Getting Started with Unified IP IVR Customer Response Solutions

Cisco Unified IP IVR and Cisco Unified Queue Manager 5.0(1)

June 2007

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Getting Started with Cisco Unified IP IVR, Release 5.0(1)

C O N T E N T S

Preface

Purpose

Use this guide as a starting point document when implementing a Cisco Unified IP IVR (Unified IP IVR) or a Cisco Unified Queue Manager (Unified QM) system before you install or configure your system. The purpose of this guide is to tell you what you need to know before you implement a Unified IP IVR or Unified QM system.

Note Unified Contact Center Express: Premium, Enhanced, and Standard is described in the *Getting Started with the Cisco Unified Contact Center Express* guide.

This guide:

- Describes what you get with each product (Unified IP IVR and Unified QM).

- Explains why you would use one product rather than the other.

- Shows the available system architectural models for each product.

- Describes the call or contact flow in the product deployments and describes how key system configuration parameters interact and depend on one another.

- Lists the key Unified CM configuration values on which Unified IP IVR and Unified QM depend on to work properly.

- Lists the key Unified IP IVR or Unified QM configuration values on which Unified ICME depends for your Unified CCE system to work properly.

- Lists the software you must install and configure and in what order these tasks must be done for each product (Unified IP IVR or Unified QM) to work.

- Lists the Unified IP IVR and Unified QM configuration tasks.

- References the documentation where you can find the procedures for installing and configuring the required software.

Audience

System installers and administrators or anyone who installs or configures a Unified IP IVR or a Unified QM telephony system.

Organization

Section	Title	Description
Part 1	Unified IP IVR and Unified QM Overview	An overview of both products.
Chapter 1	About Unified IP IVR and Unified QM	A description of both products summarizing what is supported in each.
Chapter 2	Features Enabled for Each Product by Product Licensing	A comparative list of all the CRS features enabled for each product by product licensing.
Chapter 3	Unified IP IVR and Unified QM Architecture	An overview with sample deployment models of Unified IP IVR and Unified QM architecture.
Chapter 4	Basic Call and Contact Flow Concepts	Unified IP IVR and Unified QM concepts, call and contact flows, and configuration dependencies.
Part 2	Installing and Configuring Unified IP IVR with Unified CM or CME	How to install and configure Unified IP IVR independent of a Unified CCE system.
Chapter 5	Installing and Configuring Unified CM for Unified IP IVR	How to install and configure Unified CM for Unified IP IVR.
Chapter 6	Installing and Configuring Unified CME for Unified IP IVR	How to install and configure Unified CME for Unified IP IVR.
Chapter 7	Installing and Configuring Unified IP IVR	How to install and configure UnifiedIP IVR.
Chapter 8	How to Deploy the Sample Script, aa.aef	How to deploy a sample Unified IP IVR script.
Part 3	Installing and Configuring Unified IP IVR or Unified QM with Unified CCE	Everything you should be aware of when you install and configure Unified IP IVR or Unified QM within a Unified CCE system.
Chapter 9	Installing and Configuring Unified ICME for Unified CCE	How to install and configure Unified IP IVR or Unified QM for Unified CCE.
Chapter 10	Installing and Configuring Unified IP IVR or Unified QM for Unified CCE	How to install and configure Unified ICME for Unified CCE.
Chapter 11	How To Deploy the Sample Script, BasicQ.aef	How to deploy a sample Unified IP IVR or Unified QM script in Unified CCE.
Chapter 12	Managing Unified IP IVR	About managing prompts, grammars, documents, and CRS datastores.

Related Documentation

This section lists

- The main index pages listing Cisco Customer Contact documentation available on the web

- Other related web documentation and resources

The following Web addresses can give you additional information to that provided in this guide on Unified IP IVR and Unified QM.

Note The Web addresses referenced in this guide were accurate at the time this guide was written but may change. If an address does not work, visit Cisco.com and search for the related document at the Search prompt.

Table 2-1 Main Index Pages listing Customer Contact Documentation Available on the Web

For information on	See ....
Voice and Unified Communications	Voice and Unified Communications
Cisco Unified Communications Manager (Unified CM)	Cisco Unified Communications Manager
Cisco Customer Contact Software	Cisco Customer Contact Software
Cisco Unified Contact Center Express (Unified CCX)	Cisco Unified Contact Center Express
Cisco Unified Contact Center Enterprise (Unified CCE)	Cisco Unified Contact Center Enterprise

Table 2-2 Other Related Web Documentation and Resources

For	See ....
Cisco Unified IP Phones 7900 Series	Cisco Unified IP Phones 7900 Series
Unified IP IVR and Unified QM product descriptions, datasheets, case studies, and other documents	Cisco IP Interactive Voice Response Cisco Queue Manager
How to plan, design, implement, operate, and optimize a Unified Contact Center Telephony System	*IP Telephony* and *Cisco Unified Contact Center Enterprise* technologies at Steps to Success
How to design a Unified IP IVR or Unified QM system	Solution Reference Network Design (SRND) guides at Cisco Unified Contact Center Express Design Guides
How to deploy a Unified IP IVR system	Training Resources IP Communications Training
How to install and/or upgrade a Unified IP IVR or Unified QM system	Cisco Customer Response Solutions Installation Guide at Cisco Unified Contact Center Express Install and Upgrade Guides
How to develop and program Cisco CRS Scripts	**Cisco CRS Scripting and Development Series** manuals at Cisco Unified Contact Center Express End-User Guides
How to configure and administer a Unified IP IVR system without Unified CCE	**Cisco Customer Response Solutions Administration Guide** at Cisco Unified Contact Center Express Configuration Guides
How to install, configure, and maintain a Unified IP IVR or Unified QM system with Unified CCE	**Cisco IP Contact Center Installation and Configuration Guide** at Cisco Unified Contact Center Enterprise

Table 2-2 ***Other Related Web Documentation and Resources (continued)***

For	See ....
How to troubleshoot your Unified IP IVR or Unified QM system	Cisco IP Interactive Voice Response Troubleshoot and Alerts
	Cisco Unified Contact Center Express
Technical Support	Technical Support & Documentation
	Technical Support Overview
	Cisco IP Interactive Voice Response
	Cisco Unified Contact Center Express
	Cisco Unified Contact Center Enterprise
Release Notes, Technical Notes, and Field Notices	Cisco Unified Contact Center Express Troubleshooting TechNotes
	Cisco Unified Contact Center Express Field Notices
	Cisco Unified Contact Center Enterprise Troubleshoot and Alerts
Interoperability Information	Interoperability Systems Support Resources
Unified IP IVR, Unified QM, and Unified CCE test data. The previous product names (IP IVR, IP QM, and IPCC Enterprise) might still be used with this test data.	Systems Test Release Set Documentation

Conventions

This manual uses the following conventions.

Convention	Description
boldface font	Boldface font is used to indicate commands, such as user entries, keys, buttons, and folder and submenu names. For example: • Choose **Edit > Find**. • Click **Finish**.
*italic*font	Italic font is used to indicate the following: • To introduce a new term. Example: A *skill group* is a collection of agents who share similar skills. • For emphasis. Example: *Do not* use the numerical naming convention. • A syntax value that the user must replace. Example: IF (*condition, true-value, false-value*) • A book title. Example: See the *Cisco CRS Installation Guide*.

Convention	Description
window font	Window font, such as Courier, is used for the following: • Text as it appears in code or that the window displays. Example: *<html><title>Cisco Systems,Inc. </title></html>*
< >	Angle brackets are used to indicate the following: • For arguments where the context does not allow italic, such as ASCII output. • A character string that the user enters but that does not appear on the window such as a password.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. This section explains the product documentation resources that Cisco offers.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/techsupport

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

The Product Documentation DVD is a library of technical product documentation on a portable medium. The DVD enables you to access installation, configuration, and command guides for Cisco hardware and software products. With the DVD, you have access to the HTML documentation and some of the PDF files found on the Cisco website at this URL:

http://www.cisco.com/univercd/home/home.htm

The Product Documentation DVD is created and released regularly. DVDs are available singly or by subscription. Registered Cisco.com users can order a Product Documentation DVD (product number DOC-DOCDVD= or DOC-DOCDVD=SUB) from Cisco Marketplace at the Product Documentation Store at this URL:

http://www.cisco.com/go/marketplace/docstore

Ordering Documentation

You must be a registered Cisco.com user to access Cisco Marketplace. Registered users may order Cisco documentation at the Product Documentation Store at this URL:

http://www.cisco.com/go/marketplace/docstore

If you do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Documentation Feedback

You can provide feedback about Cisco technical documentation on the Cisco Support site area by entering your comments in the feedback form available in every online document.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you will find information about how to do the following:

- Report security vulnerabilities in Cisco products
- Obtain assistance with security incidents that involve Cisco products
- Register to receive security information from Cisco

A current list of security advisories, security notices, and security responses for Cisco products is available at this URL:

http://www.cisco.com/go/psirt

To see security advisories, security notices, and security responses as they are updated in real time, you can subscribe to the Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed. Information about how to subscribe to the PSIRT RSS feed is found at this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you have identified a vulnerability in a Cisco product, contact PSIRT:

- For emergencies only—security-alert@cisco.com

    An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- For nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

> **Tip** We encourage you to use Pretty Good Privacy (PGP) or a compatible product (for example, GnuPG) to encrypt any sensitive information that you send to Cisco. PSIRT can work with information that has been encrypted with PGP versions 2.*x* through 9.*x*.

Never use a revoked encryption key or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

If you do not have or use PGP, contact PSIRT to find other means of encrypting the data before sending any sensitive material.

Product Alerts and Field Notices

Modifications to or updates about Cisco products are announced in Cisco Product Alerts and Cisco Field Notices. You can receive these announcements by using the Product Alert Tool on Cisco.com. This tool enables you to create a profile and choose those products for which you want to receive information.

To access the Product Alert Tool, you must be a registered Cisco.com user. Registered users can access the tool at this URL:

http://tools.cisco.com/Support/PAT/do/ViewMyProfiles.do?local=en

To register as a Cisco.com user, go to this URL:

http://tools.cisco.com/RPF/register/register.do

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Support website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Support Website

The Cisco Support website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day at this URL:

http://www.cisco.com/en/US/support/index.html

Access to all tools on the Cisco Support website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Before you submit a request for service online or by phone, use the **Cisco Product Identification Tool** to locate your product serial number. You can access this tool from the Cisco Support website by clicking the **Get Tools & Resources** link, clicking the **All Tools (A-Z)** tab, and then choosing **Cisco Product Identification Tool** from the alphabetical list. This tool offers three search options:

by product ID or model name; by tree view; or, for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Tip **Displaying and Searching on Cisco.com**

If you suspect that the browser is not refreshing a web page, force the browser to update the web page by holding down the Ctrl key while pressing **F5**.

To find technical information, narrow your search to look in technical documentation, not the entire Cisco.com website. After using the Search box on the Cisco.com home page, click the **Advanced Search** link next to the Search box on the resulting page and then click the **Technical Support & Documentation** radio button.

To provide feedback about the Cisco.com website or a particular technical document, click **Contacts & Feedback** at the top of any Cisco.com web page.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests, or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411
Australia: 1 800 805 227
EMEA: +32 2 704 55 55
USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—An existing network is "down" or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operations are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of the network is impaired while most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The Cisco Online Subscription Center is the website where you can sign up for a variety of Cisco e-mail newsletters and other communications. Create a profile and then select the subscriptions that you would like to receive. To visit the Cisco Online Subscription Center, go to this URL:

  http://www.cisco.com/offer/subscribe

- The *Cisco Product Quick Reference Guide* is a handy, compact reference tool that includes brief product overviews, key features, sample part numbers, and abbreviated technical specifications for many Cisco products that are sold through channel partners. It is updated twice a year and includes the latest Cisco channel product offerings. To order and find out more about the *Cisco Product Quick Reference Guide*, go to this URL:

  http://www.cisco.com/go/guide

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- Cisco Press publishes a wide range of general networking, training, and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Internet Protocol Journal* is a quarterly journal published by Cisco for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the *Internet Protocol Journal* at this URL:

  http://www.cisco.com/ipj

- Networking products offered by Cisco, as well as customer support services, can be obtained at this URL:

  http://www.cisco.com/en/US/products/index.html

- Networking Professionals Connection is an interactive website where networking professionals share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:

  http://www.cisco.com/discuss/networking

- "What's New in Cisco Documentation" is an online publication that provides information about the latest documentation releases for Cisco products. Updated monthly, this online publication is organized by product category to direct you quickly to the documentation for your products. You can view the latest release of "What's New in Cisco Documentation" at this URL:

  http://www.cisco.com/univercd/cc/td/doc/abtunicd/136957.htm

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html

P A R T   1

Unified IP IVR and Unified QM Overview

Use this guide as a starting point document when implementing a Cisco Unified IP IVR (Unified IP IVR) or a Cisco Unified Queue Manager (Unified QM) system before you install or configure your system.

The purpose of this guide is to tell you what you need to know before you implement a Unified IP IVR or Unified QM system.

Unified Contact Center Express: Premium, Enhanced, and Standard is described in the *Getting Started with the Cisco Unified Contact Center Express* guide.

About Unified IP IVR and Unified QM

This chapter contains the following:

Product Names

The following product name conventions are used in this guide:

- Cisco Unified IP IVR is abbreviated as Unified IP IVR.
- Cisco Unified Queue Manager is abbreviated as Unified QM.
- Cisco Unified Communications Manager is abbreviated as Unified CM.
- Cisco Unified Communications Manager Express is abbreviated as Unified CME.
- Cisco Unified Contact Center Express is abbreviated as Unified CCX.
- Cisco Unified Contact Center Enterprise is abbreviated as Unified CCE.
- Cisco Unified Intelligent Contact Management Enterprise is abbreviated as Unified ICME.

Summary Description of Unified IP IVR and Unified QM

The Unified IP IVR (Interactive Voice Response) and the Unified QM (Queue Manager) software are Cisco Customer Response Solutions (CRS) product packages that provide IP call queuing and IP intelligent voice response functionality for a contact center.

Both products use the same script editor. Both products can be configured to play static or dynamic prompts, to offer menus to callers, queue a call, play music, and so on.

The Basic Differences between Unified IP IVR and Unified QM

- Unified QM is used only in a Unified CCE contact center while Unified IP IVR can be used in either a Unified CCE contact center or a Unified CM cluster without Unified CCE.

- Unified IP IVR provides the same features as Unified QM, plus additional features. For example, Unified IP IVR can check a database to gather data that Unified ICME software might use for routing or to give more detailed treatment to the caller, and can use speech recognition or text to speech configurations while Unified QM cannot do these things.

- Because Unified IP IVR has more features than Unified QM, it is also more customizable than Unified QM.

- Unified QM has not been updated since CRS 3.5 while Unified IP IVR has been updated with each new release of CRS since CRS 3.5.

- Unified IP IVR will work with Unified CME while Unified QM will not work with Unified CME.

These product packages are mutually exclusive. This means that only one of them can be installed at any point in time on a CRS server. If both are installed, then priority is given to Unified IP IVR.

Enhancements to Unified IP IVR in CRS, Release 5.0

The following new features have been added to Unified IP IVR in CRS 5.0:

- Compatibility with Unified CM 6.0 and 5.1

- Support for the Microsoft Windows 2003 operating system

- Support for Sun JDK 1.5

- In Unified IP IVR (not in Unified IP QM), two nodes have High Availablity support. High Availability is the support of an optional server in a Cisco CRS deployment that provides failover capability. A high availability server automatically takes over for its corresponding active server within 5 seconds if the active server becomes unavailable.

- Upgrade support from CRS 4.5 to CRS 5.0

- Simplified install, patch, and back up, and install procedures

- Simplified Administration wizards

- Support for IBM WVS ASR/TTS (MRCP 1.0)

- Crystal report upgrade

- New L10n support for Korean, Portuguese Bazillion, Traditional Chinese, Swedish, and Dutch

- Updated Serviceability with a new Log Collection Tool and Support Tool

About Installing More than One CRS Product on a Server

All CRS product packages are mutually exclusive. This means that only one of them can be installed at any point in time on a CRS server. If more then one is installed, then priority is given to the package with the highest number at the left in the following list:

1. Unified QM
2. Unified IP IVR
3. Unified CCX Standard
4. Unified CCX Enhanced
5. Unified CCX Premium

This means, for example, that Unified CCX Standard has a higher priority than Unified IP IVR, and if both are installed on the same CRS server, you will only be able to use Unified CCX standard.

Unified IP IVR and Unified QM Feature Summary in Release 5.0

Table 1-1 lists the Cisco CRS features supported in each product.

