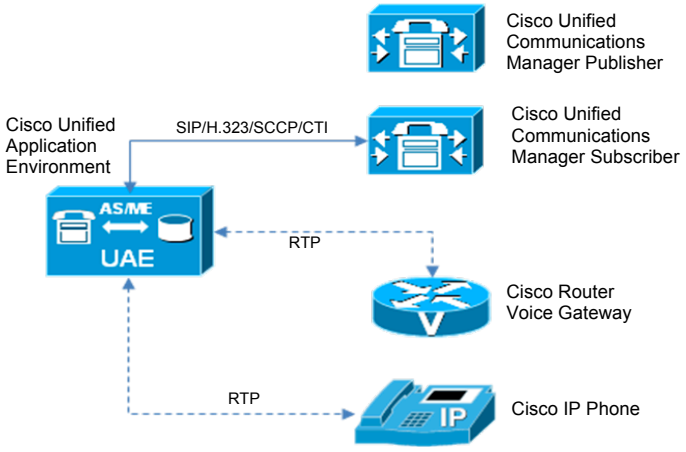


Figure 5.0 Single Application Integrated with Multiple Communication Manager Cluster

- Supports multiple Cisco Unified Communications Managers.
- 240 and fewer simultaneous media streams supported.
- WAN not a consideration.
- Redundancy is not required.

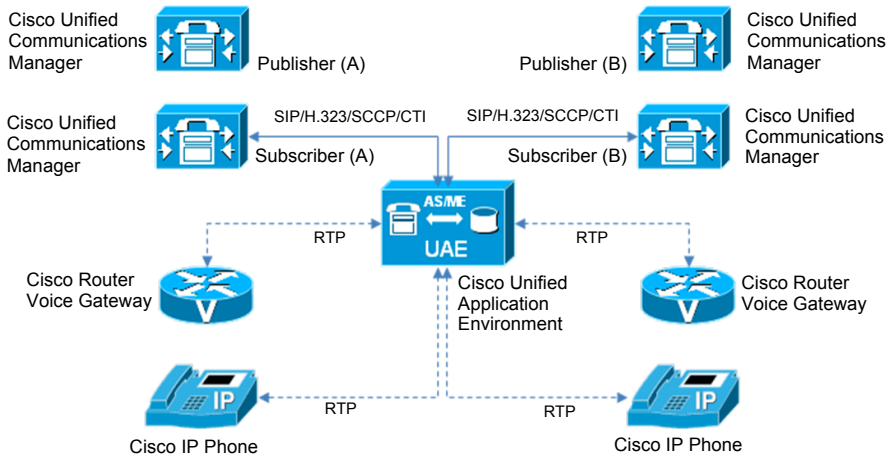
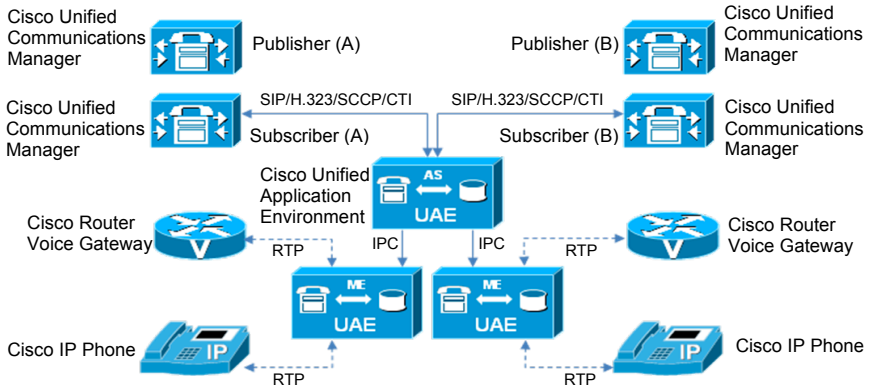


Figure 6.0 Single Application Server Controlling Localized Media Engines Integrated with Multiple Communication Manager Clusters

- Support more than one Cisco Unified Communications Manager.
- More than 240 simultaneous media streams supported.
- WAN is a consideration.
- Redundancy is required for Media Engines.



One of the most common questions raised in the design phase of a Cisco Unified Application Environment implementation is the sizing ratios of Cisco Unified Application Environment servers: how many Cisco Unified Application Servers do I need to support X number of Cisco Unified Media Engines? And how many instances of Cisco Unified Application Environments will I need to support X number of Cisco Unified Communications Managers? Unfortunately the answer is not a simple ratio of 1:1 or 1:2, but rather sizing requirements for Cisco Unified Application Environment should be determined by the number and complexity of the applications that will be deployed across the platform and more specifically directly on the same hardware. Cisco Unified Application Environment deployments can be likened to a platform such as Windows® or a service such as J2EE and as such many of the same performance considerations should be applied in the design of the solution. Cisco Unified Application Environment can support as many Cisco Unified Communications Manager clusters as can be configured by the administrator.

In the current release of Cisco Unified Application Environment 2.4, all applications must reside on the Cisco Unified Application Server, and as such Cisco Unified Application Environment performance and availability is exposed to vulnerabilities in co-resident applications. If Cisco Unified Application Environment is providing services to a simple web server (application) then a smaller server (7816/7825) may suffice. However, if the platform requires heavy lifting such large enterprise applications with databases and the delivery of large media files, then a 7835 or 7845 will likely be the best fit. The key consideration in sizing Cisco Unified Application Environment is that all Cisco Unified Application Environment deployments are essentially co-resident on the Cisco Unified Application Environment server itself, so one poorly written application can seriously impact the performance and scalability of the Cisco Unified Application Environment server for other applications on the same server.

The next release of Cisco Unified Application Environment will support more liberal application deployment scenarios that do not require co-residency with Cisco Unified Application Environment servers and as such Cisco Unified Application Environment scaling will be distinctly separate from application scaling and performance will improve through application isolation.

Figure 7.0 Single Application Environment with Multiple Cisco Unified Communications Manager Clusters

- Support more than one Cisco Unified Communications Manager.
- More than 240 simultaneous media streams supported.
- WAN is a consideration.
- Redundancy is required for Media Engines.

