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Retail Business Challenge and Solution Overview

Lost Revenue: Inadequate Expertise and Missed Opportunity

Retailers are losing revenue due to inadequate customer service around product expertise and lost opportunities to provide differentiated services. Traditionally, retailers have high employee turnover. According to Gartner, a 2006 study showed that “33% of specialty and 30% of apparel retailers churn more than 100% of their part-time nonmanagement staff annually”. Retailers that want to be perceived as delivering value that go well beyond low prices, such as product expertise or specialized services, are challenged to maintain quality, well trained specialists in every store across their enterprise. In addition, retailers strive to differentiate themselves from the competition by delivering value beyond simple product availability within their shelves. This value can be described as follows:

- **Product Expertise**—Retailers are losing revenue due to a shortage of subject-matter experts within their stores. Retail trends, such as increased online sales, have diminished in-store traffic. The macroeconomic environment has caused consumers to become increasingly thrifty. These factors have forced retailers to reduce margins to remain competitive. As a result, payroll and operational expenses have decreased. This, in turn, diminishes the retailer’s ability to hire and retain qualified personnel, especially for complex or specialized products. Often, employees are asked to do more and more tasks, reducing the capacity for consultative selling of specialized products. Customers, on the other hand, are doing more online research and are better prepared to ask specific questions when entering the retail store location. Store employees cannot become experts in every product and often do not have the research tools available to them on the sales floor; 33% of customers report they had been unable to find a salesperson to help them on their most recent retail experience (Accenture 2007).

- **Expert Services**—Retailers have the opportunity to increase revenue by offering specialized services beyond those currently available within their stores (e.g., home design or remodeling specialists for areas such as cabinetry, electrical, plumbing. Other specialized areas might include nutrition specialists, wedding gift consultants, etc.). Due to payroll constraints, not every store can afford to staff a permanent service area with the appropriate specialist. If they can afford the luxury of staffing highly trained expertise at every location, there is no guarantee that their time will be fully used. Utilization of these experts fluctuates throughout the day, depending on the needs of that stores customer patterns.

- **Specialized Customer Service**—Clear communication between retail employees and their customers is the key to addressing customer needs and offering superior service. However, most stores cannot fully-assist customers that have foreign language or hearing impaired needs since they do not have employees staffed with these language skills. The results are lost sales and a poor customer experience.
The Solution: Cisco's Virtual Expert Management

Cisco's Virtual Expert Management solution enables retailers to directly address the business problems of providing expertise for specialized products, services, or consultative selling by enabling face-to-face consultation through video, voice, and content sharing in the store with the most appropriate subject-matter expert. It locates and seamlessly connects the customer with an expert using skill-based routing and presence availability tracking, enabling all stores to capture the same business opportunity without deploying subject-matter experts at every store. Business principles include the following:

- **Relevance**—Customer interests are automatically matched against qualified and available specialists, regardless of location.
- **Intimacy**—Video-enabled, immersive face-to-face interaction with product specialists becomes a reality and increases sales conversion rate. This personal touch improves customer confidence with the retailer and drives brand loyalty.
- **Efficiency**—Retailers are able to “rationalize” pools of specialists to provide multi-channel coverage throughout the enterprise.
- **Environmental Friendly**—Expenses related to specialist travel and individual store/branch training reduced dramatically. This reduced carbon footprint contributes to “green-initiatives”

The Cisco Virtual Expert Management solution not only addresses the specific business challenges stated above, it also provides a powerful collaboration foundation that allows the retailer to derive other benefits outside of the scope of the main aim of the solution.

**Solution Benefits**

The Cisco Virtual Expert Management solution provides benefits to the customer, retailer, and suppliers that include the following:

- **Overall benefits**
  - Reduces customer revenue leakage by up to 70 percent, doubles conversion rate over audio alone, and almost doubles the number of new products per customer
- **Customer benefits**
  - Ability to communicate face-to-face with a service expert when and where needed in the store.
  - Ability to make purchase decisions with increased understanding of product's functional benefits, tradeoffs, integration complexity, and post-sale usage expectations.
  - Ability to make a complete purchase and leave the store with essential complementary products and services.
  - Ability to receive service assistance in preferred language (including sign language).
- **Employee benefits**
  - Employees can speak with an expert for training purposes when not in use by the customer.
- **Retailer benefits**
  - Demand-based workforce management provides better service and lower overall operations costs—dynamically repositioned customer service agents across multiple stores/time zones to provide more support resources where they are needed based on actual, real-time demand.
  - Increase customer satisfaction by lowering product return rates (e.g., getting the correct product on the first visit).
- Higher revenues due to better-quality up sell, cross-sell, and complete sell activities.
- Higher shopper satisfaction with shopping experience (better informed, promptly available customer service agents).
- Higher shopper loyalty (use retailer's existing customer profile to personalize today's shopping experience).
- Identify most valued customers (loyalty, spend) and offer them premium service, special value or add-on purchase opportunities before they are standing in the checkout line.

- Manufacturer/supplier benefits
  - Able to deliver consistent, accurate, and more in-depth product information, configuration, options, product reviews from manufacturers own marketing systems while they are in the store.
  - Ability to market targeted product messages to customer when they are making their purchase decisions
  - Ability to present incentives directly to customers when they are making their purchase decisions
  - Higher shopper satisfaction due to multi-language expert assistance and in-depth product information in the store
  - More completed sales, less returns with the ability to guide customer through purchase process.
  - Increased incremental revenue through up-selling/cross-selling shoppers, and supplier advertising

The Cisco Virtual Expert Management solution helps retailers differentiate themselves by redefining superior customer service expertise. In addition, many of the solution components may be reused by the retailer to help facilitate a larger communication fabric, greatly enhancing employee productivity and the customer's cross channel experience.

Target Audience

The Cisco Virtual Expert Management solution is designed for visionary retail executives that want to redefine their relationships with their customer-base by providing a superior consultative experience around complicated products or services. This audience includes CXO, VP of Store Operations, voice and data architects, and any position within the business interested in innovative selling methods. This document is intended for the aforementioned audience, as well as, engineers involved the voice or data projects or sales engineers that are interested in how the Cisco Virtual Expert Management solution can be deployed.
Solution Requirements and Process Flow

Scope

The Cisco Virtual Expert Management solution is a powerful, flexible communication solution that can address a variety of technical, business and associated service preferences. The intent of this document is to identify the components that were combined together and to validate specific “use cases” within a retail environment.

This document provides examples of products that were tested together. Lab validation testing is used to demonstrate how these components can combine to address the business problems that were identified in Chapter 1, “Retail Business Challenge and Solution Overview.” The current solution’s scope is restricted to specific products and use cases. However, the reader is encouraged to consider that certain products may already exist in a retailer’s environment that may potentially be substituted for similar functions. Other products and services could be included beyond this scope that could offer dramatic business value. In addition, the solution was restricted to certain use cases of store-to-store and store-to-contact center communication. Home-to-store and home-to-contact center were not tested due to resources and time constraints, but these scenarios would also be potential use cases for this solution. A complete list of components that were validated is available in Chapter 3, “Solution Details.”

Solution Requirements

Specific requirements are addressed within the scope of this solution:

• Audio and Video Conferencing between the customer and expert—This solution provides several options to enable audio and video consultation between the customer and the expert. The quality of video and associated products are flexible to the needs of the retailer and allows for the capability of the solution to increase as the needs of the retailer increase.

• Ability to define and search for multiple types of expertise—This solution can intelligently and automatically search for any administratively predefined ranges of expertise.

• Rich Collaboration—Bidirectional document-sharing allows either the client or the expert to input information into relevant documents, web pages, or customer-related material.

• Peripheral Device Sharing—The solution provides the option to print shared documents or collateral locally or at another location of the customer’s choice.

• Multimedia Playback—The solution provides the ability for the expert to play multimedia content (instructional videos, prerecorded material) for the customer.
• Self Assisted Model—The solution must be capable of being deployed at a retail location that would allow a customer the confidence to operate the Virtual Expert Management service without needing the assistance of a retail employee.

• Survey—The solution is capable of providing the customer with an optional, customized survey at end of session by directing them to an appropriate URL.

• Security—Secure interactions between customer and expert include many options for session encryption and privacy settings. These designs build on best practices for a secure enterprise architecture.

**Solution Use Case Walk-Through**

The customer enters the retail store featuring the Cisco Virtual Expert Management solution and approaches or is led to the Virtual Expert station. The Virtual Expert station would be located in a customer services area, an area where special product services are provided or in an isle next to the featured products (e.g., Wine selection). **Figure 2-1** shows the process flow of providing expert assistance to a customer.
Note

Dotted process steps are optional based on deployment scenarios and implemented solution components.

The following steps describe the flow in Figure 2-1:

**Step 1**
Using the virtual expert station, the customer searches for a product of interest. This web portal would typically be the retailer’s existing E-Commerce site, or a custom portal for a specific set of products or services.

**Step 2**
Once the customer finds a product of interest that may need advanced configuration or additional professional services, there will be a link on that page enabling the customer to **Talk to Expert**. See Figure 2-2
Step 3  After the customer clicks on Talk to Expert button, the web portal server would use the Cisco WebDialer WSDL service to place a call from the kiosk/phone that the customer is at to the appropriate expert queue.

Step 4  An optional step to include is database lookups for additional customer data or features such as desktop sharing. Once the customer is connected to the expert queue, the script could be configured to request additional information from the customer before processing the call. Typical information that would be requested from a customer includes customer home phone number, account numbers, and transaction numbers. This information allows the expert advisor locator system to retrieve additional information from a customer or systems database. In addition, the location of the customer can be determined by the phone number of the customer kiosk and referenced in a database that includes all VEM stations. This information is used to customize messages subsequently sent to the experts.

Step 5  The expert advisor locator service sends out instant messages to one or many experts soliciting their assistance with a customer. If a database lookup was performed, this solicitation could include information such as the customer's name, annual purchasing, or last purchase. Expert selection is also based on queuing method (longest available agent, most skilled, or least skilled) or spatiality (closest match among numeric attributes).

If an expert is not available, queue scripting would typically include forwarding the call to a Customer Contact Center agent or answering service. See Figure 2-3.
An optional solution component is recording (enhance customer service, meet emerging legal requirements). The audio session between customer and expert can be recorded in several deployment scenarios. Currently, recording of video streams, desktop collaboration and TelePresence calls are not supported. Recordings using NICE are logged and stored for reporting and audits. See Figure 2-4.
Step 6  When an expert accepts a contact offer, the offers to the other experts are revoked. If a database lookup was performed, additional information could then be provided in the subsequent messages. See Figure 2-5.
Figure 2-5    Customer Accepting Contact Offer

The expert advisor locator system then connects the expert and customer with voice and video. When additional collaboration is needed, a desktop sharing session can be started. Desktop sharing is available via several products. In this example, the expert is able to remotely control the customer's desktop using WebEx Access Anywhere. The link for the session is provided in the acknowledgement message along with the necessary credentials. See Figure 2-6.
Step 7  Once connected, both the customer and the expert are able to collaboratively control the virtual expert station desktop. The expert can direct the customers browsing experience, help complete complex product web ordering forms, and provide the expert services that the customer needs, keeping the sale in the store. See Figure 2-7.
Step 8  Once the conversation is complete, the expert directs the customer's web browser to a satisfaction survey site.
Solution Details

The Cisco Virtual Expert Management solution is specifically targeted at retailers. Cisco has created the Connected Retail model to provide innovative, relevant, and consistent solutions that work together to address the existing and future challenges of today's retailers.

Connected Retail Overview

Connected Retail is Cisco's industry vision that allows retailers to use the strength of the network to connect their brand to today's consumers who are increasingly digital and mobile. Connected Retail solutions are designed to address the many different facets and challenges that face retailers, from one unified platform. Each solution uses the same scalable and standardized architectures. Connected Retail's value is demonstrated through the following four portfolios, each of which is focused on addressing a different aspect of a retailer's business needs:

- Customer Experience Transformation—A portfolio of solutions that help a retailer transform and differentiate a customer’s experience within their stores.
- Employee Optimization—A portfolio of solutions that are targeted towards increasing efficiency of a retailer’s workforce.
- Secure Store—A portfolio of solutions that address security and compliance within a retailer’s enterprise environment.
- Lean Retail—A portfolio of solutions that help a retailer “do more with less”. Data center applications are implemented to expand and contract dynamically with the demands of the resources. Stores are streamlined to minimize cost while increasing functionality.

For more information about the Connected Retail solution portfolios, refer to the following URL: http://www.cisco.com/go/retail

Solution Framework

Cisco's Customer Experience Transformation solution portfolio is comprised of solutions that were developed and tested using Cisco’s Connected Retail framework. This model depicts the relationships between applications and the network infrastructure. Figure 3-1 depicts the Virtual Expert Management solution framework. The solution framework is divided into three functional layers: applications, core common services, and physical infrastructure.
Applications

Business and collaboration applications connect users and business processes to the infrastructure. The Applications layer of the framework depicts Cisco’s business and collaboration applications. Examples include Contact Center Agent desktop, WebEx, and Cisco’s Unified Video Advantage. Cisco’s Unified Communication Suite enables collaboration services across the Virtual Expert Management solution. Although these applications are being depicted for the utility that they bring to the Virtual Expert Management solution, it is important to recognize the greater reusable value to the retailer. Applications services are the connection from the Applications layer to the Core Common Services layer.

Core Common Services

This is where filtering, caching, protocol optimization interact with applications or application middleware services to optimize the performance from the network to the end user. Specific services that are used within the Virtual Expert Management solution include call processing, expert location services, call recording and presence.

Physical Infrastructure

The Physical Infrastructure layer is where the physical infrastructure resides. The Connected Retail reference architecture provides the foundation of the Physical Infrastructure layer. These network architectures exhibit best practices for retail networks and provide the robust foundation for higher-level services and applications. Each of these architectures contain additional products and features of a fully functional enterprise network and provide a contextual backdrop beyond what is necessary for the Virtual Expert Management solution. For more information about Connected Retail, see the following URL: http://www.cisco.com/go/retail
Virtual Expert Management Solution Architecture

The Virtual Expert Management solution is comprised of products from several areas of Unified Communications, primarily Contact Center Enterprise. Cisco Unified Contact Center Enterprise provides the core call handling needed to receive and direct calls for the expert queue. Customer Voice Portal is specifically where the customer call is queued and enables advanced call capabilities to gather information and handle exceptions. Cisco’s Expert Advisor product is used in conjunction with Cisco Unified Presence to locate experts and request their availability to engage with a customer. Once an expert accepts an offer they are connected using voice and video to the customer’s station. Video can take several forms including TelePresence, Cisco Unified Video Advantage and Cisco IP Video Phones. During the session with the customer, the expert can start a collaborative desktop sharing session using one of several different options; WebEx meeting, Cisco Meeting Place, or WebEx Access Anywhere. These allow the customer and expert to jointly view and control desktop applications (e.g., a web browser) and for the expert to assist the customer in their products of interest. While the customer and expert are conversing, their conversation is being recorded for audit/quality assurance using the NICE recording solutions (non-TP endpoints). Figure 3-2 depicts the logical relationship of the solution components.
Protocols and Services for Virtual Expert Management Solution

Virtual Expert Management is comprised of a complex set of systems located primarily in the retailers’ data center. Figure 3-3 shows an overview of many of the protocols and services of the solution and the flows between them.
The protocols used by the applications deployed need to be considered when implementing quality-of-services in the enterprise, and is covered in more detail in Chapter 4, “Design Considerations.”

**Solution Components**

Many systems are needed to create the Virtual Expert Management solution. The Virtual Expert Management solution is conceptually broken down into several functional groups based on the capabilities they bring to the solution. Each component of the solution and its function is briefly described here.

**Store Endpoints**

Two main scenarios tested in this solution contrast the products of Cisco TelePresence and Cisco Unified Video Advantage. The Virtual Expert Management solution is flexible and allows for many different types of communication channels and technologies from the customer to the expert. Validation in Cisco's laboratories was restricted to several deployment models using several different endpoints. This was not an exhaustive effort of every possible configuration, nor did it account for some additional plausible scenarios.

Common to the two scenarios are the products of CUPC, a Web browser, and desktop phones.
Cisco Unified Personal Communicator

A powerful desktop computer application that allows easy access to communications applications and services such as voice, video, instant messaging, Web conferencing, voice mail, and presence information from a single, multimedia interface on your PC or MAC. This client is a virtual or soft phone with both voice and video capability. The Cisco Unified Personal Communicator (CUPC) is one of the optional user interfaces in the solution.

Cisco Unified Personal Communicator is currently one of the two supported instant messaging clients of Cisco Expert Advisor. It is used by the expert agents to receive and respond to support requests. Both the customer station and the expert station use the CUPC client. Expert agents advertise their availability to the Cisco Expert Advisor system via their presence status in CUPC. On the customer stations the CUPC client can be used as a voice and video endpoint or solely for its instant meeting capability. CUPC includes the ability to automatically start an instant collaborative meeting session using Cisco WebEx or Cisco Unified MeetingPlace. The CUPC client is configured with the experts meeting account information (e.g., username and password) the CUP Server is configured with the meeting site information and this configuration is sent to the CUPC client. The CUPC meeting capabilities are best used for implementations where the expert needs to share their desktop and web browser with a customer rather than the customer sharing to the expert. When using the CUPC client the customer station is configured to start meeting sessions automatically, the expert clicks the start meeting button in the CUPC session window. Both the customer and expert stations open windows and join the new instant meeting. The expert can immediately start sharing their desktop and show the customer relevant information. For instances where the expert needs to view the customer desktop, WebEx Access Anywhere provides the most seamless experience, for more information see the “Remote Assistance” section on page 3-13.

The validated endpoints include the following:

- Cisco TelePresence—High Resolution
- Cisco Unified Video Advantage—Lower Resolution

Cisco TelePresence

Cisco TelePresence Station (CTS) 500 units provide high-definition video and stereo audio communication between customers and experts as shown in Figure 3-4. Their large screen format and high-quality video provide a true to life experience for face-to-face communication. The CTS 500 units are the most affordable with a smaller 37-inch display, single, primary codec, stereo-only audio and simple pedestal and wall mounting options. They connect to the network via a single Ethernet cable. Configuration and management is simple via Cisco Unified Communications Manager the same as other voice and video endpoints. Cisco TelePresence offers several resolution and quality settings that cover a broad range of available bandwidths. Each of these options are listed in “Bandwidth Considerations” section on page 4-2. Cisco TelePresence systems are the best solution option for supporting sign language. More information on Cisco TelePresence can be found at the following URL: http://www.cisco.com/go/telepresence.
Cisco Unified Video Advantage

Cisco Unified Video Advantage (CUVA) is a camera that provides video telephony functionality to Cisco Unified IP phones, 7900 Series, and Cisco IP Communicator softphone application as shown in Figure 3-5. Cisco Unified Video Advantage uses the familiar phone interface to make and receive video calls from Cisco Unified IP phones with the video component being displayed on the PC/Kiosk. Installation is comprised of Cisco Unified Video Advantage software and a Cisco VT Camera II (a video telephony USB camera). Currently, video resolutions up to 352x288 are supported. Video bandwidth and other configuration is simple via Cisco Unified Communications Manager regions. Video starts automatically after the call is passed to the expert from the virtual expert queue. Best functionality was achieved using a second 4 to 3 ratio monitor connected to the customer stations with the video displaying full screen. Even with the lower resolution, quality and performance were acceptable for most use case situations.
scenarios and it is the most cost effective video solution in conjunction with using Cisco 7900 Series IP phones as the user handsets/speaker phone. More information on Cisco Unified Video Advantage can be found at the following URL: http://www.cisco.com/go/cuva.