Table 1-1   Supported Features

Feature	Unified QM	Unified IP IVR
Hardware configuration	Cisco MCSand Cisco approved partner servers	Cisco MCS and Cisco approved partner servers
Software configuration	Microsoft Windows client-server software	Microsoft Windows client-server software
Vendor systems	Unified CM 5.0 and later	Unified CM 5.0 and later and Unified CME
Operating systems	Windows 2003 Server and Advanced Server	Windows 2003 Server and Advanced Server
Maximum number ofanalog trunks	Unlimited (no software limitations)	Unlimited (no software limitations)
Maximum number of IP trunks	Unlimited (no software limitations)	Unlimited (no software limitations)
Maximum number of trunk groups	Unlimited (no software limitations)	Unlimited (no software limitations)
CTI (Computer Telephony Integration) option	Not Available	Included
SIP (Session Initiation Protocol) option	Not Available	Included only with Unified CME
E-mail	Not Available	Included
Database	Not Available	Included
Read data from HTTP and XMLpages	Not Available	Included

Table 1-1   Supported Features (continued)

Feature	Unified QM	Unified IP IVR
MRCP ASR/TTS	Not Available	Optional using Media Resource Control Protocol (MRCP)—order from a 3rd party vendor For the currently supported MRCP ASR/TTS vendors, see the current CRS Compatibility Matrix
Playmessages to callers—music	Included using Unified CM Music On Hold server or .wav file	Included using Unified CM Music On Hold server or .wav file
Play messages to callers—prompts	Included using .wav file	Included using .wav file
Play messages to callers—combine prompts, music and messages	Included and fully customizable	Included and fully customizable
Capture and process callerDual Tone Multifrequency (DTMF) input	Included	Included and fully customizable
Capture and process caller DTMF input underVXML control	Not available	Included
Automated attendant support	Included	Included and fully customizable
All languages	Included, if installed.	Included, if installed.
Inbound HTTP request	Not Available	Included
Historical reporting	Included, but limited to Unified IP IVR reports	Included, but limited to Unified IP IVR reports
Custom scripting using CRS Drag and Drop Editor	Included, but limited to creating Unified ICME VRU scripts with limited steps.	Included. Has full editing features. All types of applications including ICM, Busy, and RNA are available.
CM Telephony triggers	Included	Included
HTTP triggers	Not Available	Included
Conditional routing (time of day, day of week, custom variables, etc)	Included	Included
Overflow, interflow, intraflow routing	Included	Included
Run defined workflow using HTTP request	Not available	Included
Integrated self-service application support	Not available	Included

Note   To check for the current versions of the preceding software supported by your version of Unified IP IVR, see the *Cisco CRS Software and Hardware Compatibility Matrix.* You can access it on the Web at Cisco IPCC Express Edition and Cisco Unified IP IVR

Unified QM and Unified IP IVR Comparative Package Descriptions

Table 1-2 summarizes the difference between Unified QM and Unified IP IVR.

Table 1-2   Comparative Descriptions

Product Package	Available Licensed Components	Purpose
Unified QM	• Unified QM Server Software (Required) • Unified QM Ports (At least one must be purchased)	Provides basic call treatment options like prompt and collect and integration with Unified ICME software. It is only sold for Unified CCE deployment. It does not provide the ability for the retrieval of information in databases, e-mail, ASR or TTS. It does not have web capabilities like Unified IP IVR.
Unified IP IVR	• Unified IP IVR Server Software (Required) • Unified IP IVR Ports (At least one is a must) • Automatic Speech Recognition (obtained through a separate Vendor) • Text To Speech (obtained through a separate Vendor) • VoiceXML	A superset of the Unified QM package. Allows contact-center applications to handle "typical" questions by letting callers interact directly with back-end databases without agent intervention. This includes integration with Unified CCE if needed. This also includes three subsystems and three corresponding editor pallets that you do not get in Unified QM: • The HTTP subsystem (which enables both incoming and outgoing HTTP support) • Outgoing Email support • Database support

Note   Three basic Historical Reports (IVR Traffic Analysis Report, IVR Application Performance Analysis Report, and the Detailed Call by Call CCDR Report) are available with both packages without needing a separate license. All supported CRS languages are included in both packages; it is up to you to install which one(s) you want.

Unified QM Feature Summary

Unified QM is an IP-based call treatment and routing solution that provides call-treatment options as part of the Unified CCE solution.

Using Unified QM, you can create applications that:

- Answer calls.

- Provide static announcements to a queued caller: "All of our agents are busy . . . "

- Provide dynamic announcements to a queued caller: "There are 12 calls in queue. Your expected wait time is 15 minutes."

- Static and dynamic messages can be tailored to specific caller interests, the route selected, the caller's place in the queue, or other associated values.

- Provide menu choices for a caller: "To leave a message press 1, to select from a list of frequently asked questions . . ." This can provide callers with easy access to multiple agent skill groups, extensions, or announcements, either before or after routing.

- Prompt to obtain caller data such as passwords or account identification.

- Transfer calls to caller-selected extensions.

CRS Subsystems Supported by Unified QM

Table 1-3 lists all the CRS subsystems supported by Unified QM.

Table 1-3   Subsystems Supported by Unified QM

Subsystem Type	Purpose
CMT (Cisco Media Termination)	Configures CMT dialog control groups, which can be used to handle simple Dual Tone Multifrequency (DTMF) data collected from dialog interactions with customers.
	The Cisco Media subsystem uses dialog groups to organize and share resources among applications. A dialog group is a pool of dialog channels in which each channel is used to perform dialog interactions with a caller, during which the caller responds to automated prompts by pressing buttons on a touch-tone phone.
Core Reporting	Provides information for Unified IP IVR real-time reports.
ICM (Intelligent Contact Management)	Manages the connection between the CRS server and Unified ICME software.
CM Telephony	Manages the connection between Unified CM CTI Manager and the CRS Engine.
RmCm (Resource Manager-Contact Manager)	Allows CRS to route and queue calls and manage the historical reporting feature.

Sample Default Unified QM Script Templates

Table 1-4 describes the Unified QM sample scripts automatically included with your Unified QM system.

Table 1-4   Sample Unified QM Script Template Descriptions

Sample Script Template	Description
Basic Queuing	Greets a caller and puts the call on hold while waiting for an available agent.
Collect Digits	Acquires an account number (or other numbers) from a caller.
Visible Queuing	Greets a caller, provides feedback about the estimated time until the caller will be connected, and puts the call on hold while waiting for an available agent.

Unified IP IVR Feature Summary

Unified IP IVR software is a multimedia (voice, data, web) IP-enabled interactive voice response solution that automates call handling by autonomously interacting with contacts.

Using Unified IP IVR, you can create applications to do everything that Unified QM does, plus the following 5 items, which Unified QM cannot do:

- Interpret voice data (as well as keyboard data).

- Translate text to speech.

- Send and respond to HTTP requests.

- Send e-mail.

- Enable CRS to interact directly with back-end databases through ODBC (Open Database Connectivity) support—without agent intervention.

- Unified IP IVR applications have ODBC support. Unified IP IVR applications can access Microsoft Structured Query Language (SQL) servers and Oracle, Sybase, and IBM DB2 databases.

✎

Note   To check for the current versions of the preceding software supported by your version of Unified IP IVR, see the *Cisco Customer Response Solutions (CRS) Software and Hardware Compatibility Guide*. You can access it on the Web at Compatibility Information

CRS Subsystems that Unified IP IVR Supports that are not in Unified QM

Unified IP IVR supports all the subsystems that Unified QM supports. In addition, Unified IP IVR supports the following subsystems which Unified QM does not support.

Table 1-5   Subsystems Supported by Unified IP IVR

Subsystem Type	Purpose
CME Telephony This subsystem is available only for the CME edition.	Provides support for SIP, a peer-to-peer, multimedia signaling protocol that is ASCII-based and that resembles HTTP.
MRCP Automatic Speech Recognition (ASR) • ASR Server Software (Required) • ASR ports (at least one is required) The number of ASR ports should be less than or equal to the number of IVR ports. If there are more ASR ports than IVR ports, then the excess ports are automatically disabled.	Allows a script to respond to voice input in addition to DTMF (Dual Tone Multi-Frequency), the signal to the telephone company that is generated when you press a key on a telephone keypad. This allows a caller to verbally convey information to the system for processing instead of pressing keys on a touch-tone telephone.
MRCP Text To Speech (TTS) • TTS Server Software (Required) • TTS Ports (at least one is required)	Composes voice prompts that are generated in real time from text, such as speaking the words in the text of an e-mail message. TTS is primarily used to convey information obtained from a database or other source that is non-repetitive. Examples of such information include name and address verification. Repetitive information, such as numbers comprising an account balance, normally is not conveyed using TTS. Although text to speech technology has improved greatly since its inception, the tone still sounds mechanical. So it is best used only when the information possibilities make wave file generation impossible.
E-Mail	Adds components to the CRS Engine that allows it to send e-mail messages
Database	Handles the connections between the CRS server and the enterprise database. Also provides Open Database Connectivity (ODBC) support. See Compatibility Information for the latest versions of the database software that are supported.

Table 1-5   Subsystems Supported by Unified IP IVR (continued)

Subsystem Type	Purpose
Inbound HTTP Request	Adds components to the CRS Engine that allow it to respond to HTTP requests.
Voice Browser	Manages Voice Browser functionality.

Sample Default Unified IP IVR Scripts

Table 1-6 describes the sample Unified IP IVR scripts automatically included with your Unified IP IVR system. In addition to these scripts, Unified IP IVR also supports all Unified QM scripts when it is installed in an Unified CCE environment. The Unified QM scripts are designed specifically for integration with Unified ICME software.

Table 1-6   Sample Default Unified IP IVR Scripts

Sample Script Template	Description
Auto Attendant	Allows a caller to call an agent by entering an extension number or the first few characters of an associated username. If ASR is enabled, the caller may simply speak the extension or the user name.
Spoken Name Upload	Enables Unified CM users to call in, authenticate their identities, and replace their spoken names with newly recorded announcements on their telephones
Voice Browser	Uses ASR functionality to allow a caller to access information from VoiceXML-enabled web sites.

Features Enabled for Each Product by Product Licensing

This chapter contains the following:

The following sections describe the various features separately enabled by product licensing for Unified IP IVR and for Unified QM.

For a list of all features enabled by CRS licensing for all CRS products, see the *Cisco CRS Administration Guide.*

CRS Administration Menus Enabled by Product Licensing

The word **Included** in Table 2-1 means that the related menu item is enabled for the product in that column.

Table 2-1   Administration Menus Enabled by Product Licensing

CRS Administrator Main Menu	Menu Items	Unified QM	Unified IP IVR
System	Unified CM Configuration	Included	Included
	Control Center	Included	Included
	Datastore Control Center	Included	Included
	System Parameters	Included	Included
	Custom File Configuration	Included	Included
	Alarm Configuration	Included	Included
	Tracing	Included	Included
	License Information	Included	Included
	Language Information	Included	Included
	Logout	Included	Included
Applications	Application Management	Included	Included
	Script Management	Included	Included
	Prompt Management	Included	Included
	Grammar Management	Included	Included
	Document Management	Included	Included
	AAR Management	Included	Included
Subsystems	Unified CM Telephony	Included	Included
	ICM	Included	Included
	Database	Not Available	Included
	HTTP	Not Available	Included
	eMail	Not Available	Included
	Cisco Media	Included	Included
	MRCP ASR/TTS	Not Available	Included

Table 2-1   Administration Menus Enabled by Product Licensing (continued)

CRS Administrator Main Menu	Menu Items	Unified QM	Unified IP IVR
Wizards	Application Wizard	Included	Included
Tools	Alarm Definition	Included	Included
	Plug-ins	Included	Included
	Real-Time Reporting	Included	Included
	Real-Time Snapshot Configuration	Included	Included
	Historical Reporting	Included	Included
	User Management	Included	Included
	Troubleshooting Tips	Included	Included
	Backup and Restore	Included	Included
Help	Contents and Index	Included	Included
	For this Page	Included	Included
	CRS Documentation on Cisco.com	Included	Included
	About	Included	Included

Prompt, Spoken Name Upload, and Plugin Options Enabled by Product Licensing

Table 2-2 lists the availability of CRS options not listed in the preceding menu list.

Table 2-2   Prompt, Spoken Name, Plugin Options Enabled by Product Licensing

Option	Unified QM	Unified IP IVR
Prompt Management	Included	Included
Spoken Name Upload	Not Available	Included
Plugin Editor	Included	Included
Plugin – HR Client(1)	Included	Included

CRS Subsystems Enabled by Product Licensing

Table 2-3   Subsystems Enabled by Product Licensing

Subsystem	Unified QM	Unified IP IVR	MRCP ASR (Add on)	MRCP TTS (Add on)
Application	Included	Included	not applicable	not applicable
ASR	Not Available	Included	Yes	not applicable
Cisco Media Termination	Included	Included	not applicable	not applicable

Table 2-3   Subsystems Enabled by Product Licensing (continued)

Subsystem	Unified QM	Unified IP IVR	MRCP ASR (Add on)	MRCP TTS (Add on)
Core Reporting	Included	Included	not applicable	not applicable
Database	Not Available	Included	not applicable	not applicable
eMail	Not Available	Included	not applicable	not applicable
Enterprise Server Data	Not Available	Not Available	not applicable	not applicable
HTTP	Not Available	Included	not applicable	not applicable
ICM	Included	Included		Yes
CM Telephony	Included	Included	not applicable	not applicable
CME Telephony	Not Available	This subsystem is available only for the CME edition.	not applicable	not applicable
Resource Manager and Cisco Media	Included	Included	not applicable	not applicable
TTS	Not Available	Included	not applicable	Included
Voice Browser (VB)	Not Available	Included	The Voice Browser subsystem is available only if MRCP ASR is enabled.	not applicable

Application Types Enabled by Product Licensing

Table 2-4   Application Types Enabled by Product Licensing

Application Type	Unified QM	Unified IP IVR
Cisco Script Application	Not Available	Included
Busy	Included	Included
Ring No Answer	Included	Included
ICM Post Routing	Included	Included
ICM Translation Routing	Included	Included

Editor Steps Enabled by Product Licensing

Table 2-5 lists the Unified QM and Unified IP IVR packages with the Step Editor steps enabled in each.

Table 2-5   Editor Steps Enabled by Product Licensing

CRS Script Step	Unified QM	Unified IP IVR
General[1]	Included	Included
Session	Included	Included
Contact	Included	Included
Call Contact[2]	Included	Included
Email Contact	Not Available	Included
HTTP Contact	Not Available	Included
Media[3]	Included	Included
User	Not Available	Included
Prompt[4]	Included	Included
Grammar	Included	Included
Document	Included	Included
Database	Not Available	Included
ACD	Not Available	Not Available
Intelligent Contact Management (ICM)	Included	Included
CM Telephony	Included	Included

1. The "Get Reporting Statistic" step is not available to either Unified QM or Unified IP IVR.
2. The "Place Call" step is not available to Unified IP IVR.
3. The "Name to User" and the "Voice Browser" steps are not availableto Unified QM.
4. The "Create TTS Prompt" step is not available to Unified QM.

Historical Reports Enabled by Product Licensing

Table 2-6 lists the historical reports that come with Unified IP IVR and Unified QM.

Table 2-6   Historical Reports Enabled by Product Licensing

Report Name	Report Description
Application Performance Analysis Report	Summary information about calls received by each Unified IP IVR application.
Detailed Call by Call CCDR Report	Detailed information about each call received by the Unified IP IVR system.
Traffic Analysis Report	Summary information about calls received by the Unified IP IVR system during each day in the report range.

Releated Documentation

Cisco Customer Response Solutions Historical Reports User Guide

Cisco Customer Response Solutions Historical Reporting Administrator and Developer Guide

Cisco Customer Response Solutions Database Schema

Real-Time Reports Enabled by Product Licensing for Unified IP IVR

Table 2-7 lists the real-time reports that come with Unified IP IVR.

Table 2-7   Real-Time Reports Enabled by Product Licensing

Report Name	Report Description
Application Administration	Displays Overall Application Engine Activity
Application Activity	Monitors Activity by Application
Application Task	Monitors Activity by Task

For how to run real-time reports and for full descriptions of the preceding reports, see the *Cisco CRS Administration Guide*.

C H A P T E R 3

Unified IP IVR and Unified QM Architecture

This chapter contains the following:

This chapter briefly describes the deployment models that you can use with Unified IP IVR or Unified QM.

