Getting Started with IP IVR Guide, Release 12.0

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Preface

Change History

This table lists changes made to this guide. Most recent changes appear at the top.

Change	See	Date
Initial Release of Document for Release 12.0(1)		January 2019

Audience

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

Organization

Section	Title	Description
Part 1	Unified IP IVR Overview, on page 13	An overview of both products.
Chapter 1	About Unified IP IVR, on page 1	A description of both products summarizing what is supported in each.
Chapter 2	Features Enabled for Each Product by Product Licensing, on page 7	A comparative list of all the Unified CCX features enabled for each product by product licensing.
Chapter 3	Unified IP IVR Architecture, on page 13	An overview with sample deployment models of Unified IP IVR architecture.

Section	Title	Description
Chapter 4	Basic Call and Contact Flow Concepts, on page 19	Unified IP IVR concepts, call and contact flows, and configuration dependencies.
Part 2	Setting up Unified IP IVR with Unified CM, on page 33	How to install and configure Unified IP IVR independent of a Cisco Unified CCE system.
Chapter 5	Install and Configure Unified CM for Unified IP IVR, on page 35	How to install and configure Unified CM for Unified IP IVR.
Chapter 6	Unified IP IVR Installation and Configuration, on page 39	How to install and configure Unified IP IVR.
Chapter 7	Deployment of Sample Script aa.aef, on page 53	How to deploy a sample Unified IP IVR script.
Part 3	Setting up Unified IP IVR with Unified CCE, on page 55	Everything you should be aware of when you install and configure Unified IP IVR within a Unified CCE system.
Chapter 8	Install and Configure Unified IP IVR for Unified CCE, on page 57	How to install and configure Unified IP IVR for Unified CCE.
Chapter 9	Unified ICME for Unified CCE Installation and Configuration, on page 63	How to install and configure Unified ICME for Unified CCE.
Chapter 10	How to Deploy the Sample Script BasicQ.aef, on page 67	How to deploy a sample Unified IP IVR script in Unified CCE.
Chapter 11	Unified IP IVR Management, on page 73	About managing prompts, grammars, documents, and Unified CCX datastores.

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**.

Convention	Description
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. • An argument for which you must supply values. Example: IF (*condition, true-value, false-value*) • A book title. Example: See the *Cisco Unified Contact Center Express Installation Guide*.

`window` font	Window font, such as Courier, is used for the following:
	• Text as it appears in code or information that the system displays. Example:
	`<html><title> Cisco Systems,Inc. </title></html>`
	• File names. Example: `tserver.properties`.
	• Directory paths. Example:
	`C:\Program Files\Adobe`

string	Nonquoted sets of characters (strings) appear in regular font. Do not use quotation marks around a string or the string will include the quotation marks.
[ ]	Optional elements appear in square brackets.
{ x | y | z }	Alternative keywords are grouped in braces and separated by vertical bars.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
< >	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.

Convention	Description
^	The key labeled Control is represented in screen displays by the symbol ^. For example, the screen instruction to hold down the Control key while you press the D key appears as ^D.

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.

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 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 CM	Cisco Unified Communications Manager
Cisco Customer Contact Software	Cisco Customer Contact Software
Cisco Unified CCX (Unified CCX)	Cisco Unified Contact Center Express
Cisco Unified CCE	Cisco Unified Contact Center Enterprise

Table 2: Other Related Web Documentation and Resources

For ...	See ...
Cisco Unified IP Phones 7900 series	Cisco Unified IP Phones 7900 Series
Unified IP IVR descriptions, datasheets, case studies, and other documents	Cisco IP Interactive Voice Response
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 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

For ...	See ...
How to install and/or upgrade a Unified IP IVR system	Cisco Unified Contact Center Express Installation Guide at Cisco Unified Contact Center Express Install and Upgrade Guides
How to develop and program Unified CCX Scripts	Cisco Unified Contact Center Express Scripting and Development Series manuals at https://developer.cisco.com/site/express-scripting/documentation/
How to configure and administer a Unified IP IVR system without Unified CCE	Cisco Unified Contact Center Express Operating System Administration Guide at Cisco Unified Contact Center Express Configuration Guides
How to install, configure, and maintain a Unified IP IVR system with Unified CCE	Cisco IP Contact Center Installation and Configuration Guide at Cisco Unified Contact Center Enterprise
How to troubleshoot your Unified IP IVR system	Cisco IP Interactive Voice Response Troubleshoot and Alerts
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, and Unified CCE test data. The previous product names (IP IVR, and IPCC Enterprise) might still be used with this test data.	Systems Test Release Set Documentation

Documentation and Support

To download documentation, submit a service request, and find additional information, see *What's New in Cisco Product Documentation* at https://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html.

You can also subscribe to the *What's New in Cisco Product Documentation* RSS feed to deliver updates directly to an RSS reader on your desktop. The RSS feeds are a free service. Cisco currently supports RSS Version 2.0.

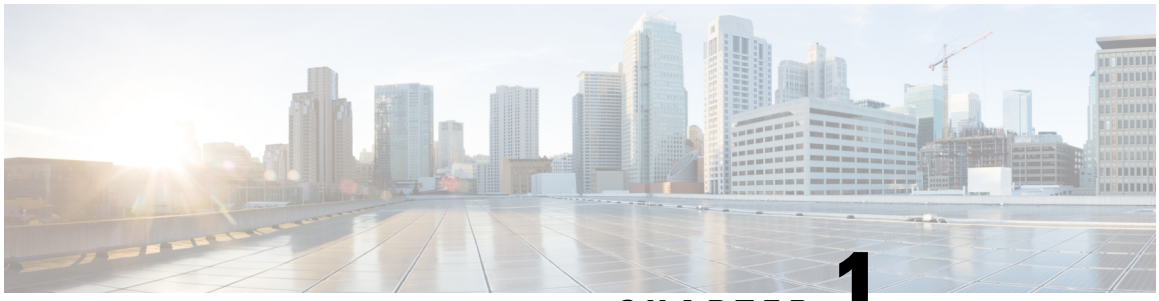
Documentation Feedback

To provide your feedback for this document, send an email to:

contactcenterproducts_docfeedback@cisco.com

PART I

Unified IP IVR Overview



CHAPTER 1

About Unified IP IVR

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 Communications Manager is abbreviated as Unified CM.
- Cisco Unified Contact Center Express is abbreviated as Unified CCX.
- Cisco Unified Intelligent Contact Management Enterprise is abbreviated as Unified ICME.

Summary Description of Unified IP IVR

The Unified IP IVR (Interactive Voice Response) is a Unified CCX product package that provides IP call queuing and IP intelligent voice response functionality for a contact center.

The Unified IP IVR uses the script editor and it can be configured to play static or dynamic prompts, to offer menus to callers, queue a call, play music, and so on.

More than One Unified CCX Product Installed on a Server

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

1. Unified IP IVR
2.
3. Unified CCX Enhanced
4. Unified CCX Premium

Unified IP IVR Features Supported in Each Product

The following table lists the Unified CCX features supported in each product.

Table 3: Supported Features

Feature	Unified IP IVR
Hardware configuration	Cisco UCS and Cisco approved partner servers
Software configuration	Client-server software
Vendor systems	Unified CM 8.x, Unified CM 9.x
Operating systems	Runs on Unified Communication Operating System (Red Hat Enterprise Linux)
Maximum number of CTI ports per server	400
CTI (Computer Telephony Integration) option	Included
Email	Included
Database	Included
Read data from HTTP and XMLpages	Included
MRCP ASR/TTS	Optional using Media Resource Control Protocol (MRCP)-order from a 3rd party vendor For the currently supported MRCP ASR/TTS vendors, see the current at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-express/products-device-support-tables-list.html.
Play messages to callers—music	Included using Unified CM Music On Hold server or .wav file

Feature	Unified IP IVR
Play messages to callers—prompts	Included using .wav file
Play messages to callers—combine prompts, music and messages	Included and fully customizable
Capture and process caller Dual Tone Multifrequency (DTMF) input	Included and fully customizable
Capture and process caller DTMF input under VXML control	Included
Automated attendant support	Included and fully customizable
All languages	Included, if installed.
Inbound HTTP request	Included
Historical reporting	Included, but limited to Unified IP IVR reports From Unified CCX 10.0(1), access the Historical reports using Unified Intelligence Center. Historical Reporting Client (HRC) is not available.
Custom scripting using Unified CCX Drag and Drop Editor	Included. Has full editing features. All types of applications including ICM, Busy, and RNA are available.
JTAPI Telephony triggers	Included
HTTP triggers	Included
Conditional routing (time of day, day of week, custom variables, and so on.)	Included
Overflow, interflow, intraflow routing	Included
Run defined workflow using HTTP request	Included
Integrated self-service application support	Included

Note To check for the current versions of the preceding software supported by your version of Unified IP IVR, see the at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-express/products-device-support-tables-list.html.

Unified IP IVR Package Description

The following table summarizes the description of the Unified IP IVR package

Table 4: Comparative Descriptions

Product Package	Available Licensed Components	Purpose
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	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: • 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 Unified CCX languages are included in both packages; it is up to you to install the languages you want.

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 the following:

- Interpret voice data (as well as keyboard data).
- Translate text to speech.
- Send and respond to HTTP requests.
- Send email.
- Enable Unified CCX 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 at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-express/products-device-support-tables-list.html.

Unified CCX Subsystems that Unified IP IVR Supports

Unified IP IVR supports the following subsystems:

Table 5: Subsystems Supported by Unified IP IVR

Subsystem Type	Purpose
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 email 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.
EMail	Adds components to the Unified CCX Engine that allows it to send email messages.