**Figure 3-5  Store-to-Store Using Video Advantage**

**Cisco Agent Desktop**

Cisco Agent Desktop (CAD) is a computer telephony integration (CTI) solution for IP-based contact centers that allows contact center agents to use powerful tools that help increase agent and supervisor productivity, improve customer satisfaction, and reduce costs. An intuitive GUI decreases IT dependency and simplifies customization, maintenance, and change management. Features a robust CTI screen pop, soft phone with media termination, and agent/supervisor coaching capabilities. Agents see
customer information in an enterprise data window and an optional screen pop. The Cisco Agent Desktop requires minimal screen space and allows agents to customize its capabilities to meet their individual needs.

Data Center Components and Services

Products in this solution enable experts to be configured, located, and used. How does the expert know what customer needs assistance? Using Cisco Customer Voice Portal (CVP), the scripting capabilities enable the entering of information before a call is queued. Typically, you would have the customer enter their phone number or CRM-based club card number. This would enable the CVP system to perform information lookups across databases and provide the resulting information in the offer and acceptance requests that are sent to the expert. These messages are sent to the expert via their Cisco Unified Personal Communicator (CUPC) client as instant messages directly from the Expert Advisor system. Additionally, the Expert Advisor product also supports the use of Microsoft Office Communicator as an instant messaging and presence service.

Cisco Unified Expert Advisor

Cisco Unified Expert Advisor (CUEA) is the core component of the Virtual Expert Management solution. It is available as an optional feature for Cisco Unified Contact Center. It extends the contact center so that highly trained experts can handle certain incoming calls. For example, there might be a call for which the contact center agent and the caller require a discussion with, or advice from, a specialist who is not employed by the contact center, but who agrees to be ‘on call’ to provide services as a consultant. That person is the expert advisor.

Expert advisors establish their presence and availability to take a call by the state of their instant messaging (IM) client; for example, available or away. The expert advisor IM client effectively serves as the “agent desktop” for experts who establish their willingness to take a call by responding to a message (e.g., Are you available to handle this contact?). Once an expert’s availability and acceptance of the message request are confirmed, the call is routed to the expert. The contact center agent can also conference the expert into a customer call.

For more information, see the Administration and Configuration Guide for Cisco Unified Expert Advisor at the following URL: http://www.cisco.com/go/ea

Expert Advisor

The expert advisor is an informal or occasional agent. Providing assistance is not their primary job, and thus, they may reject tasks. Also, since experts may not be at their desk at all times, they may not be reachable at their primary phone number. To accommodate these restrictions, the CUEA system uses an IM client instead of an agent desktop. IM clients provide a “lightweight” installation option for the expert advisors and expert advisors tend to be already familiar with the technology so that additional training is not required.

IM presence is used instead of explicit login. If an expert advisor is unavailable or not logged into IM, requests are not directed to that expert advisor. Tasks are offered through the IM client and the expert advisor can accept or reject the task. The system is configurable as to how long it waits for a reply, but by default an expert advisor has 30 seconds to respond to the request. If the expert advisor mistyped the phone number, the system will re-query them for the correct phone number to call. The expert advisor can also specify a different number for the system to call.
User Management—Adding Users, Queue Assignment, Skills and Attributes

The list of available users in the CUEA system is based on users configured on the presence server and synchronized to the expert advisor system based on a schedule. As new presence users are added (either manually or via integration with directory systems), they are then available to be added and configured as expert advisors. When a user is added to the expert advisors group, their skills and attributes are configured and assigned as desired. Once configured these users are now available for queue membership by direct assignment or based on skill and attribute capabilities.

Assignment queues are used to match expert advisors with incoming contact requests. Assignment queues have a one-to-one relationship with Unified ICM Skill Groups. When an assignment queue is created on the CUEA system, a Unified ICM Skill Group is also created and tied to the assignment queue.

There are two selection strategies for assignment queues that can be used:

- Queue ordering (longest available agent, most skilled, or least skilled)
- Spatial (closest match among numeric attributes)

Expert advisors are matched with assignment queues via membership rules in one of two ways:

- Expert advisors—Expert advisors are assigned directly to the assignment queue
- Skills and attributes—A combination of skills and attributes are specified for the assignment queue. Expert advisors are deemed eligible to be offered tasks from the assignment queue if the expert advisor's skills and attributes fall within the skill and attribute parameter ranges of the assignment queue.

An assignment queue is created for each group of expert advisors or skills to which call requests is routed. The queue is then configured to have agents directly assigned by selecting expert advisors on the membership tab, or by specifying skills and attributes on the membership tab.

- If **expert advisors** is selected in the Membership tab, then expert advisors are assigned directly to the assignment queue. When requests are routed to the queue, available expert advisors defined for the queue can receive the request.
- If **skills and attributes** is selected in the Membership tab, then only expert advisors who meet the criteria of the skills and attributes selection are routed the requests.

Skills are classifications for expert advisor abilities, general knowledge, and expertise. The skills summary page on the expert advisors system details the skills that are defined on the system. The summary page displays the skill name and a description for each skill. Once the skills have been defined they can then be assigned to expert advisors and assignment queues and used for proper call routing of incoming contacts.

When adding expert advisors there is a list skills that can be selected for each expert created or edited. Simply check the box next to the names of the skills to add, optionally edit the competency level for each skill assigned. Competency can range from 1 to 100, with 100 being the most competent. The default is 50.

Custom Messages to Expert Advisors

Message sets are collections of messages that can be sent to or received from expert advisors. Each set of messages contains a set of text strings that are either sent to or received from an expert advisor when certain call events (such as a login, a call transfer, or failover) occur.

The CUEA system includes a set of system defined messages that can be copied and customized to meet many needs, such as defining messages in a foreign language, or for multiple formats, for example, HTML and TEXT.
Messages can use token replacement strings for information sent to the expert advisor. There are two types of token replacement strings that can be used; non-call detail (NCD) and call detail (CD).

There are four NCD token replacement strings:

- **NCD:UserName%**—The login name of the user
- **NCD:UserID**—The ID of the user
- **NCD:TimeLeft%**—The amount of time left to accept the request
- **NCD:InvalidNumber%**—The invalid number that the system tried to call

CD token replacement strings are strings created from system and call attributes, as defined in the **Daily Management > Attributes** menu of the expert advisor system. To retrieve string information from databases the ICM router will need to be configured for database routing. ICM scripts are then crafted to retrieve information from databases, for example, based on caller entered digits or calling phone number, and populated to peripheral variables that are passed to the expert advisor system as call data.

As an example, an attribute can be created called **CustomerName** and mapped to a contact attribute source (e.g., PeripheralVariable1), then referenced using a token replacement string in the message to the expert advisor using this syntax **%CD:CustomerName%**. These token replacement strings are replaced with their current value when the message is sent to the expert advisor. See the default message sets for example usage.

Steps for configuring databases in ICM and attributes in expert advisor systems are available in Appendix B, “Quick Installation and Configuration Steps for Virtual Expert Management.”

**Cisco Unified Presence Server**

Cisco Unified Presence Server (CUP) is a standards-based enterprise platform that brings people together in and across organizations in the most effective way. This open and extensible platform facilitates the highly secure exchange of availability and instant messaging (IM) information between Cisco Unified Communications Manager and other applications. Cisco Unified Presence is an essential component in the Virtual Expert Management solution. It integrates the functionality of Cisco Unified Expert Advisor with the experts located throughout the organization so they can be reached using instant messaging instead of having to log into a fat and expensive agent desktop client. Users configured in the CUP server are the base users available for selection in Cisco Unified Expert Advisor. CUP server also provides instant meeting functionality to the CUPC client. Both Cisco Unified MeetingPlace and Cisco Webex meeting services can be configured in the CUP server and applied to different groups of users. Meeting settings are pushed to CUPC clients when logging in and enable the instant meeting feature when communicating with other CUPC-enabled end clients. More information on Cisco Unified Presence can be found at the following URL: [http://www.cisco.com/en/US/products/ps6837/index.html](http://www.cisco.com/en/US/products/ps6837/index.html).

**Voice Applications**

The call-processing function of the solution is comprised of several applications that work in coordination to establish intelligent call management. It not only provides basic call establishment, but also offers advanced call treatment for intelligent call routing across channels to appropriate resources and self-service applications.
Cisco Unified Communications Manager

An enterprise-class IP telephony call-processing system that provides traditional telephony features as well as advanced capabilities, such as preference, and rich conferencing services. Cisco Unified Communications Manager (CUCM) creates a unified workspace that supports a full range of communications features and applications with a solution that is highly scalable. Each CUCM cluster can support up to 30,000 users and the clusters can be distributed for scalability, redundancy, and load balancing. CUCM provides the logical addressing (phone numbers) within the solution and is the core call management component.

Cisco Unified Contact Center Enterprise

An intelligent contact routing, call treatment, network-to-desktop computer telephony integration (CTI), and multichannel contact management over an IP infrastructure. It combines multichannel automatic call distributor (ACD) functionality with IP telephony in a unified solution, enabling the rapid deployment of a distributed contact center infrastructure. As a core component of the Virtual Expert Management solution, Cisco Unified Contact Center Enterprise (CUCCE) applies business logic to customer calls and is the glue integrating the other components such as Cisco Unified Communications Manager, Cisco Unified Customer Voice Portal, Cisco Unified Expert Advisor and gateways. Contact Center agents connect using a client to track and support customer calls. The system monitors the resources available in the contact center to meet customer needs, including agent skills and availability, interactive voice response (IVR) status, and queue lengths.

For more information on Cisco Unified Contact Center Enterprise, see the following URL: http://www.cisco.com/en/US/products/sw/custcosw/ps1844/index.html

Cisco Unified Intelligent Contact Management

A combination of multichannel contact management, intelligent routing, and network-to-desktop computer telephony integration (CTI) capabilities that virtualize contact center routing, reporting, and computer telephony integration across heterogeneous and distributed third-party automatic call distribution (ACD) and interactive voice response (IVR) systems. It interfaces with carriers’ intelligent networks for pre-routing and delegation of calls targeted to one or more contact centers. It segments customers and monitors resource activity and availability, delivers each contact to the most appropriate resource anywhere in the enterprise and profiles each customer using contact-related data, such as dialed number and calling line ID. It assigns the most appropriate resources to meet a customer's needs based on real-time conditions (such as agent skills, availability, and queue lengths) continuously gathered from various contact center components. Cisco Unified Intelligent Contact Management (CUICM) is a core component in a Cisco Unified Contact Center Enterprise implementation. It performs the core call-routing functionality between services and systems, integrated database lookup functionality, and all call logging.

Cisco Unified Customer Voice Portal

An intelligent, personalized self-service over the phone application. Enables customers to efficiently retrieve the information they need from the contact center. Customers can use touch-tone signals or their own voice to request self-service information. If they request live agent assistance, Cisco Unified Customer Voice Portal (CVP) can place a call in queue until an appropriate agent is available and then transfer information given by the customer directly to the agent along with the call itself to provide a seamless customer service experience. In addition, Unified CVP can support video interactions, including self-service, queuing, and agent across mobile devices and kiosks. Unified CVP hosts the various expert advisor queue scripts created for each pool of products and services. It facilitates the
transfer of calls to the VXML gateway and manages call recovery. Cisco Unified Customer Voice Portal is the preferred call-queuing product for Cisco Expert Advisor and the Virtual Expert Management solution.

For more information on CVP, see the following URL:

Remote Assistance

Several products were validated to provide the remote assistance capabilities needed for a remote expert solution. Initially the best options integrated tightly with the Cisco Unified Personal Communicator capability of starting an instant meeting (see “CUPC Instant Meetings” section on page 4-7). But the best product for collaborative desktop sharing was found to be Cisco's WebEx Access Anywhere. Compared to WebEx Meeting Center and Cisco MeetingPlace which have many manual steps to perform for desktop sharing, Cisco's WebEx Access Anywhere is able to connect automatically to the in store customer station and instantly share the customers desktop. Cisco Webex Access Anywhere provides the most seamless user experience of any of the remote assistance options tested.

Each of these products evaluated have a number of useful features as described below and provide a great deal of options and flexibility for a virtual expert solution.

Cisco WebEx

A hosted service that offers several different products with various capabilities. These include real-time desktop sharing with phone conferencing so that the client sees the same collateral that the remote expert is sharing. This service is only available as a hosted service but has a road map of capabilities that include behind the firewall recording and mixing of sessions using an on-premise appliance. This option can be contrasted with the Cisco MeetingPlace products, but as a service can scale dynamically as needed to meet current and future business needs. More information about the WebEx suite of products is available at http://www.webex.com

WebEx Access Anywhere

Cisco WebEx Access Anywhere is a sub-component of both Cisco Meeting Center and Cisco WebEx Remote Support. It enables remote control of a computer via a preconfigured agent that is installed on that computer. The WebEx Access Anywhere sessions can be easily started via a URL link used by the expert. The link can be provided in the instant message along with user credentials needed to access the customer station. The expert is able to instantly see what the customer is looking at and take control as needed to assist the customer. The service enables dual desktop control of the mouse and keyboard, there is no need to switch control back and forth between the expert and the customer. This service also enables the expert to print to a printer connected to the customer station, as well as direct file transfers between customer and expert (i.e., the customer inserts a USB drive to receive a file or digital receipt from the expert). The WebEx Access Anywhere service provides the most seamless experience for a customer using an off the shelf product. Screen shots and installation steps for Cisco WebEx Access Anywhere is available in Appendix B, “Quick Installation and Configuration Steps for Virtual Expert Management.”

WebEx Meeting Center

Cisco WebEx Meeting Center integrates closely with Cisco Unified Personal Communicator. It enables an instant meeting to be started between the expert and the customer with a click of button on the CUPC client. The CUPC client is configured with the experts WebEx account information (e.g., username and
password) the CUP Server is configured with the WebEx site information and this configuration is sent to the CUP client. WebEx Meeting Center is best used for implementations where the Expert needs to share their desktop and web browser with a customer rather than the customer sharing to the expert. When using the CUP client the customer station is configured to start meeting sessions automatically, the expert clicks the start meeting button in the CUP session window. Both the customer and expert stations open windows and join the new instant meeting. The expert can immediately start sharing their desktop and show the customer relevant information. Using meeting center, the desktop sessions can be set to automatically record via the site settings. To enable automatic recording both Network-Based Recording and Unlimited Overage options need to be added to the site profile. Management of recordings and various features can be achieved through the published API interface.

WebEx Remote Support

Cisco WebEx Remote Support combines several virtual expert management features in a single “hosted as a service” product. It does not include any of the other products mentioned (e.g., CUCM, CUEA, CVP, CUP, CUPC, CUICM, etc). Call flows are process through WebEx and direct via VIOP. WebEx Remote Support includes WebEx WebACD, a Web-based ACD where queues and experts can be created and managed. For each ACD queue a Click-to-Connect link and Web icon is created that can be embedded in the retailers site for both internal and external customer access. This link and icon change dynamically based on whether agents are available to provide immediate support or to leave a message. Experts load the WebACD client and are assigned to various queues by a supervisor/manager. When a customer clicks on the remote support link their browser loads a thin client (similar to Meeting center) and connects them to the WebACD queue. The customer is prompted for basic information items (e.g., name and a phone number) as information that can be passed to the agent. An agent would then select the new customer from the WebACD queue and be connected with voice and video. The voice connection supports both voice-over-IP (VoIP) within the browser, if the customer has a microphone and speakers connected to their PC, or via a phone line as a callback to the customers entered phone number. The agent can then also share their desktop, or view the customer desktop as desired. Upon completion of the session, the customers’ web browser is automatically directed to a survey site where they can provide feedback. WebEx Remote Support also includes integrated recording of voice, video, and desktop sharing sessions. WebEx Remote Support also is capable of remote printing and drag and drop file transfers. As a hosted-service WebEx Remote Support is a quick and easy solution for virtual expert management to both customers at home and in the store. WebEx Remote Support is also the most flexible, enabling expert agents to provide assistance from anywhere via a simple Web browser. More information regarding WebEx Remote Support can be found at the following URL:

Cisco Unified Meetingplace

Cisco Unified Meetingplace is an in-house service (contrasted with the hosted Cisco Webex service) that allows real-time desktop sharing with phone conferencing so that the client sees the same collateral that the remote expert is sharing.

Cisco Unified Meetingplace integrates closely with Cisco Unified Personal Communicator. It enables an instant meeting to be started between the expert and the customer with a click of button on the CUPC client. The CUPC client is configured with the experts Meetingplace account information (e.g., username and password) the CUP Server is configured with the Meetingplace site information and this configuration is sent to the CUPC client. Cisco Unified Meetingplace is best used for implementations where the expert needs to share their desktop and web browser with a customer rather than the customer sharing to the expert. When using the CUPC client the customer station is configured to start meeting sessions automatically, the expert clicks the start meeting button in the CUPC session window. Both the customer and expert stations open windows and join the new instant meeting. The expert can immediately start sharing their desktop and show the customer relevant information.
Recording

There are several well known products that facilitate recording of call center audio sessions. In the Virtual Expert Management solution, NICE fulfills this requirement.

NICE Perform Recording

Compliance recording within the contact center and experts in the store has become a necessity for businesses to ensure compliance with both external and internal regulations and procedures. Non-compliance can cost millions of dollars in fines and litigation, damage business reputation, increase customer churn, and raise exposure to fraud. Recording customer interactions provides a valuable tool for:

- Compliance with regulations requiring recording
- Dispute resolution and legal defense
- Verbal contract documentation
- Accuracy verification
- Employee compliance monitoring and verification

The NICE Perform Recording solution offers a reliable and resilient compliance recording solution, enabling contact centers, stores, corporate offices, and other sites to document all information related to certain business operations, protect the business, and mitigate risk. The solution provides the capability to capture, store, and maintain customer conversations and activity.

NICE compliance recording is available for TDM, VoIP, and hybrid environments. It is seamless integration with other NICE SmartCenter solutions such as Interaction Analytics and Quality Management enhances NICE’s offering to deliver significant value added capabilities which can optimize operational efficiency and provide detailed customer insight.

NICE Perform Technology

The power of NICE Perform lies in the unique synergy between Cisco and NICE's advanced technology components:

- NICE Perform can capture and store all calls as required, and the unique NICE technology stores digitalized voice recording in a highly efficient manner, making rapid identification and retrieval simple and inexpensive.
- NICE Perform is fully integrated with Microsoft.NET client-server technology, reducing overheads, improving response time, and easing the installation of updates and new versions.
- NICE Perform's audio analysis capabilities are the most advanced and accurate available, allowing word spotting, emotion detection, and voice analysis.
- NICE Perform works in traditional, hybrid and VoIP environments.

The aggregation of the various tools and technologies included in NICE Perform allow users to find and use the insights hidden in the enterprise’s unstructured data. For more information about NICE Perform, see the following URL: http://www.nice.com/solutions/enterprise/nice_perform.php
Supplemental

This section addresses some of the additional functions and features that are available for reporting and enhancements.

Cisco Unified Customer Voice Portal Reporting Server

The Unified Customer Voice Portal Reporting Service provides historical reporting for virtual expert needs as well as to a distributed self-service deployment in a call center environment. The system is primarily used to assist call center managers with call activity summary information to manage daily operations. It can also provide operational analysis of various IVR applications.

The Reporting Service receives reporting data from the IVR Service, the SIP Service, and the VXML Server. It is deployed together with an Informix database management system, and it transforms and writes this reporting data into that database. The database schema is prescribed by the CVP product, but the schema is fully published so that customers may develop custom reports based on it.

The reporting service itself does not perform database administrative and maintenance activities such as backups or purges. However, Unified CVP provides access to such maintenance tasks through the Operations Console.

For more information on CVP Reporting, see the following URL:

Cisco Expert Advisor Reporting Server

The Cisco Expert Advisor Reporting Server is one of three servers that comprise the Cisco Unified Expert Advisor cluster. It is optional to install the reporting server. The advantage of doing so is that this server hosts the database used by reports generated from the Expert Advisor historical reports templates. Reports generated from these templates provide additional detail on expert advisor call activity and statistics than what is available from the WebView reports. Administrators can view (in real-time) experts' availability and occupancy within given assignment queues (or skill groups) for higher control and insight into business operations. An open (public schema) database is used and includes reports to view historical records of detailed experts' activities and call-handling behavior.