The following are brief descriptions of key items for a Unified IP IVR deployment:

- **Voice Gateway.** Connects the Unified Communications network to the Public Switched Telephone Network (PSTN) and to other private telephone systems. You purchase gateways separately. Both inbound and outbound calls to the PSTN travel through the gateway.

- **Unified CM (or Unified CME).** Provides the features that are required to implement IP phones, manages gateways, and directs voice over IP traffic to the Cisco CRS system. You must purchase Unified CM (or CME) separately.

- **Unified IP IVR or Unified QM.** Contains the Cisco CRS Engine that runs Unified IP IVR or Unified QM.

- The following optional, dedicated servers for a Unified IP IVR deployment:

    - **MRCP TTS.** A dedicated, vendor-specific server that converts text into speech and plays it back to the caller.

    - **MRCP ASR.** A dedicated, vendor-specific server that performs real-time ASR.

> ✎
>
> **Note**   For the currently supported MRCP ASR/TTS vendors, see the current CRS Compatibility Matrix

Available Deployment Models

Unified IP IVR or Unified QM can be deployed in your IP network on Cisco Media Convergence Servers or Cisco approved customer-provided servers. However, Unified IP IVR or Unified QM cannot be connected to Unified CM across a WAN.

> **Note** In CRS 5.0, Unified IP IVR or Unified QM can be installed only on one server with a second server as a backup server.

The following four figures illustrate the different ways you might deploy Unified IP IVR or Unified QM:

- The first two figures show how you can deploy Unified IP IVR, apart from Unified CCE. Unified QM is not sold apart from Unified CCE.

- The second two figures show how you can deploy either Unified IP IVR or Unified QM with Unified CCE.

For more information on Unified IP IVR deployment models, see the design guide for Unified Customer Contact Express, which includes information for Unified IP IVR at Design Guides

Standalone Deployment

The following Unified IP IVR deployment models show Unified IP IVR deployed apart from Unified CCE.

Figure 3-1 shows Unified IP IVR installed on a separate server. The following are brief descriptions of key items in the figure:

- **Gateway**. Connects the enterprise Unified Communications network to the Public Switched Telephone Network (PSTN) and to other private telephone systems such as Public Branch Exchange (PBX). You purchase gateways separately. Both voice and Web correspondence travel through the gateway.

- **Unified CM (or CME) Server**. Provides the features that are required to implement IP phones, manage gateways, provides failover and redundancy service for the telephony system, and directs voice over IP traffic to the Cisco Customer Response Application (Cisco CRS) system. You must purchase Unified CM separately.

   > **Note** In CRS 5.0, Unified IP IVR has to be installed on a server separate from the Unified CM (or CME) server. The reason is that the Unified CM 5.0 system is appliance based while the CRS 5.0 system is not.
   >
   > With CME, CRS 5.0 only supports single-node deployment.

- **Cisco CRS Server**. Contains the Cisco CRS Engine that runs Unified IP IVR.

Figure 3-1   *Unifed IP IVR Architecture without Unifed CCE*
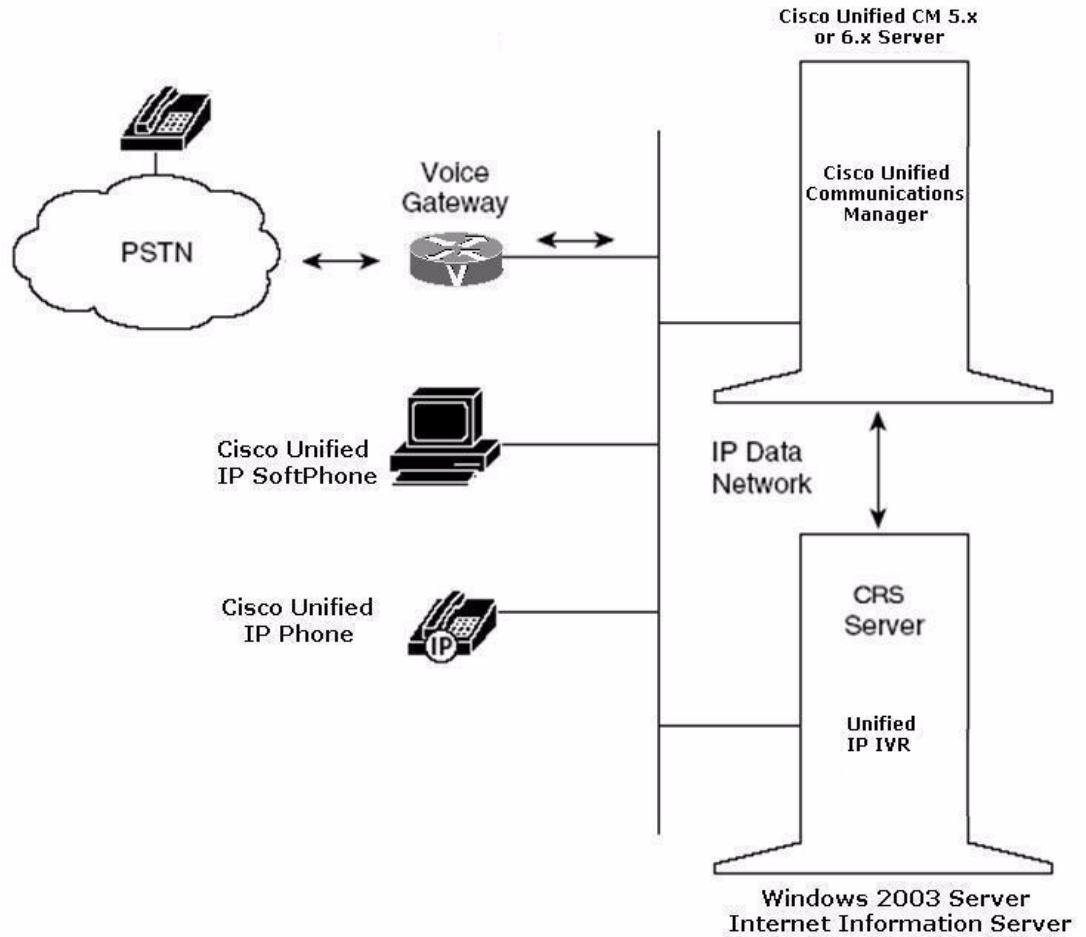
Figure 3-2 also shows how you can deploy Unified IP IVR apart from Unified CCE. This figure expands the focus to a Unified CM cluster and depicts the possibility of having a single CRS server with optional ASR and TTS servers.

Note   In CRS 4.5 and 5.0, MRCP ASR and TTS products must be deployed on separate servers.

Figure 3-2   *Standalone Deployment Model for Unified IP IVR*
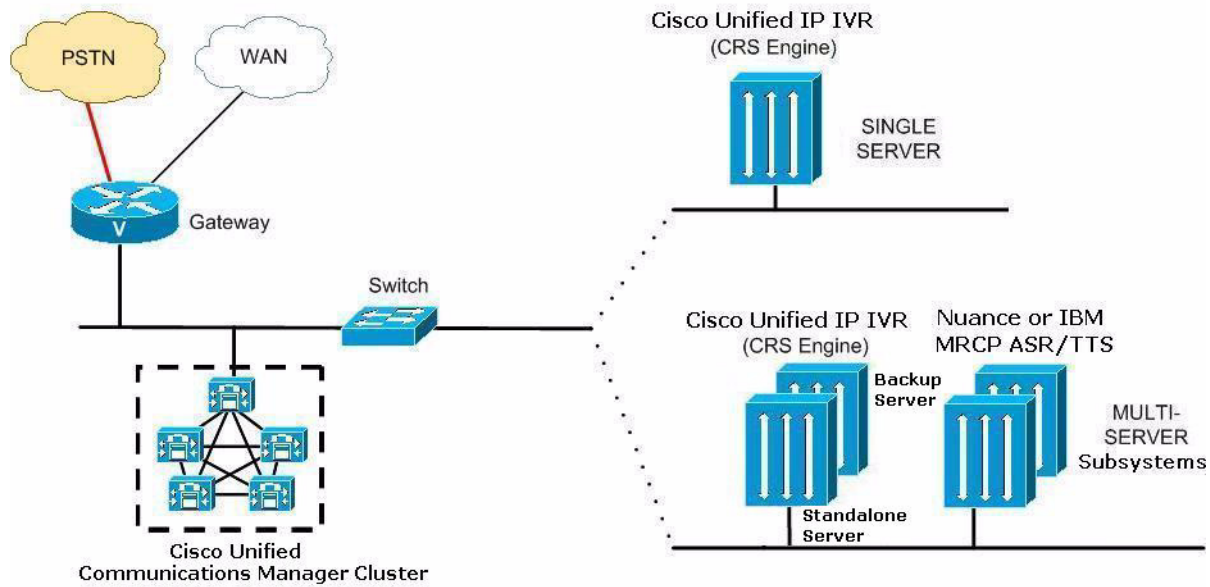
Cisco Unified Contact Center Enterprise Deployment

Figure 3-3 shows how one or more Unified IP IVR or Unified QM servers fit into an Unified CCE system.

Figure 3-3   A Unified Deployment Model within Unified CCE
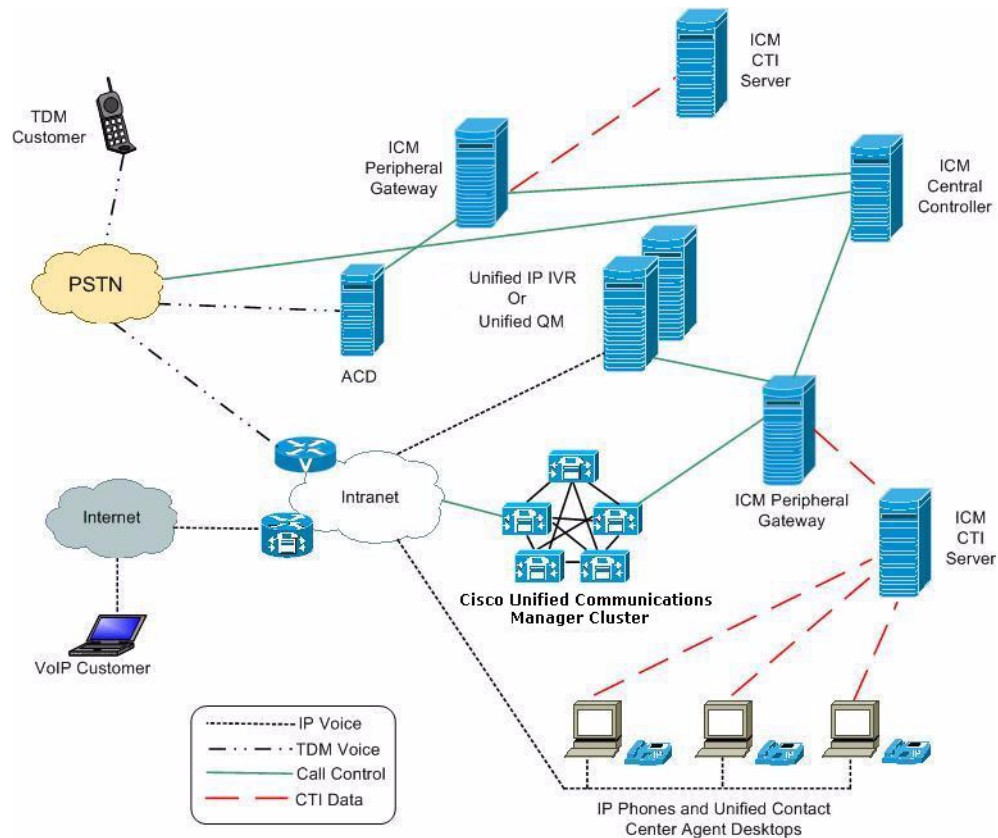
Figure 3-4 also shows a Unified CCE deployment model, but focuses in on the Unified CM, Unified IP IVR/ Unified QM, and Unified CCE servers. In a Unified CCE system, there is the Unified CM server or servers, the CRS server or servers, optional CRS subsystem servers such as MRCP ASR or MRCP TTS servers, and the Unified CCE servers.

Note   The optional MRCP ASR and TTS software cannot be on the same server as the CRS engine and is 3rd party software, not Cisco software.

Unified IP IVR supports high availability failover between two CRS servers but not between a cluster of servers. You can also deploy multiple CRS servers (with Unified IP IVR or Unified QM) and let Unified CCE manage the load balancing and failover between them. If one of the IVRs fails, the Unified CCE system will detect the failure, stop sending calls to the failed system, and instead send those calls to other Unified IP IVRs.

Note   CRS 5.0 with CME cannot be used in a Unified IP QM deployment with Unified CCE. However, CRS 5.0 with CME will support the parent-child deployment model with Unified CCE deployment.

Figure 3-4   A unified CCE Deploymnet Model for Unified IP IVR/QM
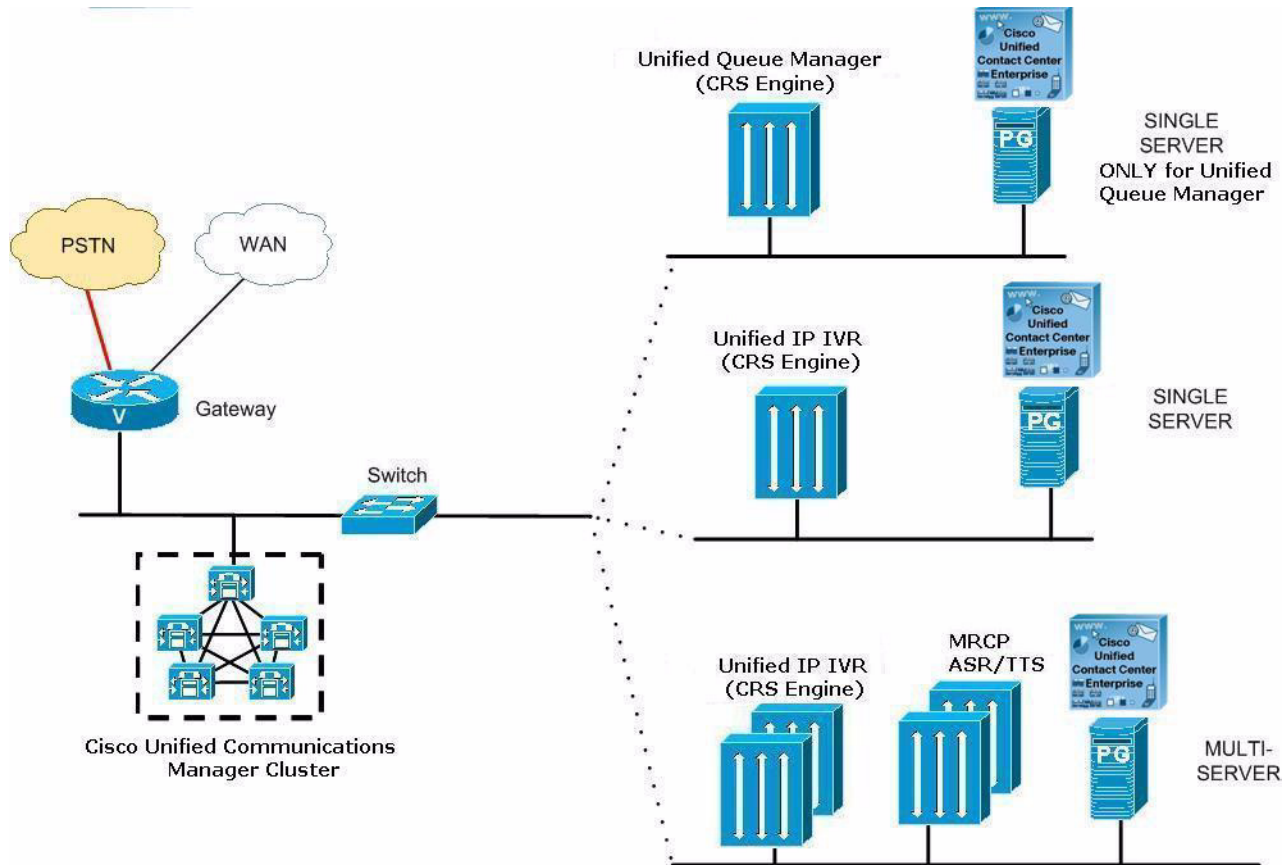
Services from Partners

Ordering from a Cisco-authorized online partner provides convenience for those customers that know which products best fit their needs and require immediate delivery. If your needs require onsite design, installation and ongoing support, a local reseller in your area could provide those value-added services. There are multiple places to order Cisco products online. Customers with Direct Purchasing agreements can order direct from Cisco. There are also numerous channel partners that transact e-commerce on their web site for Cisco products. A full list of global Cisco Partners can be found on Cisco's Partner Locator website. Customers at small and medium sized business who want the convenience of online ordering can use Cisco's Online Partners.