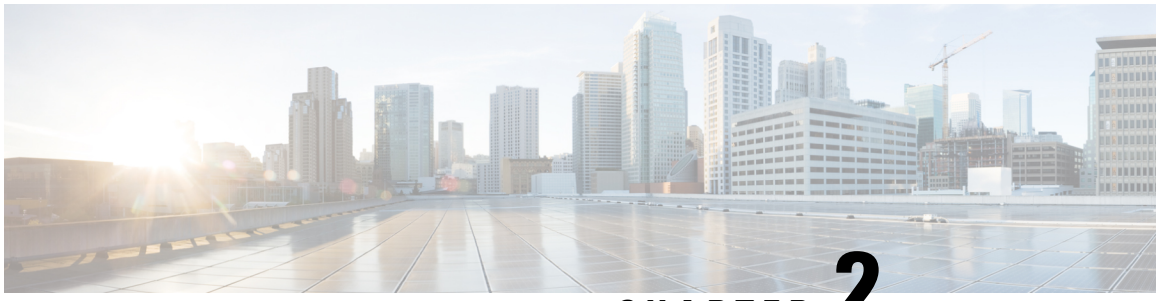
Subsystem Type	Purpose
Database	Handles the connections between the Unified CCX server and the enterprise database. Also provides Open Database Connectivity (ODBC) support. See *Compatibility Information* for the latest versions of the database software that are supported at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-express/products-device-support-tables-list.html.
Inbound HTTP Request	Adds components to the Unified CCX Engine that allow it to respond to HTTP requests.
Voice Browser	Manages Voice Browser functionality.

Sample Default Unified IP IVR Scripts

The following table describes the sample Unified IP IVR scripts automatically included with your Unified IP IVR system.

Table 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.



CHAPTER 2

Features Enabled for Each Product by Product Licensing

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

For a list of all features enabled by Unified CCX licensing for all Unified CCX products, see the *Cisco Unified Contact Center Express Administration and Operations Guide* .

This chapter contains the following:

Cisco Unified Contact Center Administration Menus Enabled by Product Licensing

The word **Included** in the following table means that the related menu item is enabled for the product in that column.

Table 7: Administration Menus Enabled by Product Licensing

Unified CCX Administrator Main Menu	Menu Items	Unified IP IVR
System	Cisco Unified CM Configuration	Included
	Control Center	Included
	Datastore Control Center	Included
	System Parameters	Included
	Custom File Configuration	Included
	Alarm and Tracing	Included
	Tracing	Included
	Logout	Included
Applications	Application Management	Included
	Script Management	Included
	Prompt Management	Included
	Grammar Management	Included
	Document Management	Included
	AAR Management	Included
Subsystems	Cisco Unified CM Telephony	Included
	ICM	Included
	Database	Included
	HTTP	Included
	eMail	Included
	Cisco Media	Included
	MRCP ASR/TTS	Included
Tools	Plug-ins	Included
	Real-Time Reporting	Included
	Historical Reporting	Included
	User Management	Included
	Password Management	Included

Unified CCX Administrator Main Menu	Menu Items	Unified IP IVR
Help	Contents and Index	Included
	For this Page	Included
	Troubleshooting Tips	Included
	Cisco Unified CCX Documentation on Cisco.com	Included
	About	Included

Prompt, Spoken Name Upload, and Plug-In Options Enabled by Product Licensing

The following table lists the availability of Unified CCX options not listed in the preceding menu list.

Table 8: Prompt, Spoken Name Upload, Plug-In Options Enabled by Product Licensing

Option	Unified IP IVR
Prompt Management	Included
Spoken Name Upload	Included
Plugin Editor	Included
Plugin - HR Client(1)	Included

Cisco Unified CCX Subsystems Enabled by Product Licensing

Table 9: Subsystems Enabled by Product Licensing

Subsystem	Unified IP IVR	MRCP ASR (Add on)	MRCP TTS (Add on)
Application	Included	not applicable	not applicable
ASR	Included	Yes	not applicable
Cisco Media Termination	Included	not applicable	not applicable
Core Reporting	Included	not applicable	not applicable
Database	Included	not applicable	not applicable
eMail	Included	not applicable	not applicable

Subsystem	Unified IP IVR	MRCP ASR (Add on)	MRCP TTS (Add on)
Enterprise Server Data	Not Available	not applicable	not applicable
HTTP	Included	not applicable	not applicable
ICM	Included		Yes
JTAPI Telephony	Included	not applicable	not applicable
Resource Manager and Cisco Media	Included	not applicable	not applicable
TTS	Included	not applicable	Included
Voice Browser (VB)	Included	The Voice Browser subsystem is available only if MRCP ASR is enabled.	not applicable

Application Types Enabled by Product Licensing

Table 10: Application Types Enabled by Product Licensing

Application Type	Unified IP IVR
Cisco Script Application	Included
Busy	Included
Ring No Answer	Included
ICM Post Routing	Included
ICM Translation Routing	Included

Editor Steps Enabled by Product Licensing

The following table lists the Unified IP IVR packages with the Step Editor steps enabled in each.

Table 11: Editor Steps Enabled by Product Licensing

Unified CCX Script Step	Unified IP IVR
General[1]	Included
Session	Included
Contact	Included

Unified CCX Script Step	Unified IP IVR
Call Contact[2]	Included
Email Contact	Included
HTTP Contact	Included
Media	Included
User	Included
Prompt	Included
Grammar	Included
Document	Included
Database	Included
ACD	Not Available
Intelligent Contact Management (ICM)	Included
CM Telephony	Included

[1] The “Get Reporting Statistic” step is not available in Unified IP IVR.
[2] The “Place Call” step is not available to Unified IP IVR.

Historical Reports Enabled by Product Licensing

From Unified CCX 10.0(1), access the Historical reports using Unified Intelligence Center. Historical Reporting Client (HRC) is not available.

The following table lists the historical reports that come with Unified IP IVR.

Table 12: 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.

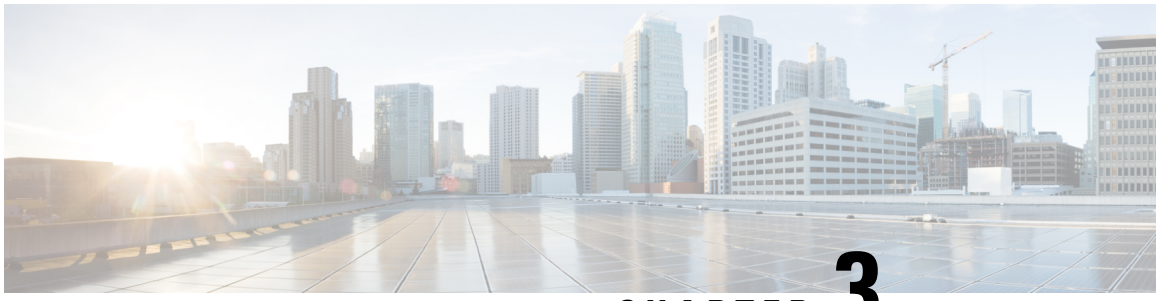
Real-Time Reports Enabled by Product Licensing

The following table lists the real-time reports that come with Unified IP IVR.

Table 13: 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 description of the preceding reports, see the *Cisco Unified Contact Center Express Administration and Operations Guide* .



CHAPTER 3

Unified IP IVR Architecture

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

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 must purchase gateways separately. Both inbound and outbound calls to the PSTN travel through the gateway.
- **Unified CM**: Provides the features that are required to implement IP phones, manages gateways, and directs Voice over IP traffic to the Unified CCX system. You must purchase Unified CM separately.
- **Unified IP IVR**: Contains the Unified CCX Engine that runs Unified IP IVR.
- 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 *Unified CCX Compatibility* at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-express/products-device-support-tables-list.html.

This chapter contains the following:

Available Deployment Models

Unified IP IVR can be deployed in your IP network on any Cisco approved virtual servers.

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

- The first two figures show how you can deploy Unified IP IVR, without Unified CCE.
- The second two figures show how you can deploy Unified IP IVR 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 Design Guides* at https://www.cisco.com/en/US/products/sw/custcosw/ps1846/products_implementation_design_guides_list.html.