For more information on Cisco Expert Advisor Reporting, refer to the Reporting Guide for Cisco Unified Expert Advisor at the following URL starting on page 51:

For more information on Cisco Expert Advisor, see the follow URL:

Media Server

Media Server is a server that serves up audio files and media supporting queue script configuration options to the VXML gateways. In this solution, the media server was implemented using Microsoft IIS on a Windows 2003 server. Separate folders were created for the content used in the queue scripts. Examples of the content served includes voice prompt wave files such as agentbusy.wav and get4digits.wav. Step-by-step installation of the media server is available in the Appendix B, “Quick Installation and Configuration Steps for Virtual Expert Management.” Additionally, the CVP
Implementation Guide includes the media server and other options for media management in detail (local storage on VXML gateways, media caching, etc). For more information on CVP, see the following URL: http://www.cisco.com/en/US/products/sw/custcosw/ps1006/prod_installation_guides_list.html

### VEM Database

A database with a table was created in SQL for correlating the customers expert station location using the calling phone number with the WebEx Access Anywhere remote control URL that is sent to the expert when an offer is accepted. This is a simple database of just two columns that is referenced in the queue script. Database access is based on credentials in the ICM call router (see the Appendix B, “Quick Installation and Configuration Steps for Virtual Expert Management” for installation steps on setting up database access in ICM). For the database server MS SQL server 2003 was used.

### Customer Relationship Management Database

The Customer Relationship Management (CRM) database is used to track all information and contacts with a customer. For this purposes of this validation, a simple database with a table was created in SQL for correlating the customers entered digits when in the expert queue and other customer information that would typically be found in a CRM system such as the customer's name, account balance, or last purchases. This information is sent to the expert as part of an offer or after the offer is accepted. This is a simple database with several columns of information that are referenced in the queue script and matched against. Database access is based on credentials in the ICM call router (see Appendix B, “Quick Installation and Configuration Steps for Virtual Expert Management” for installation steps on setting up database access in ICM). For the database server MS SQL server 2003 was used.

### Directory

A directory server is necessary for managing users in an enterprise. Best practices for user management in Cisco Unified Communications Manager are to link users in Communications Manager directly with a directory server. For this solution, Microsoft's Active Directory was used. Several users in the directory contained phone number information allowing proper linking to Cisco Unified Presence users using the Cisco Unified Personal Communicator clients. These users also directly tie together as the users listed in Cisco Unified Expert advisor to be assigned as experts. Adding new users to the solution can take several process steps depending on deployments but will typically follow the new user addition steps for the individual products in the Appendix B, “Quick Installation and Configuration Steps for Virtual Expert Management.”

### Gateways

#### Peripheral Gateways

Peripheral gateway is a service component enabled within Cisco Unified Intelligent Contact Manager. A peripheral is a switch, such as an ACD, PBX, VRU, or CUCM. Calls arrive at the peripheral through trunks that are organized into trunk groups. ICM software monitors activity at each peripheral and can route calls to targets at each peripheral. The logical interface controller and physical interface controller represent the Peripheral Gateway (PG) through which the peripheral communicates with the ICM system. Two PGs are implemented in the VEM solution with three Peripheral Interface Modules (PIM); CUCM, EA and VRU. Additional gateways may be necessary based on the deployment needs of the enterprise. PIMs facilitate the communication between the differing components in a Contact Center.
deployment. The CUCM PIM connects the Cisco Unified Communication manger to the contact center for call routing and all of the devices used by experts and agents. The EA PIM connects the Cisco Expert Advisor system to the contact center, enabling users via instant messaging clients to act as contact center agents and accepting calls. The VRU PIM connects Cisco Customer Voice Portal to the contact center and provides the interface for incoming customer calls to be directed through scripts to each queue. More information on Peripheral Gateways for ICM can be found on page 83 of the ICM Configuration guide for Cisco Unified ICM Enterprise at the following URL: http://www.cisco.com/en/US/docs/voice_ip_comm/cust_contact/contact_center/icm_enterprise/icm_enterprise_7_5/configuration/guide/icm75cfg.pdf

Cisco Voice XML Gateway

Voice Extensible Markup Language (VXML) is a standard defined by the World Wide Web Consortium (W3C). It is designed to create audio dialogs that provide synthesized speech, recognition of spoken words, recognition of DTMF digits, and recorded spoken audio. The VXML server and clients use the well known HTTP protocol to exchange VXML documents/pages. VXML is supported on several Cisco router/gateway platforms. In this solution validation, the VXML Gateway is implemented on a centralized Cisco ISR router running Voice software in the Data center. Calls are passed to the VXML gateway to play media and receive responses from callers as specified in the queue scripting. Scaling of the gateway is based on the call capacity of the gateway router and the expected call load of concurrent calls that would be in the queue at any one time. Configurations for setting up the VXML gateway on an ISR router are provided in the Appendix B, “Quick Installation and Configuration Steps for Virtual Expert Management.”
Design Considerations

QoS Recommendations

Retailers have many business applications that have different requirements for priority when traffic congestion occurs. A strategic QoS deployment will allow for an enhanced customer/retailer user experience. Typically, Enterprise retailers are not cognizant of all of the business applications that traverse the network as many applications get deployed by non IT departments or by IT departments that fail to involve Network staff for QoS considerations. As a result, some applications will greatly disrupt the performance of other well behaved applications when they are anonymously deployed. The ability of the retailer to successfully plan, implement and manage Enterprise scale QoS deployments, given the lack of its own application knowledge, is compounded by the complexity and technical knowledge required by the network staff to fully comprehend QoS. Improperly configured routers and switches are as big a threat to performance as rogue applications. Network staff should prioritize traffic by exclusion, meaning that they classify and prioritize the known important applications explicitly (e.g., voice, video and POS, leaving remaining traffic to participate in the best effort queue.

Retailers and service providers are encouraged to adopt RFC 4594 provisioning recommendations with the aim of improving QoS consistency, compatibility, and interoperability. Since these are guidelines and not standards, modifications can be made to these recommendations as specific needs or constraints require. A summary of Cisco’s implementation of RFC 4594 is presented in Table 4-1.
QoS Recommendations

Table 4-1  Cisco Differentiated Services (DiffServ) QoS Recommendations for Medianets

<table>
<thead>
<tr>
<th>Application Class</th>
<th>Per-Hop Behavior</th>
<th>Admission Control</th>
<th>Queuing and Dropping</th>
</tr>
</thead>
<tbody>
<tr>
<td>VoIP Telephony</td>
<td>EF</td>
<td>Required</td>
<td>Priority Queue (PQ)</td>
</tr>
<tr>
<td>Broadcast Video</td>
<td>CS5</td>
<td>Required</td>
<td>(Optional) PQ</td>
</tr>
<tr>
<td>Real-Time Interactive</td>
<td>CS4</td>
<td>Required</td>
<td>(Optional) PQ</td>
</tr>
<tr>
<td>Multimedia Conferencing</td>
<td>AF4</td>
<td>Required</td>
<td>BW Queue + DSCP WRED</td>
</tr>
<tr>
<td>Multimedia Streaming</td>
<td>AF3</td>
<td>Recommended</td>
<td>BW Queue + DSCP WRED</td>
</tr>
<tr>
<td>Network Control</td>
<td>CS6</td>
<td></td>
<td>BW Queue</td>
</tr>
<tr>
<td>Call Signaling</td>
<td>CS3</td>
<td></td>
<td>BW Queue</td>
</tr>
<tr>
<td>Ops/Admin/Mgmt (OAM)</td>
<td>CS2</td>
<td></td>
<td>BW Queue</td>
</tr>
<tr>
<td>Transactional Data</td>
<td>AF2</td>
<td></td>
<td>BW Queue + DSCP WRED</td>
</tr>
<tr>
<td>Bulk Data</td>
<td>AF1</td>
<td></td>
<td>BW Queue + DSCP WRED</td>
</tr>
<tr>
<td>Best Effort</td>
<td>DF</td>
<td></td>
<td>Default Queue + RED</td>
</tr>
<tr>
<td>Scavenger</td>
<td>CS1</td>
<td></td>
<td>Min BW Queue</td>
</tr>
</tbody>
</table>

The method of QoS used in the testing lab was based on the Cisco Enterprise Quality of Service reference design as shown in Table 3 - Cisco Enterprise Quality of Service.

For more information on QoS, see the following:
- Cisco Enterprise Quality-of-Service  
- QoS Design Recommendations for Medianets  
- Cisco Telepresence Design Guide - QoS  
- Network Ports Used by Cisco Unified Personal Communicator  

Bandwidth Considerations

Each of the video options in the solution have differing bandwidth requirements which can dramatically affect the design and deployment scenarios. Table 4-2 provides a brief overview of the different requirements for each product.

Table 4-2  Bandwidth Requirements

<table>
<thead>
<tr>
<th>Product / Platform</th>
<th>Bandwidth Audio &amp; Video</th>
<th>Resolution</th>
<th>Frame Rate</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>TelePresence-500 Best</td>
<td>4128Kbps</td>
<td>1920x1080p</td>
<td>30fps</td>
<td>Best Quality</td>
</tr>
<tr>
<td>TelePresence-500 Better</td>
<td>3628Kbps</td>
<td>1920x1080p</td>
<td>30fps</td>
<td>Better Quality</td>
</tr>
</tbody>
</table>
Table 4-2  Bandwidth Requirements (continued)

<table>
<thead>
<tr>
<th>TelePresence-500 Good</th>
<th>3128Kbps</th>
<th>1920x1080p</th>
<th>30fps</th>
<th>Good Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>TelePresence-500 Best</td>
<td>2378Kbps</td>
<td>1280x720p</td>
<td>30fps</td>
<td>Best Quality</td>
</tr>
<tr>
<td>TelePresence-500 Better</td>
<td>1628Kbps</td>
<td>1280x720p</td>
<td>30fps</td>
<td>Better Quality</td>
</tr>
<tr>
<td>TelePresence-500 Good</td>
<td>1128Kbps</td>
<td>1280x720p</td>
<td>30fps</td>
<td>Good Quality</td>
</tr>
<tr>
<td>TelePresence-500 Lite</td>
<td>936Kbps</td>
<td>1280x720p</td>
<td>30fps</td>
<td>Extended Reach</td>
</tr>
<tr>
<td>Video Advantage</td>
<td>384-1500Kbps</td>
<td>352x288,320x240, 176x144, and 160x120</td>
<td>up to 30fps</td>
<td></td>
</tr>
<tr>
<td>CUPC Video</td>
<td>384-512Kbps</td>
<td>352x288 / 176x144</td>
<td>up to 30fps / 15fps</td>
<td></td>
</tr>
<tr>
<td>Cisco 9900 Series Phones</td>
<td>up to 1000Kbps</td>
<td>up to 640x480</td>
<td>30fps</td>
<td></td>
</tr>
<tr>
<td>Cisco 7985 Series Phones</td>
<td>up to 768Kbps</td>
<td>352x240</td>
<td>30fps</td>
<td></td>
</tr>
<tr>
<td>Cisco WebEx</td>
<td>384Kbps</td>
<td>320x240</td>
<td>7-15fps</td>
<td></td>
</tr>
</tbody>
</table>

Table 4-2 represents raw bandwidth requirements and also needs to accommodate additional IP overhead.

For more information on Cisco TelePresence resolution and bandwidth, refer to the following URL: http://www.cisco.com/en/US/docs/solutions/Enterprise/Video/tpover.html#wp1043742

**NICE Perform Release 3.2**

NICE Perform can support many methods of recording including distributed, centralized and active recording. This solution validated the functionality of both centralized recording using a trusted ready point and monitor port as well as active recording, a feature on newer Cisco 7975, 7965 and 7945 series phones.

**Active Recording**

When the customer talks to the expert agent, the Cisco Unified Communications Manager (CUCM) sets up an additional call between the agent's phone and the NICE VoIP Logger. The voice itself is replicated at the phone's BIB (Built in Bridge) and sent to the VoIP Logger IP address. **Figure 4-1** shows the call flows for call control and the media flows between devices and the NICE VoIP logger.
Centralized Recording

When the customer talks to the expert agent, the Cisco Unified Communications Manager (CUCM) routes all calls for these stations through a trusted relay point. The voice itself is then replicated at the switches interface port of the trusted relay point and sent to the VoIP Logger monitoring interface. Figure 4-2 shows the call flows for call control and the media flows between devices.
Lessons Learned

TelePresence Lessons Learned


In the above guide, the directory number used by the CTS unit and associated 7975 handset is a shared line. Within the installation steps, the directory number is specified to be configured as Auto Answer with Speakerphone in the Auto Answer drop-down menu. This configuration causes problems when calls are routed over SIP trunks to other systems (e.g., between Call Manager clusters to CVP queue, etc.). The Cisco 7975 phone will auto answer before the CTS unit as the transferred SIP call will appear as an audio-only call. In order to have the CTS unit answer the call and perform a reinvite, adding video back to the call between the endpoints, the directory number must be configured with Auto Answer off and in the CTS unit Product Specific Configuration Layout section of the CTS device configuration set the CTS Auto Answer drop-down menu to CTS Override - Auto Answer All. See Figure 4-3.
Trusted Relay Point for Calls

The Cisco Unified Communications Manager enables the insertion of trusted relay points (TRPs). The insertion of TRPs into the media path is most often used in a network virtualization environment and when QoS enforcement is needed. In the Cisco Virtual Expert Management solution, the TRP is used to reroute the media stream from the call endpoints and force them to flow through the TRP. On the switch port where the TRP connects a SPAN session is created to mirror all traffic to the NICE recording server. This is a cost-effective way to implement a centralized recording solution for non-encrypted audio calls on devices that do not support duplicate audio streams (e.g., Cisco 7985, 7960, etc) like the newer Cisco 7975 phones. With proper decode codec support on the recording server, even TelePresence calls can be recorded. A TRP can be configured on Cisco ISR routers with Voice IOS software. A typical TRP configuration in IOS would look as follows:

```plaintext
! sccp local FastEthernet0/0
sccp ccm 192.168.45.182 identifier 1 version 7.0
sccp
!

sccp ccm group 1
associate ccm 1 priority 1
associate profile 1 register MTP-01
!
dspfarm profile 1 mtp
codec g711ulaw
codec pass-through
maximum sessions software 110
associate application SCCP
!
```

Once the TRP is configured, a Media Termination Point (MTP) is added to the CallManager under the Media resources menu. The MTP name must match the register name specified on the TRP. After the TRP is configured and registered, each phone can be configured to use the TRP individually or based on a device pool.
CUPC Instant Meetings

One of the primary advantages of using CUPC client over other IM services is the ability to start an instant meeting with the other party of a VEM session. When a customer call is passed from the expert queue to the Expert Agent the CUPC clients on both systems share call information and enable the start of an instant meeting using either Cisco MeetingPlace or Cisco WebEx Meeting. When using Cisco WebEx Meeting there are several configuration items that need to be taken into consideration. The CUPC client does not use the stations proxy configuration settings when launching a meeting. If your enterprise uses a proxy when connecting to Internet sites, special considerations need to be taken for connecting to the WebEx meeting servers. Additionally, version 7.02 and later of the CUPC client is not able to dynamically generate a meeting password for instant WebEx meetings. Consequently, when using CUPC the requirement for a meeting password in the WebEx site administration must be disabled to use WebEx meetings for collaboration in the Virtual Expert solution. See Figure 4-4.

Figure 4-4  Instant Meetings
Summary

Retailers that want to be perceived as delivering value beyond low prices, such as product expertise or specialized services, can benefit from implementing the Cisco Virtual Expert Management solution. This solution performed well in face-to-face consultation through video, voice, and content sharing between stores with the most appropriate subject matter expert. Its ability to locate and seamlessly connect experts across the enterprise using skill-based routing and presence availability-enabled stores to capture the same business opportunity without deploying subject-matter experts at every store. The Cisco Virtual Expert Management solution helps retailers differentiate themselves by redefining superior customer service expertise.

Partner Profile

NICE Solutions for Financial Institutions

Complying with regulations, improving customer retention, and enhancing operational efficiency is critical in today’s complex business environment. Achieving these goals while reducing expenses in a tough economic climate is no easy task. To empower organizations and attain these business objectives, NICE has developed a set of innovative enterprise solutions for contact centers, branches (including home agents and backoffice operations), and trading floors.

NICE's enterprise solutions deliver the powerful tools necessary to address critical business needs including the following:

- Compliance and risk management
- Customer retention and insight
- Operational efficiency

For more information about the NICE Solutions refer to the following URL:

IP Phone-Based Active VoIP Recording

NICE active VoIP recording enables the delivery of centralized recording capabilities in distributed environments. All NICE Perform servers are consolidated in the data center, where all calls that take place in the organization's branches and other remote locations are recorded.

By reducing the need for costly branch set-up, administration, and management of recording servers, NICE helps to flatten the organization and enables simple, yet efficient handling of remote employees.

This IT-friendly technology makes active VoIP recording the ideal solution even for single-site operations. NICE's solution for IP-phone-based active recording for Cisco Unified Communications Manager (CUCM) is another component of NICE's extensive portfolio of active recording integrations.
Solution Benefits

Consolidation

NICE active recording for Cisco enables the centralization of the recording system in the data center, in a similar manner to the centralization of the CUCM servers. This allows the organization to benefit from reduced expenses and to enjoy both economies of scale and the lower support costs, thanks to simplified and consolidated administration, management, and maintenance.

IT Friendliness

Passive VoIP recording requires the use of mirroring (“SPAN”) sessions. These sessions have to be maintained for supporting moves, adds and changes of the telephony and data networks. This may conflict with organizations’ IT policies. IP-phone based active recording does away with the need for mirroring sessions, thus reducing the network management load on IT staff.

Lower Total Cost of Ownership

NICE offers a reduced footprint, industry standard servers, the highest number of recording channels per server, and advanced compression capabilities that reduce long-term storage volume and ensure lower ownership costs.

Freedom from Size Limitations

The NICE integrated recording solution meets the recording needs of all sizes and kinds of business, from small enterprises recording a few dozen phones to large single-site and multi-site operations with tens of thousands of phones.

Cohesive, Integrated Solution Suite

NICE meets all the organization's call recording requirements. The same system can support all recording modes—Total recording, user initiated recording-on-demand, and rule-based recording, including sampled recording for quality management in contact center environments.

NICE offers a unified solution for recording in mixed telephony environments, specifically where CUCM is serving the back office of a financial trading floor while a turret system is being utilized in its front office.

Improved Operational Control

NICE offers organizations better control by means of centralized administration, recording and playback. All the operational and administrative activities can be performed over the network.

High Security

Extensive privilege-based user access mechanisms provide full control of user operations, while an integral audit trail provides detailed information of user activity.
Unlimited Storage

In addition to off-line storage capabilities, NICE's integration with leading enterprise storage management vendors enables centralized archiving with seamless on-line media access.

Theory of Operation

NICE Perform Architecture

The NICE Perform solution is composed of four main elements:

- Interactions Center
  The Interactions Center connects to the CUCM CTIManager using TAPI (or to the Cisco Unified Contact Center Enterprise CTI Gateway in contact center environments) for receiving call events. It implements recording rules, handles recording requests and controls the loggers.

- Loggers
  The VoIP loggers capture and record the voice packets.

- Database
  The Database maintains the call details and the system's administrative information.

- Application Server
  The Application Server provides access layer for the system to the end user applications. The system's elements may be consolidated in a single server or a pair of servers, or distributed among several servers, according to the scale of the solution.

Additional optional elements include screen loggers for recording the screen activity of the users, a Storage Center for managing long-term storage of the recorded data, and audio analytic servers for automated voice analysis.