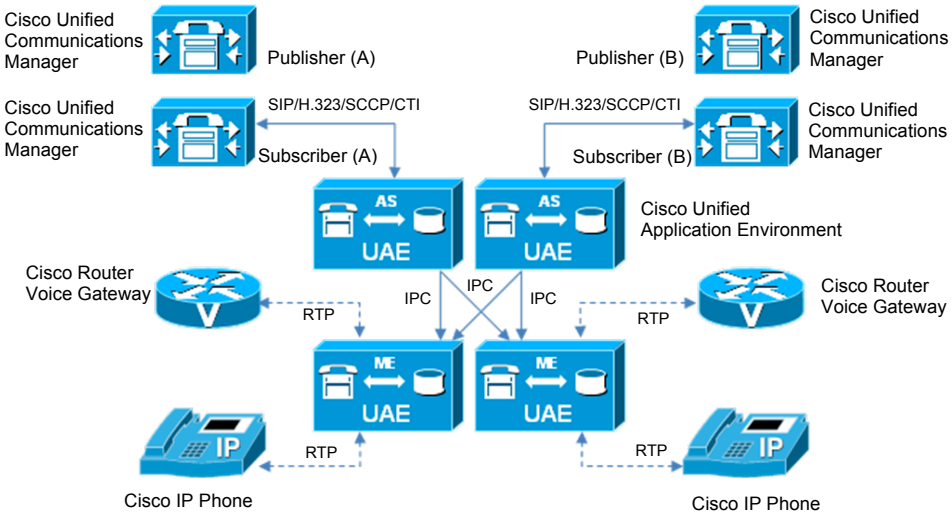


Figure 4.0 represents the most basic deployment scenario for Cisco Unified Application Environment. It also represents the least scalable and redundant architecture. Each component in the architecture is a single point of failure risk and is the least advisable of any Cisco Unified Application Environment implementation.

Figure 5.0 represents one redundant level above Figure 4.0 but only at the Cisco Unified Communications Manager level. In the 5.0 scenarios only the Unified Communications Managers have redundancy and even this is dependent upon their configuration within the architecture in an SRST clustering scenario.

Figure 6.0 shows another type of redundancy scenario whereby both the Cisco Unified Communications Managers and the Media Engines have redundancy. In this scenario the application server is the only single point of failure in the architecture. In this scenario it is possible to configure one or both of the media servers as a redundant application server in the event of failure, however the configuration would be quite complicated and the media servers may experience varying degrees of performance degradation depending upon the applications required to deliver services that would need to be resident on all Cisco Unified Application Environment servers in the architecture. It is not advisable to deploy the media engines as redundant application servers due to the extensive level of management and maintenance these servers would require in the above scenario.

Figure 7.0 shows a fully redundant Cisco Unified Application Environment platform and the optimal Cisco Unified Communications Solution architecture.

Virtualization within Cisco Unified Application Environment presents a number of significant challenges that have led Cisco to recommend against deploying Cisco Unified Application Environment in a virtualized environment. Firstly, while Cisco Unified Application Server could be virtualized, Cisco does not support a production configuration that could be deployed. Secondly, the Cisco Unified Media Engines cannot be virtualized consistently as virtualization hinges on 3rd party software that is extremely sensitive to event timing which something that virtual servers do not natively do well. None of the current VM packages on the market are suitable for a Cisco Unified production environment and at this time Cisco is not actively pursuing this product feature.

Extensibility

Cisco Unified Application Environment supports an extensive array of protocols and application platforms. If a 3rd party application has an API and .NET can be used to write to that API Cisco Unified Application Environment can interface with that application to the degree that the 3rd party application can deliver the functionality that Cisco Unified Application Environment can provide. A complete listing of all protocols supported can be found in the Cisco Unified Application Environment installation and administration documentation.

Cisco Architecture for Voice, Video, and Integrated Data (Cisco AVVID)

Cisco AVVID encompasses the following components:

• Converged client devices	• Telephony/data applications
• Hardware/software	• Network Management
• Directory services	• Service and support
• Call processing	

Cisco AVVID solutions enable you to:

- Deploy IP-enabled business applications
- Implement a standards-based open architecture
- Migrate to a converged network in your own time frame

Cisco AVVID enables you to move from maintaining a separate data network and a closed, proprietary voice unified communication system to maintaining one open and standards-based converged network for all your data, voice, and video needs.

Applications

The following list gives some voice and video applications in the application layer of Cisco AVVID:

- Cisco Unity—The Cisco Unity messaging application provides voice-messaging to enterprise communications.
- Video—IP-TV and IP-video conferencing products enable distance learning and workgroup collaboration.
- Cisco IP IVR—As an IP-powered interactive voice response (IVR) solution, Cisco IP IVR combined with Cisco IP AutoAttendant, provides an open and feature-rich foundation for delivering IVR solutions over an IP network.
- Cisco WebAttendant—This flexible and scalable application replaces the traditional Unified Communication Manager manual attendant console.
- Cisco IP SoftPhone—The Cisco IP SoftPhone, a software, computer-based phone, provides communication capabilities that increase efficiency and promote collaboration.
- Personal Assistant—Personal Assistant selectively handles calls and helps you make outgoing calls. Personal Assistant provides rule-based call routing, speech-enabled directory dialing, voice mail browsing, and simple ad-hoc conferencing.

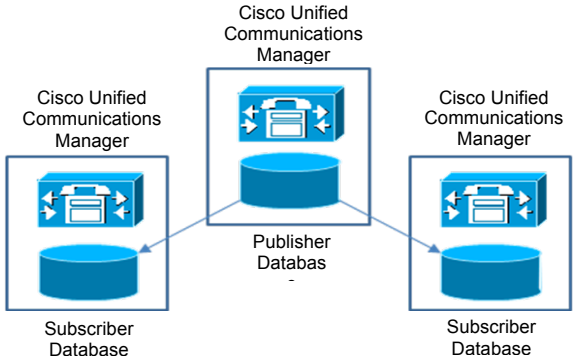
Cisco Unified Communications Manager

Central to the Cisco Unified Communications Solution is Cisco's IP telephony platform comprised of a cluster of Cisco Unified Communications Manager that also include at least one instance of Cisco Unity voicemail. The Cisco Unified Communication Solution is based on the feature rich functionality of Cisco Unified Communications Manager and its ability to traverse multiple collaboration and communication platforms, applications and protocols such as presence, video conferencing, email, SIP, H.323, HTTP, SCCP and others.

The size and number of Cisco Unified Communications Manager clusters and Cisco Unity instances is directly proportional to the size of the enterprise headcount that will be using Cisco Unified Communications Manager as well as the volume of calls to be processed by the system.

Cisco Unified Communications Manager is the software-based call-processing component of the Cisco IP telephony solution. The software extends enterprise telephony features and functions 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 videoconferencing, collaborative contact centers, and interactive multimedia response systems interact with the IP telephony solution through Cisco Unified Communications Manager's open telephony application programming interface (API). Cisco Unified Communications Manager is installed on the Cisco Media Convergence Server (MCS) 7800 series and the Cisco Integrated Communications System (ICS) 7750.

Figure 8.0 Cisco Unified Communication Manager Solution



Cisco Unified Communications Manager Clusters

A cluster consists of a set of Cisco Unified Communications Manager servers that share the same database and resources. You can configure the servers in a cluster in various ways to perform the following functions:

• Database publisher server	• Primary call / Backup call
• TFTP server	• Application software server

When you install the Cisco Unified Communications Manager software on servers, you specify which servers and which Cisco Unified Communications Manager belong to the same cluster. You also specify which server performs which function for the cluster. You can dedicate a particular server to one function or combine several functions on one server, depending on the size of your system and the level of redundancy you want.