Standalone Deployment

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

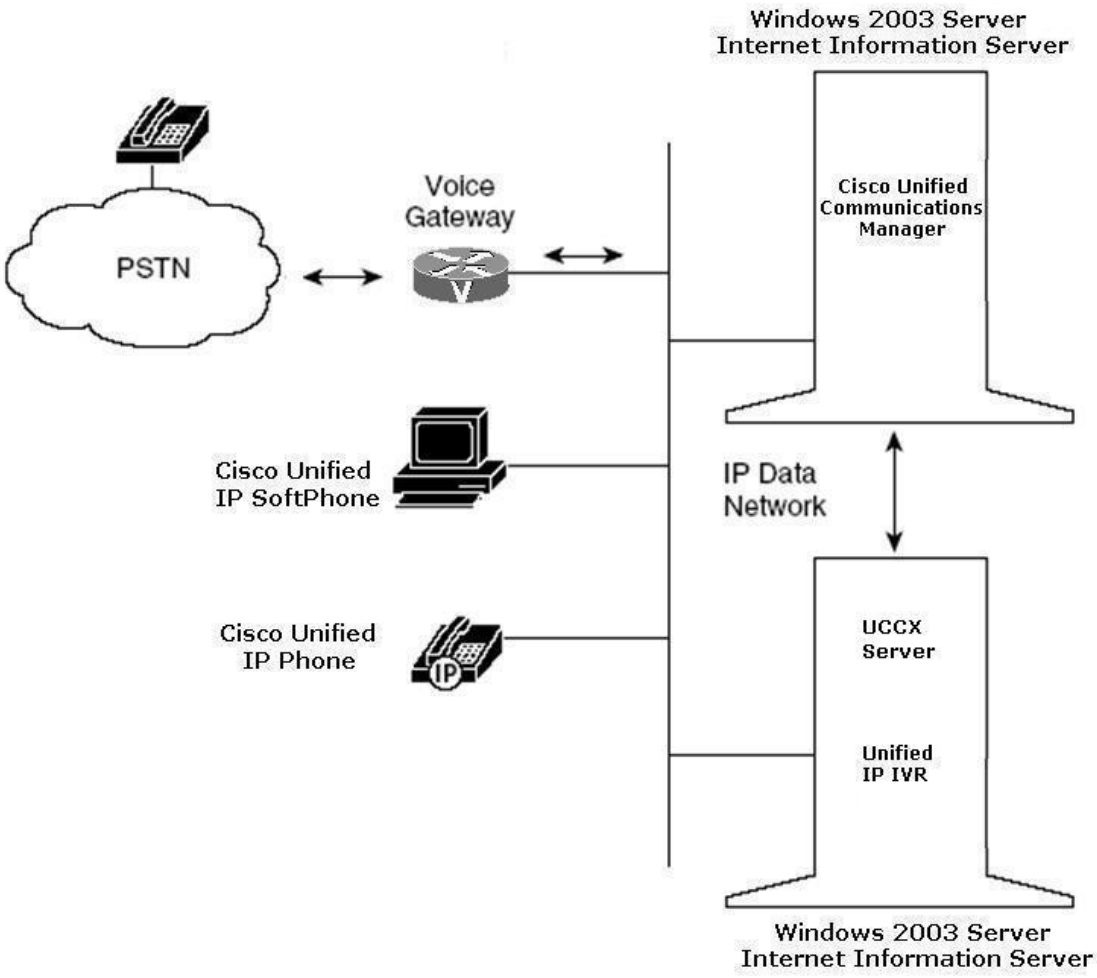
The following figure shows Unified IP IVR installed on a separate server. The following are brief descriptions of key items in the figure:

- **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 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 Unified Contact Center Express system. You must purchase Unified CM separately.

Note Unified IP IVR and CM have to be installed on separate servers.

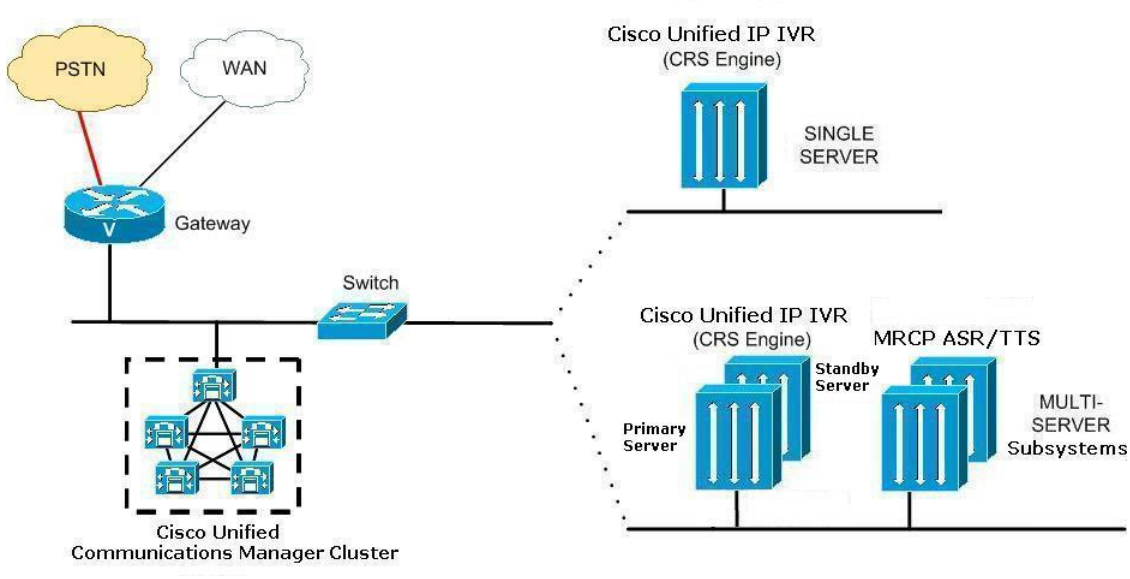
- **Cisco Unified CCX Server**. Contains the Unified CCX Engine that runs Unified IP IVR.

Figure 1: Unified IP IVR Architecture Without Unified CCE



The figure below 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 Unified CCX server with optional ASR and TTS servers.

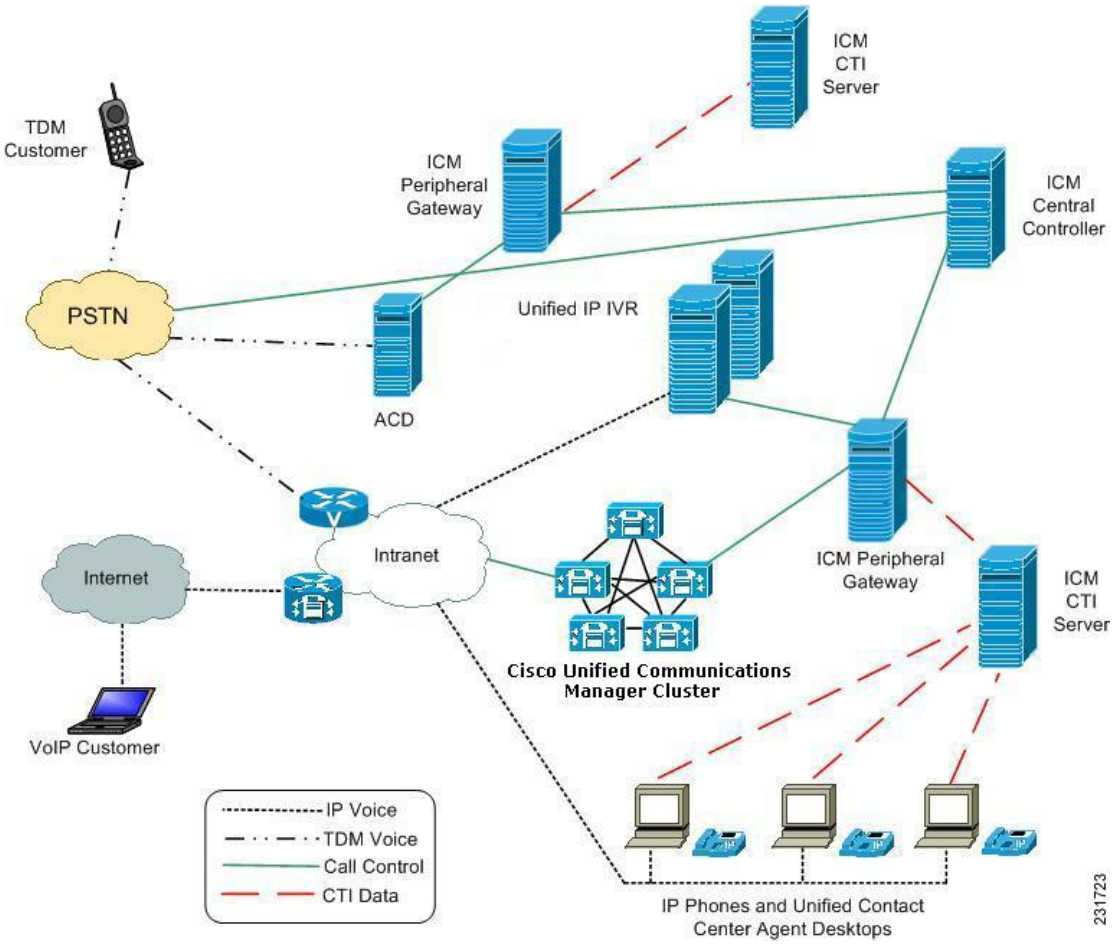
Figure 2: Standalone Deployment Model for Unified IP IVR



Cisco Unified Contact Center Enterprise Deployment

The following figure shows how one or more Unified IP IVR servers fit into an Unified CCE system.