Contact centers can take advantage of the advanced NICE SmartCenter solution. NICE SmartCenter provides organizations with capabilities to improve performance at the agent, operational and enterprise levels. This solution drives contact center and enterprise performance by leveraging the synergies of the combined capabilities of NICE's offering for interactions capture, quality management, interaction analytics, workforce management, performance management, coaching, and customer feedback; each the leading solution in its category, unified within a Service-Oriented Architecture (SOA) framework, providing powerful functionality with maximum flexibility.

Phone-Based Active VoIP Recording

One of the new features Cisco Unified Communications Manager (CUCM) version 6 had introduced is an integration capability for providing IP phone-based recording. Cisco IP-phones are capable of forking the received and transmitted voice traffic in two separate Real Time Protocol (RTP) streams. NICE Perform uses SIP trunk in order to connect to the CUCM cluster. Over this SIP trunk the CUCM and the NICE Interactions Center exchange SIP messages which direct the recorded calls from the IP-phones to their destination—the VoIP logger.
Recording Modes

The NICE-Cisco phone-based active recording integration supports the following recording modes:

- **Total Recording**
  Total recording is used where all the calls need to be recorded. The recording session automatically establishes when an agent answers or initiates a call.

- **Interaction-based recording**, including record-on-demand or quality management recording programs.
  Interaction-based recording serves for recording specific calls. NICE Perform invokes the recording session for an active call through the CUCM CTIManager using TAPI. The trigger for recording calls in interaction-based recording may be a human recording request or a recording rule, based on the call's details.

The setting of the recording mode is based on directory numbers (DNs), and mixed recording modes are supported within the same system for different DNs. The recording capability is a CUCM administered feature. The phone's DN is configured as “Automatic recording” for total recording or as “Application-invoked recording” for interaction-based recording in the CUCM administration.

Recording Transparency and Tones

Even though the IP-phone actively participates in the recording process by sending out the audio streams, the recorded user does not receive any visual or audio indication that recording is taking place.

Note that in certain jurisdictions, a requirement exists to inform the calling or the called party by means of a specific tone that their call is being recorded. The IP-phone is capable of inserting this notification tone, ensuring that the called or the calling party (or both) is notified that recording is taking place.

Supported Versions and Phone Models


For earlier CUCM versions and for other phone models, NICE offers three recording methods:

- **Passive VoIP recording**
- **Active VoIP recording-based on NICE's VoIP Recording Gateway**
- **Active VoIP recording-based on NICE's VoIP Recording Agent**

The VoIP Recording Gateway is a network element that filters RTP traffic and forks it, sending the forked streams to the recording system. Distributed implementation of the VoIP Recording Gateway enables consolidation of the recording system servers, and is not dependant on CUCM version or phone models.

The VoIP Recording Agent is software that runs on a PC, capable of forking the RTP packets of a Cisco IP Communicator softphone or of a daisy-chained hard IP-phone. The VoIP Recording Agent then sends the forked streams to the VoIP logger, in a similar manner as the phone-based active recording.

NICE Perform software migration paths are available once the CUCM system and phones are upgraded to support phone-based active recording. Where only a portion of the phones are of the models that support phone-based active recording, the rest of the phones can be recorded using any of the other above-mentioned methods. NICE Perform supports mixed recording methods in the same system.
## Product List

<table>
<thead>
<tr>
<th>Product / Platform</th>
<th>Software Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Unified Communications Manager</td>
<td>7.1(2a)</td>
</tr>
<tr>
<td>Cisco Unified Contact Center Enterprise</td>
<td>7.5(5)</td>
</tr>
<tr>
<td>Cisco Customer Voice Portal Call Server</td>
<td>7.0(2)</td>
</tr>
<tr>
<td>Cisco Expert Advisor Runtime Servers</td>
<td>7.6(1)</td>
</tr>
<tr>
<td>Cisco Expert Advisor Reporting Server</td>
<td>7.6(1)</td>
</tr>
<tr>
<td>Cisco Unified Video Advantage</td>
<td>2.1(2)</td>
</tr>
<tr>
<td>Cisco Unified Presence Server</td>
<td>7.0(4)</td>
</tr>
<tr>
<td>Cisco Unified Personal Communicator Client</td>
<td>7.0(2)</td>
</tr>
<tr>
<td>Cisco TelePresence 500 systems</td>
<td>1.5.3(2115)</td>
</tr>
<tr>
<td>Cisco Media Conferencing Unit (MCU)</td>
<td>5.7(0)</td>
</tr>
<tr>
<td>Cisco MCU</td>
<td></td>
</tr>
<tr>
<td>IOS XML Gateway</td>
<td></td>
</tr>
<tr>
<td>Windows Workstation (Expert &amp; Customers)</td>
<td>Windows 7 and XP w/sp3</td>
</tr>
<tr>
<td>Cisco WebEx</td>
<td>current</td>
</tr>
<tr>
<td>NICE Perform Recording Server</td>
<td>Release 3.2 Version 9.10.6.356</td>
</tr>
</tbody>
</table>
Quick Installation and Configuration Steps for Virtual Expert Management

Introduction

This section is based on internal guides created by Laurent Pham and Shahazd Ali. It has been expanded to include all VEM components, and updated to reflect the specific settings and items used in the validation lab. Figure B-1 depicts the components and endpoints that are covered.

![Figure B-1 Virtual Expert Management Protocols and Services](image)
Prerequisites

Cisco recommends that you should have knowledge of the following topics:

- Cisco Unified Communication Manager (CUCM)
- Cisco Unified Intelligent Contact Management (CUICM)
- Cisco Unified Cisco Voice Portal (CUCVP)
- Cisco Voice Gateways and VXML Gateways
- Cisco Unified Expert Advisor
- Cisco Unified Presence and SIP Proxies
- Cisco Unified TelePresence
- Cisco Unified Video Advantage
- Cisco Unified MeetingPlace
- Cisco WebEx Meeting
- Cisco WebACD
- Cisco WebEx Access Anywhere

Preparing the Environment

System Information

- This guide assumes that CUCM is installed and configured with appropriate endpoints. For a quick guide to install and configure CUCM with CVP and VXML GW, refer to the following URL: https://supportforums.cisco.com/docs/DOC-1374
- All domain controllers in your domain or forest must be running Windows Server 2003 with the domain functional level set to Windows Server 2003, thereby all domain- and forest-wide features needed are available.
- Before installing ICM software components, the computers must have the Microsoft Windows operating system—including SNMP and (for Windows 2003) WMI and, for some components, Microsoft SQL Server database management software installed. See Figure B-2.

Figure B-2  System Installer
Appendix B      Quick Installation and Configuration Steps for Virtual Expert Management

Introduction

This installation includes setting up the Windows Active Directory services for ICM software. Setting up Active Directory entails adding the Cisco Root Organizational Unit, one Facility Organizational Unit, and one Instance Organizational Unit to the Active Directory Schema. These steps require domain admin-level access.

For more information, refer to the Staging Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted and the SNMP Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted at the following URLs:


CCE components that operate on Cisco IPT Windows OS 2003 Enterprise Edition must also have the following services installed and started:

- DNS Service—Required for AD
- Replication Service—Required for AD
- Task Scheduler Service—Required for ICM Installation
- Install WMI Windows Installer Provider—Required for ICM Router Installation
- NT LM Security Support Provider—Required for AD
- File Replication—Required for AD

The CUICM components Router, Logger, AW, PG, and CTIOS Server must communicate with the Active Directory server and join a domain. In this validation setup, the Active Directory Domain Controller and DNS Server are already set up and have been used in previous solutions. For more information on installing and setting up Active Directory, refer to the Windows 2003 server administration guides.

SQL server is a required component for the Logger platform. Installation of this software is covered in the Staging Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted referenced above.

ICM software requires Microsoft SQL Server databases on each Logger, Historical Data Server (HDS), and each Real-time Distributor Admin Workstation (SQL Server is not required for Client AWs). SQL Server must be installed on each of these computers before you install the ICM software.

Virtualization Support

Beginning with Cisco Unified ICM and Unified Contact Center Enterprise and Hosted Editions Release 7.5(3), servers can be consolidated by deploying a virtualization solution for Client Administrative Workstations (AWs) and certain Peripheral Gateways (PGs) on the VMware platform. For the virtualization requirements, mapping to discrete servers, and CPU processor and RAM requirements for each of the supported PG and Client AW virtual machines (VMs), refer to the latest version of the Hardware & System Software Specification (Bill of Materials) for Cisco ICM/IPCC Enterprise & Hosted Editions, available at the following URL:


Before you incorporate virtual machines into your contact center design and deployment, you must read through and follow the guidelines and restrictions described in the Virtualization Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted, available at the following URL:

Other Unified ICM and Unified CCE components, such as the CallRouter, Logger, AW Distributor, HDS, WebView Server, and CAD Server, as well as the Cisco Unified Contact Center Management Portal (Unified CCMP), and Cisco Unified Intelligence Suite, are not supported in a virtualized environment at this time.

**Hardware Components**

The following are the hardware components of the IPCC laboratory system:

- Two Cisco 794x/796x/797x series IP phones as Expert Advisor user phones
- One MCS Server for CUCM
- Two servers running Windows 2003 Enterprise Edition for CUICM Enterprise Components in duplex mode:
  - Router
  - Logger
  - AW
  - CUCM PG
  - CVP VRU PG
  - CTIOS Gateway or CTIO PG
  - CTIO Server
- Windows 2003 Enterprise Edition-based server running the following CVP components:
  - CVP Call Server
  - CVP Media Server
  - Microsoft IIS Web Server
- One MCS server for Cisco Unified Presence
- One MCS server for Cisco Unified Expert Advisor
- Windows XP based agent PC
- Cisco 3845 Router
  - Ingress PSTN Gateway
  - VXML Gateway
- PSTN Simulator (CUCME gateway with cross over T1 PRI cable connected to CVP Gateway could be used)

Unified CCE 7.5(1) components are supported only on Cisco MCS or MCS-equivalent servers. For further specifics on hardware requirements including recommended platform sizing guidelines (not specific brands or models of servers), based on the types of available hardware systems, refer to the *Hardware and System Software Specification (Bill of Materials) for Cisco Unified ICM/Unified Contact Center Enterprise & Hosted, Release 7.5(1)* at the following URL:

Software Components

The software release is based on the system Release 7.1(3):

- Cisco IOS Software Releases 12.4(24)T1 Voice Feature Set on the VXML Gateway
- Cisco Unified Communication Manager version 7.1(3)
- Cisco Unified Presence Server 7.0(5)
- Cisco Unified ICM version 7.5(6)
- Cisco Unified CVP version 7.0(2)
- Cisco Unified Expert Advisor 7.6(1) SR1
- Cisco CTI Object Server 7.5(6)
- JTAPI Client version is CUCM bundled

Installation

The following component need to be installed:

- Install CUCM (Publisher and Subscriber)
- Install TelePresence endpoints
- Install CCE / ICM
- Install CVP
- Install CUP and CUPC Clients
- Install EA

Pre-requisite:

- Be familiar with CUCM, Unified CCE, and Unified CVP

Note

This appendix does not cover the basic installation of Unified CCE and Unified CVP. It assumes you have basic knowledge of CUCM, Unified CCE, and Unified CVP.

CUCM Installation

- In VMWare environment, a minimum of 72 GB disk is required
- Version: 7.1.3.10000-11
- Make sure the CTI Manager and Cisco AXL Web services are running
About the ICM Setup Program

The ICM Setup program allows you install, update, and configure your ICM software. It is located on the ICM CD. Run Setup on each machine in the ICM system: each CallRouter, each Logger, each Peripheral Gateway (PG), and each Admin Workstation. At the initial installation, a local version of the Setup program is installed on each ICM component at \icm\bin\ICMSetup.exe. (On an Admin Workstation, the Cisco Admin Workstation group contains an icon for this program.)

In order to run Setup, you must be a local administrator and belong to the setup group for any instance that you are installing a component.

Note

During the installation of the Central Controller and Administration and WebView Reporting, the ICM installer checks to see whether there is a Microsoft.NET Framework 3.5 installed. If it is not installed, Setup will install it. After the installation of the Microsoft.NET Framework 3.5, it might prompt you to reboot the system. If prompted, reboot the system and run Setup again.
About ICM Component Installation Order

You can install the various components in the order in which they are treated in this appendix. In general, there is a great deal of flexibility in the order of installation, provided that you know the names and locations for the various components beforehand. However, the following presents the standard approach:

Step 1  Install either the CallRouter or the Logger first. It does not matter in which order you install the CallRouter and Logger.
Step 2  Install both the CallRouter and the Logger before you install an Admin Workstation (AW).
Step 3  If you are using WebView, install it after you have installed the Real-time Distributor AW.
Step 4  Install the CallRouter, Logger, and AW before you install the Network Interface Controller (NIC) and Peripheral Gateway (PG), but it does not matter in which order you install the NIC and PG.
Step 5  Install the CTI Server after you have installed the CallRouter, Logger, AW, NIC, and PG.

Creating an ICM Instance

- Before any ICM components can be installed and ICM instance must first be created
- Before an instance can be selected the proper entries must first be created in the domain using the Domain Manager

Configure Domain Manager

Step 1  Start the Cisco Unified ICM installation by running the ICMSetup.exe application on the CD or local directory as appropriate.
Step 2  Click the Domain Manager. See Figure B-3.

![Domain Manager](image)

Step 3  Select the desired domain from the list on the left and click ADD, then click OK. See Figure B-4.
Step 4 After the domain is selected, click **Add** it under the Cisco root section. Enter an appropriate name such as **Cisco_ICM** and click **OK**.

Step 5 With the new root selected, click the **ADD** button under the Facility option. Enter an appropriate Facility name such as **Cisco_ICM_Facility** and click **OK**.

Step 6 Once the Facility has been added, select it and click **Add** under the Instance option. Enter an instance name such as **ICM** and click **OK**. See Figure B-5.
Step 7  
After adding the root, facility and instances click close. After the domain components have been created, you can then add the instance in the ICM setup. At least one ICM instance must be added before you can install any ICM components.

Note  
Before you can create an ICM instance, you must have set up the Windows Active Directory services for ICM software. You must also have added the Cisco Root Organizational Unit, and at least one Facility Organizational Unit with one Instance Organizational Unit. Refer to the Staging Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted.

Step 8  
In the Cisco ICM Setup dialog box, in the ICM Instances section, click Add. The Add Instance dialog box opens:

a. Select the network Domain for the instance.

b. Select the Facility Organizational Unit for the instance.

c. Select the Instance Name for the instance.

Note  
The ICM Instance Name is the name of the Instance Organizational Unit.

Use the Instance Number generated by the ICM software. (For standard single-instance ICM configurations, the instance number is 0.)

Note  
The mappings of instance names to instance numbers must be the same on every node in the system.
Install the Router and Logger

Call Router Installation

The CallRouter (generally referred to in this document simply as the Router) is the component that contains the contact routing logic and makes all routing decisions. It receives contact routing requests and determines the best destination for each contact. It also collects information about the entire system. This appendix explains how to install the CallRouter software and perform some basic configuration. For this configuration, you must know the visible and private network addresses (either host names or IP addresses) of the CallRouter and, for a duplexed configuration, the addresses of the CallRouter on the other side. The CallRouter and Logger are typically on separate computers. However, in small contact center configurations they can both be on the same computer. See Figure B-7.
Step 1 In the ICM Setup application, click the **Add** button on the right under **Instance Components**. See Figure B-8.

A new dialogue window will appear where you will be able to select the Router component. See Figure B-9.
Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

Install the Router and Logger

**Figure B-9**

![Router Properties](image)

**Step 2**  For high availability installations select the **Duplexed Router** option and click **Next**.

Do not select any Network Interface Controllers. Leave all the options as default. The Customer ID is insignificant for this solution. See **Figure B-10**.

**Figure B-10**

![Router Component Properties](image)

**Step 3**  Click **Next**.

For the lab validation, two peripheral gateways were used; one for CUCM and another as VRU PG for CVP and expert advisor.
The number of PGs must be entered as a range or comma separated list. For the two PGs, it could be entered as either “1-2” or “1,2”. See Figure B-11.

**Figure B-11**

The number of PGs must be entered as a range or comma separated list. For the two PGs, it could be entered as either “1-2” or “1,2”. See Figure B-11.

**Step 4** Accept the current settings and click on Next for the following screens.

It is best practice to use IP addresses rather the hostnames when identifying the public and private interfaces for the Router. The following image and other similar installation screens during CUICM component installation will be similar. See Figure B-12.

**Figure B-12**

It is best practice to use IP addresses rather the hostnames when identifying the public and private interfaces for the Router. The following image and other similar installation screens during CUICM component installation will be similar. See Figure B-12.

**Note** If the CallRouter is simplex, enter localhost in both the B and B high fields.

**Step 5** After entering the Router interface IP addresses click Next. See Figure B-13.
Step 6  At the ICM setup, review the installation settings and click Next to complete the installation of the Call Router.

Logger Installation

In the ICM Setup application, click the Add button on the right under “Instance Components”. A new dialogue window appears where you will be able to select the Logger component. See Figure B-14 and Figure B-15.
Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

Install the Router and Logger

Figure B-15

Step 7  Select production, Auto startup and Duplexed logger options, then click Next. See Figure B-16.

Figure B-16

Step 8  Click Next. See Figure B-17.
Install the Router and Logger

Step 9 Configure the public and private Router and Logger interfaces using the IP address. Click Next.

Step 10 At the end of the ICM setup, review the installation settings and click Next to complete the installation of the Call Logger.

Create ICMDB on Logger

You must create a database for each Logger, it is best to do this before installing other components. To create the database and determine the appropriate size of the database, run the ICM Database Administration (ICMDBA) tool. This tool is installed on each ICM component that has an installed database (ICMDBA is in the \icm\bin directory) and on each Admin Workstation.

For more information on using the ICMDBA tool, refer to the ICM Administration Guide for Cisco Unified ICM/Contact Center Enterprise &Hosted.

Once the proper size is determined, run the icmdba.exe file from the local ICM directory to create and configure the new database. See Figure B-18.
If you are prompted that the SQL Server is not configured properly, click yes and then set the memory requirement to 0 and the recovery interval to 1. As this may have interrupted the installation process, you will see that no new database has been created. You need to once again select Create under the database option.

This time all the necessary changes have been made, you will be able to create the database. Now add the data and log databases to the list and create the database. See Figure B-19.

You will notice a screen similar to screen shown in Figure B-20 and once the database is created successfully click OK.
Installing the Admin Workstation

After completing the installation of the Router and Logger, the Admin Workstation can be set up. The Admin workstation is configured before the other PGs as it assigns the IDs needed for the Router, Logger, and PGs to communicate through.

The Admin Workstation (AW) is the human interface to the ICM software. It serves as a control console where you can monitor agent and contact center activity and change how the ICM software routes contacts. For example, you can use the Admin Workstation to configure the ICM contact center data and to create routing scripts. Admin Workstations can be located anywhere, as long as they have LAN, WAN, or dial-up connections to the ICM software. Typically, the Admin Workstation is installed on a Windows operations console used by system administrators, not the Router, Logger, or other ICM server systems. It requires an SQL database and must be a member of the Active Directory Domain. See Figure B-21.

**Figure B-21**

---

**Step 1**

From the ICM Setup applications, select **Add** for the ICM instance and then “**Admin Workstation**”. See **Figure B-22**.
Step 2  Select Next. See Figure B-23.

Step 3  Select Next. See Figure B-24.
Installing the Admin Workstation

Figure B-24

Step 4  Select **Next**. See Figure B-25.

Figure B-25

Step 5  Verify Setup parameters and select **Next** to finish. See Figure B-26.
Step 6 After the AW installation is complete, you must initialize the local database. The initialize database dialogue will appear after the Admin Workstation module installation is completed. See Figure B-27.

