## Contents

Preface i  
Audience ii  
Organization ii  
Related Documentation v  
Glossary vi  
Conventions vii  
Obtaining Documentation, Obtaining Support, and Security Guidelines viii  
Documentation Feedback viii

### Chapter 1

**Installing and Starting the Cisco Unified CCX Editor** 1-1  
Starting the Cisco Unified CCX Editor 1-1  
Prerequisites for a Separate Installation 1-3  
Downloading the Cisco Unified CCX Editor for a Separate Installation 1-3  
Installing the Cisco Unified CCX Editor 1-4

### Chapter 2

**How To Use the Cisco Unified CCX Editor** 2-1  
About the Cisco Unified CCX Editor 2-2  
An Example Cisco Unified CCX Editor Window 2-2  
Cisco Unified CCX Editor Window with a Sample Script 2-4  
About the Cisco Unified CCX Editor Status Bar 2-5
Validating and Debugging Your Script 2-48
How to Validate Your Script 2-48
How to Debug Your Script 2-48
Using BreakPoints 2-48
Using Reactive and Active Debugging 2-49
Using Reactive Debugging 2-49
Using Non- Reactive Debugging 2-52
How To Handle Basic Script Errors 2-53
Using the “Continue on Prompt Errors” Option 2-53
Enabling the ”Continue On Prompt Errors“ Option 2-54
Script Execution When Enabling the ”Continue On Prompt Errors“ Option 2-55
Script Execution When Disabling the ”Continue On Prompt Errors“ Option 2-55
Using Error Output Branches 2-55
How and Why To Use the CRTP Protocol 2-56
CRTP URI Protocol Syntax 2-57
Example CRTP URI Specifications 2-61
How To Use Cisco Unified CCX Script Templates 2-63
The Script Templates Installed with the Cisco Unified CCX Editor 2-63
How do I find the script templates installed with the Cisco Unified CCX Editor? 2-64
Default Script Template Descriptions 2-65
How to Create Your Own Script Template 2-67
How to Create Your Own Script Template Directory 2-68
Where Sample Prompts for Your Scripts Are Stored 2-68
The Cisco Unified CCX Edition Script Web Repository 2-69
The Cisco Unified CCX Script Web Repository Location 2-69
How do I add my favorite Cisco Unified CCX script to the Web repository? 2-70
Obtaining Technical Assistance 2-70

CHAPTER 3
Using Expressions and the Expression Editor 3-1
  How to Access the Cisco Unified CCX Expression Editor 3-1
  How to Use the Expression Editor 3-2
    How To Enter Expressions in the Expression Editor 3-2
  About the Expression Editor Toolbar 3-4
    Toolbar Tabs 3-5
    A Pop-Up Menu 3-7
    Showing or Hiding the Expression Editor Toolbar 3-8
  About the Expression Editor Syntax Buttons 3-9
  About Expression and Java Licensing 3-9

CHAPTER 4
Localizing Cisco Unified CCX Scripts 4-1
  Installing Language Groups 4-1
  When Do You Need a Language Group? 4-2
  Changing a Cisco Unified CCX Installed Language 4-4
  Language Restrictions 4-4
  Creating a Custom Country-Specific Language 4-4
  Using VXML to Implement a Language Not Available in Cisco Unified CCX 4-5

CHAPTER 5
Advanced Scripting Techniques 5-1
  Managing Contacts in Your Scripts 5-1
  Managing Sessions in Your Scripts 5-3
    Using Mapping Identifiers 5-3
    Using Session Objects 5-4
  Using Grammars in Your Scripts 5-4
Contents

Recording Step 5-27
Explicit Confirmation Step 5-27
Implicit Confirmation Step 5-28
Simple Recognition Step 5-28
Using a Voice Browser in Your Scripts 5-28
  Understanding VoiceXML 5-29
  Voice Browser Architecture 5-30
  Voice Browser Development Tools 5-32
A Script for Incrementing the Current Date 5-34
A Script Example Showing Timeout or Retry Logic 5-35