Figure 3: A Unified Deployment Model within Unified CCE

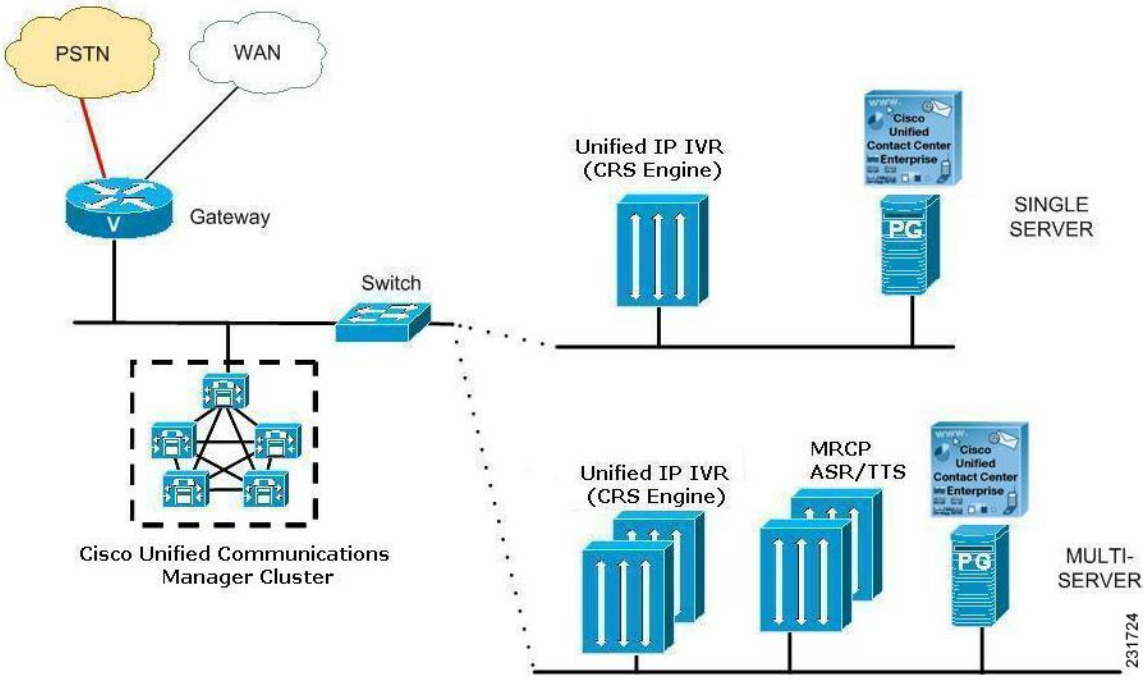


The following figure shows a Unified CCE deployment model, but focuses on the Unified CM, Unified IP IVR, and Unified CCE servers. In a Unified CCE system, there is the Unified CM server or servers, the Unified CCX server or servers, optional Unified CCX subsystem servers such as MRCP ASR or MRCP TTS servers, and the Unified CCE servers.

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

Unified IP IVR supports high availability failover between two Unified CCX servers but not between a cluster of servers. You can also deploy multiple Unified CCX servers (with Unified IP IVR) 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.

Figure 4: A Unified CCE Deployment Model for Unified IP IVR



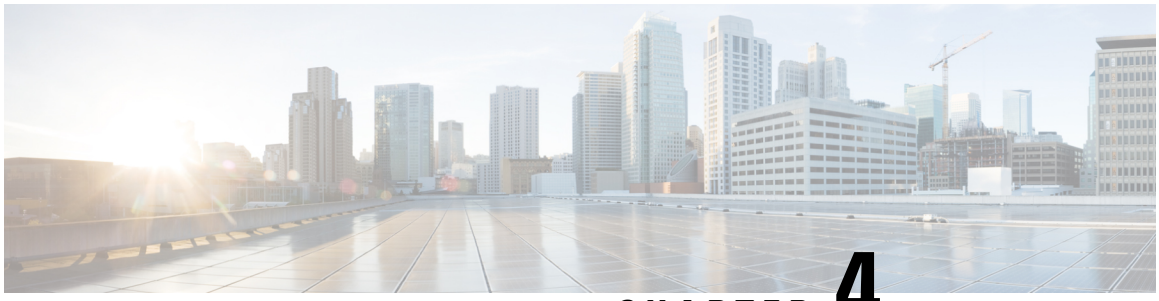
Services From Partners

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 website 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.



CHAPTER 4

Basic Call and Contact Flow Concepts

This chapter contains the following:

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**: The Unified CCX 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 the Unified CCX 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), the Unified CCX 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, the Unified CCX associates it with that session. If there is no session for the contact, the Unified CCX 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 *email*. 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 Unified CCX and the Contact. For example, a CM Telephony call that is presented to Unified CCX 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 about CM Telephony Call Flow Outside 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 Unified CCX system?*

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

  Unified CCX 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, Unified CCX 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 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 Unified CCX system determine which CTI Port to use?*

  A Unified CCX *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 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:

    1. The Unified CCX system looks for an available CTI Port in the *CM Telephony Call Control Group* assigned to the Trigger.
    2. Unified CCX then requests the Unified CM to Redirect the caller to the desired *CTI Port*.
    3. The call is presented to the CTI Port.
    4. Unified CCX accepts the call on the CTI Port, the call rings on the CTI Port, and a Unified CCX script decides how to handle the call.

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

  For the Unified CCX system to establish a media connection to a caller, Unified CCX must allocate a *Media Channel* for that call. When Unified CCX 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 Unified CCX 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 Unified CCX requests that a caller be rerouted from a CTI Route Point to a CTI Port.
  - When a Unified CCX script executes a Call Redirect step
  - In Unified CCE, when a Unified ICME system sends a *Connect* request to the Unified CCX system to send a queued call to a destination label.

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

HTTP Contact Flow Outside of Unified CCE

When an HTTP request is presented to Unified CCX:

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:

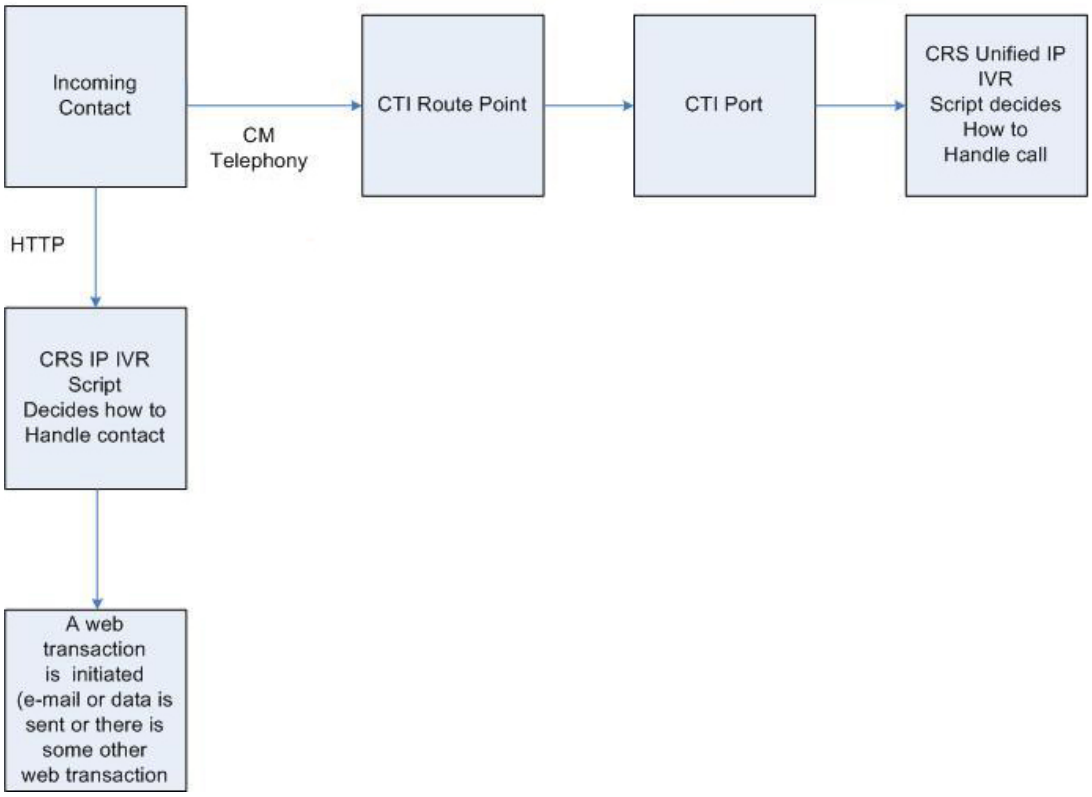
- **Get HTTP contact information**. Obtain Header Information, Parameters, Cookies and Environment Attributes and assign them to local variables.
- **Send a response**. Send a Document Object as a response to the calling browser.

- **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.

Summary of Unified IP IVR Contact Flow Outside of Unified CCE

The figure below shows a simplified block diagram of a contact flow outside of Unified CCE.

Figure 5: Basic Contact Flow Outside of Unified CCE



The following are the steps a call or contact takes within a Unified IP IVR system with Unified CM but without Unified CCE:

1. The caller dials the desired phone number or enters a Web address.
2. Unified CCX receives the contact signal at the phone number trigger point or the Web address trigger point.
3. Unified CCX 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 Unified CCX 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 Unified CCX 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 Unified CCX on the CTI port.
6. Unified CCX accepts the call.
7. Unified CCX starts an application that executes a CCX script.
8. The script determines how to handle the call:

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

   If the Unified CCX script answers the call and the trigger has been assigned a Dialog Group, Unified CCX 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 Unified CCX 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 Unified CCX in the Unified CCX Administration web page, you must enter the information that Unified CCX uses to configure CTI Ports and Route Points in Unified CM.
- **CM Telephony User**. When configuring Unified CCX, 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 Unified CCX script executes a call Redirect step, or when a Unified ICME system sends a Connect request to the Unified CCX 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 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 Unified CCX servers CTI Ports, if the connection to calling or called device cannot be made at the Unified CCX servers installed bandwidth, then a Transcoder channel must be available.

  Warning If you install Unified CCX with the default 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 a location, 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 Unified CCX 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 Unified CCX server 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 Unified CCX 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.

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.

Unified CCX 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 Unified CCX 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, Unified CCX 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 Unified CCX. The ICM script will not start until Unified CCX requests instructions from Unified CCE after the Unified CCX Initial Script ends (if one is configured).

  An example would be when a caller is prompted by Unified CCX 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 Unified CCX.

  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 The Unified ICME system and the Unified CCX system together form the Unified CCE system. In a Unified CCE environment, the Unified ICME software is the *primary controller* of all calls. The Unified CCE queuing is done through the Unified CM and Unified CCX 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.

Post-routed Call Flow Scenario

This scenario represents a call that is queued in the Unified IP IVR 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 Unified CCX Route Point).
2. The trigger is linked to a Post-Routing application with a default Unified CCX script.
3. The call is presented to the Unified CCX system.
    1. The Unified CCX system looks for a CTI port in the CM Telephony Call Control Group assigned to the trigger (the phone number).
    2. The Unified CCX system determines which CTI Port to take the call on and sends a redirect request to Unified CM through the CM Telephony protocol.