When you install a Distributor Admin Workstation, ICM Setup automatically sizes and creates a local database on the machine. Because this database is constantly overwritten by new data, the database size remains fairly constant. You normally do not need to resize the Distributor Admin Workstation (AW) real-time database. If you do need to resize the Distributor AW database, you can do so using the ICM Database Administration (ICMDBA) tool.
AW Configuration Manager CUCM PG Setting

Each peripheral communicates with ICM software through a Peripheral Gateway, called a PG. The PG is a computer that communicates directly with the ACD, PBX, VRU, or Call Manager at a contact center, monitoring status information from the peripheral and sending it to the ICM system’s Central Controller. If the peripheral acts as a routing client, the PG sends routing requests to ICM software.

The PG can be a single-simplexed computer or a pair of duplexed computers. A single PG can service more than one peripheral; however, each peripheral uses only one PG.

Note

Although a PG can consist of a pair of duplexed computers, only one of them is active at a time, so that ICM software sees it as a single logical and physical PG.

Primary CTI OS Server

Before adding the peripheral gateways to the CUCCE Servers, they must first be created in the Admin Workstation Configuration Manager. This generates the peripheral IDs that are necessary for the PG/PIM installations.

To create the peripheral gateways in Configuration Manager there must first be an Agent Desk Settings List entry as it is one of the required settings under a PG controller configuration.

Create a new Agent Desk Settings list as follows:

Step 1 Open the Configurations Manager on the AW.
Step 2 Select the Agent Desk Settings List option under the Tools > Explorer Tools group.
Step 3 Click Retrieve.
Step 4 Click Add.
Step 5 Enter an appropriate list name such as Agent_Desk_Settings_1.
Step 6 Enter a proper description.
Step 7 Set the Ring no Answer time to 10.
Step 8 Set the Wrap up time to 20.
Step 9 Click Save. See Figure B-28.
To create the peripheral gateways in Configuration Manager, there must also be an Media Routing Domain list entry as it is one of the required settings under a PG controller configuration.

Create a new Agent Desk Settings list as follows:

**Step 1** Open the Configurations Manager on the AW.

**Step 2** Select the **Media Routing Domain List** option under the **Tools > Explorer Tools** group.

**Step 3** Click **Retrieve**.

**Step 4** Click **Add**.

**Step 5** Enter an appropriate list name such as **Cisco_Voice**.

**Step 6** Enter a proper description.

**Step 7** Set the Media Class to **Cisco_Voice**.

**Step 8** Click **Save**. See **Figure B-29**.
Installing the Admin Workstation

**Figure B-29**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Cisco_Voice</td>
</tr>
<tr>
<td>Media routing domain ID</td>
<td>1</td>
</tr>
<tr>
<td>Media class</td>
<td>Cisco_Voice</td>
</tr>
<tr>
<td>Lifespan</td>
<td>0 seconds</td>
</tr>
<tr>
<td>Start timeout</td>
<td>0 seconds</td>
</tr>
<tr>
<td>Max duration</td>
<td>0 seconds</td>
</tr>
</tbody>
</table>

Once the Agent Desk setting list and the Media Routing Domain have been created, the new PG logical controllers for the Call Manager, CVP, and Expert Advisor can be created.

There are several methods for creating PGs and their underlying Peripheral Interface Managers (PIMS). For this solution, two PGs are created. One PG is generic and have the CUCM and VRU_CVP PIMS, the other PG is for Expert Advisor and have the EA PIM. Each ICM server set that is deployed can have a maximum of two Peripheral Gateways. The PG Explorer on the AW Configuration Manager generates and maintains PG records for a logical interface controller, a physical interface controller, associated peripherals, and, if appropriate, an associated routing client.

Create the first peripheral gateway logical controller as follows:

**Step 1** Open the Configurations Manager on the AW.

**Step 2** Select the **PG Explorer** option under the **Tools > Explorer Tools** group.

**Step 3** Click **Retrieve**.

**Step 4** Click **Add PG**.

**Step 5** Enter an appropriate name such as **Generic_PG_1**.

**Step 6** Enter a proper description.
Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

Installing the Admin Workstation

**Step 7** Set the client type to **PG Generic**.
**Step 8** Set the IP address for the primary and secondary CTI Servers.
**Step 9** Click **Save**.

After clicking **Save**, the logical and physical controller IDs will be automatically generated. Note them for later use when installing the peripheral gateways in ICMSetup later. See Figure B-30.

**Figure B-30**

After creating the logical controller, the first of the underlying peripherals can now be added as follows:

**Step 1** Select the **Generic_PG_1** PG that was just added from the PG explorer results on the left.
**Step 2** Click **Add Peripheral**.
**Step 3** Enter an appropriate peripheral name such as **CCM_PIM_1**.
**Step 4** Select the Client Type as **CallManager/SoftACD**.
**Step 5** Select the Default Desk Settings option that was created earlier **Agent_Desk_Settings_1**.
**Step 6** Enter a proper description.
**Step 7** Check the **Enable post routing** option.
**Step 8** Then Click **Save**.

After clicking **Save** the peripheral ID will be automatically generated; note it for later use when installing the peripheral gateways in ICMSetup. See Figure B-31.
Installing the Admin Workstation

Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

Figure B-31

Select the Routing Client tab and enter the following information for the peripheral:

Step 1 Enter an appropriate name and Peripheral name such as CUCM_RC.
Step 2 Select the Client Type as PCC/Enterprise Agent.
Step 3 Select the Default media routing domain option to Cisco_Voice.
Step 4 Enter a proper description.
Step 5 Click Save. See Figure B-32.

Figure B-32
Installing the Admin Workstation

### Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

#### Installing the Admin Workstation

**Step 1**
On the Default Route tab ensure that **Cisco_Voice** is selected. See **Figure B-33**.

**Figure B-33**

![Figure B-33](image)

After the creation of the CUCM peripheral the second CVP VRU peripheral can now be added as follows:

**Step 1**
Select the **Generic_PG_1** PG that was added from the PG explorer results on the left.

**Step 2**
Click **Add Peripheral**.

**Step 3**
Enter an appropriate name and peripheral name such as **CVP_VRU_PIM_2**.

**Step 4**
Select the Client Type as **VRU**.

**Step 5**
Select the Default Desk Settings option to **NONE**.

**Step 6**
Enter a proper description.

**Step 7**
Check the **Enable post routing** option.

**Step 8**
Click **Save**.

After clicking **Save**, the peripheral ID will be automatically generated; note it for later use when installing the peripheral gateways in ICMSetup. See **Figure B-34**.
Appendix B      Quick Installation and Configuration Steps for Virtual Expert Management

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Figure B-34

Select the Routing Client tab and enter the following information for the peripheral:

**Step 1** Enter an appropriate name and Peripheral name such as CVP_VRU_PIM.

**Step 2** Select the Client Type as VRU.

**Step 3** Select the Default media routing domain option to Cisco_Voice.

**Step 4** Enter a proper description.

**Step 5** Click Save. See Figure B-35.

Figure B-35

Create the second peripheral gateway logical controller for the Expert Advisor as follows:

**Step 1** Open the Configurations Manager on the AW.
Step 2 Select the PG Explorer option under the Tools > Explorer Tools group.

Step 3 Click Retrieve.

Step 4 Click Add PG.

Step 5 Enter an appropriate name such as EA_PG_2.

Step 6 Enter a proper description.

Step 7 Set the Client Type to Expert Advisor.

Step 8 Leave the IP address for the primary and secondary CTI Servers blank.

Step 9 Click Save.

After clicking Save, the logical and physical controller IDs will be automatically generated; note them for later use when installing the peripheral gateways in ICMSetup later. See Figure B-36.

**Figure B-36**

<table>
<thead>
<tr>
<th>Logical Controller</th>
<th>Physical controller ID: 5002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical controller ID: 5002</td>
<td>Physical controller ID: 5002</td>
</tr>
<tr>
<td>Name:</td>
<td>EA_PG_2</td>
</tr>
<tr>
<td>Client type:</td>
<td>Expert Advisor</td>
</tr>
<tr>
<td>Configuration parameters:</td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td>F6 for EA</td>
</tr>
<tr>
<td>Physical controller description:</td>
<td></td>
</tr>
<tr>
<td>Primary CTI address:</td>
<td></td>
</tr>
<tr>
<td>Secondary CTI address:</td>
<td></td>
</tr>
</tbody>
</table>

After the creation of the logical controller the underlying peripheral can now be added.

Step 1 Select the EA_PG_2 PG that was just added from the PG explorer results on the left.

Step 2 Click Add Peripheral.

Step 3 Enter an appropriate peripheral name such as EA_PG_2_1.

Step 4 Select the Client Type as Expert Advisor.

Step 5 Under Configuration Parameters enter /ExtendedAgent.

Step 6 Select the Default Desk Settings option to NONE.

Step 7 Enter a proper description.

Step 8 Check the Enable post routing option.

Step 9 Check the Peripheral auto configured option.

Step 10 Click Save.

After clicking Save, the peripheral ID will be automatically generated; note it for later use when installing the peripheral gateways in ICMSetup. See Figure B-37.
Select the Routing Client tab and enter the following information for the peripheral:

**Step 1** Enter an appropriate peripheral name such as EA_PIM.

**Step 2** Select the Client Type as Expert Advisor.

**Step 3** Select the Default media routing domain option to NONE.

**Step 4** Enter a proper description.

**Step 5** Click Save. See Figure B-38.

**Step 6** On the Advanced tab, ensure that the Agent auto-configuration option is not checked.

Once all of the peripheral gateways and peripheral interface managers have been created in the Admin Workstation Configuration Manager they can then be installed in the ICM servers.
Peripheral Gateway Installation for CUCCE

Each contact center device (ACD, PBX, or IVR/VRU) communicates with ICM software through a Peripheral Gateway (PG). The PG reads status information from the device and passes it back to the ICM software. The PG runs one or more Peripheral Interface Manager (PIM) processes, which are the software components that communicate with proprietary ACD and IVR/VRU systems.

*Note*

A single PG can support ACD PIMs, VRU PIMs, and Media Routing PIMs, though the ACD PIMs must all be of the same kind and the VRUs must all be of the same kind.

Before you install a Peripheral Gateway (PG), the Windows operating system (for version specifics refer to the Cisco Intelligent Contact Management Software Release 7.5(1) Bill of Materials—including SNMP and (for Windows 2003) WMI—must be installed on the computer, you must have setup the Windows Active Directory services for ICM software, and you must have setup at least one ICM instance.

Further, before you can complete the installation of a Peripheral Gateway, you must create configuration records in the ICM database. To create these configuration records you must have installed the CallRouter, a Logger, and the Admin Workstation.

To configure a PG, you must know the visible network addresses for the CallRouter machines. If the PG is duplexed, you must know the visible and private network addresses of its duplexed peer.

For each PG, you must have defined a `Logical_Interface_Controller` record, a `Physical_Interface_Controller` record, and a Peripheral record for each PIM you intend to configure—though at least one Peripheral record is necessary. (Configure ICM creates these records automatically if you choose Configure a PG using the PG Explorer.)

*Note*

ICM software restricts running more than two PGs of the same instance on a single machine at the same time.

Figure B-39 shows the deployment of redundant servers with peripheral gateways.
Installing the Admin Workstation

The following section outlines the steps to install two peripheral gateways with three peripheral interface managers for the solution. More information on peripheral gateway installations and configurations can be found in the *ICM Setup and Installation Guide*.

On the servers selected for the peripheral gateways start the ICMSetup.exe application. At least one ICM instance must be added before you can install any ICM components.

In the Cisco ICM Setup dialog box, in the **ICM Instances** section, click **Add**. The Add Instance dialog box opens. Complete the following steps:

**Step 1** Select the network **Domain** for the instance.

**Step 2** Select the **Facility** Organizational Unit for the instance.

**Step 3** Select the **Instance Name** for the instance.

**Note** The ICM Instance Name is the name of the Instance Organizational Unit.

**Step 4** Use the **Instance Number** generated by the ICM software. (For standard single-instance ICM configurations, the instance number is 0.)

**Note** The mappings of instance names to instance numbers must be the same on every node in the system.

**Step 5** Click **OK**.
You can now add ICM Instance components.

**Step 1**  
In the ICM Setup application, click the **Add** button on the right under **Instance Components**. See Figure B-41.

**Figure B-41**

A new dialogue window will appear where you will be able to select the Peripheral Gateway component. In the Peripheral Gateway properties window configure the following:

a. Check the **Production** node.

b. Check the **Auto start at system startup**.

c. Check the **duplexed Peripheral Gateway**.

d. Set the PG Node Properties ID to **PG 1** and select the appropriate side for duplexed installations.

e. Select the following client types and click the **Add** button:
   - **CallManager**
Installing the Admin Workstation

- VRU

1. Click Next. See Figure B-42.

Figure B-42

Step 3 For the Peripheral Gateway Component Properties click Add in the Peripheral Interface Managers section. Set the Client type as CallManager and select PIM 1 from the Available PIMS List. Click OK. See Figure B-43.
Step 4  In the PIM Configuration dialogue, configure the PIM as follows:

a. Select **Enable**.

b. Enter an appropriate Peripheral name.

c. Enter the Peripheral ID that was assigned by the Configuration Manager on the Admin Workstation.

d. Specify the appropriate agent Extension length for DN’s on the Cisco Unified Communication Manager (this is critical as additional digits are added for call handling to CVP and call handoff will fail when mismatched).

e. In the CallManager Service Parameter enter the IP address of the call manager cluster publisher.

f. Enter the CCE username and password created in the Call Manager (i.e., jtapi user).

g. Click **OK**. See Figure B-44.
Step 5  Back on the Peripheral Gateway Component Properties click **Add** in the Peripheral Interface Managers section again. Set the Client type as **VRU** and select **PIM 2** from the Available PIMS List. Click **OK**. See Figure B-45.

**Figure B-45**

---

**Step 6**  In the PIM Configuration dialogue, configure the PIM as follows:

a. Select **Enable**.

b. Enter an appropriate Peripheral name.
c. Enter the Peripheral ID that was assigned by the Configuration Manager on the Admin Workstation.
d. In the VRU Hostname enter the IP address of the CVP Server.
e. Enter VRU connection port.
f. Click OK. See Figure B-46.

Figure B-46

![VRU Configuration (PIM 2)](image)

Step 7 Back on the Peripheral Gateway Component Properties enter the Peripheral Gateway Logical controller ID that was generated by the Configuration Manager on the Admin Workstation and click Next. See Figure B-47.

Figure B-47

![Peripheral Gateway Component Properties](image)
Step 8  On the Device Management Protocol Properties set **Side A preferred** option and click **Next**. See Figure B-48.

![Figure B-48](image1)

Step 9  Enter the name or IP addresses for the Visible and Private Interfaces of the PG and Router. Optionally, enable QoS for these interfaces as desired. Click **Next**. See Figure B-49.

![Figure B-49](image2)

Step 10  Review the PG setup information and click **Next** to complete installation of the first PG. The ICM interface will return to the ICM Setup application, click the **Add** button on the right under “Instance Components” to add the second peripheral gateway. See Figure B-50.

![Figure B-50](image3)
Step 11
A new dialogue window will appear where you will be able to select the Peripheral Gateway component. In the Peripheral Gateway properties window configure the following:

a. Check the **Production** node.

b. Check the **Auto start at system startup**.

c. Check the duplexed Peripheral Gateway.

d. Set the PG Node Properties ID to **PG 2** and select the appropriate side for duplexed installations.

e. Select the **Expert Advisor** client type from the list of available types and click the **Add** button.

f. Click **Next**. See Figure B-51.

**Figure B-51**

Step 12
For the Peripheral Gateway Component Properties click **Add** in the Peripheral Interface Managers section. Set the Client type as **Expert Advisor** and select **PIM 1** from the Available PIMS List. Click **OK**. See Figure B-52.
The number of PIMs is only significant within the respective PG. If you have only a few PGs deployed with few PIMs, it is acceptable to assign PIMs that match the PG numbering for ease of documenting.

**Figure B-52**

**Step 13** In the PIM Configuration dialogue, configure the PIM as follows:

a. Select **Enable**.

b. Enter an appropriate Peripheral name.

c. Enter the Peripheral ID that was assigned by the Configuration Manager on the Admin Workstation.

d. Enter the IP address or name of the Expert Advisor Runtime Server.

e. Accept the default Expert Advisor server port or enter a different one as configured.

f. Click **OK**. See **Figure B-53**.
Back on the Peripheral Gateway Component Properties, enter the Peripheral Gateway Logical controller ID that was generated for the Expert Advisor PG by the Configuration Manager on the Admin Workstation and then click **Next**. See **Figure B-54**.

**Step 14** On the Device Management Protocol Properties set **Side A preferred** option and click **Next**. See **Figure B-55**.
Installing the Admin Workstation

Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

Figure B-55

Step 15 Enter the name or IP addresses for the Visible and Private Interfaces of the PG and Router. Optionally, enable QoS for these interfaces as desired. Click Next. See Figure B-56.

Figure B-56

Step 16 Review the PG setup information and click Next to complete installation of the PG.
**JTAPI Client Installation**

It is mandatory to install the JTAPI client on the CUCM PG (which is PG1 in this setup) machine, so that it can talk to the CUCM via JTAPI interface. Once this has been completed, there will be a new process called JTAPIGW, which should be active even if no agents or phones are created in the CUCM.

Associate all of the agent’s phone device’s with this user in CUCM as well. To install the jtapi client, download the client from the CUCM administration interface and install it on the PG1 machine.

Within the Cisco Unified CM Administration interface select **Application** and then **Plugins**. Click the **Find** button to list all available plug-ins. Download and install the **Cisco JTAPI for Windows** plug-in. See Figure B-57 and Figure B-58.

**Figure B-57**

![Cisco Unified CM Administration Dashboard](image-url)

- **Download Cisco JTAPI for Windows**
  - Install the JTAPI client on the PG1 machine.
  - Go to the Cisco Unified CM Administration interface.
  - Select **Application** and then **Plugins**.
  - Click the **Find** button to list all available plug-ins.
  - Download and install the **Cisco JTAPI for Windows** plug-in.
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Figure B-58

After completion of the JTAPI plug-in, install the CTI Server.

CTI Server Installation

The CTI Server is an optional ICM node that allows a desktop or server application to receive call control information from the ICM and from call center peripherals. This information can be used, for example, in a screen pop on the agent’s desktop. The CTI Gateway is available as part of the Cisco Enterprise CTI product.

Note Cisco supports installation of CTI Server on the same machine where the Peripheral Gateway software is installed. Installing CTI Server on a machine separate from the PG may cause network problems including, but not limited to, network disconnects, agents missing calls, and agents forced into Not READY.

Before installing CTI Server, you must have installed/set up all the other components of ICM as described in the preceding sections.

CTI Server (ctisvr) is also called CG (short for CTI Gateway) which connects to the CTI OS Server using the ctidriver service running on the CTI OS Server machine. Logically, it can be viewed as shown in Figure B-59.
In the ICM Setup application, click the **Add** button on the right under **Instance Components**. See Figure B-60.

A new dialogue window will appear where you will be able to select the CTI Server component. In the CTI Server properties window configure the following:

**Step 1** Check the **Production node**.

**Step 2** Check the **Auto start at system startup**.

**Step 3** Check the **duplexed** Peripheral Gateway.

**Step 4** Set the CG Node Properties ID to **CG 1** and select the appropriate side for duplexed installations.

**Step 5** Click **Next**. See Figure B-61.
Figure B-61

CTI Server Properties

- Node Manager Properties
  - Production Mode
  - Auto start of system startup
  - Duplicated CTI Server

- CTI node properties
  - ID: [ID]
  - ICM system ID: [ID]
  - Side A:
  - Side B:

- Driver:

CTI Server Properties

Help  < Back  Next >  Cancel

Step 6  CTI Server as a default connects to the CTIOS Server on port 42027, but can be configured to use a different port. Click **Next**. See **Figure B-62**.

Figure B-62

CTI Server Configuration

- Client Connection Port Number: 42027
- Agent Login Required for Client Events

Step 7  Configure the PG and CG Public and Private interfaces. Click **Next**. See **Figure B-63**.