Each cluster can have only one database publisher and one TFTP server (either separate or combined). Other servers in the cluster subscribe to the publisher database maintain their own local copies of it. Figure 1.0 illustrates a simple cluster containing three Cisco Unified Communications Managers. For details on cluster size and recommended configurations, refer to the Cisco IP Telephony Network Design Guide.

Call Processing

Cisco Unified Communications Manager, a software-only call-processing application, distributes calls and features; and clusters phones, regions, groups, etc., over an IP network; allowing scalability to 10,000 users and triple call processing redundancy. Cisco Unified Communications Manager provides signaling and call control services to Cisco-integrated applications, as well as third-party applications.

Infrastructure

The following list shows the components of the infrastructure layer of Cisco AVVID:

• Media convergence servers	• Voice trunks
• Switches	• Voice gateways
• Integrated IP telephony solution	• Toll bypass products

Clients

Cisco delivers the following IP-enabled communication devices:

• Cisco IP Phone 7960, 7940, 7910	• Microsoft Exchange Outlook
• Cisco IP Phone 7921 Wireless	• Cisco IP SoftPhone
• Cisco IP Conference Station 7935	• Cisco Sidecar 79xx

All Cisco Unified IP Phones 79xx support Stateless Client Control Protocol (SCCP). Additionally, Session Initiation Protocol (SIP) support is available in Cisco Unified Communications Manager with support of line-side devices, including IETF RFC 3261–compliant devices available from Cisco and other manufacturers. Cisco SIP-compliant devices include the Cisco Unified IP Phone 7905G, 7912G, 7940G, and 7960G models. SIP is also available on the Cisco Unified IP Phone 7906G, 7911G, 7941G, 7941G-GE, 7961G, 7961G-GE, 7970G, and 7971G-GE models.

Cisco IP Telephony Network

The Cisco IP Telephony network includes the following components:

• Cisco Unified Communications Manager	• Conferencing (hardware/software)
• Cisco IP phones	• Media Termination Point
• IOS platforms	• Music On Hold
• Digital & Analog gateways	• Inline power modules
• Transcoders	• Cisco IP SoftPhone

Cisco Unified Survivable Remote Site Telephony

Cisco offers enterprises of all sizes with a cost effective, reliable solution for providing continuous IP Telephony services to branch offices using Cisco Unified Survivable Remote Site Telephony (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 deployments, while leveraging the existing network infrastructure at the remote office. If the WAN link to the remote office fails and the connection to the Cisco Unified Communications Manager is lost, the 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. Cisco Unified SRST is accomplished through an integrated system approach with no additional hardware components and is currently available for Cisco 175x, 1760, 2600, 2800, 3700, 3800 and 7200 Series Routers.

Key benefits offered by Cisco SRST:

- Centralized IP Telephony configuration and management
- Access at every site to Cisco Unified Communications Manager features such as setting up and breaking down calls
- Intelligent and automatic failover configuration with no manual IT or Telecom intervention required
- Cost-effective operations through converged voice and data network
- Remote maintenance and troubleshooting

Cisco Unified Communications Manager (formerly Cisco Unified Communications Manager) is the powerful call-processing component of the Cisco Unified Communications solution. It provides voice, video, mobility, and presence services for businesses with up to 60,000 users. Cisco Unified Communications Manager is a scalable, distributable, and highly available enterprise-class IP telephony call-processing system.

Cisco Unified Communications Manager creates a unified workspace that extends enterprise telephony features and capabilities to packet telephony network devices such as IP phones, media processing devices, voice over IP (VoIP) gateways, mobile devices, and multimedia applications. Additional services, such as unified messaging, multimedia conferencing, presence, collaborative contact centers, and interactive multimedia response systems, are made possible through open telephony APIs.

Cisco Unified Communications Manager, deployable on the Cisco 7800 Series Media Convergence Servers or on third party servers by HP or IBM, includes the following features:

- Highly scalable, supporting up to 60,000 lines per server cluster able to support a full range of communications features and applications, including SIP-based applications
- Highly available for business continuity, supporting multiple levels of server redundancy and survivability
- Support for a broad range of phones to suit varying user requirements
- Choice of operating system environments: Windows server-based implementation or Linux-based appliance model implementation
- Available in an easy-to-manage single-server solution, Cisco Unified Communications Manager Business Edition, that combines call processing and unified messaging

Cisco Unified Communications Manager Deployment Checklist

Table 4.0 Cisco Unified Communications Manager Deployment Checklist

Configuration Steps		Procedures and Related Topics
Step 1	Install the servers and other hardware required for the cluster.	Refer to the installation documentation for the hardware components you are installing.
Step 2	Gather the information you need to install Cisco Unified Communications Manager and any other software applications on the servers. Also, determine how you will allocate the servers in the cluster.	Refer to • *Cisco IP Telephony Network Design Guide* • *Installing Cisco Unified Communications Manager Release 3.1* • *Cisco IP IVR Installation Guide*
Step 3	Install Cisco Unified Communications Manager and any additional software applications on the servers.	Refer to • *Installing Cisco Unified Communications Manager Release 3.1* • *Cisco IP IVR Installation Guide*
Step 4	Configure Cisco Unified Communications Manager groups to provide the desired level of redundancy for device failover and failback.	Refer to Cisco Unified Communications Manager Group Configuration, *Cisco Unified Communications Manager Administration Guide*.
Step 5	Configure device pools and use them to assign specific devices to a Cisco Unified Communications Manager group.	Refer to Device Pool Configuration, *Cisco Unified Communications Manager Administration Guide*.
Step 6	If you are using an intercluster trunk, install and configure it as an H.323 device.	Refer to • *Cisco IP Telephony Network Design Guide* • Adding a Cisco IOS H.323 Gateway or Intercluster Trunk, *Cisco Unified Communications Manager Administration Guide*.
Step 7	If you want to provide call admission control for an intercluster trunk, configure either a gatekeeper or Cisco Unified Communications Manager locations.	Refer to • *Cisco IP Telephony Network Design Guide* • Gatekeeper Configuration, *Cisco Unified Communications Manager Administration Guide.* • Location Configuration, *Cisco Unified Communications Manager Administration Guide.*

Where to Find More Information

- Cisco Unified Communications Manager Configuration, *Cisco Unified Communications Manager Administration Guide*
- Device Defaults Configuration, *Cisco Unified Communications Manager Administration Guide*
- Cisco IP Phone Configuration, *Cisco Unified Communications Manager Administration Guide*
- Gateway Configuration, *Cisco Unified Communications Manager Administration Guide*
- Transcoder Configuration, *Cisco Unified Communications Manager Administration Guide*
- Conference Bridge Configuration, *Cisco Unified Communications Manager* Administration Guide

Cisco IP Telephony Network Design Guide
http://www.cisco.com/univercd/cc/td/doc/product/voice/ip_tele/network

Cisco Unity is a Windows NT and Windows 2000-based communications solution that delivers voice mail and unified messaging in a unified environment.