       If no ports are free, the caller hears a "fast busy" until there is a free port to take the call.
    3. Unified CM sends the caller to the specified CTI Port.
    4. The caller is presented to the Unified CCX system on the CTI Port.
    5. The default Unified CCX script linked to the application is run.
4. The Unified CCX script then determines what to do next:
    1. 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.
    2. The script maps this data using the Set Unified ICME data step.
    3. The script ends with the End step.
5. Since this is a post-routing application, once the End step is reached, the Unified CCX system requests instruction from the Unified ICME system.

   This instruction is a route request with the VRU peripheral as the routing client and the Unified CCX 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 Unified CCX system accordingly.

   ICM scripts are composed of many different call-handling steps, including the following four commands it can send to the Unified CCX system-connect, Release, Run VRU Script, and Cancel.
8. The Unified CCX 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 Unified CCX system then checks the VRU Script Name variable to determine if it

needs to run a PreConnect script. The Unified CCX system routes the call to the agent indicated in the Normal label.

Translation-Routed Call Flow Scenario

This scenario represents a call that is queued in the Unified IP IVR 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 as follows:
    1. The caller is translation routed to the Unified IP IVR by the PG (the ICM Peripheral Gateway) sending a redirect request to CTI through CM Telephony. The destination is a Unified CCX Translation 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.
    2. The call is presented to the Unified CCX system on the trigger.
    3. The Unified CCX system looks for a CTI port in the CM Telephony Call Control Group assigned to the trigger (the phone number).
    4. The Unified CCX system determines which CTI Port to take the call on and sends a redirect request to through CM Telephony.
    5. The Unified CM sends the caller to the specified CTI Port.
    6. The caller is presented to the Unified CCX system on the CTI Port.
    7. The Unified CCX 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 Unified CCX system.
5. The Unified CCX system maps the requested VRU script name to a Unified CCX Script based on the VRU Script configuration in the Unified CCX system.
6. The Unified CCX script then determines how to handle the call. A call can either be redirected or answered with the accept step.
7. If the Unified CCX 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 Unified CCX 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 Unified CCX system.
10. The Unified CCX 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 Unified CCX system then redirects the caller to the agent's extension.

ICM Subsystem

The ICM subsystem of the Unified CCX system allows Unified IP IVR to interact with the ICM system. The ICM subsystem of Unified CCX uses a proprietary protocol to communicate with the ICM PG.

When using the ICM subsystem, you should understand:

- Service Control interface, on page 28
- Labels, on page 28
- VRU Scripts, on page 29
- Expanded Call Variables, on page 29
- Script Parameter Separators, on page 29

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 Unified CCX 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 Unified CCX script name (.aef file) in the Unified CCX system. This mapping is done from the Unified CCX ICM subsystem configuration web page.

Expanded Call Variables

Data is passed back and forth between the Unified ICME system and the Unified CCX 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 Unified CCX system. In the Unified CCX system, they are configured from the Unified CCX 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 Unified CCX 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:

- Cisco Unified CCX 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 Unified CCX 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 Unified CCX, 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 Unified Contact Center Express Editor Step Reference Guide* and the *Cisco Unified Contact Center Express Getting Started with Scripts*.

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 Telephony aspect of a call.

When debugging Unified ICME problems in the Unified IP IVR system, turn on the ICM related debugs. The Unified CCX LIB_ICM (ICM library) and the SS_ICM (ICM subsystem) show the Unified ICME events messaging. Use the *Cisco Unified Contact Center Express 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 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 Unified CCX 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 Unified CCX must have the same numbers as the *peripheral trunk group numbers* in the Unified ICME system.

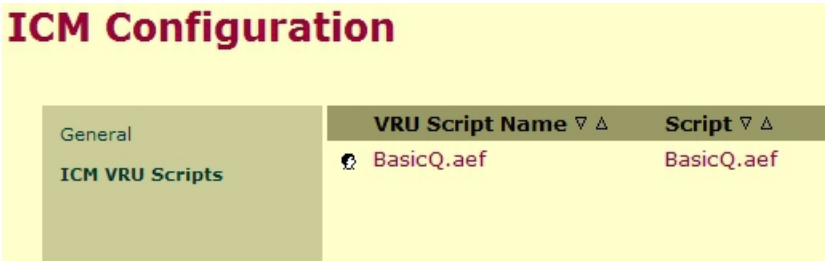
- It is imperative that the *script name* referenced in your Unified ICME Run External Script node matches what is configured in the VRU Script List configuration in the ICM Subsystem on Unified CCX.

Figure 6: The Script Name Referenced in your ICM Run External Script Node

In order to eliminate any confusion, name the Unified CCX script exactly the same in all places.

Consider the example **BasicQ.aef** script provided with your Unified CCX server. Obviously, this is the script name by which Unified CCX 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 Unified CCX Application Administration application is where you couple the ICM External Script name with the Unified CCX script name.

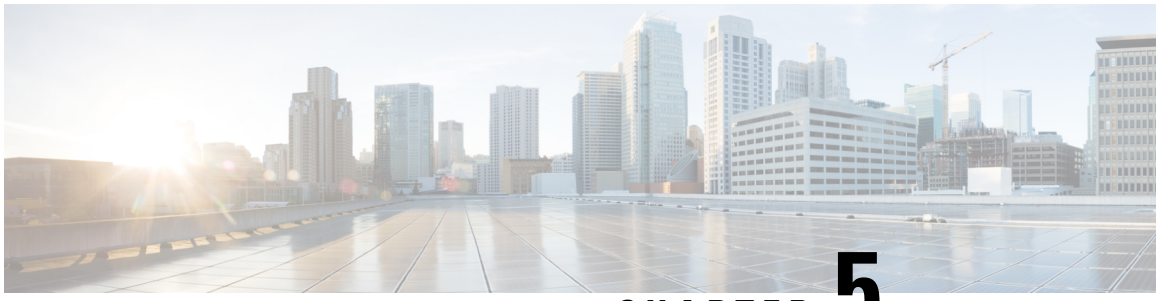
Figure 7: Matching the ICM Script Name with the Unified CCX Script Name



- 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 Unified CCX 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 Unified CCX, it can become confusing when it comes time to troubleshoot. Thus 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 Unified CCX 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 and in Unified ICME software).

PART II

Setting up Unified IP IVR with Unified CM



CHAPTER 5

Install and Configure Unified CM for Unified IP IVR

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

This section contains the following:

About Unified CM

Unified CM:

- Provide 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).
- Allow deployment of voice applications and the integration of telephony systems with Intranet applications.

Unified CM Install

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

There are no Unified 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 Install and Upgrade* website.

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

Prior to proceeding with configuration, ensure that:

- By using the System option in the Cisco Unified CM menu selection from the Unified CCX 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 Unified CCX. 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

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 Contact Center Express Operations Guide

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.

Procedure

Enter: **`https://<Communications Manager_servername>/ccmadmin`**

Unified CM Configuration Checklist

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

Procedure

Task	Purpose
1.Create Unified CM users that will later be assigned administrative privileges in the Unified CCX 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 Unified CCX 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 CM Administration 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 CM Administration 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.
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.

Task	Purpose
	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 Configuration, 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).

Check Phone Configuration in Unified CM

Procedure

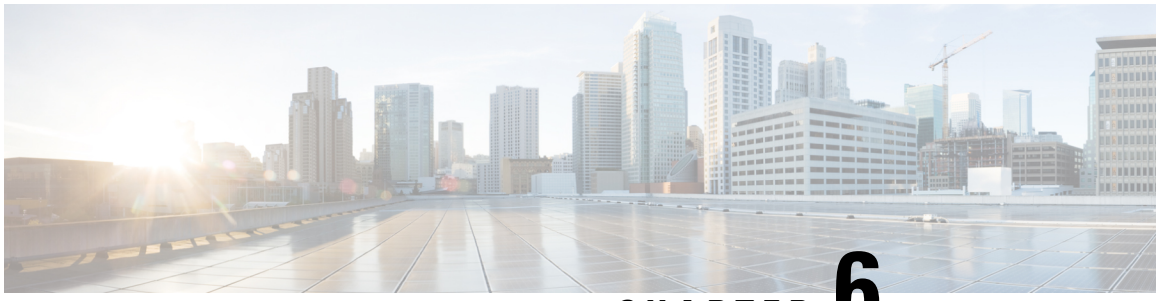
Step 1 Using a Web browser, open **Unified CM Administration**.

This URL is commonly: `https://<Communications Manager_servername>/ccmadmin`

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

Step 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 Unified CCX Application.



CHAPTER 6

Unified IP IVR Installation and Configuration

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

This section contains the following:

Cisco IP IVR Installation

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

The Unified CCX installation procedure contains two steps:

1. **Installation**: Loads the Unified CCX software onto your system. At this time, you select the deployment type (Unified CM) and a language.
2. **Server Setup**: After you install Unified CCX, you use the Unified CCX Administration web application to perform the initial system setup.
3. **Server Setup**: Enables the specific Unified CCX components that will run on a particular server. Also determines if a server will function as a standby server for high availability. This procedure is done for each Unified CCX node in a cluster, including the one on which you perform the cluster setup.

Once these installation and setup procedures are done, you will have access to the complete set of Unified CCX Administration features that are licensed for your Unified CCX 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 Unified Contact Center Express Install and Upgrade Guide* at the Install and Upgrade Guides.

Unified IP IVR Configuration

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

These tasks include:

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

You can access the Unified CCX Administration web interface from a server on which Unified CCX 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 Unified CCX node.