Support Services

Depending on individual operational, maintenance, and network level requirements, each installation has unique support requirements throughout the network life cycle of planning, designing, implementing, operating, and optimizing a network.

A full list of the Cisco support services available to you can be found at Voice and IP Communications Services

Basic Call and Contact Flow Concepts

This chapter contains the following:

When installing and configuring your Unified IP IVR or Unified QM system, you should understand the concepts, call flows, and configuration dependencies described in this chapter.

Relationships Between Tasks, Sessions, Contacts, and Channels

When installing and configuring Unified IP IVR, you must understand the concepts, call flows, and configuration dependencies explained in this section:

- **Task**. CRS receives the incoming call/contact signal on a *Trigger*, which is then assigned an *Application*. The application can be a workflow application, a CM Telephony application, (and in a Unified CCE system) an ICM Translation Routing application or an ICM Post-Routing application. When CRS accepts the contact, the application starts an application task. The application task in turn invokes an instance of a script associated with the application.

- **Session**. A session tracks *Contacts* as they move around the system. This enables information to be shared among contacts that are related to the same session.

  When a contact is received (inbound) or initiated (outbound), CRS checks to see if an existing session already exists with that contact's Implementation ID. The Implementation ID is the Unified CM Global CallID plus the Unified CM node (GCID/<node>). If a session already exists for the contact, CRS associates it with that session. If no session already exists for the contact, CRS automatically creates one.

  After the contact ends, the session remains idle in memory for a default period of 30 minutes before being automatically deleted.

- **Contact**. A contact can be a *Call*, an *HTTP request*, or an *e-mail*. A contact carries attributes such as creation time, state, language, and so on.

- **Channel**. Each type of contact can have various channel types associated with it. Channels are allocated and associated with contacts as needed and are used to support performing actions on contacts.

  Different types of channels are allocated based on the type of contact and the type of dialogue that needs to be supported between the CRS and the Contact. For example, a CM Telephony call that is presented to CRS will be connected to a CTI Port. To support the call control event transfer, a "Call Control" channel is allocated.

  If the Trigger is associated to a Primary and or Secondary Dialogue Group, depending on the type, a Media Channel or an MRCP channel will be allocated.

  If an application is triggered by an HTTP Trigger, an HTTP Control Channel will be allocated.

Frequently Asked Questions on a CM Telephony Call Flow Outside of Unified CCE

When deploying your system, you should understand the following about call flows and the Unified CM configuration dependencies that can impact call flow:

- *How is a call presented to the CRS system?*

  Caller > CTI Route Point. An incoming call is given to the CRS system on a *Trigger*, which is also called a *CTI Route Point*. The trigger signals the CRS system through CM Telephony that there is an incoming call.

  CRS rejects the call if the *Max Session* limit has been hit for the Trigger or the Application to which the trigger is assigned.

  If there are available sessions, based on the *Call Control Group* assigned to the trigger, CRS searches for an available CTI Port to receive the call. If it finds an available port, it sends a request to Unified CM through CM (or CME) Telephony/CTI requesting that the caller be rerouted from the CTI Route Point to the CTI Port.

  The calling party is a GW (for a call from the PSTN) or an IP Phone (for an internal call into the system).

- *How does the CRS system determine which CTI Port to use?*

  A *CRS Application* requires a *Trigger*. The trigger type determines whether or not a port will be required.

  There are two types of triggers: CM Telephony and HTTP.

  - If an application is started by dialing a phone number, it must have a *CM or CME Telephony Trigger*.

  - If an application is started by entering a URL, it must have an *HTTP Trigger*.

  If an application is triggered by calling a CM Telephony Trigger:

  a. The CRS system looks for an available CTI Port in the *CM or CME Telephony Call Control Group* assigned to the Trigger.

  b. CRS then requests the Unified CM or CME to Redirect the caller to the desired *CTI Port*.

  c. The call is presented to the CTI Port.

    d. CRS accepts the call on the CTI Port, the call rings on the CTI Port, and a CRS script decides how to handle the call.

- *Why does the CM (or CME) Telephony Trigger need to have Primary and or Secondary Dialogue Groups assigned to it?*

  For the CRS system to establish a media connection to a caller, CRS must allocate a *Media Channel* for that call. When CRS accepts a call on a CTI Port, it looks for an available Media Channel in the *Primary Dialog Group*. If there are none available, it will look for an available channel in the *Secondary Dialogue Group*.

- *What are the CRS script call control choices?*

  The call control step choices are:

  Accept. Answers the call and establishes a media connection. This is based on the Primary and Secondary Dialogue Groups assigned to the Trigger. It can be either CMT (Cisco Media Termination) or ASR (Automatic Speech Recognition).

  Reject. Rejects the call and returns it to Unified CM without answering it.

  Terminate. Disconnects the Contact.

  Redirect. Requests that Unified CM reroute the caller to another destination.

- *How are Redirects done?*

  Redirects can be done in several ways:

  - When CRS requests that a caller be rerouted from a CTI Route Point to a CTI Port.

  - When a CRS script executes a Call Redirect step

  - In Unified CCE, when a Unified ICME system sends a *Connect* request to the CRS system to send a queued call to a destination label.

  Once the CRS system requests a Redirect and Unified CM accepts it, the redirecting CTI Port is released and returned to the idle port list.

An HTTP Contact Flow Outside of Unified CCE

When an HTTP request is presented to CRS:

1. The HTTP trigger is assigned to an application.

2. When the URL trigger is hit, an application task is started.

3. The application is assigned to a script and the script starts.

4. An HTTP control channel is allocated.

5. The script performs steps on the triggering contact.

Possible step choices are:

- **Get HTTP contact information**. Obtain Header Information, Parameters, Cookies and Environment Attributes and assign them to local variables.

- **Send a response**. Send a Document Object as a response to the calling browser.

- **Send a JSP reply**. Send a response to the calling browser based on a JSP template. This step allows for the mapping of local variables to keywords in the template.

- **HTTP redirect**. Allows a calling browser to be redirected to a different URL.

A Summary of the Unified IP IVR Contact Flow Outside of Unified CCE

Figure 4-1 is a simplified block diagram of a contact flow outside of Unified CCE.

Figure 4-1   Basic Contact Flow Outside of Unified CCE
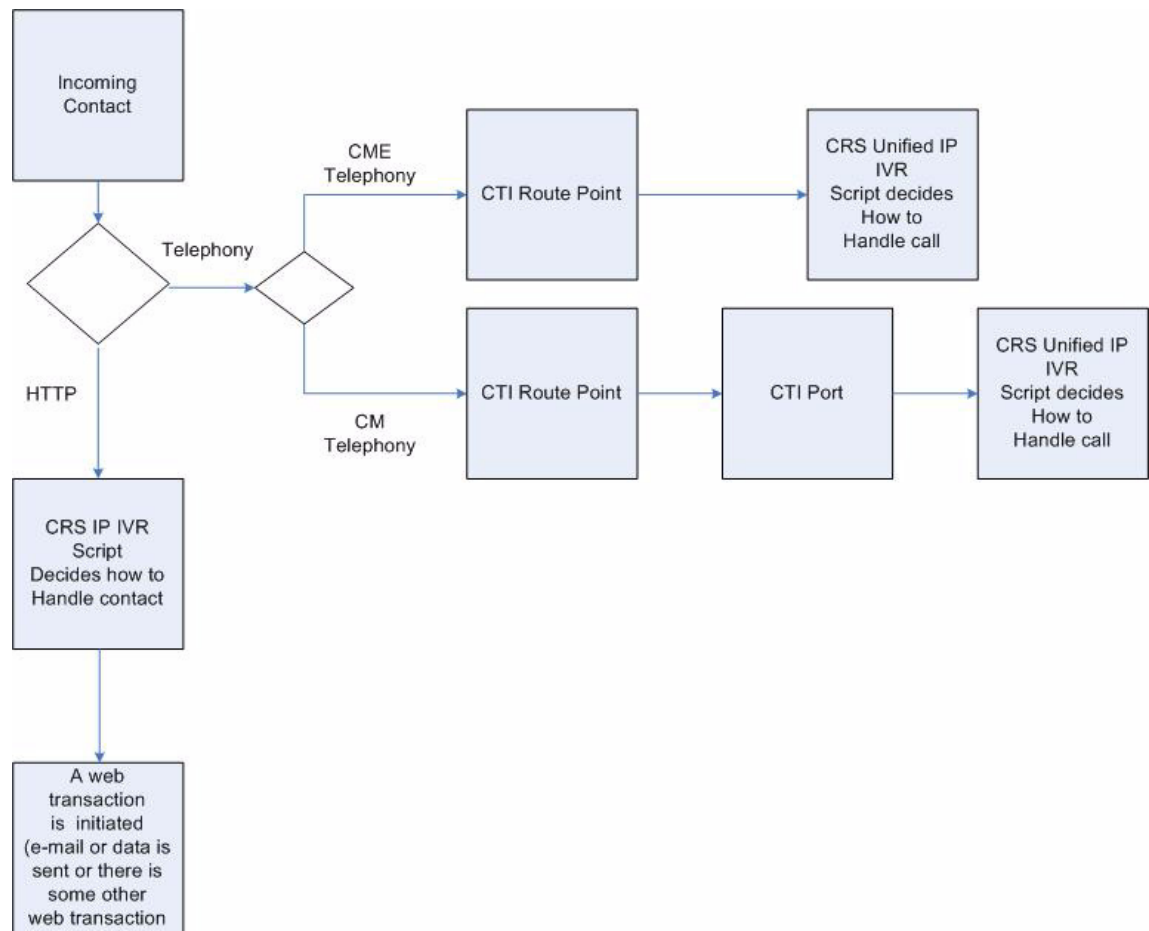
The following are the steps a call or contact takes within a Unified IP IVR systemwith Unified CM but without Unified CCE:

1. The caller dials the desired phone number or enters a Web address.

2. CRS receives the contact signal at the phone number trigger point or the Web address trigger point.

3. CRS determines which CTI port to take the contact on and sends a Redirect Request to CTI in the Unified CM to send the contact to the port:

   – If the contact is a call, then the CRS system looks for a CTI port in the CM Telephony Call Control Group assigned to the trigger (the phone number).

   – If the contact is a Web connection, then the CRS system looks for a CTI port in the HTTP Control Group assigned to the trigger (the URL).

4. Unified CM sends the contact to the specified CTI port.

5. The caller is presented to CRS on the CTI port.

6. CRS accepts the call.

7. CRS starts an application that executes a CRS script.

8. The script determines how to handle the call:

 The CRS script can Redirect the call (for example, when no agents are available). Or, the CRS script can answer the call with the Accept step.

If the CRS script answers the call and the trigger has been assigned a Dialog Group, CRS establishes a media connection with the caller.

Important Unified CM Configuration Dependencies

Unified CM is a software ACD that distributes calls. The Unified IP IVR software tells Unified CM how to distribute calls. For both products to work together correctly, you should therefore understand how calls are set up when you configure the Unified CM devices.

You should be aware of the following:

- **Repository Datastore**. The IDs resides on the CRS server in the MSDE or SQL2K database. It holds the prompts, grammars, documents, and scripts used by the system.
- **CTI Ports** and **Route Points**. When configuring CRS in the CRS Administration web page, you must enter the information that CRS uses to configure CTI Ports and Route Points in Unified CM.
- **CM Telephony User**. When configuring CRS, you define a CM Telephony User Prefix that is used to create the CM Telephony User in the Unified CM.
- **Redirects**. Redirects are performed when a call comes and the call is sent from the route point to the designated CTI port (in this case, the redirect takes place internally as part of the protocol), when a CRS script executes a call Redirect step, or when a Unified ICME system sends a Connect request to the CRS system to send a queued call to a destination label.

  When the Redirect is performed, if the Unified CM destination is available, the call is immediately sent to the Unified CM and released from the CTI Port.
- **Destination**. A Redirect will fail if the destination is not available.
- **Redirect Calling Search Space**. Unlike the redirect that the Route Point does to the CTI Port (which is not configurable), the CSS used for a redirect for a call that is already established on a CTI Port is indeed controlled by the "Redirect Calling Search Space" parameter in the Call Control Group config.
- **Calling Search Space**.Calling search spaces (CSS) determine the partitions that calling devices, including IP phones, SIP phones, and gateways, can search when attempting to complete a call. A collection of partitions are searched to determine how a dialed number must be routed. The CSS for the device and the CSS for the directory number get used together. The directory number CSS takes precedence over the device CSS.

  See Cisco Unified Communications Manager (CallManager) Maintain and Operate Guides for more information.
- **Device Regions**. Regions determine the maximum bandwidth codec that is allowed for calls both intra- and inter-region, not the codec itself. In the case of the Cisco CRS servers CTI Ports, if the connection to calling or called device cannot be made at the Cisco CRS servers installed bandwidth, then a Transcoder channel must be available.

> **Warning** **If you install CRS with thedefault codec (G.711), your region configuration must allow calls into the region assigned to the CTI Ports at G.711. Otherwise, calls across the WAN are forced to G.729 in the region configuration, which causes the call to fail if there are no hardware transcoding resources properly configured and available.**

See Regions Configuration for more information.

- **Device Locations**. In the event that one or more of the devices are in alocation, if sufficient bandwidth is not available, the requested call-control operation will fail.

  See Location Configuration for more information.

- **Media Connections**.Media connections to the Cisco CRS system are either all G.711 or all G.729. This means that the Unified CM region configuration must allow for connections between devices and the Cisco CRS server's CTI Ports with the appropriate Codec. If not, then Transcoder channels MUST be configured and available. You do this at the appropriate matching Codec at Cisco CRS installation time.

- **Connection path device (Codec)**. When you create a region, you specify the codec that can be used for calls between devices within that region, and between that region and other regions. The system uses regions also for applications that only support a specific codec; for example, an application that only uses G.711.

Understanding How Calls Go Through the Unified CCE System

This section describes the following:

Call Flow Control

The Unified ICME system is a major component of the Unified CCE system. Unified ICME provides a central control system that directs calls to various human and automated systems, such as Integrated Voice Response (IVRs) units [also called Voice Response Units (VRUs)] and Automatic Call Distribution (ACD) systems.

CRS scripts can direct calls based on various criteria, such as time of day or the availability of subsystems. When used with Unified ICME in a Translation Routing or Post Routing Application, the Unified IP IVR system does not make decisions as to what script to run. Instead, Unified ICME controls the call treatment by issuing RUN_VRU_SCRIPT commands to Unified IP IVR system. These RUN_VRU_SCRIPT commands tell Unified IP IVR which CRS script to run.

ICM scripts use four different commands to interact with the Unified IP IVR system:

- **Connect**—to connect the call. The Unified ICME system sends the connect message with a label to instruct the Unified IP IVR system where to direct the call

- **Release**—to hang up a call.

- **RUN_VRU_SCRIPT**—to run an ICM VRU script on the Unified IP IVR system.

- **Cancel**—to cancel the ICM VRU script currently running.

Two Ways of Configuring Unified IP IVR with Unified ICME

When integrated in a Unified CCE environment, CRS can be used in two different ways depending on the call flow.

You can define your Applications as either post-routing or translation-routing applications.

- **Post Routing**. If the calls will first traverse through the Unified IP IVR and then through Unified CCE, it is considered a Post-Routing scenario. In this type of call flow, Unified CCE is notified of the call by CRS. The ICM script will not start until CRS requests instructions from Unified CCE after the CRS Initial Script ends (if one is configured).

  An example would be when a caller is prompted by CRS for some information that is intended for subsequent delivery to a Unified CCE Agent.

- **Translation Routing**. If Unified CCE first has control of the call and it needs to flow through the Unified IP IVR, it is considered a Translation-Routing scenario. In this type of call flow, the call is under Unified CCE script control when arriving at CRS.

  Examples of this call flow are when you have to queue a caller or if you use the Unified IP IVR for menu based (CED) routing.

Note In the following flow descriptions, the Unified IP IVR and Unified QM system are both referred to as the CRS system. The Unified ICME system and the CRS system together form the Unified CCE system.

In a Unified CCE environment, the Unified ICME software is the *primary controller* of all calls. The Unifed CCE queuing is done through the Unified CM and CRS software. The agent assigned by the software to handle a call can be defined in either the Unified CM database or the Unified ICME database.

A Post-Routed Call Flow

This scenario represents a call that is queued in the Unified IP IVR or Unified QM system through Post Routing until an agent becomes available.