Unified messaging means that all types of messages can be managed from the same Inbox. Cisco Unity works in concert with an embedded Exchange server to collect and store all messages—including voice, fax, and e-mail—in one logical message store. Users can then access voice, fax, and e-mail messages on a computer, through a touchtone phone, or over the Internet. Unity offers Microsoft Exchange users the ability to play, reply, and send voice mail messages and fax messages using a Microsoft Outlook client plug-in, Cisco View Mail for Outlook – Cisco VMO.

System Requirements

The following lists provide requirements for your phone system and the Cisco Unity server:

Phone System

- Cisco Unified Communications Manager software, version 3.0(9) or later, running on a Cisco IP telephony applications server.
- Cisco licenses for all phone lines, IP phones, and other H.323-compliant devices or software (such as Cisco Virtual Phone and Microsoft NetMeeting clients) that will be connected to the network, as well as one license for each Cisco Unity port.
- IP phones for the Cisco Unified Communications Manager extensions.
- A LAN connection in each location where you will plug an IP phone into the network.

Cisco Unity Server

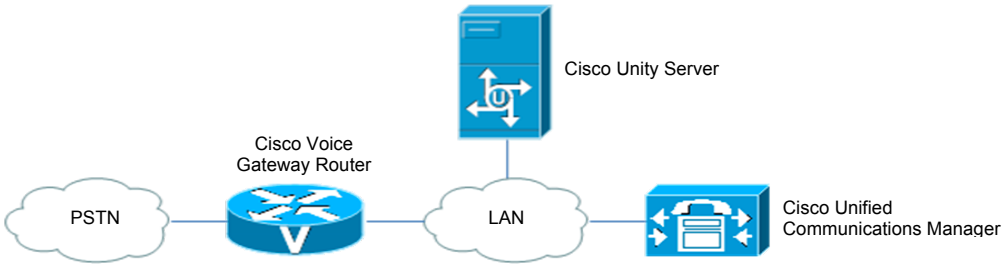
- Cisco Unity, Version 3.0(1) or later, installed and ready for the integration as described in the Cisco Unity Installation Guide.
- A system key with the integration type set to "TAPI" and with the appropriate number of voice-messaging ports enabled. If you are integrating Cisco Unity with two phone systems (Cisco Unified Communications Manager and a second, non-IP phone system), you must set the integration type on the system key to "Multiple Integrations."
- A Cisco license for each Cisco Unity port.

Integration Description

Figure 2.0 shows a Cisco Unity installation integrating with the Cisco Architecture for Voice, Video and Integrated Data (AVVID) network with Connections between the Phone System and Cisco Unity.

* Note Some countries require a phone system between the public phone network and the gateway.

Figure 9.0 Cisco Unity with Cisco Unified Communications Manager



The following steps give an overview of the path an external call takes through the Cisco AVVID network.

1. When an external call arrives, the Cisco gateway sends the call over the LAN to the machine on which Cisco Unified Communications Manager is installed.
2. For Cisco Unified Communications Manager lines that are configured to route calls to Cisco Unity, Cisco Unified Communications Manager routes the call to an available Cisco Unity extension.
3. Cisco Unity answers the call and plays the opening greeting.
4. During the opening greeting, the caller enters either the name of a subscriber or an extension, for example, 1234.
5. Cisco Unity notifies Cisco Unified Communications Manager that it has a call for extension 1234.
6. At this point, the path of the call depends on whether Cisco Unity is set up to perform supervised transfers or release transfers. Refer to the Cisco Unified Communications Manager Integration Guide for more information.

Cisco Unity Configuration Checklist

Table 5.0 Cisco Unity Deployment Checklist

Configuration Steps		Procedures and Related Topics
Step 1	Ensure you have met the system requirements for Cisco Unified Communications Manager and Cisco Unity.	See the "System Requirements" section. Refer to the *Cisco Unified Communications Manager Integration Guide*.
Step 2	Add voice mail ports for each port that you are connecting to Cisco Unity.	Refer to the "Cisco Voice Mail Configuration" section in the *Cisco Unified Communications Manager Administration Guide*. Refer to the *Cisco Unified Communications Manager Integration Guide*.
Step 3	Specify MWI and voice mail extensions.	Refer to the "Service Parameters Configuration" section in the *Cisco Unified Communications Manager Administration Guide*.
Step 4	Enable the DTMF relay feature in the gateways.	Refer to Cisco Unified Communications Manager Group Configuration, *Cisco Unified Communications Manager Administration Guide*. Refer to the *Cisco Unified Communications Manager Integration Guide*.
Step 5	Install, configure, and test the TAPI service provider.	Refer to the *Cisco Unified Communications Manager Integration Guide*.
Step 6	Configure Cisco Unity for the integration.	Refer to the *Cisco Unified Communications Manager Integration Guide*.
Step 7	Test the integration.	Refer to the *Cisco Unified Communications Manager Integration Guide*. Refer to the installation guide for the phone system. Refer to the Cisco Unity Troubleshooting Guide.

Where to Find More Information

- Cisco Voice Mail Configuration, *Cisco Unified Communications Manager Administration Guide*
- Service Parameters Configuration, *Cisco Unified Communications Manager Administration Guide*
- *Cisco Unified Communications Manager Integration Guide*
- *Cisco Unity Installation Guide*
- *Cisco Unity Troubleshooting Guide*

Cisco Unified Presence Solution

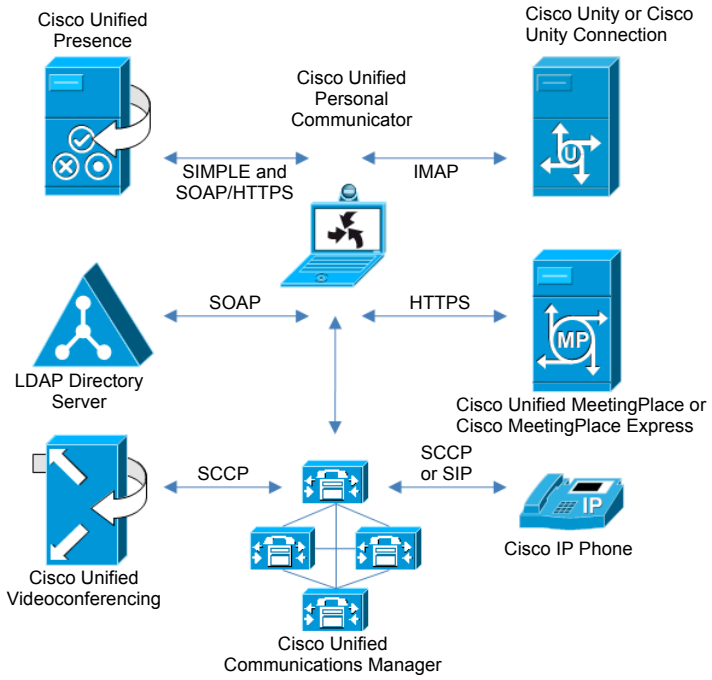
Cisco Unified Presence is a critical capability that helps you realize the full value of a Cisco Unified Communications system. It collects information about a user's availability status and communications capabilities, including whether you are using a communications device such as a phone at a particular time or have Web collaboration or videoconferencing enabled on your system.