Figure B-63

CTI Server Network Interface Properties

- PG private interfaces
  - Node A: 192.168.5.21
  - Node B: 192.168.5.22

- CG private interfaces
  - Node A: 192.168.5.21
  - Node B: 192.168.5.22

- CG visible interfaces
  - Node A: 192.168.45.151
  - Node B: 192.168.45.152

Help  < Back  Next >  Cancel
Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

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Step 8 Review the CG setup information and click Next to complete installation of the CTI Gateway.

CTIOS Server Installation

The Computer Telephony Integration Object Server (CTI OS) is Cisco’s next generation customer contact integration platform. CTI OS combines a powerful, feature-rich server and an object-oriented software development toolkit to enable rapid development and deployment of complex CTI applications.

Refer to the CTI OS System Manager’s Guide for Cisco ICM/IPCC Enterprise & Hosted Editions for a complete explanation of configuring peripherals and connection profiles in the CTI OS Server.


From the Server directory on the CD, run Setup.exe (or if already installed C:\icm\CTIOS_bin\setup.exe). Click Yes on the Software License Agreement screen. The CTI OS Instances dialog appears.

Step 1 The CTIOS Instances dialog allows you to create CTI OS Instances and add CTI OS Servers to a configured instance of CTI OS. You will create only one CTI OS instance for each ICM instance.

Step 2 Under the CTI OS Instance List, click Add.

Step 3 Enter an instance name (e.g., “ctios”).

Step 4 Now click on Add inside the CTI OS Server List. The Add CTIOS Server dialog appears.

The CTIOS Server Name is filled in with the string “CTIOS” followed by the next available index for a CTI OS Server. If a CTI OS Server has been deleted, the CTIOS Server Name string is filled in with the index that was deleted.

If you are installing CTI OS Server for the first time, an Enter Desktop Drive screen appears. Accept the default installation drive or select another drive from the pull down list. See Figure B-64 and Figure B-65.

Figure B-64
**Step 5**  
The Peripheral ID here is the same ID that was assigned during the CUCM PG configuration in the Configuration Manager on AW. The agent desktop communicates with the CUCM IP Phone. See Figure B-66.

**Figure B-65**

![CTI Server Information](image)

**Figure B-66**

![Peripheral Identifier](image)

**Step 6**  
The listen port is where CTI Desktop Agent will connect. This port will also be used if a secondary CTIOS Server wants to talk to this one in an high availability environment or setting. See Figure B-67.
Step 7 Enter the default polling interval for Skillgroup statistics (in seconds). Click **Next**. See **Figure B-68**.

**Figure B-68**

Step 8 The Peer CTIOS Server dialog is used to configure a CTI OS Peer Server. It is also used for Chat and CTI OS Silent Monitoring. Enter the appropriate information. After you click **Finish**, and the files are laid down, the service is registered, and Registry entries are made. See **Figure B-69**.
Installing the Admin Workstation

**Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management**

**Figure B-69**

![Peer CTIOS Server](image)

The Security installation is launched with the dialog shown in Figure B-70.

**Figure B-70**

![Cisco CTIOS Server Security](image)

**Step 9** The Security installation is launched with the dialog shown in Figure B-70.

**Step 10** If you wish to disable Security, just click OK; otherwise, check the checkbox and enter the appropriate information, and click OK. For more information about CTI OS Security, see Chapter 7, “CTI OS Security” in the CTI OS System Manager's Guide for Cisco ICM/IPCC Enterprise & Hosted Editions Guide.

Upon the completion of the CTI OS Server the next step is to create device targets in Configuration Manager. Device targets are the extensions used by the formal Contact Center agents when the login into the Agent Desktop application. These next configuration steps are for formal contact center agents that would be used in addition to the Expert advisor agents. It is recommended to install a few formal agents for testing prior to the completed Expert Advisor implementation.
Create Device Target in Configuration Manager

Create each of the Device Targets using the following steps:

**Step 1**  Open the Configurations Manager on the AW.

**Step 2**  Select the Device Target Explorer option under the Tools > Explorer Tools group.

**Step 3**  Click Retrieve.

**Step 4**  Click Add Device Target.

**Step 5**  Enter an appropriate name such as the agent Extension “6001”.

**Step 6**  Enter the Global Address, also the extension number for fully qualified number.

**Step 7**  Enter the Configuration parameters as follows “/devtype CiscoPhone /dn 6001”.

**Step 8**  Enter a description if desired.

**Step 9**  Then Click Save. See Figure B-71.

---

**Figure B-71**

---

**Step 10**  Add label for each of the routing-clients. In this setup there are the following two routing clients:

- CU Communication Manager
• CU CVP VRU

These two routing clients can request for labels from CUICM and CUICM will return the label to the routing-client. Figure B-72 shows a label for CUCM Routing Client.

![Figure B-72](image1)

Figure B-72 shows a label defined for CUCM Routing Client.

![Figure B-73](image2)

Figure B-73 shows a label defined for CVP Routing Client.

Network VRU Configuration in AW Configuration Manager

Create the Network VRU device as follows:

Step 1  Open the Configurations Manager on the AW.

Step 2  Select the Network VRU Explorer option under the Tools > Explorer Tools group.

Step 3  Click Retrieve.
Step 4 Click Add Network VRU.
Step 5 Enter an appropriate name such as “cvp”.
Step 6 Select the type as “Type 10”.
Step 7 Enter a description such as the extension numbers associated with CVP and the VXML Gateway.
Step 8 Then Click Save. See Figure B-74.

Figure B-74

After the Network CVP VRU is created, add labels for each of the Route Clients as follows:

Step 1 Click Add Label.
Step 2 Select the Network VRU cvp.
Step 3 Select the Route Client CUCM_RC.
Step 4 Enter the label of the CVP Extension line 1005.
Step 5 Select normal for the label type.
Step 6 Select icm as the Customer.
Step 7 Enter a description as desired.
Step 8 Click Save. See Figure B-75.

Figure B-75

Perform the same steps and add a label for the CVP VRU PIM Route client as follows:
Step 1  Click **Add Label**.
Step 2  Select the Network VRU **cvp**.
Step 3  Select the Route Client **CVP_VRU_PIM**.
Step 4  Enter the label of the CVP Extension line **1006**.
Step 5  Select **normal** for the label type.
Step 6  Select **icm** as the Customer.
Step 7  Enter a description as desired.
Step 8  Click **Save**. See Figure B-76.

**Figure B-76**

Step 9  After the network VRUs have been created, add a Contact Center Agent and Skill Group for testing purposes.
Add Agents

Create the Agent as follows:

**Step 1** Open the Configurations Manager on the AW.
**Step 2** Select the **Agent Explorer** option under the **Tools > Explorer Tools** group.
**Step 3** Click **Retrieve**.
**Step 4** Click **Add Agent**.
**Step 5** Enter an appropriate first, last, and login name.
**Step 6** Enter an appropriate password.
**Step 7** Verify the Enterprise name that was generated is appropriate.
**Step 8** Enter an AgentID number or allow one to be generated automatically. This number is used during agent login to the Agent desktop client.
**Step 9** On the Supervisor tab, check **Supervisor agent** if desired.
**Step 10** Click **Save**. See **Figure B-77**.

**Figure B-77**
Add Skill Group

Create a Skill Group as follows:

Step 1  Open the Configurations Manager on the AW.
Step 2  Select the **Skill Group Explorer** option under the **Tools > Explorer Tools** group.
Step 3  Click **Retrieve**.
Step 4  Click **Add Skill Group**.
Step 5  Enter a Peripheral name such as **PreSale**.
Step 6  Enter an appropriate Name such as **Generic_Presale**.
Step 7  Select the Media Routing domain **Cisco_Voice**.
Step 8  On the Skill Group Members tab click add and select the agent created earlier.
Step 9  Click **Save**.
Step 10 Add route option in the skill group.
Step 11 Click **Add Route**.
Step 12 Assign an appropriate name such as **Generic_PreSale_Route**.
Step 13 Click **Save**. See **Figure B-78**.
Step 14  The next step is to create Call Type Lists for the Presales group and the Expert Advisor Service.

Add Call Type List

Create a Call Type List as follows:

Step 1  Open the Configurations Manager on the AW.
Step 2  Select the Call Type List option under the Tools > Explorer Tools group.
Step 3  Click Retrieve.
Step 4  Click Add.
Step 5  Enter a name such as PreSales_SanJose or Expert_Advisor_Service.
Step 6  Select the Customer icm.
Step 7  Enter an appropriate description as desired.
Step 8  Click Save. See Figure B-79.
Step 9  Repeat for second list.
Add Dialed Number/Script Selector List

Create a Dialed Number List as follows:

**Step 1**  Open the Configurations Manager on the AW.

**Step 2**  Select the Dialed Number/Script Selector List option under the Tools > Explorer Tools group.

**Step 3**  Click Retrieve.

**Step 4**  Click Add.

**Step 5**  Select the Routing client CUCM_RC.

**Step 6**  Select the Media routing Domain Cisco_Voice.

**Step 7**  Enter the Dialed Number string that is called to reach this queue.

**Step 8**  Enter a name such as CUCM_RC.1000 or CUCM_RC.1301 as appropriate.

**Step 9**  Select the Customer icm.

**Step 10**  Leave the default Label as <None>.

**Step 11**  Enter an appropriate description as desired.
Step 12  Click Save. See Figure B-80.
Step 13  Repeat for additional dialed numbers.

Figure B-80

![Dialled Number / Script Selector Link](image)

Step 14  On the Dialed Number Mapping Tab, select the calling line ID, Caller Entered digits (if any) and the Call type. For the 1301 dialed number the **Expert_Advisor_Service** was selected, for the 1000 dialed number **PreSaled_SanJose** was selected. See Figure B-81.
Figure B-81

Enable Expanded Call Context

To ensure proper call routing, ensure that **Expanded call context** is enabled in the System information configuration as follows:

**Step 1** Open the Configurations Manager on the AW.

**Step 2** Select the **System Information** option under the **Configure ICM > Enterprise > System Information** group.

**Step 3** Check the **Expanded call context** option.

**Step 4** Click **Save**. See Figure B-82.

Figure B-82
CUICM Instance Explorer Setting

An additional customer definition must be created for CVP under the ICM instance. Create a customer definition as follows:

---

**Step 1** Open the Configurations Manager on the AW.
**Step 2** Select the ICM Instance Explorer option under the Tools > Explorer Tools group.
**Step 3** Click Retrieve.
**Step 4** Select the desired instance.
**Step 5** Click Add Customer definition.
**Step 6** Enter an appropriate name.
**Step 7** Select the Network VRU as cvp.
**Step 8** Enter an appropriate description as desired.
**Step 9** Click Save. See Figure B-83.

---

*Figure B-83*
Add Expanded Call Variable List

Call variables are used to carry various pieces of information between systems as a call flows through the queue script steps. The default installation lacks several variables used in an Expert Advisor deployment and as such need to be added.

Add additional call variables as follows:

1. Open the Configurations Manager on the AW.
2. Select the Expanded Call Variable List option under the Tools > Explorer Tools group.
3. Click Retrieve.
4. Click Add.
5. Using the table of information below, configure each variable.
6. Enter the variable name.
7. Set the variable maximum length.
8. If an array size is defined, check the array option and set the size.
9. Set the variable as enabled.
10. Set as persistent if specified.
11. Enter an appropriate description as desired.
12. Click Save. See Figure B-84.
13. Repeat for each call variable.

<table>
<thead>
<tr>
<th>Name</th>
<th>Max Length</th>
<th>Array size</th>
<th>Enabled</th>
<th>Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td>user.cvpmovies_bg_media</td>
<td>40</td>
<td></td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>user.h323.rftransfer</td>
<td>1</td>
<td></td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>user.media.id</td>
<td>36</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.app_media_lib</td>
<td>10</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.caller_input</td>
<td>210</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.charset</td>
<td>10</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>user.microapp.currency</td>
<td>6</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.cvpmovies_params</td>
<td>40</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.error_code</td>
<td>2</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.FromExtVXML</td>
<td>210</td>
<td>1</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.grammar_choices</td>
<td>210</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.inline_tts</td>
<td>210</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.input_type</td>
<td>1</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.locale</td>
<td>5</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.media_server</td>
<td>30</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>user.microapp.metadata</td>
<td>62</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
Table B-1  Expanded Call Variables (continued)

<table>
<thead>
<tr>
<th>Call Variable</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user.microapp.override_cli</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>user.microapp.pd_tts</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>user.microapp.play_data</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>user.microapp.recording</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>user.microapp.sys_media_lib</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>user.microapp.ToExtVXML</td>
<td>210</td>
<td></td>
</tr>
<tr>
<td>user.microapp.uui</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>user.microapp.UseVXMLParams</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>user.sip.refertransfer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>user.video_media_server</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

Network VRU Script List

The Network VRU enables interaction with the caller using a variety of external scripts. The scripts created in the Network VRU Script List are then made available in the Script Editor.
Create the following scripts for use later in the Script Editor.
Create the VRU Scripts as follows:

**Step 1**  Open the Configurations Manager on the AW.
**Step 2**  Select the **Network VRU Script List** option under the **Tools > Explorer Tools** group.
**Step 3**  Click **Retrieve**.
**Step 4**  Click **Add**.
**Step 5**  Using the table of information below, create each of the VRU Scripts.
**Step 6**  Enter the script name.
**Step 7**  Set the Network VRU as **cvp** for all entries.
**Step 8**  Enter the VRU script name.
**Step 9**  Enter the Timeout length.
**Step 10**  Enter the Configuration param.
**Step 11**  Set the Customer as **icm**.
**Step 12**  Enter an appropriate description as desired.
**Step 13**  Click **Save**. See **Figure B-85**.
**Step 14**  Repeat for each Network VRU Script in the table.

**Table B-2**

<table>
<thead>
<tr>
<th>Name</th>
<th>VRU Script name</th>
<th>Timeout</th>
<th>Config. Param</th>
<th>Int</th>
<th>Ovr</th>
</tr>
</thead>
<tbody>
<tr>
<td>agentbusy</td>
<td>PM,agentsbusy</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>get4digits</td>
<td>GD,enter_4_digits,A</td>
<td>180</td>
<td>4,4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>holdmusic</td>
<td>PM,holdmusic</td>
<td>600</td>
<td>y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>playdigits</td>
<td>PD,Char</td>
<td>180</td>
<td>y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>playpromptVar7</td>
<td>PM,-7</td>
<td>180</td>
<td>y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>requery_busy</td>
<td>PM,requery_busy</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>requery_connect_failure</td>
<td>PM,requery_connect_failure</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>requery_rna</td>
<td>PM,requery_rna</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CTI Toolkit Agent Desktop Client Installation

For Agents located in Contact Centers, or agents that would service more standard call center queues; the Cisco Agent Desktop facilitates access to the queue and the tools necessary to track and monitor queue status.

The Cisco agent desktop is installed by running the Setup.exe program on the CTI disc (i.e., D:\ctios_builds\Release\ctios\Installs\CTIOSClient).

After running Setup.exe, complete the following steps are complete:

Step 1  Click Next, to continue.
Step 2  Click Yes on the confirmation page.
Step 3  Select the Installation drive.
Step 4  Click Next.
Step 5  Select the Agent Desktop feature.
Step 6  Click Next.
Step 7  Enter the CTIOS Server information.
Step 8  Enable QoS as desired.
Step 9  Click Next.
Step 10  If the formal agents are also using video endpoints select Enable for CVP Video.
Step 11  Click Next.
Step 12  Verify installation items and click Next.
Step 13  Once the installation is complete you will need to enter a CTIOS Client Certificate password between 8 and 30 characters long to secure communication between the Agent desktop and the CTIOS Server. Click OK.
Step 14  Review the Important Note content and click Next to install security components.
Step 15  Once the client security setup is complete click Finish.
Step 16  Once the client setup is complete click Finish. See Figure B-6.86 and Figure B-6.87.

*Figure B-6*
If all configurations are good and communication to the CUCM via PG is active, then agent should be able to login. At this point, it is also good idea to check if calls are being routed to the agent by making a simple ICM routing script. **Start >LAA >Skill Group Selection >Stop.**

### CUICM Routing Script

Create and schedule a routing script on AW by using the Script Editor software. **Figure B-88** shows a sample routing script. The logic that is followed for creating this script is as follows:

**Step 1** Start the script with the start node.

**Step 2** Set the value of media server HTTP URL in `Call.user.microapp.media_server` variable. This is the web server URL from where `.wav` files will be played (e.g., `http://media.cisco-irn.com`).

**Step 3** Set the value of language in `Call.user.microapp.locale` as `en-us`.

**Step 4** Set the value of input type (which is digits in this sample script) in `Call.user.microapp.input_type` variable to `D`.

**Step 5** Set the value of the `Call.user.microapp.app_media_lib` to `Custom`.

**Step 6** After setting the variables send the call to IVR using “Send to VRU” node.

**Step 7** Run external script called “get4digits” that will ask the customer to enter 4 digits (i.e., an account number).

**Step 8** Use the Set Variable to save the value `Call.CallerEnteredDigits` in the `Call.user.microapp.play_data` variable.

**Step 9** Run another external script called `playdigits`. This script will play the value stored in `Call.user.microapp.play_data` variable.

**Step 10** The select Longest Available Agent (LAA) decision object.

**Step 11** If agent is available, send the caller to agent using the Skill Group node.

**Step 12** If agent is not available, send the caller to Queue.

**Step 13** While the caller is in queue, play agent busy and music on hold `.wav` files in loop.
Cisco Voice Portal Installation

Prerequisites

- The CVP server hostname should not contain any hyphen.
- Arrange for CVP license.
- Regional and language options should be set to English.

See Figure B-89.
Text services and input languages options should be set to English (United States) - US. See Figure B-90.

Only one Ethernet connection should be active on the machine. See Figure B-91.

CVP Call Server, Operation Console and Media Server Installation

In this solution deployment lab validation, CVP Call Server and the Operation Console collocated on the same machine for ease of testing.

Install the CVP server by running the Setup.exe program from the installation DVD. Step through the installation using the following information:

**Step 1** Select Core Software, Remote Operations and System Media Files. See Figure B-92.
Step 2  Enter appropriate security certificate information. See Figure B-93.

Step 3  Enable the Call server and the Operations console. See Figure B-94.
Appendix B      Quick Installation and Configuration Steps for Virtual Expert Management

Figure B-94

**Step 4** Enter the preshare key to use between servers and node agents software. See [Figure B-95](#).

Figure B-95

As part of the Unified CVP, the installer will attempt to set-up Support Tools with IPSEC security using a preshared key. If successful, IPSEC will be configured with this key, and Support Tools will be enabled. This will add a level of security between any Servers and Node Agents. If a preshared key is not entered, then you must disable Support Tools to continue with the installation. Please note: if using a preshared key, it must be entered exactly the same for each Server or Node Agent, for them to be able to communicate with each other.

- **Disable Support Tools**
- **Preshared Key**: `cisco`

CVP Component Configuration

There are several components that need to be configured before CVP can operate properly. They are as follows:

- **CVP Media Server Configuration**
- **CVP Call Server Configuration**

**CVP Media Server Configuration**

This setup used Microsoft IIS as the web server to host the media files. See [Figure B-96](#).
Step 1  Enable read permission to the directory where .wav files are saved. See Figure B-97.

Step 2  Either create a Virtual Directory linking to the Media Files installed by the CVP setup.exe, or copy the “en-us” folder to the root of the IIS Web server. See Figure B-98.
Step 3  Make sure anonymous access is enabled and the built-in IIS User is assigned. See Figure B-99.

Step 4  Create a folder named **Custom** below the **en-us** folder for the audio files in the custom scripts. See Figure B-100.
CVP Component Configuration

Before configuring CVP call server, it should be important to know little bit about the setup and SIP call flows. Notices that these call flows are valid for the Type 10 VRU only. Also notice that “cid” is actually the correlation ID and is a numerical value.