CHAPTER 6

The Basic Cisco Unified CCX Script 6-1
  The Example Cisco Unified CCX Basic Script Template 6-2
  The Start Step (Creating a Script) 6-2
  Script Variables for icd.aef 6-3
  The Accept Step 6-5
  The Play Prompt Step 6-6
  The Select Resource Step 6-7
    The Connected Output Branch 6-10
    The Queued Output Branch 6-10
      The Label Step 6-10
      The Play Prompt Step 6-11
      The Delay Step 6-12
    The Goto Step 6-14
  The End Step 6-14

CHAPTER 7

Designing a Basic Script 7-1
  An Example Basic Script 7-2
<table>
<thead>
<tr>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Start Step (Creating a Script)</td>
</tr>
<tr>
<td>SNU Script Template Variables</td>
</tr>
<tr>
<td>The Accept Step</td>
</tr>
<tr>
<td>The Play Prompt Step</td>
</tr>
<tr>
<td>The Label Step (GetUser)</td>
</tr>
<tr>
<td>The Name To User Step</td>
</tr>
<tr>
<td>The Successful Output Branch</td>
</tr>
<tr>
<td>The Get User Info Step</td>
</tr>
<tr>
<td>The If Step</td>
</tr>
<tr>
<td>The Label Step (GetPin)</td>
</tr>
<tr>
<td>The Timeout Output Branch</td>
</tr>
<tr>
<td>The Unsuccessful Output Branch</td>
</tr>
<tr>
<td>The Get Digit String Step</td>
</tr>
<tr>
<td>Configuring the Get Digit String Step</td>
</tr>
<tr>
<td>The Successful Output Branch</td>
</tr>
<tr>
<td>The Timeout Output Branch</td>
</tr>
<tr>
<td>The True Output Branch</td>
</tr>
<tr>
<td>The False Output Branch</td>
</tr>
<tr>
<td>The Unsuccessful Output Branch</td>
</tr>
<tr>
<td>The Authenticate User Step</td>
</tr>
<tr>
<td>The Success Output Branch</td>
</tr>
<tr>
<td>The Unsuccessful Output Branch</td>
</tr>
<tr>
<td>The True Output Branch</td>
</tr>
<tr>
<td>The False Output Branch</td>
</tr>
<tr>
<td>The Recording Step</td>
</tr>
<tr>
<td>The Successful Output Branch</td>
</tr>
<tr>
<td>The Unsuccessful Output Branch</td>
</tr>
<tr>
<td>The Menu Step</td>
</tr>
<tr>
<td>The Key 1 Output Branch</td>
</tr>
</tbody>
</table>
The Key 2 Output Branch 7-44
The True Output Branch 7-45
The False Output Branch 7-45
The Timeout and Unsuccessful Output Branches 7-46
The Closing Steps of the SNU.aef Script 7-47
The Set Contact Info Step 7-48
The Set Step 7-49
The Play Prompt Step 7-49
The Terminate Step 7-49
The End Step 7-49

CHAPTER 8  Working with Multiple Contacts 8-1
An Example Script Template with Multiple Contacts 8-2
The Start Step (Creating a Script) 8-3
Script Variables for broadcast.aef 8-4
The Annotate Step 8-6
The Accept Step 8-7
The Get Contact Info Step 8-8
The Recording Step 8-8
The Successful Output Branch 8-10
The Unsuccessful Output Branch 8-10
The Play Prompt Step 8-11
The Terminate Step 8-11
The End Step 8-11
The Play Prompt Step 8-11
The Set numbersToCall Step 8-12
The Call Subflow Step 8-13
The Set numCalls Step 8-15
The Label Step (Call Loop) 8-15
The If Step 8-15
  If True Output Branch 8-16
  If False Output Branch 8-17
The Set Steps 8-17
  The First Set Step 8-17
  The Second Set Step 8-18
The Play Prompt Step 8-19
The Call Hold Step 8-20
The Place Call Step 8-21
  The Successful Output Branch 8-24
    The On Exception Goto Step 8-24
    The Set Contact Info Step 8-24
    The Play Prompt Step 8-25
    The Terminate Step 8-25
    The Set Contact Info Set 8-25
    The Label Step (LABEL0) 8-25
    The On Exception Goto Step (Clear Exception) 8-25
    The Call Unhold Step 8-26
    The Play Prompt Step 8-26
  The Other Output Branches 8-26
The Increment Step (i) 8-27
The Goto Step (Call Loop) 8-27
The Terminate Step 8-27
The Set Contact Info Step 8-27
The End Step 8-28