In a post-routed call flow:

1. The caller dials the desired phone number (an application Trigger that is a CRS Route Point).

2. The trigger is linked to a Post-Routing application with a default CRS script.

3. The call is presented to the CRS system.

   a. The CRS system looks for a CTI port in the CM Telephony Call Control Group assigned to the trigger (the phone number).

   b. The CRS system determines which CTI Port to take the call on and sends a redirect request to Unified CM through the CM Telephony protocol.

      If there is not a free port, the caller hears a "fast busy" until there is a free port to take the call.

   c. Unified CM sends the caller to the specified CTI Port.

   d. The caller is presented to the CRS system on the CTI Port.

   e. The default CRS script linked to the application is run.

4. The CRS script then determines what to do next:

   a. In most post-routing cases, the script will welcome the caller and collect some information from the caller to be sent over to the Unified ICME system.

   b. The script maps this data using the Set Unified ICME data Step.

   c. The script ends with the End step.

5. Since this is a post-routing application, once the End step is reached, the Cisco CRS system requests instruction from the Unified ICME system.

   This instruction is a route request with the VRU peripheral as the routing client and the CRS Route Point as the DN.

6. The Unified ICME system will have an ICM script configured to run for this routing client DN. After it is notified of the call, the Unified ICME system runs the ICM script.

7. The ICM script will determine how to handle the call and will instruct the CRS system accordingly.

   ICM scripts are composed of many different call-handling steps, including the following four commands it can send to the Cisco CRS system—Connect, Release, Run VRU Script, and Cancel.

8. The Cisco CRS system responds to the commands from the Unified ICME system until the Unified ICME system signals that the call is complete.

   For example, the ICM script could send a Run VRU Script request to the Unified IP IVR system, instructing the Unified IP IVR system to run a script that plays music and thanks the caller for their patience. When an agent becomes available, the Unified ICME system sends a Cancel request and the Unified IP IVR system stops running the current script.

   The Unified ICME system then sends a Connect command with a Normal label that indicates the extension of the free agent. The Cisco CRS system then checks the VRU Script Name variable to determine if it needs to run a PreConnect script. The Cisco CRS system routes the call to the agent indicated in the Normal label.

A Translated-Routed Call Flow

This scenario represents a call that is queued in the Unified IP IVR or Unified QM system through Translation Routing until an agent becomes available.

In a translation-route call flow:

1. The caller dials the desired phone number (an application Trigger that is a Unified ICME Route Point).

2. The call is presented to the Unified ICME system.

3. An ICM script is started. Based on the ICM script logic, the caller is queued for a group of agents. If none are available, the caller is queued in the Unified IP IVR or Unified QM as follows:

   a. The caller is translation routed to the Unified IP IVR or the Unified QM by the PG (the ICM Peripheral Gateway) sending a redirect request to CTI through CM Telephony. The destination is a CRS Translation Route Route Point (Trigger).

   The Unified ICME system sends along with the call additional information associated with the call, including a reserved DNIS value, a trunk group, a label for the PG, and instructions for further processing.

   b. The call is presented to the CRS system on the trigger.

   c. The CRS system looks for a CTI port in the CM Telephony Call Control Group assigned to the trigger (the phone number).

   d. The CRS system determines which CTI Port to take the call on and sends a redirect request to through CM Telephony.

   e. The Unified CM sends the caller to the specified CTI Port.

   f. The caller is presented to the CRS system on the CTI Port.

   g. The CRS system accepts the call, starts a session with the ICM PG, and sends a REQUEST_INSTRUCTION request.

4. The ICM script then determines what to do next. In most cases, it sends a RUN_VRU_SCRIPT request to the CRS system.

5. The CRS system maps the requested VRU script name to a CRS Script based on the VRU Script configuration in the CRS system.

6. The CRS script then determines how to handle the call. A call can either be redirected or answered with the accept step.

7. If the CRS script answers the call, and the trigger has been assigned a Dialogue Group, it establishes a media connection with the caller. At this point the CRS system can interact with the caller as desired.

8. When the script ends, it sends a RUN_SCRIPT_ RESULT message back to the Unified ICME system. The ICM script determines what to do next. Typically another RUN_SCRIPT_REQUEST events is sent. This continues until an agent becomes available to take the call.

9. Once an agent becomes available, the Unified ICME system sends a CANCEL message to the CRS system.

10. The CRS system terminates the running script.

11. The Unified ICME system then sends a CONNECT message that includes the Agent's extension as the Label.

12. The CRS system then redirects the caller to the agent's extension.

The ICM Subsystem

The ICM subsystem of the Cisco CRS system allows Unified IP IVR or Unified QM to interact with the ICM system. The CRS's ICM subsystem uses a proprietary protocol to communicate with the ICM PG.

When using the ICM subsystem, you should understand:

- The Service Control Interface, page 4-10
- Labels, page 4-10

The Service Control Interface

The Service Control interface allows the Unified ICME system to provide call-processing instructions to the Unified IP IVR system. It also provides the Unified ICME system with event reports indicating changes in call state.

The Service Control Interface is enabled from the CRS ICM subsystem configuration web page.

Labels

The Service Control interface supports four label types:

- Normal

  The Normal label is a character string that encodes the instructions for routing the call. It contains either a directory number to which the Unified IP IVR system should route the call or the name of a .wav file representing an announcement.

  If you configure the Unified IP IVR system to send an announcement, the Unified IP IVR system plays the .wav file, pauses for two seconds, and repeats the .wav file followed by the two second pause three additional times. Then it pauses 8 seconds and plays a fast busy signal until the caller hangs up.

- Busy

  The Busy label indicates that the caller should receive a busy treatment. Unless you set up a Busy label port group to handle the call, the Unified IP IVR system generates a simulated busy signal from a .wav file until the caller hangs up.

- Ring No Answer

  The Ring No Answer (RNA) label indicates that the caller should receive an RNA treatment. Unless you set up a Ring No Answer label port group to handle the call, the Unified IP IVR system generates a simulated ringing sound from a .wav file until the caller hangs up.

- Default

  The Default label indicates that the Unified IP IVR system should run the default script

VRU Scripts

The scripts that control Unified IP IVR calls have a VRU Script name in the Unified ICME system that must be properly mapped to a CRS script name (.aef file) in the CRS system. This mapping is done from the CRS ICM subsystem configuration web page.

Expanded Call Variables

Data is passed back and forth between the Unified ICME system and the CRS scripts using *Expanded Call Variables*. There are 10 default variables available, but others can be configured. Since these variables are used globally throughout the system, they are considered to be premium and should only be used when necessary. Expanded Call Variables are configured both in the Unified ICME system and in the CRS system. In the CRS system, they are configured from the CRS ICM subsystem configuration web page.

Script Parameter Separators

One function that can prove useful is the ability to use the Unified ICME RUN_SCRIPT node with a name that includes parameter separators. The Parameter Separator is defined from the CRS ICM subsystem configuration web page. By default it is the | (pipe) symbol.

One example of its usefulness is if you have one main script. Within that script, you can have multiple branches that would execute based on the value of a parameter that is passed by the Unified ICME system.

Example

Configuration data:

- CRS Script name = testscript.aef
- VRU Script name = *testscript* ICM VRU Scripts
- Run VRU Script node in Unified ICME = testscript|100

Get ICM Data step in script testscript.aef:

- Field Name: VRU Script Name
- Token Index: 1
- Decoding Type: String
- Local Variable: param1 (of type string)

In the preceding example of a script parameter separator, the script variable *param1* will contain the first parameter (after the |) In this case, that would be 100. This example allows the variable *param1* to be tested and for the script to take the desired branch based on its value. The benefit is that only one VRU Script needs to be defined in the CRS system, and you do not have to use any other variables as parameters to determine which branch to take in the script.

> **Note** When you use parameter separators in CRS, the Unified ICME script name must include the parameter as part of its name. If you want to pass a different parameter like "testscript|200" then you need to configure another VRU script on the Unified ICME system and name it testscript|200.

For more information on script parameters, see the *Cisco Customer Response Solutions Editor Step Reference Guide* and the *Cisco Customer Response Solutions Getting Started with Scripts Guide*.

Debugging Problems in the Unified IP IVR System

The SS_TEL or SS_SIP (Telephony subsystems) debug traces can be used to debug the CM or CME Telephony aspect of a call.

When debugging Unified ICME problems in the Unified IP IVR system, turn on the ICM related debugs. The CRS LIB_ICM (ICM library) and the SS_ICM (ICM subsystem) show the Unified ICME events messaging. Use the *Cisco Customer Response Solutions Servicing and Troubleshooting Guide* for instructions on how to interpret the messages and how to use Trace.

Important Unified ICME Configuration Dependencies

When configuring your Unified IP IVR or Unified QM system in an Unified CCE environment, you need to be aware of the following:

- The DNs (*Dialed Numbers*) of the Route Points, that is, the triggers that you configure in the CRS system are used in the Unified ICME system as *Translation Route DNIS'*. As such, it is critical that these DNs match the Translation Route DNIS' you configure in ICM. If you fail to do this, Translation Routing will not work and calls will be dropped.

  For example, if your Translation Route DNIS pool has DNIS' 5000, 5001, 5002, and 5003 in it, then you must create four Route Points, each with one of those numbers as the DN of the Route Point.

  So, your configuration might look like this (the names are up to you, but the DNs are mandatory):

  - TRRoutePoint1 – DN 5000
  - TRRoutePoint2 – DN 5001
  - TRRoutePoint3 – DN 5002
  - TRRoutePoint4 – DN 5003

- The *CTI port group number IDs* in CRS must have the same numbers as the *peripheral trunk group numbers* in the Unified ICME system.

- It is imperative that the *script name* referenced in your Unified ICME "Run External Script" node matches what is configured in the VRU Script List configuration in the ICM Subsystem on CRS.

Figure 4-2   *The Script Name Referenced in YOur ICM "Run External Script" Node*
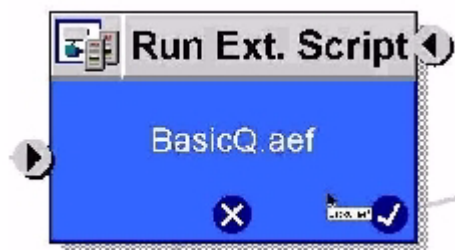
In order to eliminate any confusion, it is highly recommended that you name the CRS script exactly the same in all places.

Consider the example "BasicQ.aef" script provided with your CRS server. Obviously, this is the script name by which CRS will know the script. However, you can refer to this script in a Run External Script node in Unified ICME by whatever name you want. The VRU Script List configuration in CRS Application Administration application is where you couple the ICM External Script name with the CRS script name.

Figure 4-3   Matching the ICM Script Name with the CRS Script Name

ICM Configuration

	VRU Script Name ▽ △	Script ▽ △
General		
ICM VRU Scripts	☻ BasicQ.aef	BasicQ.aef

- The "VRU Script Name" column on the left is the name that Unified ICME will refer to when calling the script and the "Script" column on the right is the file name of the CRS script you want to run when Unified ICME calls the script mentioned in the VRU Script Name column.

- As you can imagine, if you refer to these scripts by different names in Unified ICME and CRS, it can become confusing when it comes time to troubleshoot. This is why it is recommended to keep these names exactly the same. This way there is no ambiguity as to what script you are referring to.

- The *VRU connection port numbers* in CRS must be the same as the *VRU connection port numbers* in the Unified ICME system.

- Any *enterprise ECC (Expanded Call Context) variables* must be defined on both sides of the system (in Unified IP IVR or Unified QM and in Unified ICME software)

P A R T   2

Installing and Configuring Unified IP IVR with Unified CM or CME

This section describes how to install and configure Unified IP IVR with Unified CM or Unified CME.

Configure the Unified IP IVR system components in the following order:

1. Install and setup your Cisco Unified IP phones.

2. Install and configure Unified CM or Unifed CME and register your IP phones with Unified CM/CME.

3. Install and configure the Cisco CRS application engine with a licensed Unified IP IVR package.

4. Configure your script applications.

5. Load your scripts into the CRS repository and test them.

C H A P T E R **5**

Installing and Configuring Unified CM for Unified IP IVR

This section contains the following:

This section describes how to install and configure Unified CM for Unified IP IVR.

About Unified CM

Unified CM:

- Provides features for which organizations have traditionally used PBX systems. Unified CM uses open standards, such as TCP/IP, H.323 standards (for packet-based multimedia communications systems), and Media Gateway Control Protocol (MGCP).
- Allows deployment of voice applications and the integration of telephony systems with Intranet applications.

How to Install Unified CM

Unified CM Must be installed on the Cisco Media Convergence Server (MCS).

Follow the step-by-step installation instructions for Unified CM included in the *Installing Cisco Unified Communications Manager Guide*. See Cisco Unified Communications Manager (CallManager) Install and Upgrade Guides.

There are no Unifed CCE specific installation prerequisites or instructions for Unified CM. You can find the guide and the other guides mentioned at the Cisco Unified Communications Manager (CallManager) Install and Upgrade web site

Once the Unified CM installation is complete, configure Unified CM as described in the next section.

Prior to proceeding with configuration:

- By using the **System > Cisco Unified CM** menu selection from the Customer Response Solutions Administration web page, verify that Unified CM has been created on a Unified CM server.

- By using Unified CM Administration and the Cisco Unified Serviceability Administration, verify that all the services required by Unified CM are running.

- If you are planning on using the Unified CM BAT (Bulk Administration Tool), you can run it by choosing Bulk Administration from the Unified CM Administration menu.

- By using the Unified CM User Management web page, identify the users in the Unified CM directory that will be assigned administration privileges in CRS. If these users do not exist in the Unified CM directory, then you must create those users in Unified CM.

Note   Write down in a notebook the Unified CM directory information since you will need it for the Unified IP IVR installation. If you keep configuration information that is used more than once in a check list notebook, then it will be easier to enter the correct configuration information when it is needed.

Related Documentation

Installing Cisco Unified Communications Manager 6.0(1)

Cisco Unified Communications Manager Bulk Administration Guide

Cisco Unified Communications Manager Administration Guide

Cisco Unified Communications Manager Features and Service Guide

Cisco Unified Communications Manager System Guide

Cisco Unified Serviceability Administration Guide

How to Configure Unified CM

For instructions on configuring Unified CM, see the configuration instructions in the *Cisco Unified Communications Manager Administration Guide*.

Most of the Unified CM configuration tasks are done by using Cisco Unified Communications Manager Administration. The administration program is accessed from a PC by using a web browser.

Enter:
https://<Communications Manager_servername>/ccmadmin.

Unified CM Configuration Check List

When configuring Unified CM, complete the tasks described in the following table to configure Unified CM for use with Unified IP IVR or Unified QM.

Table 5-1   Unified CM Configuration Check List

Task	Purpose	Configuration Location
1.Create Unified CM users that will later be assigned administrative privileges in the CRS Administration software.	Provides a user account for Unified IP IVR to connect with Unified CM. You will need to remember the user IDs and passwords for when you install and configure Unified IP IVR. The user ID should not be longer than 31 alphanumeric characters. Although a user ID in Unified CM can contain up to 128 alphanumeric characters, in a Cisco CRS system, a user ID can be no longer than 31 alphanumeric characters.	User Configuration window See also the *Cisco Unified Communications Manager Administration Guide*, *"End User Configuration"*chapter. From the Unified CMAdministration page menu bar, select **User Management > End User**.
2. Configure the Unified CM Group for the devices or use the default.	Specifies the Unified CM group to provide redundancy and to assign to devices in this device pool.	Unified CM Group Configuration window See also the *Cisco Unified Communications Manager Administration Guide*, *"Cisco Unified Communication Manager Group Configuration"* chapter.
3. Configure the appropriate Regions for the sites.	Specifies the codecs to be used by calls between devices in that region and other regions.	Region Configuration window See also the *Cisco Unified Communications Manager Administration Guide*,*"Region Configuration"* chapter. From the Unified CMAdministration page menu bar, select **System > Region** and then click the **Add New** link.
4. Configure the Locations for the sites.	Implements Call Admission Control which regulates voice quality by limiting the available bandwidth for calls.	Location Configuration window See also the *Cisco Unified Communications Manager Administration Guide*, *"Location Configuration"*chapter.