Based on information captured by the Cisco Unified Presence, applications such as Cisco Unified Personal Communicator and Cisco Unified Communications Manager can improve productivity by helping users connect with colleagues more efficiently by determining the most effective avenue for collaborative communication. Presence information can be incorporated in applications developed using the Cisco Unified Applications Environment, extending Cisco Unified Presence into customized applications. Presently Cisco Unified Application Environment is independent of Cisco Unified Presence are all feature sets and functionality. In a Cisco Unified Applications Environment solution Cisco Unified Presence is required component and not included with Cisco Unified Communications Manager.

Cisco Unified Presence includes the following features:

- Supports Cisco Unified Personal Communicator and Cisco IP Phone Messenger
- Facilitates applications interoperability using standards-based SIP/SIMPLE implementation
- Supports Microsoft Office Communicator click-to-dial and phone monitoring functions, as well as integration with Microsoft Outlook Calendar and Meeting Notification to help users maintain their availability and status information automatically
- Integrates with the IBM Sametime 7.5 client allowing Sametime users to initiate calls on their Cisco Unified IP Phones by using the click-to-call feature.

Figure 10.0 Cisco Unified Presence Solution



Cisco Unified MeetingPlace / MeetingPlace Express

Cisco Unified MeetingPlace Express VT is a deployment option that provides impromptu voice, video, and Web conferencing for Cisco Unified Communications Manager environments. The solution enhances the effectiveness of your communications by integrating multimedia conferencing functions that enable users to simply extend point-to-point voice and video communications to multiparty voice, video, and Web conferences.

Part of the Cisco Unified Communications system, Cisco Unified MeetingPlace Express is an integrated voice, video, and Web conferencing solution that is deployed over internal networks. It supports industry-standard telephony and video protocols to help ensure connectivity with a range of solutions, including Cisco Unified Communications Manager and Cisco Unified Communications Manager Express.

Cisco Unified MeetingPlace 6.0 includes:

- A Flash-based Web conferencing interface for rapid and reliable meeting entry across multiple platforms without any downloads
- Exceptional graphics capabilities that can automatically scale and optimally display shared content to each Web conferencing participant
- Meeting templates for different meeting types and user roles, including collaborative meetings, presentations, and training
- New functions to support interactivity, such as user status icons
- Support for Web conferences of more than 1000 users in a single meeting

Cisco Unified MeetingPlace 6.0 provides integration with presence and IM applications so that users can:

- Initiate ad-hoc Web conferences from Cisco Unified Personal Communicator
- Initiate conferences from Microsoft Office Communicator

Cisco Unified Personal Communicator

Cisco Unified Personal Communicator allows you easily access voice, video, instant messaging, Web conferencing, voice mail, and presence information from a single, multimedia interface on your PC or Mac. An integral component of the Cisco Unified Communications family of products, Cisco Unified Personal Communicator is a powerful desktop computer application that uniquely integrates your most frequently used communications applications and services. The application features an easy-to-use interface that enables you to:

- Increase productivity and speed decision making: Connect with colleagues on the first try by knowing beforehand whether they are available and how they prefer to be reached.
- Enhance collaboration: Share documents and communicate face-to-face using video and Web conferencing.
- Streamline communications: Manage voice, video, instant messaging (IM), document sharing, voicemail playback, and directories in a single interface.
- Respond faster: Save time by using an integrated toolbar for click-to-call or IM within your Outlook contacts and e-mail.
- Build a competitive advantage: Get answers fast, collaborate in real-time, and respond quickly to customer needs. Cisco Unified Personal Communicator clients are available for both PC and Mac OS. Cisco Unified Mobile Communicator supports an ever-growing variety of mobiles devices such as Nokia/Symbian, Blackberry/RIM and Windows Mobile.

Figure 11.0 Cisco Unified Personal Communicator Solution

WebEx

WebEx is a hosted, subscription-based conferencing service, using an on-demand, software as a service (SaaS) solution. Work with people across companies, across platforms, and across the world—almost as easily as you do face-to-face. Meet online in real time with WebEx. Share documents, deliver presentations, demonstrate applications, and more. WebEx can be used from any standard web browser in the world. WebEx on-demand web meetings combine the ease of audio conferencing with the interactivity of video conferencing and add the power of real-time document/applications/desktop for exceptionally productive collaboration.

WebEx allows you to present information, share applications, and collaborate on projects with customers, partners, and employees around the globe as if you were side by side. WebEx delivers performance you can count on—with a rich set of features, always-on reliability, and high-level security. More information is available at http://www.cisco.com/web/products/webex/index.html.

Differences between WebEx Meeting Center and Cisco Unified MeetingPlace

While there are similar capabilities between WebEx Meeting Center and Cisco Unified MeetingPlace, each has its own unique functionality, which should help you to decide which platform best serves your conferencing requirements. Currently Cisco is completing the integration of WebEx and Cisco Unified MeetingPlace and while not all features and functionality have been integrated, many of the most utilized WebEx features are now available through the Cisco Unified MeetingPlace and WebEx interface.

Two platform configurations are currently available in a Cisco Unified MeetingPlace and WebEx architecture that introduce the WebEx gateway as shown in Figure 8.0 and 8.1.

Figure 12.0 Cisco Unified MeetingPlace and WebEx Architecture (Internal server located in DMZ)

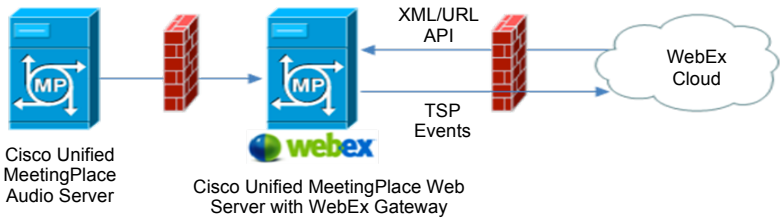


Figure 13.0 Cisco Unified MeetingPlace and WebEx Architecture (Internal/External server)