Call Flow

CUCM Originated Calls

<table>
<thead>
<tr>
<th>Table B-3</th>
<th>CUCM Originated Calls</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUCCE Pilot Number</td>
<td>IP Phone caller dials CTI route point number 1000</td>
</tr>
<tr>
<td>Routing Client</td>
<td>SIP Gateway is the routing client</td>
</tr>
<tr>
<td>Label Returned to SIP GW by CUICM</td>
<td>1000+cid</td>
</tr>
<tr>
<td>Processing at SIP GW</td>
<td>SIP GW receives the label and sends the call to CVP Call Server</td>
</tr>
<tr>
<td>Processing at CVP</td>
<td>CVP receives this label and send it to CUICM as a new route-request.</td>
</tr>
<tr>
<td>Routing Client</td>
<td>Notice that now CVP is the routing-client</td>
</tr>
<tr>
<td>Processing at CUICM</td>
<td>CUICM receives its own generated label again and knows that loop is complete. And then generates a new label 1000+cid and sends to CVP</td>
</tr>
</tbody>
</table>
Once you understand the high level overview of the call flow, it will be easy to understand the static routes needed by the CVP Call Server. Using the SIP Gateway, a single static route can be used, (e.g., `sip-1.cisco-irn.com`)

**CVP Operation Console Server**

CVP Operation Console Server provides web-based front-end to configure different components in CVP environment. See Figure B-101 and Figure B-102.

**Figure B-101**  **CVP Call Server General Setting**

<table>
<thead>
<tr>
<th>General</th>
<th>ICM</th>
<th>SIP</th>
<th>IVR</th>
<th>Device Pool</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP Address: *</td>
<td>192.168.45.131</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostname: *</td>
<td>cvp-1.cisco-irn.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enable secure communication with the GUI console:</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure B-102**

Table B-3  **CUCM Originated Calls (continued)**

<table>
<thead>
<tr>
<th>Processing at CVP</th>
<th>CVP Call Server send this label 1000+cid to VXML-GW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing at VXML-GW</td>
<td>VXML-GW has an incoming dial-peer configured that basically invokes the bootstrap tcl service</td>
</tr>
<tr>
<td>Processing at CVP</td>
<td>Now a sequence of VXML communications happens between the VXML GW and CVP IVR Service. This communication is called MicroApps.</td>
</tr>
<tr>
<td>Processing at CVP</td>
<td>At this point CVP sends the same label 1000+cid to CUICM to inform that VXML-GW resources are engaged</td>
</tr>
</tbody>
</table>

**CVP Call Server ICM Configuration**

See Figure B-103.
Appendix B   Quick Installation and Configuration Steps for Virtual Expert Management

CVP Component Configuration

Figure B-103

CVP Call Server SIP Configuration and Static Route

Default information was used and no fields were modified. See Figure B-104.

Figure B-104

VXML and Ingress Gateway Configuration

In this setup, the same router can be used as an ingress gateway as well as the VXML gateway. Note that due to VXML compatibility issues, all Cisco IOS versions are not supported. In this lab validation tested c2800nm-ipvoicek9-mz.124-24.T1.bin.

Copy following files to VXML Gateway router’s flash memory:

- bootstrap.tcl
- bootstrap.vxml
- cvperror.tcl
- CVPSelfService.tcl
- CVPSelfServiceBootstrap.vxml
- survivability.tcl
- handoff.tcl
- ringtone.tcl
- recovery.vxml
- holdmusic.wav
ringback.wav
pleasewait.wav
critical_error.wav
en_0.wav
en_1.wav

Configuration

version 12.4
service timestamps debug datetime localtime show-timezone
service timestamps log datetime localtime show-timezone
no service password-encryption
!
hostname VXML
!
boot-start-marker
boot system flash c2800nm-ipvoicek9-mz.124-24.T1.bin
boot-end-marker
!
logging message-counter syslog
logging buffered 100000
enable password cisco
!
no aaa new-model
!
clock timezone PST -8
!
clock summer-time PSTDST recurring
!
dot11 syslog
!
ip source-route
!
ip cef
!
!
ip domain name cisco-irn.com
!
ip name-server 192.168.42.130
no ipv6 cef
!
ntp server 192.168.0.1
!
ntp server 192.168.42.130
!
ntp server 192.168.62.161 prefer
!
ntp server 192.168.62.162
!
multilink bundle-name authenticated
!
!
voice service voip
!
allow-connections h323 to h323
allow-connections h323 to sip
allow-connections sip to h323
allow-connections sip to sip
!
fax protocol cisco
!
!
h323
emptycapability
no telephony-service ccm-compatible
no ccm-compatible
!
h225 id-passthru
call start slow
h245 passthru tcsnonstd-passthru
sip
ds0-num
Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

CVP Component Configuration

header-passing

voice class codec 1
codec preference 1 g711ulaw
codec preference 2 g729r8

voice class h323 1
   h225 timeout setup 3

voice translation-rule 1
   rule 1 /987654/ //</

voice translation-profile block
   translate called 1

voice-card 0
dsp services dspfarm

http client cache memory pool 15000
http client cache memory file 500
ivr prompt memory 15000

application
   service new-call flash:bootstrap.vxml
      paramspace english language en
      paramspace english index 0
      paramspace english location flash:
      paramspace english prefix en

   service cvp-survivability flash:survivability.tcl
      paramspace english language en
      paramspace english index 0
      param alert-timeout 20
      paramspace english location flash
      paramspace callfeature med-inact-det enable
      param setup-timeout 7
      paramspace english prefix en

   service ringtone flash:ringtone.tcl
      paramspace english language en
      paramspace english index 0
      paramspace english location flash
      paramspace english prefix en

   service recovery flash:recovery.vxml
      paramspace english language en
      paramspace english index 0
      paramspace english location flash:
      paramspace english prefix en

   service cvperror flash:cvperror.tcl
      paramspace english index 0
      paramspace english language en
      paramspace english location flash
      paramspace english prefix en

   service takeback flash:survivability.tcl
      paramspace english language en
      paramspace english index 0
paramspace english location flash
paramspace english prefix en
!
service HelloWorld flash:CVPSelfService.tcl
paramspace english index 0
paramspace english language en
param CVPSelfService-port 7000
param CVPSelfService-app HelloWorld
param CVPPrimaryVXMLServer 192.168.45.131
paramspace english location flash
paramspace english prefix en
param CVPBackupVXMLServer 192.168.45.132
!
service handoff flash:handoff.tcl
paramspace english index 0
paramspace english language en
paramspace english location flash
paramspace english prefix en
!
service bootstrap flash:bootstrap.tcl
paramspace english index 0
paramspace english language en
paramspace english location flash:
paramspace english prefix en
!
! vxml version 2.0
!
archive
log config
hidekeys
!
!
interface FastEthernet0/0
description Connection to SACCESS-g1/33
ip address 192.168.45.101 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/1
no ip address
shutdown
duplex auto
speed auto
!
interface GigabitEthernet1/0
no ip address
shutdown
!
ip forward-protocol nd
ip route 0.0.0.0 0.0.0.0 192.168.45.1
!
ip http server
no ip http secure-server
!
control-plane
!
mgcp fax t38 ecm
mgcp behavior g729-variants static-pt
!
! <====Configuration for Trusted Relay====>
sccp local FastEthernet0/0
sccp ccm 192.168.45.182 identifier 1 version 7.0
sccp ccm 192.168.80.181 identifier 2 version 7.0
sccp!
sccp ccm group 1
    associate ccm 1 priority 1
    associate profile 1 register MTP-01!
sccp ccm group 2
    associate ccm 2 priority 1
    associate profile 2 register MTP-02!
dspfarm profile 2 mtp
    codec g711ulaw
    codec pass-through
    maximum sessions software 110
    associate application SCCP!
dspfarm profile 1 mtp
    codec g711ulaw
    codec pass-through
    maximum sessions software 110
    associate application SCCP
! <====End Configuration for Trusted Relay===>
!
 dial-peer voice 9191 voip
    service ringtone
    session protocol sipv2
    incoming called-number 9191T
    dtmf-relay rtp-nte
    codec g711ulaw
    no vad!
dial-peer voice 9292 voip
    service cvperror
    session protocol sipv2
    incoming called-number 9292T
    dtmf-relay rtp-nte
    codec g711ulaw
    no vad!
dial-peer voice 1006 voip
    translation-profile incoming block
    service bootstrap
    session protocol sipv2
    incoming called-number 1006T
    dtmf-relay rtp-nte
    codec g711ulaw
    ip qos dscp cs3 signaling
    no vad!
dial-peer voice 987654 voip
    translation-profile incoming block
    incoming called-number 987654
!
!
line con 0
    exec-timeout 0 0
line vty 0 4
    exec-timeout 0 0
    password cisco
    login
line vty 5 15
    exec-timeout 0 0
password cisco
login
!
scheduler allocate 20000 1000
end

Expert Advisor Installation

The installation is on VOS. It is very simple. Refer to the Installation Guide for Cisco Unified Expert Advisor 7.6(1) for additional information. Follow these steps:

Step 1 Media Check: select Yes if you want to check the media.
Step 2 Product Deployment Selection: Click OK.
Step 3 Proceed with Install: Yes.
Step 4 Platform Installation Wizard: Click on Proceed.
Step 5 Apply Patch: Click No.
Step 6 Basic Install: Click on Continue.
Step 7 Timezone Configuration: Select your timezone.
Step 8 Auto Negotiation Configuration: Select the default option Yes.
Step 9 MTU Configuration: Select the default option: No.
Step 10 DHCP Configuration: Select No.
Step 11 Static Network Configuration: Enter the information for your network.
Step 12 DNS Client Configuration: Click Yes.
Step 13 DNS Client Configuration: Enter your DNS information.
Step 14 Administrator Login Configuration: Enter your Administrator ID and password information.
Step 15 Certification Information: Enter your Certificate Information.
Step 16 First Node Configuration: Click Yes if you are installing your first node. If you are installing the second Expert Advisor Server or the reporting server, click No.
Step 17 Network Time Protocol Client Configuration: Click Yes.
Step 18 Network Time Protocol Client Configuration: Enter the NTP Client information.
Step 19 Database Access Security Configuration: Enter the system security password.
Step 20 SMTP Host Configuration: Select No if you are not configuring a SMTP Host for this machine.
Step 21 Application User Configuration: Enter the Application (GUI) username and password.
Step 22 Platform Configuration Confirmation: Click on Ok.

For more information on the installation of the Expert Advisor servers, refer to the Installation Guide for Cisco Unified Expert Advisor 7.6(1).
CUP Installation

The CUP installation is very similar to the installation of Expert Advisor, since it is also running on Unified Communications Operating System (UCOS). Follow the steps above for base installation.

Once the server is installed, a few post install steps need to be done; log into the server via the web interface: \texttt{http://<YourCUPServerAddress>/ccmadmin}.

After the install, enter the post install information. See \textit{Figure B-105} to \textit{Figure B-109}.

\textit{Figure B-105}

\begin{figure}[h]
\centering
\includegraphics[width=0.8\textwidth]{post_installation_deployment_wizard}
\caption{Post-Installation Deployment Wizard}
\end{figure}

\textbf{Post-Installation Deployment Wizard}

The final install steps for this Cisco Unified Presence server need to be completed. The following screens will walk you through this process.

The Cisco Unified Communications Manager Publisher is the node that the CUP server will communicate with to receive and send updates.

\textbf{Cisco Unified Communications Manager Publisher configuration:}

<table>
<thead>
<tr>
<th>Hostname*</th>
<th>cm-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
<td>192.168.45.158</td>
</tr>
</tbody>
</table>

\textit{Figure B-106}

\begin{figure}[h]
\centering
\includegraphics[width=0.8\textwidth]{post_installation_deployment_wizard_2}
\caption{Post-Installation Deployment Wizard}
\end{figure}

\textbf{Post-Installation Deployment Wizard}

AXL is the API that CUP uses to communicate with the CUOM Publisher. Communication via AXL requires AXL login information from the CUOM Publisher.

\textbf{AXL Configuration Information:}

<table>
<thead>
<tr>
<th>CUOM Publisher IP Address</th>
<th>192.168.45.182</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXL User*</td>
<td>CUPsecruised</td>
</tr>
<tr>
<td>AXL Password*</td>
<td>**********</td>
</tr>
<tr>
<td>Confirm Password*</td>
<td>**********</td>
</tr>
</tbody>
</table>
**Figure B-107**

Post-Installation Deployment Wizard

The IPSec Security password is used to secure communication among CUCM and CUP nodes. This password must match the security password as configured on the CUCM Publisher node.

Security Password configuration:

Security Password

Confirm Password

--- Back Next ---

**Figure B-108**

Post-Installation Deployment Wizard

Please verify the information below and click Confirm. If any information is incorrect, please go back and correct it before proceeding.

Hostname: cm-2
IP Address: 192.168.45.162
AML User: CUPSecUser

--- Back Confirm ---

**Figure B-109**

Post-Installation Deployment Wizard

Post-Installation Deployment has been completed. Click below where you want to go next:

- Home - Administration Home Page
- System Dashboard - System Dashboard
- Topology - System Topology
Configuration

CUP

Step 1  Activate the Cisco UP SIP Proxy, Cisco UP Presence and Cisco UP Sync Agent Services. See Figure B-111.

![Figure B-111](image)

Database and Admin Services

<table>
<thead>
<tr>
<th>Service Name</th>
<th>Activation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco AXL Web Service</td>
<td>Activated</td>
</tr>
<tr>
<td>Cisco Bulk Provisioning Service</td>
<td>Activated</td>
</tr>
</tbody>
</table>

Performance and Monitoring Services

<table>
<thead>
<tr>
<th>Service Name</th>
<th>Activation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Serviceability Reporter</td>
<td>Activated</td>
</tr>
</tbody>
</table>

CUP Services

<table>
<thead>
<tr>
<th>Service Name</th>
<th>Activation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco UP SIP Proxy</td>
<td>Activated</td>
</tr>
<tr>
<td>Cisco UP Presence Engine</td>
<td>Activated</td>
</tr>
<tr>
<td>Cisco UP Sync Agent</td>
<td>Activated</td>
</tr>
</tbody>
</table>

Step 2  Go to Presence > Routing > Static Routes. See Figure B-112.
Step 3  And add routes to the Expert Advisor Runtime server. See Figure B-113.

Step 4  Create a Presence Gateway so that Unified CM can send presence information to the Cisco Unified Presence Server. Go to Presence > Presence Gateways. See Figure B-114.

Step 5  Configure a Proxy Domain so that CUPC users can connect to the CUP server to obtain presence information. Go to System > Service Parameters.

Step 6  Set the “Proxy Domain” field to the correct DNS domain.

Step 7  Configure Incoming ACL: configure which hosts, domains, and CUPC clients can access CUP Server.

Step 8  Go to System > Security > Incoming ACL. See Figure B-115.
Step 9 Configure TFTP Server for CUPC.

Step 10 Go to Application > Cisco Unified Personal Communicator > Settings. See Figure B-116.

Step 11 Add SIP Publish capability to the SIP trunk between CUCM and CUP. This will allow CUCM to provide phone presence information to CUP server.

Step 12 Go to the CUP server, Application > Presence > Settings.

Step 13 Check the Enable SIP Publish on CUCM.

Step 14 Select the SIP trunk configured on CUCM. See Figure B-117.
Another way to do this is to go directly to the CUCM admin page, Service Parameter, Cisco CallManager, and select the SIP trunk in the field CUP Publish Trunk.

**Step 15** Configure Conferencing hosts as appropriate. Go to Application > Cisco Unified Personal Communicator > Conferencing Server > New servers. See Figure B-118.

**Figure B-118**

<table>
<thead>
<tr>
<th>Conferencing Host (1 - 2 of 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Meeting Place Express</td>
</tr>
<tr>
<td>VEM Webex Conference</td>
</tr>
</tbody>
</table>

**Step 16** After the server is configured, create a Conferencing profile and add users to the profile. See Figure B-119.

**Figure B-119**

**Conferencing Profile Configuration**

- **Name**: VEM users Desktop Share
- **Description**: VEM collaborative desktop sharing
- **Primary Conferencing Server**: Meeting Place Express
- **Backup Conferencing Server**: < Name >
- **Backup Conferencing Server**: < Name >

**Users in Profile**

<table>
<thead>
<tr>
<th>User ID</th>
<th>Firstname</th>
<th>Lastname</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jack3</td>
<td>Jack</td>
<td>Large</td>
</tr>
<tr>
<td>Jill</td>
<td>Jill</td>
<td>Small</td>
</tr>
<tr>
<td>Jill3</td>
<td>Jill</td>
<td>Small</td>
</tr>
<tr>
<td>John</td>
<td>John</td>
<td>mini</td>
</tr>
<tr>
<td>John2</td>
<td>John</td>
<td>Mini</td>
</tr>
<tr>
<td>John3</td>
<td>John</td>
<td>mini</td>
</tr>
</tbody>
</table>

**Provisioning Guide**

- Jack3
- Jill
- Jill3
- John
- John2
- John3
Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

**CUCM**

Since in this solution calls are originated from an IP Phone, create a CTI RP (you could also send the call to CVP with a Route Pattern, but here, the scenario covers where the call is sent to CVP using a CTI RP) and add a DN for this CTI RP (in our example, 1000 and 1301 DNs are used). If your calls are coming directly to CVP via a PSTN GW, you do not need these steps. See Figure B-120 and Figure B-121.

**Figure B-120**

<table>
<thead>
<tr>
<th>Device Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration</td>
<td>Registered with Cisco Unified Communications Manager cm-2.disco-im.com</td>
</tr>
<tr>
<td>IP Address</td>
<td>192.168.45.152</td>
</tr>
<tr>
<td>Device Name*</td>
<td>CTI-RP-1000</td>
</tr>
<tr>
<td>Description</td>
<td>CTI-RP CS Route Point 1000</td>
</tr>
<tr>
<td>Device Pool*</td>
<td>Default</td>
</tr>
<tr>
<td>Common Device Configuration</td>
<td></td>
</tr>
<tr>
<td>Calling Search Space</td>
<td></td>
</tr>
<tr>
<td>Location*</td>
<td>Hub_None</td>
</tr>
<tr>
<td>User Locale</td>
<td>&lt; None &gt;</td>
</tr>
<tr>
<td>Media Resource Group List</td>
<td></td>
</tr>
<tr>
<td>Network Hold MOC Audio Source</td>
<td></td>
</tr>
<tr>
<td>User Hold MOC Audio Source</td>
<td></td>
</tr>
<tr>
<td>Use Trusted Relay Point*</td>
<td>Default</td>
</tr>
<tr>
<td>Calling Party Transformation CSS</td>
<td></td>
</tr>
<tr>
<td>Geo Location</td>
<td>&lt; None &gt;</td>
</tr>
<tr>
<td>Use Device Pool Calling Party Transformation CSS</td>
<td></td>
</tr>
</tbody>
</table>

**Association Information**

- **Line (1) - 1000 (no partition)**
- **Line (2) - Add a new DN**

**Figure B-121**

**Step 1**

Associate the CTI-RP to the jtapi user that the Agent PG is using to connect to CUCM. See Figure B-122.
Step 2  Add the CUP server in the Application server Configuration as shown in Figure B-123 and Figure B-124.
Step 3  If the expert advisor user will use CUPC as a softclient, create a phone device on CUCM for the CUPC softclients. Select the **Cisco Unified Personal Communicator** Phone Type. See Figure B-125.