Table 5-1   ***Unified CM Configuration Check List (continued)***

Task	Purpose	Configuration Location
5. Configure the device pool with the previously configured Regions.	Specifies the voice codec to be used for calls in the regions with the devices.	Device Pool Configuration window See also the *Cisco Unified Communications Manager Administration Guide*, *"Device Pool Configuration"* chapter. From the Unified CM Administration page menu bar, select **Device > Phone** and then either find a configured phone or click the **Add New** link. Choose the device pool from the Phone Configuration web page.
6. Configure the phones individually in Unified CM with the correct directory numbers or configure them with the Unified CM BAT tool. For Bulk Configurtion, associate the Device Pool with the Phone Configuration.	Specifies a unique dialable phone number for each phone. Also, defines characteristics for devices, such as region, date/time group, failover behavior, and others. You must set the configuration on each IP phone so that it can locate and connect to Unified CM. This procedure varies by site according to the customer's network configuration.	Phone Configuration window or BAT See also the *Cisco Unified Communications Manager Administration Guide*, *"Cisco Unified IP Phone Configuration"*section. From the Unified CM Administration page menu bar, select **Device > Phone** and then click the **Add New** link. Next select your phone type and click **Next** and continue to follow the instructions, filling in the required information in the Phone Configuration window. Add the phone number and a directory number to the phone number, and then configure the DN (Dialed Number).

How to Check Your Phone Configuration in Unified CM or in Unified CME

1. Using a Web browser, open **Unified CM Administration**. This URL is commonly:

   https://<Communications Manager_servername>/ccmadmin

2. From the Device menu, select **Phone**.

3. In the Find and List Phones page, make sure the last text box is blank and click **Find**.

   This will list all the IP phones connected to your system plus the CTI ports and Call Control groups automatically created in Unified CM when you configured the CRS Application.

Installing and Configuring Unified CME for Unified IP IVR

This section describes how to install and configureUnified CME for Unified CCX.

This section contains the following:

About Unified CME

Effective Cisco CRS Release 5.0, Unified IP IVR enables interoperability with Unified CME, Release 4.2 between Cisco CRS and Unified CME.

After you complete the initial setup of Cisco CRS (see Cisco Customer Response Solutions Installation Guide), you will have identified the information that Cisco CRS requires to provision Unified CME for Unified IP IVR. You can modify the Unified CME information from Cisco CRS.

The interoperability with Unified CME allows for the following functions:

- Configuration query and update between Unified IP IVR and Unified CME.
- SIP-based simple and supplementary call control services including call routing between Unified CME and Unified IP IVR using SIP-based route point.
- Unified CCX keep alive session management of Unified IP IVR.

Support Information and Guidelines to Interoperate with Unified CME

The following Cisco CRS features are not supported by the Unified CME offering:

- Unified QM
- High Availability (only single node support)
- Outbound preview dialer

- Remote monitoring

The following guidelines apply when using the Unified CME product for Cisco CRS:

- In the Unified CME Telephony subsystem the concept of CTI Ports does not exist. When a call is offered at a CME Telephony Route Point, the route point accepts the call. The call is not transferred to a CTI Port.

- The Unified CME Telephony subsystem only supports G711 codec prompts.

- Unified CME Telephony users are stored locally in the CRS Database

- Unified IP Phone Agents are limited to one Cisco CRS platform for each Unified CME product

- The Unified CME Telephony subsystem only SCCP Phones as agent devices.

How to Install and Configure Unified CME

The following table identifies the tasks to configure interoperability between Cisco CRS and Unified CME.

Table 6-1   Tasks to Configure Interoperability between Cisco CRS and Unified CME

Step	Task	Name of Document
1	Verify that the appropriate version of Unified CME is installed on the router.	See the *Configuring Interoperability with External Services* chapter in the Cisco Unified Communications Manager Express, Release 4.2 System Administrator Guide.
2	Configure the Unified CME router. Note down the AXL user ID, password, and the router's IP address	
3	Configure Unified CME to enable interoperability with Cisco Unified CCX.	
4	Install Unified CCX for Unified CME.	See the Cisco CRS Installation Guide
5	Launch the setup wizard on CRS and go through the setup for the Unified CME. When setup launches, you are asked for the AXL user ID and password that you created in Unified CME. You also need to enter the router IP address.	
6	Configure Unified CME Telephony Subsystem to enable interoperability with Unified CCX.	See the Cisco CRS Administration Guide
7	Create users and assign the agent capability to these users in Cisco CRS.	These two steps are explained in greater detail in the next section.

Unified IP IVR Configuration Check List for Unified CME

When configuring Unified CME, complete the tasks described in the following table to configure Unified CME for use with Unified IP IVR.

Note   Licenses are installed for the first time in the Cisco CRS setup wizard. Once you have uploaded the licenses, the Unified CME Telephony Call Control Group is automatically created.

Table 6-2   Tasks Performed in Unified CCX

Task	Purpose	Configuration Location
1. Obtain the AXL authentication details for the Cisco CRS setup wizard.	During the Cisco CRS setup process, the administrator provides the Unified CME IP address and hostname(s) and the Administrative XML Layer (AXL) authentication (user ID and password) information. You can change this information at any time as required from Cisco CRS. If you do change the information, you must provide the IP address of the AXL server to which you will move this server.	Cisco CRS setup wizard. See Chapter 6, Performing the Initial Setup of Cisco CRS in the Cisco CRS Installation Guide
2. Configure the AXL User in Cisco CRS	The Unified CME Telephony subsystem is available if your system has a license installed for Unified IP IVR. You can change previously-configured Unified CME setup information from Cisco CRS.	See *Chapter 5: Provisioning Unified CCX for Unified CME* in the Cisco CRS Administration Guide

Table 6-2   Tasks Performed in Unified CCX (continued)

Task	Purpose	Configuration Location
3. Provision the Unified CME Telephony Subsystem.	The Unified CME Telephony subsystem sends and receives call-related messages from Unified CME.	See *Chapter 5: Provisioning Unified CCX for Unified CME* in the **Cisco CRS Administration Guide**
3a. Validate Unified CME and Cisco CRS versions.	Use the validate tool when the configuration in Cisco CRS and Unified CME are not synchronized.	
3b. Configure a Unified CME Telephony Provider, if not already configured. Specify the server on which Unified CME is running, and provide a Unified CME user ID and password.	The Unified CME Telephony provider opens a logical session with Unified CME to detect the state of the connection.	
3c. Provision Unified CME Telephony call control groups.	The Unified CME Telephony call control group is automatically added based on license. It is created when you upload the license.	
3d. Provision a Unified CME Telephony trigger. Unified CME Telephony triggers invoke application scripts in response to incoming contacts.	Unified CME Telephony triggers define the route point to which a directory number is associated.	

Installing and Configuring Unified IP IVR

This section contains the following:

After you have configured Unified CM or Unified CME, install and configure Unified IP IVR.

Installing Cisco IP IVR

To install Unified IP IVR, you must install Cisco CRS and select the Unified IP IVR product package during the installation.

The Cisco CRS installation procedure contains two steps:

1. **Installation**: Loads the Cisco CRS software onto your system. At this time, you select the deployment type (Unified CM or Unified CME) and a language.

2. **Server Setup**: After you install Cisco CRS, you use the Cisco CRS Administration web application to perform the initial system setup.

3. This enables the specific Cisco CRS components that will run on a particular server. Also it determines if a server will function as a standby server for high availability. This procedure is done for each Cisco CRS node in a cluster, including the one on which you perform the cluster setup.

✎
Note   With CRS 5.0, there is available both a single-node cluster and a two-node cluster. Server setup is done for each node in the cluster.

Once these installation and setup procedures are done, you will have access to the complete set of Cisco CRS Administration features that are licensed for your Cisco CRS product.

For installation instructions, including the planning of your Unified IP IVR installation, a pre-installation check list, and an installation and setup check list, see the *Cisco Customer Response Solutions Installation Guide, Release 5.0* at the Install and Upgrade Guides

Configuring Unified IP IVR

After you install and perform the initial set up of Unified IP IVR, use the Cisco CRS Administration web interface to perform a variety of additional set up and configuration tasks.

These tasks include:

- Configuring Cisco CRS to work with Unified CM
- Configuring the required subsystems
- Configuring Cisco CRS for Unified IP IVR

You can access the Cisco CRS Administration web interface from a server on which Cisco CRS is installed or from a client system with access to your network.

From a web browser on any computer in your network, enter the following URL:*http://servername/AppAdmin* where*servername* is the host name or IP address of the CRS node.

For detailed instructions about configuring Cisco CRS and Unified IP IVR, see the *Cisco Customer Response Applications Administration Guide* at Configuration Guides. The procedure locations referenced in the table are found in the Release 5.0(1) of the administration guide.

See the Cisco Unified Contact Center Express web sitefor the latest CRS documentation.

Unified IP IVR Configuration Check List

Do the following tasks in the given order.

Table 7-1   Unified IP IVR Configuration Check List

Task	Purpose and Notes	Configuration Location	Procedure Location
1. Configure the CM Telephony subsystem on CRS.	The Cisco CRS Engine uses the CM Telephony subsystem to send and receive calls from Unified CM.	CM Telephony Configuration web page From the CRS Administration web page menu bar, select **Subsystems > CM Telephony**. Then select **CM Telephony provider** in the option list on the left.	"Configuring a CM Telephony Provider" section in the *Cisco Customer Response Solutions Administration Guide.*
	For the CM Telephony Provider configuration, select the IP address(es) or hostname(s) of one of the Available CTI Manager machines. The 'Available CTI Managers' list box lists all the available CTI Managers that are in the Unified CM cluster.		
	The primary provider is the first value in the list of selected CTI managers in the cluster, and the secondary provider is the second (also the last) value in the list of CTI selected managers in the cluster.		
	There cannot be more than two selected CTI Managers for CM Telephony Provider Configuration.		
	The User Prefix is used by CRS to create the Application User in Unified CM that controls the Route Points and CTI Ports.		
	Make sure the users (<User prefix> +"_"+,nodeid) are NOT defined in Unified CM.		
	On clicking **OK**, CM Telephony users are created in the Unified CM. Depending on how many CRS engines are enabled in the cluster, those many CM Telephony users are created.		
	In an IP IVR system installed independently of Unified CCX, you do not need to configure the RmCm subsystem.		
	That configuration is shown here only to show you what you would have to configure next if your IP IVR system were installed as a part of Unified CCX.		
2. Provision a CM Telephony Call Control Group.	The CRS system uses CM Telephony call control groups to pool together a series of CTI ports, which the system uses to serve calls as they arrive at the CRS server. CRS automatically adds the needed CTI ports port assignments and the specified call control groups to the Unified CM database when you click**Update**.	CM Telephony Call Control Group Configuration web page From the CRS Administration web page menu bar, select **Subsystems > CM Telephony**. Then select **CM Telephony Call Control Group** in the option list on the left.	"Provisioning CM Telephony Call Control Groups" section in the *Cisco Customer Response Solutions Administration Guide.*

Table 7-1   *Unified IP IVR Configuration Check List (continued)*

Task	Purpose and Notes	Configuration Location	Procedure Location
3. Check to make sure the CM Telephony information in Cisco CRS and Unified CM is synchronized. If it is not synchronized, resynchronize it.	Makes sure the CM Telephony configuration data entered in Unified CM through Cisco CRS is synchronized with the CM Telephony configuration data in Unified CM for every server in both the Unified CM cluster and the Cisco CRS cluster. The check and Synchronize option generates a report describing the status of CM Telephony information (CM Telephony Users, Port Groups, and Triggers).	The CM Telephony Resynchronize dialog box From the CRS Administration web page menu bar, select**Subsystems > CM Telephony**. Then select**Resynchronize** in the option list on the left.	"Provisioning CM Telephony Call Control Groups" section in the *Cisco Customer Response Solutions Administration Guide.*
4. Provision the Cisco Media Termination Subsystem.	Specifies the media you need for your system. The Cisco CRS server uses the Real-Time Transport Protocol (RTP) to send and receive media packets over the IP network. To ensure that the CRS Engine can communicate with your Cisco Unified Communications system, you need to configure the RTP ports that the CRS Engine will use to send and receive RTP data.	Cisco Media Termination Dialog Group Configuration web page From the CRS Administration web page menu bar, select **Subsystems > Cisco Media** and then in the upper, right corner of the window, click the **Add a New CMT Dialog Control Group** link.	"Provisioning the Cisco Media Subsystem" section in the *Cisco Customer Response Solutions Administration Guide.*
	You can choose different types of media, from a simple type of media capable of supporting prompts and DTMF (Cisco Media Termination) to a more complex and rich type of media capable of supporting speech recognition. It is even possible to provision calls without media.		
	Because of the media capabilities, you must provision media manually. Each call requires both a CTI port and a media channel for the system to be backward compatible or to support media interactions.		
	Media resources are licensed and sold as IVR ports so you can provision more channels than you are licensed for and, at run-time, licensing will be enforced to prevent the system accepting calls, as this would violate your licensing agreements.		

Table 7-1   Unified IP IVR Configuration Check List (continued)

Task	Purpose and Notes	Configuration Location	Procedure Location
5.Provision and configure any other CRS subsystems that you will use.	Expands the functionality of your Unified IP IVR system.	This task includes the following three tasks and depends on whether or not you have bought licenses for subsystems and have installed them when you installed CRS.	"Provisioning ASR and TTS" section in the *Cisco Customer Response Solutions Administration Guide.*
5.1 Provision an MRCP Automated Speech Recognition (ASR) subsystem. (optional)	Allows users to navigate through a menu of options by speaking instead of pressing keys on a touch-tone telephone.	MRCP ASR Configuration web page In the CRS Administration web page, select**Subsystems > MRCP ASR**.	
	The MRCP ASR software is optional and requires a vendor license. The License is the number of MRCP ASR port licenses purchased from the ASR vendor. For the currently supported MRCP ASR vendors, see the current CRS Compatibility Matrix. To configure an MRCP ASR server or a dialog group, click the **MRCP ASR Servers** or **MRCP ASR Dialog Groups** respectively in the column on the left of the web page. The Cisco CRS system uses the Media subsystem of the CRS Engine to configure Cisco Media Termination (CMT) dialog groups that can be used to handle simple Dual-Tone Multi-Frequency (DTMF) based dialog interactions with customers. A dialog group is a pool of dialog channels in which each channel is used to perform dialog interactions with a caller. This step involves the configuration of your: • MRCP ASR Providers • MRCP ASR Servers • MRCP ASR Dialog Groups		
5.2 Provision an MRCP Text-to-Speech (TTS) subsystem. (optional)	Converts text (UNICODE) into spoken words in order to provide a user with information or to prompt a user to respond to an action.	MRCP TTS Configuration web page In the CRS Administration web page, select **Subsystems > MRCP TTS**, click Add **MRCP TTS Provider**, link, fill in the information required and click **Add**.	"Provisioning ASR and TTS" section in the *Cisco Customer Response Solutions Administration Guide.*
	The MRCP TTS software is optional and requires a vendor license. For the currently supported MRCP TTS vendors, see the current CRS Compatibility Matrix To configure an MRCP TTS server or default gender, click on the**MRCP TTS Servers** or the **MRCP TTS Default Genders** in the column on the left of the web page. This step involves the configuration of your: • MRCP TTS Providers • MRCP TTS Servers • MRCP TTS Default Genders		

Table 7-1   Unified IP IVR Configuration Check List (continued)

Task	Purpose and Notes	Configuration Location	Procedure Location
5.3 Provision the HTTP subsystem. (optional)	Enables Unified IP IVR applications to respond to requests from a variety of web clients, including computers and IP phones. If you are not using HTTP applications, you do not need to provision the HTTP subsystem.	HTTP Trigger Configuration web page From the CRS Administration menu bar, choose **Subsystems > HTTP**, and click the **Add a New HTTP Trigger** link, fill in the information required and click**Add**.	"Provisioning the HTTP Subsystem" section in the *Cisco Customer Response Solutions Administration Guide.*
5.4 Provision the database subsystem. (optional)	Enables CRS applications to interact with database servers in order to make database information accessible to contacts. For example, if you want customers to be able to dial in to automatically get account information, you would need this subsystem. The database subsystem is optional. If you are not using CRS applications that require access to databases, you do not need to provision the Database subsystem.	The ODBC Data Source Administrator window and the Enterprise Database Subsystem Configuration web page This involves two procedures: • On the script server, select **Start > Programs > Administrative Tools > Data Sources (ODBC)**. • From the CRS Administration menu bar, select **Subsystems > Database**, • and in the Database Subsystem Configuration web page, click **Add a New Datasource**.	"Provisioning the Database Subsystem" section in the *Cisco Customer Response Solutions Administration Guide.*
5.5 Provision the e-mail subsystem. (optional)	Communicates with your e-mail server and enables your Unified IP IVR applications to create and send email.	From the CRS Administration menu bar, select **Subsystems > eMail**.	Provisioning the eMail Subsystem" section in the *Cisco Customer Response Solutions Administration Guide.*
	The e-mail subsystem is optional. If you are not using eMail applications, you do not need to provision the eMail subsystem. Once you configure e-mail functionality, the CRS scripts created with the e-mail steps will function correctly. The e-mail configuration identifies the default e-mail address and server to be used for sending e-mail (including e-pages and faxes) and for receiving acknowledgments: • A Mail Server is a fully-qualified e-mail server name. For example: server.domain.com) • An eMail Address is an existing fully qualified e-mail address for the administrative account. For Example:administrator@domain.com		

Table 7-1   Unified IP IVR Configuration Check List (continued)

Task	Purpose and Notes	Configuration Location	Procedure Location
6. Start the Application Engine	The Application Engine is the execution vehicle for Unified IP IVR and Unified QM scripts. The application engine runs when you install CRS. However, you need to restart the engine after you configure your subsystems.	CRS Control Center web page From CRS Administration menu bar, select **System > Control Center**. Then click **Component Activation**. Finally, on the Component Activation page, select all your components and click **Update**.	"Starting, Stopping, and Restarting Cisco CRS Services" section in the *Cisco Customer Response Solutions Administration Guide.*
7. Install and configure the applications that you will use with Cisco CRS (as needed).	Enable the Unified IP IVR applications you want.	This task is subdivided into 5 tasks summarized in the following *CRS Application Configuration Check List*.	See Unified IP IVR Application Configuration Check List, page 7-7. For instructions for how to use a specific web page, from the menu bar, select **Help > For this page**.