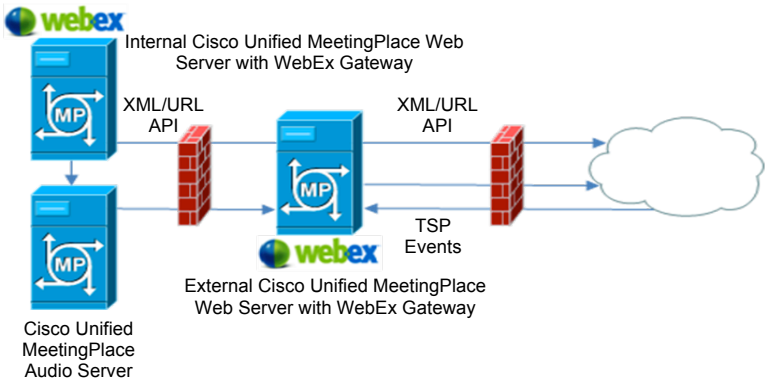
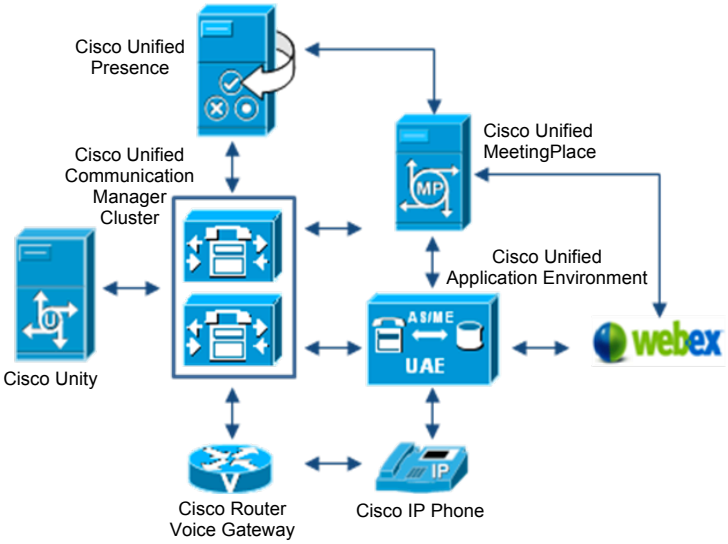


Figure 14.0 shows a Cisco Unified Communications Solution with MeetingPlace and WebEx functionality.

Figure 14.0 Cisco Unified Communications Solution with Cisco Unified MeetingPlace and WebEx Integration



In Figure 14.0 both Cisco Unified MeetingPlace and WebEx are shown as conferencing solutions. The reason for the inclusion of both of the platforms is that currently either solution can be used for web, voice and video conferencing. There is presently a cost differention factor to deploying one or both solutions due to their individual delivery systems and customer use. Cisco sales and account management teams will be able to assist in developing pricing models that will align with your enterprise requirements.

Cisco Unified Application Environment Deployments by Industry

Every Cisco Unified Application Environment deployment must consist of a core set of components:

- Cisco Unified Communications Manager
- Cisco Unity
- Cisco Unified Application Environment
  - Cisco Unified Application Server
  - Cisco Unified Media Engine
  - Cisco Unified Application Designer
- Cisco Voice Gateway Router
- Cisco IP Phone

Figure 15.0 Cisco Unified Application Environment Configuration

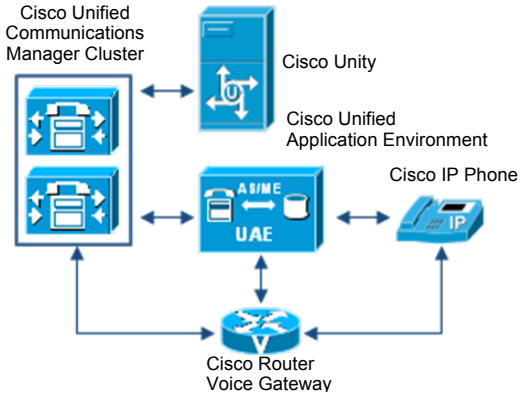
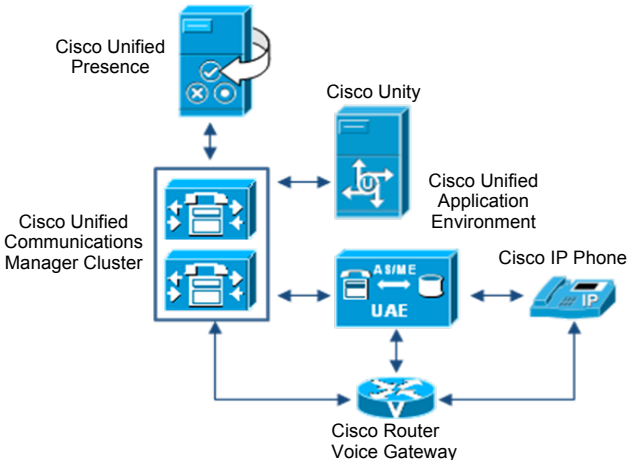


Figure 16.0 Cisco Unified Application Environment with Presence



Regardless of the business type or industry vertical, nearly the deploy a Cisco Unified Application Environment with these baseline level components. The components shown in Figure 15.0 provides for the basic functionality of a Cisco Unified Communication Collaboration Solution. This is the baseline configuration that is needed before integration with the customer environment can occur with the Cisco Unified Application Environment. Notice the solution in Figure 15.0 does not contain a presence component as presence is not a requirement to a baseline Cisco Unified Application Environment. However, not having presence greatly limits the ability of the platform to show the status of various resources. Presence is a key component to any Cisco Unified Application Environment and such it recommended by Cisco that every Cisco Unified Application Environment deploy a presence server as part of the baseline configuration as shown in Figure 16.0.

Now that a baseline configuration has been established we can look at industry scenarios where the Cisco Unified Application Environment plays a critical function in the day-to-day operations of the business.

Manufacturing Case – Emergent Change Software Design

A major manufacturer of airliners is developing a new type of aircraft for production and needs to reduce the time frame for managing emergent change. Emergent change is a circumstance in which an unplanned change within production operations (in the immediate instance on the manufacturing floor) is identified, for example, by an engineer or a team of engineers and is then passed forward for resolution by other personnel that are part of the resolution team. The goal for the Cisco Unified Application Environment is to reduce cycle times associated with resolving emergent changes to prevent slowing the production line.

The manufacturer uses Windchill 9.0 as their Product Lifecycle Management (PLM) platform for manufacturing operations. When an unplanned change is identified an engineer he or she logs into the Emergent Change section of Windchill to initiate a change request. This is done simply through an Adobe PDF form available to anyone via the Internet. This is a familiar and easy-to-use format, but has the power and many advantages as a result of being managed by Windchill workflow. Adobe forms are highly customizable so easy to tailor the look and feel of the form to the needs of the business.

The Adobe form in this case has been integrated into the Windchill 9.0 Emergent Change user interface. The problem identifier then opens the Adobe Change Request form, fills in the necessary information and then submits it into the system. The level of urgency required for the change will dictate which workflow path the change request will follow. All emergent change workflow paths are managed by Windchill as are the personnel identified as part of the problem resolution team. In the immediate instance it is assumed that the type of change needed is of the utmost urgent kind and as such a real-time resolution action is necessary which means all personnel associated with the resolution outcome for this change need to be informed of the change request immediately.