**Figure B-125**

![Select the type of phone you would like to create](image)

Step 4  The device name must start with UPC and be followed, all capital letters, by the username of the expert advisor that will use the client. See Figure B-126.
**Figure B-126**

<table>
<thead>
<tr>
<th>Phone Type</th>
<th>Product Type: Cisco Unified Personal Communicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device Protocol:</td>
<td>SIP</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Device Information**

- Registration: Unknown
- IP Address: Unknown
- Device Name*: UPCJ072401
- Description: John 1 Mini
- Device Pool*: Default
- Common Device Configuration: <None>
- Phone Button Template*: Standard Unified Communicator SIP
- Common Phone Profile*: Standard Common Phone Profile

**Step 5**
Add a DN for each of the CUPC device.

**Step 6**
Add expert advisor users as shown in **Figure B-127**.

**Figure B-127**

**Step 7**
In the *Directory Number Association* field, select the primary Extension for the user. See **Figure B-128**.
Step 8 If allowing CTI deskphone mode for the users, make the user part of the **Standard CTI Enabled** user group. See Figure B-129.

Step 9 For each Expert Advisor user, go to their phone configuration and then line configuration, go to the section **Users Associated with Line**, and associate the end user (expert advisor user) that will use this phone. See Figure B-130.

This will change the CUPC client availability to “On the Phone” when the expert advisor user goes off hook on one of his associated phone devices.

Step 10 Add an CUCM user for each Expert Advisor Runtime server. See Figure B-131.

Step 11 Enable presence and CUPC capabilities for the Expert Advisor users and also for the user that the Expert Advisor runtime server will use to connect to CUP (in our case, ExpertAdvisor user).

Step 12 In System > Licensing > Capabilities Assignment, enable CUP and CUPC for each Expert Advisor user. See Figure B-132.
Step 13  Configure a SIP Trunk between CUCM and CUP server (enter the IP address or DNS name of the CUP server in the Destination Address field). See Figure B-133.

**CUP Server Configuration**

**LDAP Configuration**

LDAP is an optional component of the Unified Expert Advisor system and is not required for routing requests. It allows Expert Advisor users to search through the AD with their CUPC client.

**Step 1**  Go to Application > Cisco Unified Personal Communicator > LDAP Server. See Figure B-134.

**Step 2**  Go to: Application > Cisco Unified Personal Communicator > LDAP Profile.

**Step 3**  Enter the information of your LDAP directory and click on Add Users to profile. The users that are shown are the users entered in CUCM that were downloaded into CUP server, with the right capability settings configured in CUCM administration page. See Figure B-135.
Figure B-135

If you are deploying OCS/LCS and want to enable deskphone control with CUPC, go to Application > Deskphone Control > Settings.

Select On for the Application Status and enter the jtapi CtiGw information and CTIM information. See Figure B-136.

Figure B-136

The Deskphone control application provides connectivity between Cisco Unified Communications Manager (CUOM) and soft clients that provide Click-to-Call/Phone control-type services. You can configure the Deskphone control application to connect up to a maximum of eight CUOM servers.

Select Application > Deskphone Control > User Assignment and check the Enable Deskphone Control checkbox. See Figure B-137.

Figure B-137
Expert Advisor Configuration

Step 1 Go to http://<EA-ip-address>. Expert Advisor system can be deployed with expert advisor users using either Cisco Unified Presence or Microsoft Office Communicator, not both types in the same Expert Advisor deployment. See Figure B-138.

Figure B-138

Please select the type of IM clients your experts will be using to connect to Expert Advisor.

IMPORTANT: This setting is permanent and cannot be changed without re-installing Expert Advisor and re-entering your configuration.

- Cisco Unified Presence
- Microsoft Office Communicator

Step 2 Go through the Guided Configuration Wizard. See Figure B-139.

Figure B-139

Start Guided Configuration Wizard

Would you like to configure the System using the Guided Configuration Wizard?

☐ Do not ask again

Step 3 Upload the license. If not, the system comes with a default license of 5 users. See Figure B-140.

Figure B-140

Configure License

Please browse to and upload your license file, which sets the number of Expert Advisors you are authorized to enable.

Current License
Total Licenses available for Enabled Expert Advisors: 5

License File Management
Select a local license file to upload: [C:\Documents and Settings\Administrator\Desktop] Browse...

Step 4 Configure the Primary Runtime Server. In the CUP user field, enter the CUP user that Expert Advisor runtime server will use to connect to the CUP server. See Figure B-141.
Step 5 Configure the secondary Runtime Server. Skip if you do not deploy a HA Runtime server. See Figure B-142.

Figure B-142
**Step 6** Configure an Expert Advisor reporting server. Skip if you do not deploy a Expert Advisor reporting server. See Figure B-143.

*Figure B-143*

<table>
<thead>
<tr>
<th>Configure Reporting Server</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
</tr>
<tr>
<td>* Name:</td>
</tr>
<tr>
<td>* Host Address:</td>
</tr>
<tr>
<td>Description:</td>
</tr>
<tr>
<td><strong>Reporting Properties</strong></td>
</tr>
<tr>
<td>Define the maximum disk size to use to persist reporting data on the runtime servers during reporting server outages or loss of connectivity.</td>
</tr>
<tr>
<td>* Max Storage Size (MB):</td>
</tr>
<tr>
<td>Restore Default</td>
</tr>
</tbody>
</table>

**Step 7** Configure a AD server. See Figure B-144.
**Figure B-144**

### Configure Active Directory

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Directory Server</td>
<td></td>
</tr>
<tr>
<td>Host Address</td>
<td>activedirectory.cisco-lm.com</td>
</tr>
<tr>
<td>Port</td>
<td>389</td>
</tr>
<tr>
<td>Use SSL</td>
<td></td>
</tr>
<tr>
<td>Host Address</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>389</td>
</tr>
<tr>
<td>Use SSL</td>
<td></td>
</tr>
<tr>
<td>Manager Distinguished Name</td>
<td>CN=Administrator, CN=users, DC=disco-lm</td>
</tr>
<tr>
<td>Manager Password</td>
<td>*****</td>
</tr>
<tr>
<td>Confirm Manager Password</td>
<td>*****</td>
</tr>
<tr>
<td>User Search Base</td>
<td>CN=users, DC=disco-lm, DC=com</td>
</tr>
<tr>
<td>Attribute for User ID</td>
<td>sANAccountName</td>
</tr>
</tbody>
</table>

* Required fields

---

**Step 8** Configure the ICM translation route. These DNIS numbers need to be routable by your system (for example, enter a route in CUP SIP proxy). See Figure B-145.
**Figure B-145**

Configure Unified ICM Translation Route Targets

<table>
<thead>
<tr>
<th>Specify Unified ICM DNIS Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting DNIS:  5200</td>
</tr>
<tr>
<td>Ending DNIS:  1202</td>
</tr>
</tbody>
</table>

*Required fields

---

**Step 9** Configure the Cisco Unified Presence servers. See Figure B-146.
Appendix B      Quick Installation and Configuration Steps for Virtual Expert Management

Figure B-146

Synchronize Presence Users

- Presence Servers
  * Primary Presence Server: sip-1.cisco-int.com
  Secondary Presence Server: sip-1.cisco-int.com

- Presence Server Username: bmcgloth
- Presence Server Password: ************

Test Connection

Synchronization Schedule

- Frequency
  - Every 1 minute(s)
- Start Date and Time
  - Time: 12 AM
  - Day: Sunday

* Required fields
Click Next to Synchronize Presence Users.

Step 10 Verify the summary. See Figure B-147.

Figure B-147

Guided Initial Configuration Wizard Summary

You have successfully completed the following steps in the Initial Configuration Wizard:

- Welcome to Guided Initial Configuration Wizard
- Configure Primary Runtime Server
- Configure Primary Runtime Server
- Configure Unified ICN Translation Route Targets
- Configure Unified ICN Translation Route Targets
- Synchronize Presence Users
- Synchronize Presence Users

If you have skipped some steps, return to this wizard at any time by opening it from the System Management drawer.

Please note that you must supplement this initial configuration by completing some additional procedures. Click Help on this screen for details on full configuration.

Click Done to close the wizard and return to the Cisco Unified Expert Advisor: Welcome screen.

Step 11 In System Management tab, click on Synchronize Presence Users.

Step 12 Click on the Synchronization tab, click on Synchronize Now. Among other tasks, this will download the list of users from the CUP server. See Figure B-148.

Step 14 Click on Add New. Select the users from CUP. See Figure B-149.
### Step 15
Configure settings for the expert advisor users and click on **Add as Expert Advisors**. See Figure B-150.

**Figure B-150**

<table>
<thead>
<tr>
<th>Presence ID</th>
<th>First Name</th>
<th>Last Name</th>
<th>Locale</th>
<th>Unified JCM ID</th>
<th>Enabled</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>jack2</td>
<td>Jack</td>
<td>Large</td>
<td>en_US</td>
<td>29</td>
<td>True</td>
<td>Valid</td>
</tr>
<tr>
<td>jill</td>
<td>Jill</td>
<td>Small</td>
<td>en_US</td>
<td>29</td>
<td>True</td>
<td>Valid</td>
</tr>
<tr>
<td>john1</td>
<td>John</td>
<td>mini</td>
<td>en_US</td>
<td>24</td>
<td>True</td>
<td>Valid</td>
</tr>
<tr>
<td>john2</td>
<td>John</td>
<td>Mini</td>
<td>en_US</td>
<td>24</td>
<td>True</td>
<td>Valid</td>
</tr>
</tbody>
</table>

* Invalid means that the Expert Advisor no longer exists in the Presence Server.

### Step 16
In **Daily Management**, select **Skills**. Click on **Add New**.

### Step 17
Enter a name for the Skill and click on Add in the **Expert Advisors** section.

### Step 18
Select the users that will belong to this skill and click on **Add and Close**.
Step 19  Click on Save. See Figure B-151.

**Figure B-151**

![Figure B-151](image)

Step 20  Create an Assignment Queue. In Daily Management, select Assignment Queues. Click on Add New.

Step 21  Enter a Name for the assignment queue. Enter an incoming label. This label will need to be routable by the CUP SIP Proxy. Select the other appropriate settings, for simplicity use the Queue CTI-RP DN number. Click on Save. See Figure B-152.
**Figure B-152**

**Configure Assignment Queue**

- **General**
  - **Names:** Expert Service
  - **Description:** Expert Level General Customer Service - High Touch

- **Unified SCM**
  - **Incoming Label:** 1301
  - **Skill Group Peripheral Number:** 47
  - **Skill Group Peripheral Name:** Expert Service

- **Selection Strategy**
  - **Queue ordering:**
    - Longest Available
    - Least Skilled
    - Most Skilled
  - **Queue to Expert**
  - **Spatial**

- **Selected Attributes**

- **Advanced**
  - **Broadcast Number:** 1
  - **Broadcast Number greater than 50 can adversely affect performance.**
  - **Offer Task Timeout:** 50 (seconds)

---

**Step 22** Click on the **Membership** tab.

**Step 23** Add the expert advisor users that should belong to this assignment queue. Click on **Add and Close**. See Figure B-153.
Step 24  Start the Expert Advisor runtime service.

Step 25  Go to Serviceability > Control Center. Select the runtime server and click on Start. The status should be in “Running (in service)”. See Figure B-154.

ICM Configuration

To configure ICM, complete the following steps:

Step 1  Select the PG for expert advisor and click on Retrieve.

Step 2  Click on Add Network Trunk group. Enter a name for the Network trunk group.

Step 3  Click on Add Trunk. Provide a Peripheral name, and select Use Trunk Data for the Trunk count. See Figure B-155.
Step 4  On the Unified ICM Configuration Manager, select Explorer Tools > Skill Group Explorer.
Step 5  Select the Expert Advisor PG, select Retrieve.
Step 6  You should see the Skill Group/AssignmentQueue that was configured on Expert Advisor.
Step 7  Click on Add Route and add the route information.
Step 8  Click on Save. This adds a new button to Add Peripheral target. Click on that button.
Step 9  Enter the DNIS that should be the same as the Incoming Label configured on Expert Advisor Operations Console.
Step 10 Select the Expert Advisor Network trunk group. Click on Save.
Step 11 Click on Add Label. Select the Expert Advisor PIM. Enter the label that should be the same as the DNIS entered above.
Step 12 Click on Save. See Figure B-156.
Step 13 Configure the translation routes. On Configuration Manager, select **Explorer Tools > Translation Route Explorer**.

Step 14 Select the PG for the Expert Advisor runtime server. Click on **Retrieve**.

Step 15 Click on **Add Translation route**. Enter a name for the translation route. Click on **Add Route**.

Step 16 Enter a name for the Route and click on **Save**.

Step 17 Click on **Add Peripheral target**. Enter the DNIS to send the call to Expert Advisor runtime. Select the **Network trunk group** and click on **Save**.

Step 18 Click on **Add Label**. Select the CVP Routing client, enter the label (same as the DNIS configured for the Peripheral target). Click on **Save**. See **Figure B-157**.

Step 19 Repeat those steps for other Translation Routes assigned to Expert Advisor.
Step 20  Edit the Dialed Number for the Expert Advisor. This is the number that customer or agent will dial to reach an expert advisor user.

Step 21  In Config Manager, go to List Tools > Dialer Number / Script Selector List and edit the Dialed Number for the CM Routing Client that was created previously.

Step 22  Go to the Dialed Number Label tab and click on Add.

Step 23  Select all the translation routes configured for Expert Advisor and press OK. See Figure B-158.
Step 24  Click on Save.

Step 25  In the Config Manager on the Admin Workstation open the Service Explorer option under Tools > Explorer Tools. Check that the Expert Advisor server has connected to the queue service. See Figure B-159.
**Expert Advisor Script**

Create the ICM Script for the Expert Advisor Queue on the AW by using the Script Editor software. Shows a sample routing script. The logic that is followed for creating this script is as follows:

---

**Step 1**
Start the script with the start node.

**Step 2**
Set the value of media server HTTP URL in `Call.user.microapp.media_server` variable. This is the web server URL from where .wav files will be played (e.g., http://media.cisco-irn.com).

**Step 3**
Set the value of language in `Call.user.microapp.locale` as `en-us`.

**Step 4**
Set the value of input type (which is digits in this sample script) in `Call.user.microapp.input_type` variable to “D”.

**Step 5**
Set the value of the `Call.user.microapp.app_media_lib` to `Custom`.

**Step 6**
After setting the variables send the call to IVR using `Send to VRU` node.

**Step 7**
Perform a DB lookup based on the calling number and/or caller entered digits for an account number.

**Step 8**
Use the Set Variable to save the values of the data retrieved from the Database as PeripheralVariables under the Call object type.

**Step 9**
Send the caller to Queue using the Queue to Skill Group, add the **EA_PG_2_1 Skill** group.

**Step 10**
While the caller is in queue, play agent busy and music on hold .wav files in loop. See Figure B-160.
Trouble Shooting Tip

If using CUPC in the deskphone mode, you might see the following error message when the expert advisor is replying with a “Yes” that you will not see in the softphone mode. See Figure B-161.

Figure B-161

ExpertAdvisor@ipcc.vse.cisco.com (10:59 AM): Are you available to handle this contact?
expert 1 (10:59 AM): y
ExpertAdvisor@ipcc.vse.cisco.com (10:59 AM): Sorry, the system could not find your phone number. Please specify a phone number where you would like to receive the contact.

As a remedy, configure the Phone Numbers in the Expert Advisor page. See Figure B-162.
Database Lookup and Passing Data to the Expert

Step 1 Prepare your Database/CRM. Make sure you configure a primary key in your table.

Step 2 On the ICM Router servers execute the ICM setup utility (Run C:\icm\bin\ICMSetup.exe) and turn on Database Routing. See Figure B-163.

Step 3 On the ICM Router server, open the regedit utility and edit the registry key for the Database configuration as follows:

a. Locate HKEY_LOCAL_MACHINE\SOFTWARE\Cisco Systems, Inc.\ICM\<instance>\Router\Router\CurrentVersion\Configuration\Database.

b. For the SQLLogin key, enter the information of your database:
Figure B-164

You need to do that only on one side. This setting will be automatically replicated to the other side.

Step 4  In ICM Configuration, open the DB Lookup Explorer.

Step 5  Enter a name for the Script Table. For side A and B, enter the DB server information with DB name and table as: `\<ipaddress-or-name>\<Database_name>=(<username>, <password>)`. See Figure B-165.
Step 6  In the ICM script, perform add a DB Lookup step to select the row you are looking for. For example, if the account number should match “1111”, then enter the following information in the Database Lookup step. See Figure B-166.
Step 7  After a match is found other column data can be retrieved for this record. In the following example, we set the *PeripheralVariable1* to the AccountNumber column of the DB record, using the `set` step. Later on, with Expert Advisor, we will map this Peripheral Variable1 to an Expert Advisor variable, also called Expert Advisor attribute. See Figure B-167.

Figure B-167

Step 8  On Expert Advisor OAMP, if you want to display this information to the expert, create new Attribute Definitions. Go to *Daily Management*, select *Attribute Definitions*. See Figure B-168.
**Step 9**  Add new attribute definitions. Click on **Disabled** in the **In Expert Advisor Client**. See **Figure B-169**.

**Figure B-169**

**Step 10**  In **Contact Attribute Sources**, map the new Attribute Definitions to Variables you use in the ICM script. See **Figure B-170**.
Step 11 Modify the messages sent to the expert. Go the Daily Management > Message Sets. You can for example use the Clone functionality to clone the System Defined Message for English. See Figure B-171.

Step 12 Edit the new message set and choose the To Expert tab.

Step 13 Edit the Contact Offer Request Notice.

Step 14 Edit the Contact Offer Notice. See Figure B-172.
The dialogue with the Expert will then look like to what is shown in Figure B-173.
For more information on DB Lookup, refer to the Scripting and Media Routing Guide for Cisco Unified ICM/Contact Center Enterprise & Hosted and the Administration and Configuration Guide for Cisco Unified Expert Advisor 7.6(1) at the following URLs:


**WebEx Access Anywhere**

WebEx Access Anywhere is a simple method for an Agent to control the desktop and system that the customer used when contacting the agent from within the enterprise. The WebEx Access Anywhere service uses an agent installed on the remote system to allow connection and control from an Expert Agent without the customer having to connect to, navigate or share the system they are using via services such as WebEx meeting or Cisco Meeting Place sessions.

**Step 1**

To install the WebEx Access Anywhere agents on a system, login to the WebEx account. Select My WebEx from the tool menu and then click on My Computers. See Figure B-174.
Step 2  Click on **Set up Computer**. Accept the Security Warning for ActiveX. See **Figure B-175**.

Step 3  Click **Next**.

Step 4  Enter the Computer name and WebEx Account Info and click **Next**. See **Figure B-176**.
Appendix B      Quick Installation and Configuration Steps for Virtual Expert Management

Configuration

Figure B-176

Step 5  Click Next.

Step 6  For Virtual Expert Kiosks in an Enterprise Branch configure the session options to enable both the Expert and the customer to access and control the System at the same time. Click Next. See Figure B-177.

Figure B-177

Step 7  Configure access for the entire Desktop and click Next. See Figure B-178.
Figure B-178

![WebEx Access Anywhere Setup Wizard](image1)

**Step 8**  Set the Access code for this system and click **Next**. Figure B-179.

Figure B-179

![WebEx Access Anywhere Setup Wizard](image2)

**Step 9**  With setup completed, click **Finish**. See Figure B-180.
Figure B-180

Step 10  The newly added system will be listed in the My WebEx Computer table and the WebEx Access Anywhere agent will be running in the System Task Tray waiting for a connection. See Figure B-181.
### Appendix B  Quick Installation and Configuration Steps for Virtual Expert Management

#### Figure B-181

![Cisco Webex Welcome Screen]

**My WebEx Computers**

<table>
<thead>
<tr>
<th>Computer</th>
<th>Status</th>
<th>Application</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>web01</td>
<td>Available</td>
<td>Desktop</td>
<td>Connect</td>
</tr>
<tr>
<td>web03-Branch 123</td>
<td>Available</td>
<td>Desktop</td>
<td>Connect</td>
</tr>
</tbody>
</table>

**Action Options:**
- **Remove**
- **Set Up Computer**
- **Download manual installer**

---

> **Powered by**
> Cisco WebEx Technology

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Terms of Service
References

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- Installation Guide for Cisco Unified Expert Advisor 7.6(1)
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