Unified IP IVR Application Configuration Check List

Unified IP IVR applications require Unified IP IVR scripts. For instructions on creating and editing scripts see the Cisco Customer Response Solutions Script Developer Series documentation at the Cisco Unified Contact Center Express End-User Guidesfor the latest Cisco CRS documentation.

To configure your applications for Unified IP IVR, do the following tasks in the given order.

Table 7-2   Unified IP IVR Application Configuratin Check List

Task	Purpose and Notes	Configuration Location	Procedure Location
1. If needed, edit the script that your CRS application will use.	To customize the script for your needs. By double clicking on an uploaded script listed in the CRS Script Management page, you can open the script with the Cisco CRS Editor.	CRS Script Editor (for creating or editing scripts) and CRS Administration web pages	"Managing Scripts, Prompts, Grammars, and Documents" section in the *Cisco Customer Response Solutions Administration Guide.*
	See also the Cisco CRS Script Developer Series documentation: • *Volume 1, Getting Started with Cisco CRS Scripting* • *Volume 2, Cisco CRS Editor Reference* • *Volume 3, Cisco CRS Expression Language Reference* These three PDF documents contain the same information that is in the CRS Editor online help, only in PDF format, rather than HTML format. If you are customizing the Cisco Unified CM AutoAttendant, you should see the customization procedure in the *Cisco Unified Communications Manager Features and Services Guide* for Unified CM 4.x. You can access this guide through the Unified CM documentation web page		

Table 7-2   *Unified IP IVR Application Configuratin Check List (continued)*

Task	Purpose and Notes	Configuration Location	Procedure Location
2. If needed, create or customize any prompts that your CRS script will use.	Through Cisco CRS Administration Media Configuration, you can modify the prompts that your script uses. You can also upload spoken names for each person in the organization, so callers receive spoken names rather than, for example, spelled-out names when the automated attendant is asking the caller to confirm which party they want.	CRS Prompt Management web page From the menu bar in the CRS Administration web page, select **Applications > Prompt Management**.	"Managing Scripts, Prompts, Grammars, and Documents" section in the *Cisco Customer Response Solutions Administration Guide.*
	Some notes on Prompts • The Cisco Unified CM AutoAttendant, for example, comes with a prerecorded, generic welcome prompt. You should record your own welcome prompt to customize your automated attendant for the specific role that it is to fulfill for your organization. • You can use any sound recording software to record your prompts if the software can save the prompt in the required file format. You can record a different welcome prompt for each instance of your script application that you create. • You can record your prompts by using Microsoft Sound Recorder. Save each prompt as a .wav file in CCITT (mu-law) 8-kHz, 8-bit, mono format. You must have a microphone and speakers on your system to use the software.		
3. Upload the script.	To put the needed scripts in the CRS repository so that they are available for use in a CRS application.	CRS Script Management web page From the CRS Administration menu bar, select**Applications > Script Management**. In the*Script Management* page, click **Upload New Scripts**. Then in the *Explorer User Prompt* dialog box, type in the script name in expression format.	"Uploading a Script" section in the *Cisco Customer Response Solutions Administration Guide.* If you have questions when on a Cisco Response Solutions Administration web page, from the menu bar, select **Help > For this page**
4 Upload any prompts needed for the script.	For customized or language specific prompts	CRS Prompt Management web page From the CRS Administration menu bar, select**Applications> Prompt Management** . Then in the Prompt Management page, click **Upload New Prompts**.	"Uploading prompts" section in the *Cisco Customer Response Solutions Administration Guide.*

Table 7-2   Unified IP IVR Application Configuratin Check List (continued)

Task	Purpose and Notes	Configuration Location	Procedure Location
5. Add the application.	To perform a telephony task through CRS, you need a CRS application. Adding an application involves giving it a name, assigning it a script, and defining any application variables. An example application that comes with Unified IP IVR is the **Cisco Unified CM AutoAttendant** The script for the Cisco Unified CM AutoAttendant is **aa.aef**.	CRS Application Configuration web page From the CRS Administration web page menu bar, select **Applications > Application Management**and then in the upper, right corner of the window, click the **Add New Application link** link. Next, Under Application Type, select **Cisco Script Application** and click**Next**.	"Configure a Cisco Script Application" section in the *Cisco Customer Response Solutions Administration Guide.*
6. Give the application a name and assign the script to the application.	To make the application available for use.	CRS Cisco Script Application web page	"Configure a Cisco Script Application" section in the *Cisco Customer Response Solutions Administration Guide.*
7.Customize the application parameters. If you are using a Cisco supplied script, you might also want to customize the application prompts. For example, you can record and upload your own prompts as previously explained in this check list.	On the Application page, if there are variables, you can customize the application by the definitions (values) you give the variables. The variables are the parameters you specify on the application web page in the CRS Administration tool.	CRS Cisco Script Application web page	"Configure a Cisco Script Application" section in the *Cisco Customer Response Solutions Administration Guide.*

Table 7-2   *Unified IP IVR Application Configuratin Check List (continued)*

Task	Purpose and Notes	Configuration Location	Procedure Location
8. Add the Application Trigger.	Enable the application to respond to CM Telephony calls and/or HTTP requests. When you configure CM Telephony triggers, you need to specify the CTI Route Point attributes used by the trigger. For example, device pool, location, and voice mail profile.	CRS "Add Application Triggers" web page	See the online help for that web page. Also see "Add Application Triggers" section in the *Cisco Customer Response Solutions Administration Guide.*
	Some Configuration Specifics 1. From the *CRS Administration* web page, select **Applications > Application Management**. 2. In the *Application Configuration* web page, Click the name of your new application. 3. In the Cisco Script Application web page for your new application, the **Add New Trigger** link. 4. In the pop-up window, select the trigger type and click **Next**. 5. Enter the trigger phone number or web address and the other configuration information that you need.		
9. Test the application.	Make sure the application works. Before the Unified IP IVR system can receive calls, the CRS engine must be running.	From one of your phones, phone the number specified by the trigger. Or if you have an HTTP trigger, from your computer, e-mail the specified Web address.	Your application specific documentation.

How to Deploy the Sample Script, aa.aef

This chapter contains the following:

Since the Cisco Unified CM AutoAttendant is an application and a script that comes by default in Unified IP IVR, making sure that it works is a good way to test your system. The Cisco Unified CM AutoAttendant script is the AutoAttendant script template that is installed by default with your system.

For instructions on creating or modifying an IP IVR script, see Creating a Basic IVR Script

Cisco Unified CM AutoAttendant Overview

The Cisco Unified CM AutoAttendant works with Unified CM to receive calls on specific telephone extensions. The software interacts with the caller and allows the caller to search for and select the extension of the party (in your organization) that the caller is trying to reach.

The Cisco Unified CM AutoAttendant does the following:

- Answers a call.
- Plays a user-configurable welcome prompt.

Plays a main menu prompt that asks the caller to perform one of three actions:

  - Press 0 for the operator.

    Press 1 to enter an extension number.

    Press 2 to spell by name.

    If the caller chooses to spell by name (option 2), the system compares the letters that are entered with the names that are configured to the available extensions.

  - If a match exists, the system announces a transfer to the matched user and waits for up to two seconds for the caller to press any DTMF key to stop the transfer. If the caller does not stop the transfer, the system performs an explicit confirmation: it prompts the user for confirmation of the name and transfers the call to that user's primary extension.

    If more than one match occurs, the system prompts the caller to choose the correct extension.

    If too many matches occur, the system prompts the caller to enter more characters.

    When the caller has specified the destination, the system transfers the call.

– If the line is busy or not in service, the system informs the caller accordingly and replays the main menu prompt.

Configuring the Cisco Unified CM AutoAttendant Application (aa.aef)

Follow the instructions for configuring a Unified IP IVR application in Installing and Configuring Unified IP IVR, page 7-1, and for the application, choose the Cisco Unified CM AutoAttendant. Configure both a telephone number that can be dialed and a name that can be dialed.

For further information on how to configure and how to customize the Cisco Unified CM AutoAttendant, see the chapter on the AutoAttendant in the *Cisco Unified Communications Manager Features and Services Guide* for Unified Communications Manager 4.x which you can access from

Example configuration data:

- AutoAttendant Number: 5000
- Telephones: 7001 and 7002
- Agent: tjones (Tom Jones)
- Tom Jones phone: 7002

Testing your System and the Cisco Unifed CM AutoAttendant Application

Verify that your system and the Cisco Unified CM AutoAttendant application work.

1. Select one of the phone numbers you've configured in the Unified CM and dial that phone number to see if you get the correct phone. If you get the correct phone, Unified CM is working.

2. On one of your IP phones, phone the AutoAttendant number you've created (for example: 5000).

   You should get the welcome prompt. If you do, then the AutoAttendant is working.

3. If you've associated a person with a phone (in the example case, Tom Jones), dial the AutoAttendant number and then at the prompt, type in the person's name (in our example, tjones).

   The phone (for example, 7002) you associated with the name (for example, Tom Jones) should ring.

P A R T 3

Installing and Configuring Unified IP IVR or Unified QM with Unified CCE

This section describes how to install and configure Unified IP IVR or Unified QM in a Unified CCE environment.

Whether you are configuring Unified IP IVR or Unified QM for Unified CCE, the configuration tasks are the same except when you get to the point of deploying the applications. However, you can configure only one of these products at a time on a server. You cannot configure both on the same server. If you do, Unified IP IVR takes precedence.

Install and configure the Unified CCE system components in the following order:

1. Unified CM or Unified CME

   Note Use the same installation and configuration procedure for installing and configuring Unified CM(or CME) in a Unified CCE Environment as you would for installing and configuring Unified CM (or CME) outside of an Unified CCE environment. See Installing and Configuring Unified CM for Unified IP IVR, page 5-1 for instructions.

2. Unified IP IVR or Unified QM (Note: you cannot install Unified QM with Unified CME)

3. Unified ICME Software

4. CTI Object Server

5. CAD Desktop Software or CTI Desktop Software

Installing and Configuring Unified IP IVR or Unified QM for Unified CCE

This section contains the following:

This section describes how to install and configure Unified IP IVR or Unified QM for a Unified CCE system.

About Unified IP IVR and Unified QM in a Unified CCE System

Unified QM and Unified IP IVR are mutually exclusive. This means that only one of them can be installed at any point in time on a CRS server. If both are installed, then priority is given to Unified IP IVR.

In a Unified CCE system, you can use Unified IP IVR (but not Unified QM) to extract and parse Web-based content and present the data to customers using a telephony or HTTP interface.

Unified IP IVR and Unified QM communicate with Unified ICME software by way of the Service Control Interface (SCI) protocol.

How to Install Unified IP IVR or Unified QM for Unified CCE

The procedure for installing Unified IP IVR or Unified QM for an Unified CCE system is the same as that for installing Unified IP IVR outside of an Unified CCE system.

Check List for Configuring Unified IP IVR or Unified QM in a Unified CCE System

After installation, in addition to the configuration tasks described in Unified IP IVR Configuration Check List, page 7-3, complete the tasks described in the following table to configure Unified IP IVR for use in a Unified CCE environment. These tasks should be performed in the order listed.

Table 9-1   Check List for Configuring Unified IP IVR or Unified QM for Unified CCE

Task	Purpose	Configuration Location	Procedure Location
1. Configure the ICM subsystem.	Allows the Unified IP IVR/Unified QM system to interact with Unified ICME software. Unified ICME software provides a central control system that directs calls to various human and automated systems. You must enable the *Service Control Interface* to use the ICM subsystem. The VRU Connection Port is the same number configured in the VRU Peripheral Interface Manager (PIM) on the Unified ICME system. This is the TCP/IP socket number to use for receiving messages from the Unified ICME system.	CRS ICM Configuration web page In the CRS Administration web page, select **Subsystems > ICM**.	"Provisioning the ICM Subsystem" section in the *Cisco Customer Response Solutions Administration Guide.*

Table 9-1   *Check List for Configuring Unified IP IVR or Unified QM for Unified CCE (continued)*

Task	Purpose	Configuration Location	Procedure Location
2. Create and upload CRS VRU scripts.	Unified CCE uses Unified ICME Voice Response Unit (VRU) scripts to handle interactions with contacts. These scripts are loaded as applications on the CRS Engine.	CRS ICM Configuration web page After you create the script, in the CRS Administration web page, select**Subsystems > ICM**. Then click **Add a New VRU Script**.	"Configuring ICM VRU Scripts" section in the *Cisco Customer Response Solutions Administration Guide* For creating VRU scripts, see the *Cisco ICM/IP Contact Center Enterprise Edition Scripting and Media Routing Guide.*
	The script you configure in this step is the CRS script to associate with the ICM VRU script. You can select the script from the drop-down list or click the Edit button to specify a new script.		
	The VRU Script Name configured in this step must be the name of the VRU Script from the Property window of the Run VRU Script call. In other words, the CRS file name configured here and the ICM VRU script file name must have the same name.		
	All scripts under the \default directory are listed in the drop-down list of the Script field in the Cisco Script Application Configuration page.		
	To specify a new script, click Edit, enter the script name in the dialog box, and click OK. The User Prompt dialog box closes, and the name you entered appears in the Script field.		
	If you enter the script name as a file URL, enter the value with double backslashes (\\). For example, file://c:\\temp\\aa.aef		
	The Application Name is the filename of the script in the CRS repository to run for this VRU Script Name. For example, SCRIPT[BasicQ.aef].		
	A script name is displayed only as an Expression starting in CRS 4.5. The expression formats for different types of script are as follows: • SCRIPT[aa.aef] for User scripts • SSCRIPT[aa.aef] for System scripts • SCRIPT[FILE[C:\\Windows\aa.aef]] for File scripts • SCRIPT[URL[http://localhost/aa.aef]] for URL-based scripts		
3. Configure Unified IP IVR for ICM Translation Routing.	In translation routing, Unified ICME software receives the call, instead of the Unified IP IVR system, but then Unified ICME software routes the call to the Unified IP IVR or Unified QM for queuing.	CRS ICM Translation Routing web page In CRS Administration, select **Applications > Application Management**. Then click**Add a New Application**, select ICM Translation Routing and click **Next**	"Configure an ICM Translation-Routing Application" section in the *Cisco Customer Response Solutions Administration Guide, Release 5.0(1).*
	You must configure Cisco Unified ICME translation-routing applications when the Cisco IP IVR is used as a queue point in an Cisco IPCC solution.		
	Translation routing happens when a call is transferred from one peripheral to another. For example, the call could be transferred from a peripheral gateway to an IP IVR.		

Table 9-1   *Check List for Configuring Unified IP IVR or Unified QM for Unified CCE (continued)*

Task	Purpose	Configuration Location	Procedure Location
4. Configure Unified IP IVR for ICM Post Routing.	In a Unified ICME post routing situation, the Unified CM receives the call and controls it. In this case, Unified IP IVR receivews the call directly from the Unified CM and then requests instructions from the Unified ICME system.	CRS ICM Post-Routing web page In CRS Administration, select**Applications > Application Management**. Then click **Add a New Application**, select ICM Post Routing and click **Next**.	"Configure an ICM Post-Routing Application" section in the *Cisco Customer Response Solutions Administration Guide, Release 5.0(1)*.
	If the agent is configured in the Unified ICME system, CRS gets the routing information for the call from the Unified ICME system, and post routes it to the Unified ICME agent when that agent becomes available. This situation happens when any phone numbers that are configured in Unified CM as triggers are dialed. You do not have to configure both ICM post routing and ICM translation routing unless your configuration requires it.		