Windchill 9.0 has the capability to display the status of all personnel that will be part of the resolution process. Before the change request is submitted in Windchill 9.0 the problem identifier has the ability to see how other personnel are available either by phone, mobile device, instant messaging or if they are unavailable. This visibility is made possible through direct communication between Windchill 9.0 and the Cisco Unified Application Server which in turn communicates directly with Cisco Unified Communication Managers and Cisco Unified Presence as shown in Figure 19.0.

Figure 17.0 Cisco Unified Application Environment – Windchill 9.0 Manufacturing Production Environment Configuration

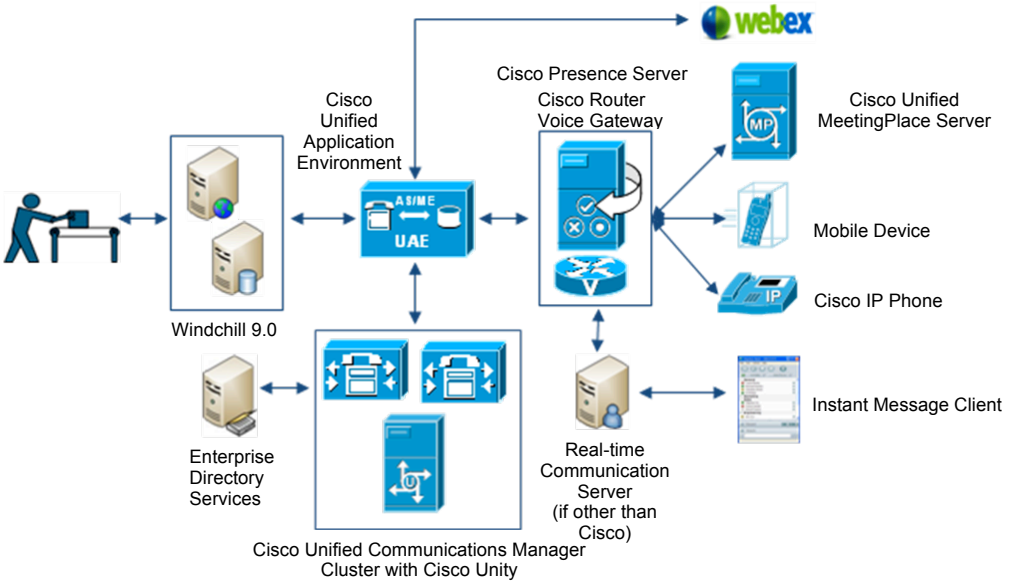


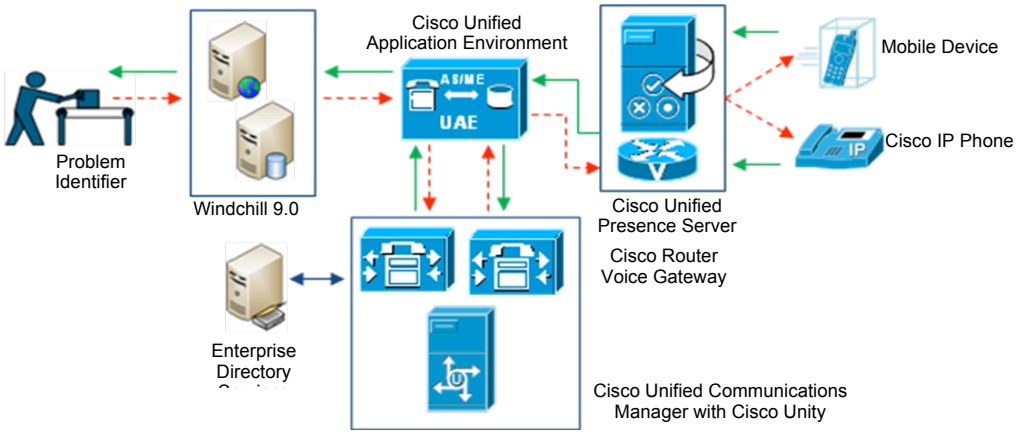
Figure 19.0 shows the process and workflow for an emergent change request:

1. Production change is identified by personnel (problem identifier).
2. Problem identifier logs into Windchill 9.0 to initiate an emergent change request; completes change request form which then logs the change request into the Windchill 9.0 data repository. The problem identifier then submits the change request form.
3. Once the changer request is submitted by the problem identifier, and Windchill 9.0 has logged the change request, the problem identifier is directed to their Task List page where the new change request appears as a new task in their queue. In this case the problem identifier is responsible for routing the issue to the correct personnel. Once the problem identifier opens the new task, all personnel that are needed for the resolution of this particular issue are listed in the task view. The problem identifier simply selects which people the issue will flow to and submits the request for action to those identified as resolution resources.
4. At this point the Windchill 9.0 application server sends a request to the Cisco Unified Application Server to contact all personnel identified as resolution resources. Based on established business rules that are part of the Windchill 9.0 workflow, the request sent to the Cisco Unified Application Server will contain the method by which the resolution resources are to be contacted. The method could be a voice call, email, instant message or as request to join a web conference or voice conference. Generally, the fastest resolution method is by phone call and as such the Cisco Unified Application Server will use Cisco Unified Communication Manager to forward the change request message to the recipient via phone call.

   When a change request is sent from Windchill to the Cisco Unified Application Server and the primary method for contacting the resolution resource is a phone call, the application server then offloads the message to the Cisco Unified Media Engine. The media engine will transform specific text in the request message into a voice message that can be heard by the recipient as described in Step 5.
5. Once the Cisco Unified Application Server has received the change request message and has transformed it into a voice message it sends a request to Cisco Unified Communication Manager to place a call to the desired recipient. If the recipient answers the call, the media engine will play the change request message to the caller at which point the caller will have the option to accept the proposed change request, deny the proposed change request or take no action at that time so as to investigate the issue further. The response is submitted to the system by pressing #1 to “Accept” the change or #2 to “Deny” the change or finally #3 to “Take No Action” or #4 “Contact Problem Identifier.” Again, the business rules dictate which types of options will be available to the message recipient.
6. Any action taken by the message recipient is captured by the Cisco Unified Application Server and sent back to Windchill so that the task information associated with the pending request can be updated in real-time. If by chance the message recipient is unavailable the system will send the emergent change request voice message to Cisco Unity and possibly to the recipients email address if the business rules mandate this workflow path.

Figure 20.0 shows the process and workflow using only a phone call or "click to call" as the preferred method of contacting change request resolution resources.

Figure 18.0 Emergent Change Request Workflow from Windchill 9.0 and Cisco Unified Application Environment



* Red dotted lines show an emergent change request path from Windchill 9.0 into Cisco Unified Application Environment.
* Green solid lines show an emergent change request response path from Cisco Unified Application Environment into Windchill 9.0.