For detailed instructions about configuring Unified CCX and Unified IP IVR, see the *Cisco Unified Contact Center Express Administration and Operations Guide* at https://www.cisco.com/en/US/products/sw/custcosw/ps1846/products_installation_and_configuration_guides_list.html. The procedure locations referenced in the table are found in the administration guide.

See the https://www.cisco.com/en/US/products/sw/custcosw/ps1846/tsd_products_support_series_home.html for the latest Unified CCX documentation.

Unified IP IVR Configuration Checklist

Do the following tasks in the given order.

Table 14: Unified IP IVR Configuration Checklist

Task	Purpose and Notes	Configuration Location	Procedure Location
1. Configure the JTAPI subsystem on Unified CCX.	The Unified CCX Engine uses the JTAPI subsystem to send and receive calls from Unified CM.	JTAPI Configuration web page From the Unified CCX Administration web page menu bar, select **Subsystems** > **JTAPI**. Then select **JTAPI provider** in the option list on the left.	*Configuring a JTAPI Provider* section in the *Cisco Unified Contact Center Express Administration and Operations Guide*.
	For the JTAPI 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 JTAPI Provider Configuration. The User Prefix is used by Unified CCX 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**, JTAPI users are created in the Unified CM. Depending on how many Unified CCX engines are enabled in the cluster, those many JTAPI 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.		

Task	Purpose and Notes	Configuration Location	Procedure Location
2. Provision a JTAPI Call Control Group.	The Unified CCX system uses JTAPI call control groups to pool together a series of CTI ports, which the system uses to serve calls as they arrive at the Unified CCX server. Unified CCX automatically adds the needed CTI ports port assignments and the specified call control groups to the Unified CM database when you click **Update**.	**JTAPI Call Control Group Configuration** web page From the **Unified CCX Administration** web page menu bar, select **Subsystems** > **JTAPI**. Then select **JTAPI Call Control Group** in the option list on the left.	*Provisioning JTAPI Call Control Groups* section in the *Cisco Unified Contact Center Administration and Operations Guide*.
3. Check to make sure the JTAPI information in Unified CCX and Unified CM is synchronized. If it is not synchronized, resynchronize it.	Makes sure the JTAPI configuration data entered in Unified CM through Unified CCX is synchronized with the JTAPI configuration data in Unified CM for every server in both the Unified CM cluster and the Unified CCX cluster. The check and Synchronize option generates a report describing the status of JTAPI information (JTAPI Users, Port Groups, and Triggers).	The JTAPI Resynchronize dialog box From the **Unified CCX Administration** web page menu bar, select **Subsystems** > **JTAPI**. Then select **Resynchronize** in the option list on the left.	*Provisioning JTAPI Call Control Group*s section in the *Cisco Unified Contact Center Express Administration and Operations Guide*.

Task	Purpose and Notes	Configuration Location	Procedure Location
4. Provision the Cisco Media Termination Subsystem.	Specifies the media you need for your system. The Unified CCX server uses the Real-Time Transport Protocol (RTP) to send and receive media packets over the IP network. To ensure that the Unified CCX can communicate with your Cisco Unified Communications system, you need to configure the RTP ports that the Unified CCX Engine will use to send and receive RTP data.	**Cisco Media Termination Dialog Group Configuration** web page From the **Unified CCX 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 Unified Contact Center Express Administration and Operations 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.		

Task	Purpose and Notes	Configuration Location	Procedure Location
5. Provision and configure any other Unified CCX 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 Unified CCX.	*Provisioning ASR and TTS* section in the *Cisco Unified Contact Center Express Administration and Operations 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 **Unified CCX 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 Unified CCX 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 Unified CCX system uses the Media subsystem of the Unified CCX 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		

Task	Purpose and Notes	Configuration Location	Procedure Location
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 **Unified CCX 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 Unified Contact Center Express Administration and Operations Guide*.
	The MRCP TTS software is optional and requires a vendor license. For the currently supported MRCP TTS vendors, see the current Unified CCX 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		
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 Unified CCX 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 Unified Contact Center Express Administration and Operations Guide*.

Task	Purpose and Notes	Configuration Location	Procedure Location
5.4 Provision the database subsystem. (optional)	Enables Unified CCX 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 Unified CCX 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 Unified CCX 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 Unified Contact Center Express Administration and Operations Guide*.
5.5 Provision the email subsystem. (optional)	Communicates with your email server and enables your Unified IP IVR applications to create and send email.	From the Unified CCX Administration menu bar, select **Subsystems** > **eMail**.	*Provisioning the eMail Subsystem* section in the *Cisco Unified Contact Center Express Administration and Operations Guide*.
	The email subsystem is optional. If you are not using email applications, you do not need to provision the eMail subsystem. Once you configure email functionality, the Unified CCX scripts created with the email steps will function correctly. The email configuration identifies the default email address and server to be used for sending email (including e-pages and faxes) and for receiving acknowledgments: • A Mail Server is a fully-qualified email server name. For example: server.domain.com) • An eMail Address is an existing fully qualified email address for the administrative account. For Example:administrator@domain.com		

Task	Purpose and Notes	Configuration Location	Procedure Location
6. Start the Application Engine	The Application Engine is the execution vehicle for Unified IP IVR scripts. The application engine runs when you install Unified CCX. However, you need to restart the engine after you configure your subsystems.	**Unified CCX Control Center** web page From Unified CCX 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 Unified CCX Services* section in the *Cisco Unified Contact Center Express Administration and Operations Guide*.
7. Install and configure the applications that you will use with Unified CCX (as needed).	Enable the Unified IP IVR applications you want.	This task is subdivided into 5 tasks summarized in the following Unified CCX *Application Configuration Check List*.	See Unified IP IVR Application Configuration Checklist, on page 47. For instructions for how to use a specific web page, from the menu bar, select **Help** > **For this page**.

Unified IP IVR Application Configuration Checklist

Unified IP IVR applications require Unified IP IVR scripts. For instructions on creating and editing scripts see the Cisco Unified Contact Center Express Script Developer Series documentation at the Cisco Unified Contact Center Express End-User Guides for the latest Unified CCX documentation.

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

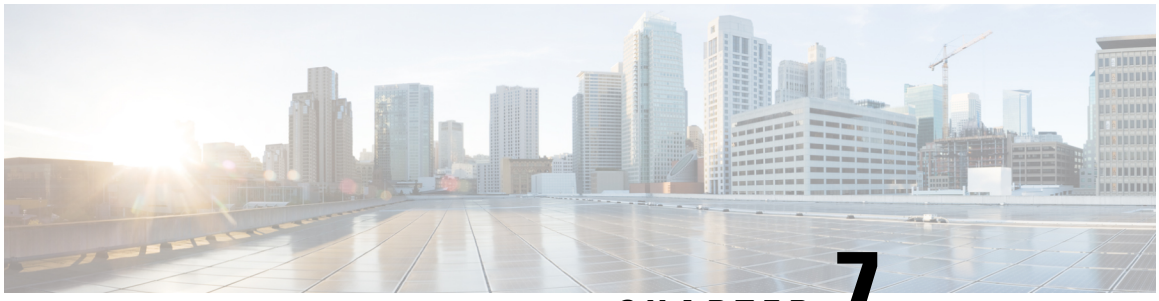
Table 15: Unified IP IVR Application Configuration Checklist

Task	Purpose and Notes	Configuration Location	Procedure Location
1. If needed, edit the script that your Unified CCX application will use.	To customize the script for your needs. By double clicking on an uploaded script listed in the **Unified CCX Script Management** page, you can open the script with the Unified CCX Editor.	Unified CCX Script Editor (for creating or editing scripts) and Unified CCX Administration web pages	*Managing Scripts, Prompts, Grammars, and Documents* section in the *Cisco Unified Contact Center Express Administration and Operations Guide* .
	See also the Unified CCX Script Developer Series documentation: • *Volume 1, Getting Started with Cisco Unified CCX Scripting* • *Volume 2, Cisco Unified CCX Editor Reference* • *Volume 3, Cisco Unified CCX Expression Language Reference* These three PDF documents contain the same information that is in the Unified CCX 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 . You can access this guide through the Unified CM documentation web page.		

Task	Purpose and Notes	Configuration Location	Procedure Location
2. If needed, create or customize any prompts that your Unified CCX script will use.	Through Unified CCX 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.	**Unified CCX Prompt Management** web page From the menu bar in the **Unified CCX Administration** web page, select **Applications** > **Prompt Management**.	*Managing Scripts, Prompts, Grammars, and Documents* section in the *Cisco Unified Contact Center Express Administration and Operations 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 Unified CCX repository so that they are available for use in a Unified CCX application.	**Unified CCX Script Management** web page From the Unified CCX 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 Unified Contact Center Express Administration and Operations Guide* . If you have questions when on a Unified CCX Administration web page, from the menu bar, select the **Help** > **For this page**.

Task	Purpose and Notes	Configuration Location	Procedure Location
4. Upload any prompts needed for the script.	For customized or language specific prompts	**Unified CCX Prompt Management** web page From the Unified CCX Administration menu bar, select **Applications** > **Prompt Management**. Then in the Prompt Management page, click **Upload New Prompts**.	*Uploading prompts* section in the *Cisco Unified Contact Center Express Administration and Operations Guide* .
5. Add the application.	To perform a telephony task through Unified CCX, you need a Unified CCX 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.	**Unified CCX Application Configuration** web page From the **Unified CCX 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. Next, Under Application Type, select **Cisco Script Application** and click **Next.**	*Configure a Cisco Script Application* section in the *Cisco Unified Contact Center Express Administration and Operations Guide* .
6. Give the application a name and assign the script to the application.	To make the application available for use.	**Unified CCX Script Application** web page	*Configure a Cisco Script Application* section in the *Cisco Unified Contact Center Express Administration and Operations 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 Unified CCX Administration tool.	**Unified CCX Cisco Script Application** web page	*Configure a Cisco Script Application* section in the *Cisco Unified Contact Center Express Administration and Operations Guide* .