Important Unified IP IVR and Unified QM Dependency Check List

Before you install Unified ICME, list the values for all the Unified IP IVR configurations listed in the following table. You will need these for your Unified ICME configuration.

CRS route points, group IDs, connection ports, and IVR script names must be the same as the corresponding Unified ICME route points, trunk group numbers, connection ports, ICM VRU script, and enterprise ECC variable names.

 lists the configuration dependencies between Unified IP IVR or in Unified QM and Unified ICME in a Unified CCE deployment. The items in the left column must be the same as the corresponding items in the right column.

Table 9-2   *Unified IP IVR and QM Dependency Check List*

Unified IP IVR Configuration	Unified ICME Configuration
CRS Route Points (DNIS and label for the translation route in the Unified ICME Configuration that maps the route point in CRS)	ICM Translation Routing Route Points (DNIS and label)
CTI Port Group IDs	ICM peripheral trunk group numbers
VRU connection port	VRU connection port in the Unified ICME system
CRS script names	ICM VRU Script names
CRS enterprise ECC (Extended Call Context) variable names	ICM enterprise ECC variable names

Installing and Configuring Unified ICME for Unified CCE

This chapter contains the following:

- About Unified ICME Software, page 10-1
- Unified ICME Dependencies in a Unified CCE System, page 10-2

  What needs to be installed and configured before you install and configure Unified ICME software.

- Configuring the Unified ICME System for the Unified IP IVR System, page 10-2

  A Unified ICME configuration that needs to be done for Unified IP IVR applications to work in a Unified CCE system.

- Unified ICME Documentation, page 10-3

Note Although you can install Unified ICME software before you install the Unified CM and Cisco CRS (Unified IP IVR or Unified QM) software, this guide places Unified ICME installation and configuration last. If by chance you have installed Unified ICME software in your contact center first, you should be aware of all the configuration dependencies described in this guide when you configure each product.

For instructions on installing and configuring Unified ICME for use in a Unified CCE environment, see the Cisco Unified Contact Center Enterprise Install and Upgrade Guides.

About Unified ICME Software

As part of Unified CCE, Unified ICME software provides ACD functionality including monitoring and control of agent states, routing and queuing of contacts, CTI capabilities, real-time data for agents and supervisors, and gathering real-time and historical data for reporting in the Unified CCE system.

The basic Unified ICME software for a Unified CCE system includes the following components—CallRouter, Logger, Peripheral Gateway with a Unified CM PIM and an Unified IP IVR or Unified QM PIM, CTI Server, and an Admin Workstation.

Unified ICME Dependencies in a Unified CCE System

Before installing and configuring Unified ICME for use with Unified IP IVR or Unified QM in a Unified CCE system, you must do the following.

Table 10-1   Unified ICME Dependencies

Unified ICME Installation Prerequisite	Installation/Configuration Notes
1. Install Unified CM.	On the Cisco Unified Communications Manager, you must have: • Created a Unified CM PG user and associated the user with CTI Route Point(s) and CTI Port(s). • Enabled CTI for the Unified CM PG user.
2. Install Unified IP IVR or Unified QM if your Unified CCE system will use Unified IP IVR or Unified QM.	On the Unified IP IVR/ or Unified QM system, you must have: • Configured one CTI Route Point for each post route number and/or one for each translation route DNIS. • Configured the VRU Port Group. • Configured the ICM subsystem. • Predefined in the CRS Editor any enterprise ECC variables and uploaded VRU scripts. • Specified the VRU Connection Port. • Configured translation routing on the Unified IP IVR or Unified QM system.

Configuring the Unified ICME System for the Unified IP IVR System

To enable the Unified ICME to communicate with the Unified IP IVR system, you must:

• Add an ICM VRU PIM to an ICM VRU Peripheral Gateway.

• Add a Type 2 Network VRU in the ICM Configuration Manager and select this Network VRU in the Advanced tab of the VRU PIM configuration.

• Define the necessary ICM Labels.

• Create separate ICM call types for Unified IP IVR applications and queuing applications (not essential, but a good practice).

• Define ICM Expanded Call Variables.

• Configure Announcements.

• Define ICM VRU Scripts.

• Configure an ICM Service for Translation Routing.

• Configure an ICM Service for Post Routing.

For complete instructions on configuring Unified ICME for use in a Unified CCE Environment, see the appropriate installation and configuration guide for the software version you have at Cisco Unified Contact Center Enterprise Install and Upgrade Guides.

A Unified ICME and Unified IP IVR Application Configuration Dependency

There may be cases when a call is not queued, but instead sent to the agent directly (via the LAA Select node) from Unified IP IVR. You must ensure the Unified IP IVR PG is configured correctly to ensure that such a call is considered answered at the Unified IP IVR service rather than abandoned.

1. In the ICM Configuration Manager, select **Tools > Explorer Tools > PG Explorer**.

2. Click**Retrieve**.

3. Select the IP IVR peripheral.

4. In **Configuration Parameter**, insert /ASSUME_ANSWERED.

5. Click **Save**.

Unified ICME Documentation

Planning and step-by-step installation instructions for Unified ICME are included in the documentation located at Cisco Unified Contact Center Enterprise Install and Upgrade Guides

C H A P T E R **11**

How To Deploy the Sample Script, BasicQ.aef

This section contains the following:

Note If you have installed Unified IP IVR, you can also test your Unified CCE system with the Cisco Unified CM AutoAttendant (aa.aef). See How to Deploy the Sample Script, aa.aef, page 8-1. The BasicQ.aef script works with both Unified IP IVR and Unified QM.

How CRS Scripts Work in a Unified CCE System

In a Unified CCE system, the Cisco CRS system uses the ICM subsystem, which manages call distribution across sites and call-processing environments.

The Cisco CRS system is a queue and call-control *point* within the Enterprise system that the Unified ICME system manages. The Unified ICME system manages the queuing and call control.

Cisco User to User (UU) scripts, which the BasicQ.aef script is, do not handle complete calls, but provides different call-handling instructions to be executed sequentially by the Cisco CRS server. For example, VRU scripts may play a prompt or acquire dual tone multi-frequency (DTMF) values.

The following example ICM VRU script runs two different CRS scripts, *CollectDigits* and *BasicQ,* that provide two different call-handling steps in the ICM VRU script.

Figure 11-1   Example ICM VRU Script
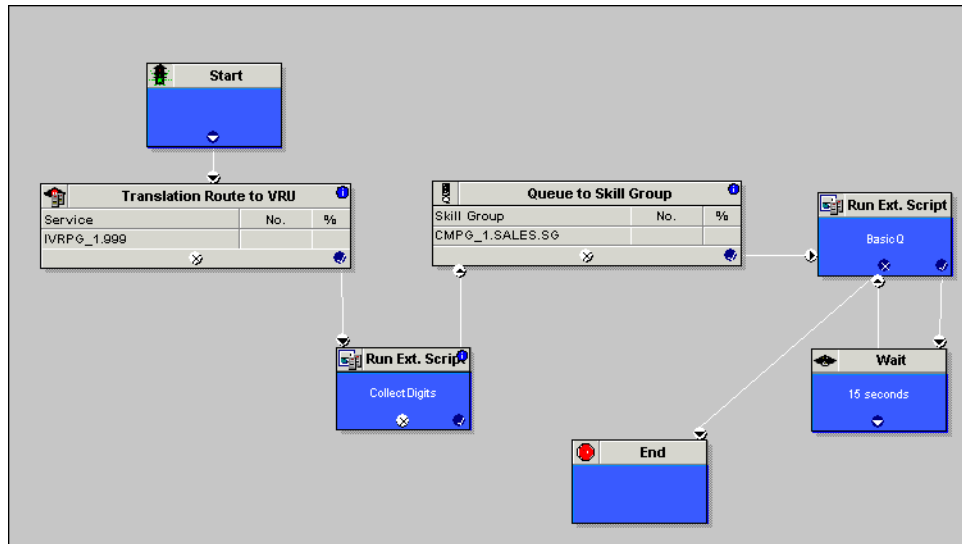
ICM VRU scripts run when the Unified ICME system sends a Run VRU Script request to the Cisco CRS system using a Run External Script node in an ICM script. However, before the Unified ICME system can run a VRU script, you must have configured the CRS script that the VRU script is to run, uploaded it to the CRS Repository, and mapped it to the ICM VRU script.

For related Cisco Customer Response Solutions documentation, see Cisco Unified Contact Center Express Documentation

For related Unified CCE documentation, see Cisco Unified Contact Center Enterprise Documentation.

See Also

Cisco CRS Scripting Series: Volume 1, Getting Started Developing Scripts

Cisco CRS Scripting Series: Volume 2, Editor Step Reference

Cisco CRS Scripting Series: Volume 3, Expression Language Reference

Cisco Customer Response Solutions Administration Guide

Cisco Unified Contact Center Express Installation and Configuration Guide

Cisco Unified Contact Center Enterprise Installation and Configuration Guide

How the BasicQ.aef Script Works

The Cisco CRS BasicQ script, BasicQ.aef, is a default CRS script for a Unified CCE environment that Cisco provides for the *queue treatment* part of an enterprise call flow. The script plays several prompts, (and puts the call on hold), looping through the prompts until an agent phone becomes free and the Unified ICME system can route the call to the agent. This script has no variables defined.

The Cisco CRS system accepts the call with the Accept step. Next, it plays the ICMStayOnline.wav file using the Play Prompt step, then puts the call on hold for 30 seconds using the Call Hold and Delay steps. The script uses the Call UnHold step to take the call off hold, plays the ICMWait4NextAvail.awv file,

and then puts the call back on hold for another 60 seconds. This sequence repeats until a cancel and then a connect are sent to connect the call through the Unified ICME system to an available agent or the call is released.

Figure 11-2 I, and example ICM VRU script, shows how that script calls the CRS BasicQ.aef script as a function in the ICM script.

Figure 11-2   *Example ICM BasicQ VRU Script*
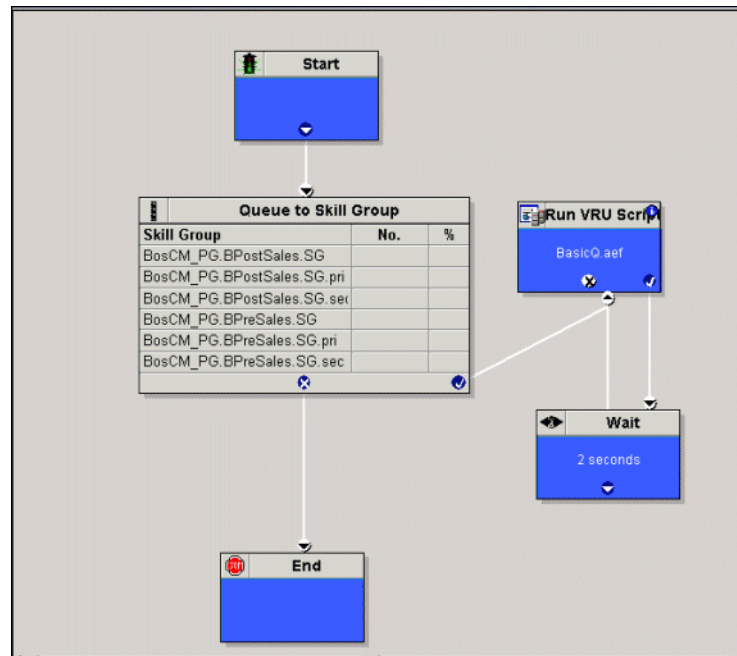
Required BasicQ.aef Configuration Tasks

For instructions on configuring Unified IP IVR or Unified QM, see the **Cisco Customer Response Solutions Administration Guide** at Cisco Unified Contact Center Express End-User Guides.

For instructions on installing and configuring Unified ICME for use in a Unified CCE environment, see the Cisco Unified Contact Center Enterprise Install and Upgrade Guides.

To configure the BasicQ.aef script, do the following.

Table 11-1   *BasicQ.aef Configuration Tasks*

Task	Configuration Location
1. Configure a port group and a trigger for ICM translation routing.	Go to the CRS Administration*CM (or CME) Telephony Call Control Group Configuration* web page by selecting **Subsystems > CM (or CME) Telephony**.
2. Upload the CRS BasicQ script.	Go to the CRS Administration *Script Management* web page by selecting **Application > Script Management** and then click **Upload new Scripts.**

Table 11-1   BasicQ.aef Configuration Tasks (continued)

Task	Configuration Location
3. Create the CRS application, BasicQ.	Go to the CRS Administration *Application Configuration* web page by selecting **Applications > Application Management** and then click **Add a New Application**.
4. Add the BasicQ ICM VRU script.	Go to the CRS Administration *ICM Configuration* web page by selecting **Subsystems > ICM.** Then click **ICM VRU Scripts** and next click **Add a new VRU Script**. Select the BasicQ.aef script and enter BasicQ for the name.
5. Configure the BasicQ VRU script in the Unified ICME system.	Go to the Network VRU Script List dialog box by selecting from the ICM Configuration Manager **Tools > List Tools> Network VRU Script List**. Click **Retrieve** and then**Add**. Make sure that the VRU Script Name you enter in the Unified ICME system matches the VRU Script Name configured on the Unified IP IVR system and the Enterprise Name matches the name of the script called in the Run VRU Script call in the ICM Script Editor.

Testing Your Deployment

Select the target number for your Unified IP IVR or Unified QM system and two phone numbers and an agent number in your system.

The following is example configuration data:

- Dial Number (DN): 3000
- Telephones: 9501 and 9502
- Agent Number: 24

Using your own data or the preceding example data, verify the following sequence of events for your system:

1. A caller dials 3000 from phone 9501.
2. The caller listens to Unified IP IVR play BasicQ music. BasicQ is the name of the VRU script.
3. Agent 24 logs in to phone 9502 using Cisco Agent Desktop.
4. The state for Agents 24 changes to the ready state.
5. The IP IVR music stops.
6. Agent 24 gets a screen pop on the Agent Desktop along with a phone ring.
7. The caller can then hang up or the Agent can drop the call through Cisco Agent Desktop software.

C H A P T E R **12**

Managing Unified IP IVR

This chapter contains the following:

When you have provisioned the telephony and media resources, the Unified IP IVR system, additional subsystems (if required) and configured the Cisco script applications, then you can manage the following files:

- Prompt, Grammar, and Document Files
- Central datastore, Cisco CRS repository

Managing Prompt, Grammar, and Document Files

Cisco CRS applications might use auxiliary files that interact with callers, such as scripts, pre-recorded prompts, grammars, and custom Java classes. Depending on each implementation, Cisco CRS applications use some or all of the following file types:

- **Prompts**. Many applications make use of pre-recordedprompts, stored as .wav files, which are played back to callers in order to provide information and elicit caller response.

- **Grammars**. The Cisco CRS system usesspecific grammars when recognizing and responding to caller response to prompts. A grammar is a specific set of all possible spoken phrases and/orDTMF digits to be recognized by Cisco CRS applications and acted upon during run time.

- **Documents**.Documents might consist of .txt, .doc, .jsp, or .html files. Documents can also include custom classes and Java Archive (JAR) files that allow you to customize the performance of your Cisco CRS system. Several system-level prompt, grammar, and document files are loaded during Cisco CRS installation. However, any file you create needs to be made available to the Cisco CRS engine before a Cisco CRS application can use them. This is done through the Cisco CRS cluster's repository datastore, where the prompt, grammar, and document files are created, stored, and updated.

Note The Cisco CRS Server's local disk prompt, grammar, and document files are synchronized with the central repository during Cisco CRS engine startup and during run-time when the Repository datastore is modified. For more information, refer to the *Cisco Customer Response Solutions Administration Guide*.

Managing Cisco CRS Datastores

Datastores are components that allow you to manage and monitor historical, repository, andconfiguration data in the Cisco CRS cluster.

The Datastore Control Center allows you to configure and manage the following data in the cluster:

- Historical records
- Repository data, such as prompts, grammars and documents
- Configuration data for historical reporting

Access the Datastore Control Center by selecting **Applications > Datastore Control** from the Cisco CRS administration menu bar.

You can use the Datastore Control Center to obtain an overview of the datastores in the cluster and their relationships, manage the datastore read/write access, monitor and control the replication agents (only available for agent, historical, and repository datastores), and activate the Publisher.

Note   For more information, refer to the *Cisco Customer Response Solutions Administration Guide*.

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