In many instances each of the resources needed to review the emergent change request will not be available through the same communication methods. Some may be available via desk phone or mobile phone while others will only have access to email or instant messaging. It is in these instances that Cisco's Unified Application Environment delivers exceptional value to the business by bridging communication gaps between the various methods available to the resolution resource. Figure 20.0 shows the workflow path where all of the resolution resources are only available through different communication methods.

Figure 21.0 shows the process and workflow for an emergent change request using all available methods for notifying resolution resources of a pending emergent change request:

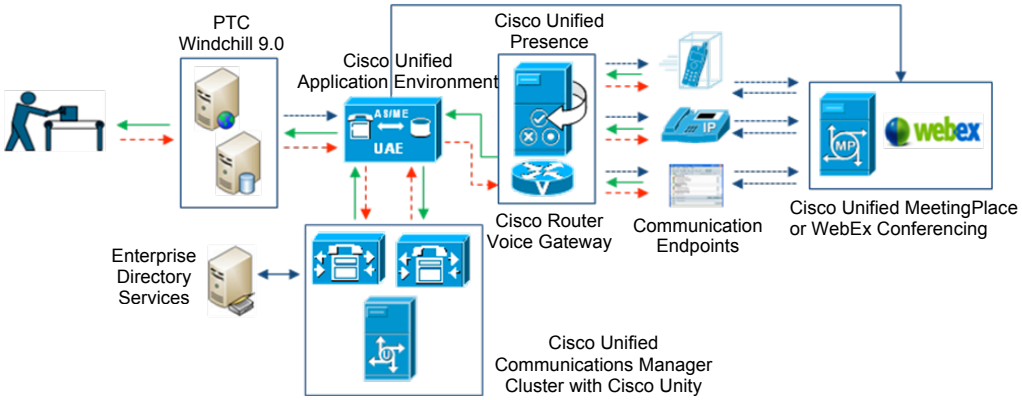
1. Production change is identified by personnel (problem identifier).
2. Problem identifier logs into Windchill 9.0 to initiate an emergent change request; completes change request form which in turn logs the change request into the Windchill data repository. The problem identifier then submits the change request form.
3. Problem identifier is directed to their Task List page where the new change request appears as a new task in their queue and they are able to check availability of resolution resources. Problem identifier then selects which resources are to be contacted for the resolution of the pending change request. In this case the Manufacturing Engineer is available via a desk phone, the Program Manager is available via a mobile phone, the Production Engineer is available via instant messaging or email as he is currently on another call and finally the Operations Manager is on travel and not shown as available a this time.
4. Problem identifier initiates contact with all four team members by selecting the appropriate option from the emergent change submit form and the change request is sent to the Cisco Unified Application Environment. At this point the Cisco Unified Application Environment sends a request to the Cisco Unified Communication Manager to place calls to manufacturing engineer, the program manager and the operations manager while simultaneously sending an instant message and email to the production engineer.

   As noted earlier the operations manager is not available but the business rules for this situation dictate that the emergent change request be sent to all unavailable parties via phone call and email even if the end result of the call is a voicemail left for the resolution resource to review the new change request.
5. The manufacturing engineer and the program manager need more information before they are able to make an informed decision and respond to the request change phone call by selecting option #4 – "Contact Problem Identifier." Within seconds the phone for the problem identifier is ringing and both

the manager and engineer explain the need to drill further into the issue before it can be resolved. The problem identifier returns to the Task List in Windchill, opens the corresponding task and selects the Web Conference option which then performs two actions: 1. Sends an email to all resources identified as resolution resources with a link to a web conference as well as a link to those using instant messaging and 2. Initiates a voice conference bridge for the corresponding web conference. All with the click of a single button. During the web/voice conference, the problem identifier is able to show diagrams of what the change will look like and explain any potential impacts on production the change might invoke.

6. Once the web/voice conference has concluded each resolution resource can either log in to Windchill 9.0 and submit approvals for the change to take place or they have the option to call into Cisco Unified Application Environment, enter the Emergent Change Identifier Number and select the option to approve the change. Cisco Unified Application Environment then submits the change to Windchill 9.0 and the task record is updated in real-time.

Figure 19.0 Emergent Change Request Workflow from Windchill 9.0 and Cisco Unified Application Environment and Web Conferencing



* Red dashed lines show an emergent change request path from Windchill 9.0 into Cisco Unified Application Environment.
* Green solid lines show an emergent change request response path from Cisco Unified Application Environment into Windchill 9.0.
* Blue dotted solid lines show a web conference request path from Windchill 9.0 into WebEx or Cisco Unified MeetingPlace.

It is important to note that Figure 21.0 represents only type of platform architecture. In actuality there are numerous possible architectures that can be constructed in a Cisco Unified Application Environment based solely on the manner in which the Cisco Unified Application Environment is configured. For example, the Cisco Unified Communication Manager can communicate directly with the voice gateway, IP phones, Cisco Unity and other components within the environment. Cisco Unified Communication Manager can also communicate directly with Cisco Unified Application Environment. And of course Cisco Unified Communication Manager can communicate with all components simultaneously using any available protocols that are supported by the component and or application.

Another example is where the H.323 protocol is used within the environment. The Cisco Unified Communication Manager can have the Cisco Unified Application Environment configured as one of the gateways and it can also point to another gateway. Route Patterns can then determine which calls are sent to the Cisco Unified Application Environment and which are sent to the other gateway. Another example is when using SCCP (Skinny Client Control Protocol), the Cisco Unified Application Environment can register virtual SCCP phones with the Cisco Unified Communication Manager and of course the Cisco Unified Communications Manager can have real SCCP phones connected to it.

Clearly there are many configuration options available to the customer, all of which simply rely on the type of deployment environment the customer is seeking to deploy. The major determining factor is how the customer applications and protocols need to work within the environment.

Additionally, in the event of a partial platform failure where an application or component residing within the environment becomes unavailable for service delivery, the remaining functionality of the platform can continue providing communication services until the failed component can be restored to a fully operational status and depending up on the architecture, failures can be significantly reduced through redundancy.

In many instances the resources needed for an emergent change request will only be available through different kinds of devices at the time an action is necessary to move the change request to a resolved state and allow the manufacturing line to continue operating. Emergent change will always be a part of manufacturing operations across the enterprise. Today's strategy for dealing with emergent change requests is real-time collaboration across any user available device. To resolve challenges that occur in real-time, industry needs technology that communicates in real-time. Platform integration has traditionally been the problem for business - getting business applications to send meaningful information across communications platforms. Cisco Unified Application Environment delivers a robust application integration environment that brings enterprise manufacturing and enterprise communications systems together in a single unified environment.

For more information about Cisco Unified Application Environment visit
http://www.cisco.com/web/developer/cuae/index.html

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