Task	Purpose and Notes	Configuration Location	Procedure Location
8. Add the Application Trigger.	Enable the application to respond to JTAPI calls and/or HTTP requests. When you configure JTAPI triggers, you need to specify the CTI Route Point attributes used by the trigger. For example, device pool, location, and voice mail profile.	**Unified CCX Add Application Triggers** web page	See the online help for that web page. Also see *Add Application Triggers* section in the *Cisco Unified Contact Center Express Administration and Operations Guide* .
	Some Configuration Specifics **1.** From the **Unified CCX 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 Unified CCX 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, email the specified web address.	Your application specific documentation.



CHAPTER 7

Deployment of Sample Script aa.aef

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.

This section contains the following:

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.

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

Follow the instructions for configuring a Unified IP IVR application in Unified IP IVR Installation and Configuration, on page 39, 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 .

Example configuration data:

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

Test Your System and the Cisco Unified CM AutoAttendant Application

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

Procedure

Step 1 Select one of the phone numbers you have 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.

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

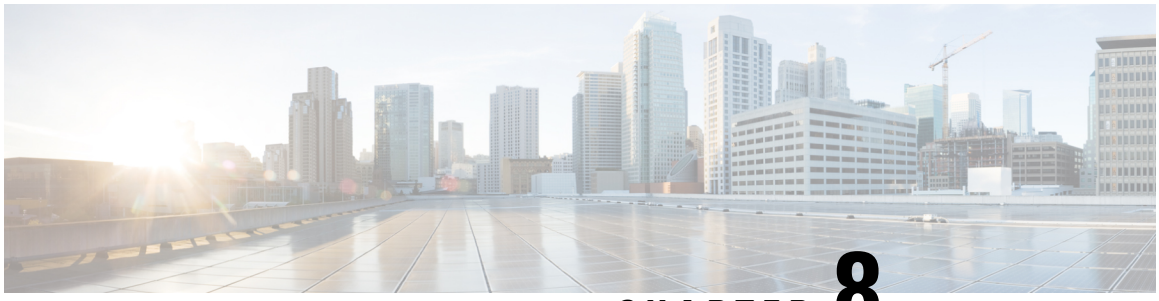
You should get the welcome prompt. If you do, then the AutoAttendant is working.

Step 3 If you have 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.

PART III

Setting up Unified IP IVR with Unified CCE



CHAPTER 8

Install and Configure Unified IP IVR for Unified CCE

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

This section contains the following:

Unified IP IVR in a Unified CCE System

In a Unified CCE system, you can use Unified IP IVR to extract and parse web-based content and present the data to customers using a telephony or an HTTP interface.

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

Unified IP IVR for Unified CCE Installation

The procedure for installing Unified IP IVR 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 in a Unified CCE System

After installation, in addition to the configuration tasks described in Unified IP IVR Configuration Checklist, on page 40, 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 16: Checklist for Configuring Unified IP IVR for Unified CCE

Task	Purpose	Configuration Location	Procedure Location
1. Configure the ICM subsystem.	Allows the Unified IP IVR 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.	**Unified CCX ICM Configuration** web page In the Unified CCX Administration web page, select **Subsystems** > **ICM**.	Provisioning the ICM Subsystem *sec*tion in the *Cisco Unified Contact Center Express Administration and Operations Guide* .

Task	Purpose	Configuration Location	Procedure Location
2. Create and upload Unified CCX 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 Unified CCX Engine.	Unified **CCX ICM Configuration** web page After you create the script, in the **Unified CCX Administration** web page, select **Subsystems** > **ICM**. Then click **Add a New VRU Script**.	*Configuring ICM VRU Scripts* section in the *Cisco Unified Contact Center Express Administration and Operations 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 Unified CCX 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 Unified CCX 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 Unified CCX repository to run for this VRU Script Name. For example, **SCRIPT[BasicQ.aef].** A script name is displayed only as an Expression starting in Unified CCX 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		

Task	Purpose	Configuration Location	Procedure Location
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 for queuing.	**Unified CCX ICM Translation Routing** web page In Unified CCX 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 Unified Contact Center Express Administration and Operations Guide* .
	You must configure Cisco Unified ICME translation-routing applications when the Cisco IP IVR is used as a queue point in an contact center 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.		
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 receives the call directly from the Unified CM and then requests instructions from the Unified ICME system.	**Unified CCX ICM Post-Routing** web page In Unified CCX 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 Unified Contact Center Express Administration and Operations Guide* .
	If the agent is configured in the Unified ICME system, Unified CCX 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 Dependency Check List

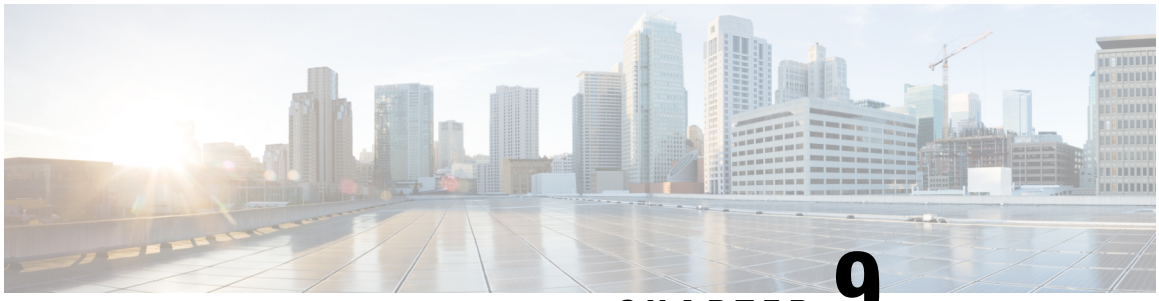
Before you install Unified ICME, list the values for all the Unified IP IVR configurations listed in the following table. You will need these for your Unified ICME configuration.

Unified CCX 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.

The following table lists the configuration dependencies between Unified IP IVR 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 17: Unified IP IVR Dependency Check List

Unified IP IVR Configuration	Unified ICME Configuration
Unified CCX Route Points (DNIS and label for the translation route in the Unified ICME Configuration that maps the route point in Unified CCX)	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
Unified CCX script names	ICM VRU Script names
Unified CCX enterprise ECC (Extended Call Context) variable names	ICM enterprise ECC variable names



CHAPTER 9

Unified ICME for Unified CCE Installation and Configuration

Note Although you can install Unified ICME software before you install the Unified CM and Cisco Unified CCX (Unified IP IVR) 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*.

This section contains the following:

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 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 in a Unified CCE system, you must do the following.

- 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.

- Install Unified IP IVR if your Unified CCE system will use Unified IP IVR.

  On the Unified IP IVR 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 Unified CCX Editor any enterprise ECC variables and uploaded VRU scripts.
  - Specified the VRU Connection Port.
  - Configured translation routing on the Unified IP IVR system.

Configure 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.

Ensure Unified IP IVR PG is Configured Correctly

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.

Procedure

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

Step 2 Click **Retrieve.**

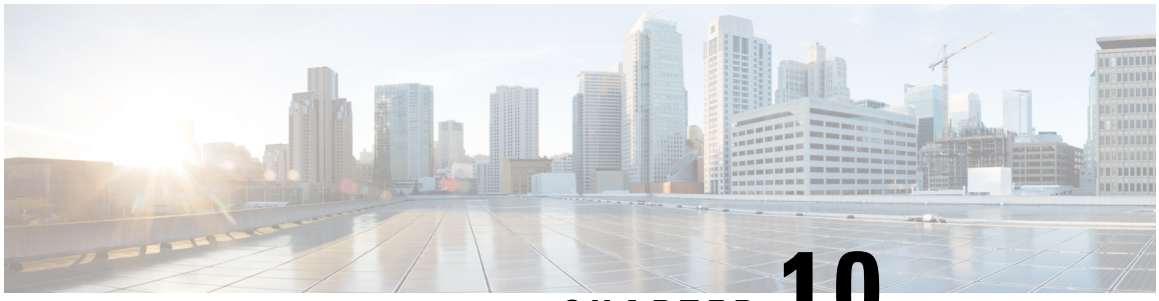
Step 3 Select the IP IVR peripheral.

Step 4 In Configuration Parameter, insert `/ASSUME_ANSWERED`.

Step 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.



CHAPTER 10

How to Deploy the Sample Script BasicQ.aef

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 Deployment of Sample Script aa.aef, on page 53. The BasicQ.aef script works with Unified IP IVR.

This section contains the following:

How Unified CCX Scripts Work in a Unified CCE System

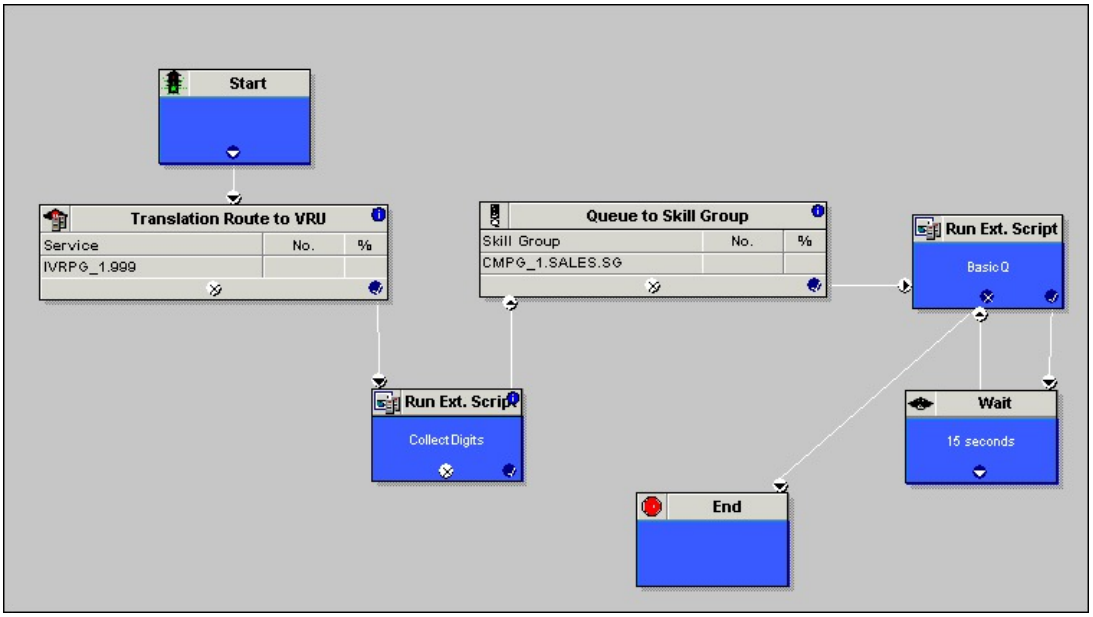
In a Unified CCE system, the Unified CCX system uses the ICM subsystem, which manages call distribution across sites and call-processing environments.

The Unified CCX 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 Unified CCX 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 Unified CCX scripts, *CollectDigits* and *BasicQ*, that provide two different call-handling steps in the ICM VRU script.

Figure 8: Example ICM VRU Script



ICM VRU scripts run when the Unified ICME system sends a Run VRU Script request to the Unified CCX 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 Unified CCX script that the VRU script is to run, uploaded it to the Unified CCX Repository, and mapped it to the ICM VRU script.

For related Unified CCX Contact Center documentation, see *Cisco Unified Contact Center Express Documentation*.

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

See Also

Cisco Unified Contact Center Express Scripting Series: Volume 1, Getting Started Developing Scripts

Cisco Unified Contact Center Express Scripting Series: Volume 2, Editor Step Reference

Cisco Unified Contact Center Express Scripting Series: Volume 3, Expression Language Reference

Cisco Unified Contact Center Express Administration Guide

Cisco Unified Contact Center Express Installation and Upgrade Guide

Cisco Unified Contact Center Enterprise Installation and Configuration Guide

BasicQ.aef Script Example

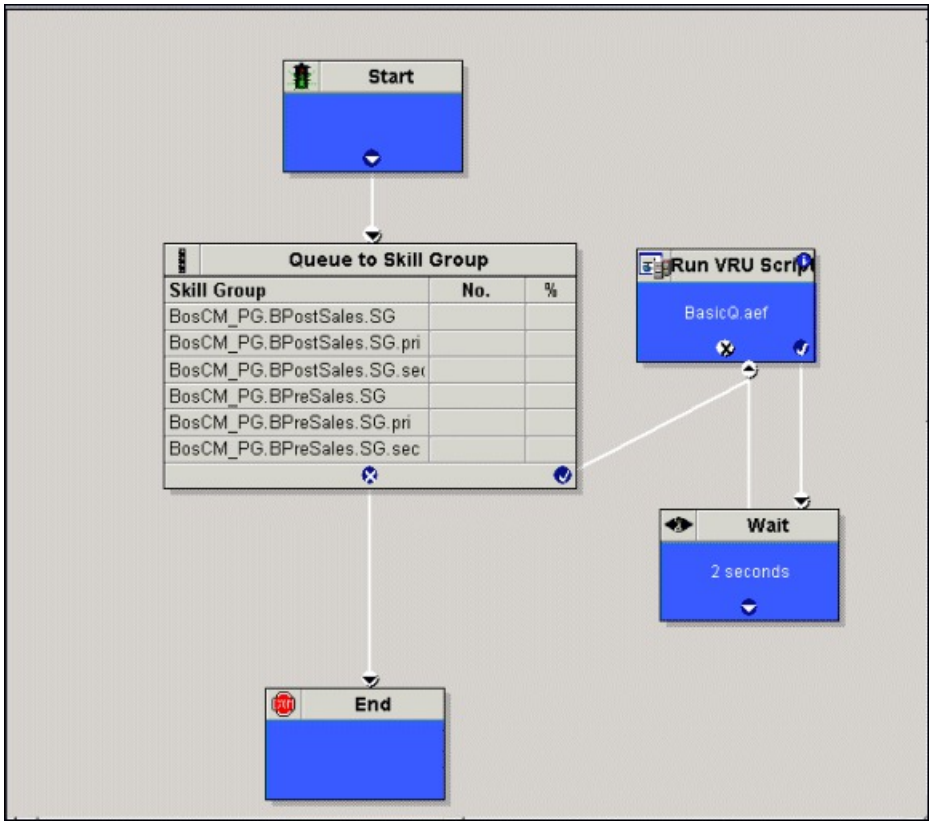
The Unified CCX BasicQ script, BasicQ.aef, is a default Unified CCX script for a Unified CCE environment that Cisco provides for the *queue treatment* part of an enterprise call flow. The script plays several prompts, (and puts the call on hold), looping through the prompts until an agent phone becomes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

The Unified CCX 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.wav 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.

The figure below shows an example ICM VRU script. The diagram illustrates how the example script calls the Unified CCX BasicQ.aef script as a function in the ICM script.

Figure 9: Example ICM BasicQ VRU Script



Configure BasicQ.aef

For instructions on configuring Unified IP IVR, see the *Cisco Unified Contact Center Express Administration and Operations Guide* at: https://www.cisco.com/en/US/products/sw/custcosw/ps1846/products_installation_and_configuration_guides_list.html.

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.

Procedure

Step 1 Configure a port group and a trigger for ICM translation routing.

Go to the **Unified CCX Administration CM Telephony Call Control Group Configuration** web page by selecting **Subsystems** > **CM Telephony**.

Step 2 Upload the Unified CCX BasicQ script.

Go to the **Unified CCX Administration Script Management** web page by selecting **Application** > **Script Management** and then click **Upload new Scripts**.

Step 3 Create the Unified CCX application, BasicQ.

Go to the **Unified CCX Administration Application Configuration** web page by selecting **Applications** > **Application Management** and then click **Add a New Application**.

Step 4 Add the BasicQ ICM VRU script.

Go to the **Unified CCX 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.

Step 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.

Test Your Deployment

Select the target number for your Unified IP IVR 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:

Procedure

Step 1 A caller dials 3000 from phone 9501.

Step 2 The caller listens to Unified IP IVR play BasicQ music. BasicQ is the name of the VRU script.

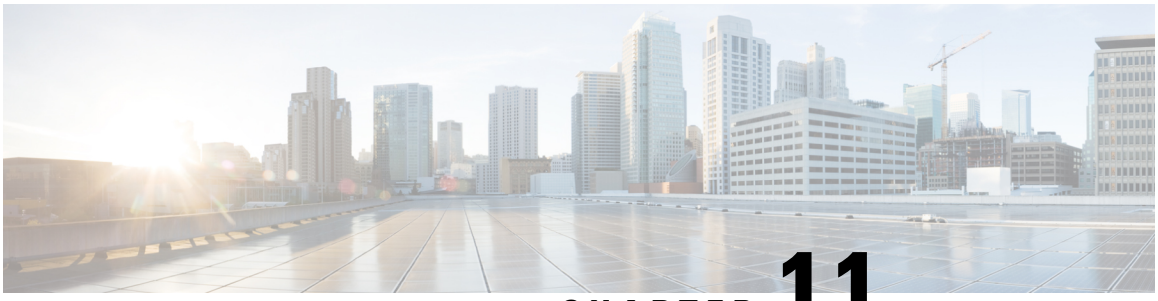
Step 3 Agent 24 logs in to phone 9502 using Cisco Finesse Desktop.

Step 4 The state for Agents 24 changes to the ready state.

Step 5 The IP IVR music stops.

Step 6 Agent 24 gets a screen pop on the Agent Desktop along with a phone ring.

Step 7 The caller can then hang up or the Agent can drop the call through Cisco Finesse Desktop software.



CHAPTER 11

Unified IP IVR Management

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, Unified CCX repository

This chapter contains the following:

Manage Prompt, Grammar, and Document Files

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

- **Prompts**. Many applications make use of pre-recorded prompts, stored as .wav files, which are played back to callers in order to provide information and elicit caller response.
- **Grammars**. The Unified CCX system uses specific grammars when recognizing and responding to caller response to prompts. A grammar is a specific set of all possible spoken phrases and/or DTMF digits to be recognized by Unified CCX 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 Unified CCX system. Several system-level prompt, grammar, and document files are loaded during Unified CCX installation. However, any file you create needs to be made available to the Unified CCX engine before a Unified CCX application can use them. This is done through the Unified CCX cluster's repository detester, where the prompt, grammar, and document files are created, stored, and updated.

Note The Unified CCX Server local disk prompt, grammar, and document files are synchronized with the central repository during Unified CCX engine startup and during run-time when the Repository detester is modified. For more information, refer to the *Cisco Unified Contact Center Express Administration and Operations Guide* .

Unified CCX Datastores

Datastores are components that allow you to manage and monitor historical, repository, and configuration data in the Unified CCX 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 Unified CCX 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 Unified Contact Center Express Administration and Operations Guide* .