CHAPTER 9

Designing a Web-Enabled Script 9-1
  An Example Web-Enabled Script Template 9-1
Contents

Creating Server Script Web Pages 9-3
  Creating a Static Web Page 9-3
  Creating a Dynamic Web Page 9-4
Creating the hello.aef Script 9-5
  The Start Step 9-5
  Web-enabled Script Variables 9-6
  The Get Http Contact Info Step 9-8
  The Create File Document Step 9-10
  The Keyword Transform Document Step 9-11
  The Send Http Response Step 9-14
  The End Step 9-16
Managing the hello.aef Script 9-16
  Uploading the hello.aef Script 9-17
  Creating the Application for hello.aef Script 9-17
  Creating the HTTP Trigger 9-17
  Testing the script 9-18

CHAPTER 10

Designing a Web-Enabled Client Script 10-1
  Example Web-Enabled Client Script Template 10-2
  Analyzing the Data Source 10-3
  Creating the getQuoteClient.aef Script 10-4
    The Start Step (Creating a Script) 10-5
    Defining the Client Script Variables 10-5
    The Accept Step 10-6
    The Create URL Document Step 10-7
    The Create XML Document Step 10-8
    The Get XML Document Data Step 10-10
    The Create Generated Prompt Step 10-12
    Create Container Prompt Step 10-15
Chapter 11

Designing a Database Script

An Example Database Script Template

The Start Step (Creating a Script)

Database Script Variables

The Accept Step

The Play Prompt Step

The DB Read Step

  The Successful Output Branch

  The Connection Not Available Output Branch

  The SQL Error Output Branch

The Label Step (Physician Loop)

The DB Get Step

  The Successful Output Branch

  The Play Prompt Step

  The Goto Step (Physician Loop)

The No Data Output Branch

  The DB Write Step

  The DB Release Step

  The Terminate Step

  The End Step

  The SQL Error Output Branch

  The End Step

Chapter 12

Designing a Cisco Unified IP IVR Script

The Sample AutoAttendant (aa.aef) Script Template
The Start Step (Creating a Script) 12-5
The aa.aef Script Variables 12-6
The Getting the Contact Information and Setting Up the Prompts 12-10
  Accept 12-10
  Get Contact Info 12-11
  The First Create Conditional Prompt Step 12-12
  The Second Create Conditional Prompt Step 12-13
  The First Create Container Prompt Step 12-14
  The Third Create Conditional Prompt Step 12-16
  The Play Prompt Step 12-16
  The Label Step (MainMenu) 12-18
Determining if the System is ASR Enabled 12-19
  If ASR 12-19
  The True Output Branch 12-20
  The False Output Branch 12-20
  The Switch Step 12-21
Creating and Setting an Error Message Prompt 12-22
  The Second Create Container Prompt Step 12-23
  The Set Step 12-23
Recognizing Input 12-24
The DialByExtn Output Branch of the Simple Recognition Step 12-27
  The Label Step 12-28
  The Create Container Prompt Step 12-28
  The Set Step 12-29
  The Get Digit String Step 12-29
The Successful Output Branch (of Get Digit) 12-30
  Transferring the Call if Recognition is Successful 12-32
  The True Recognition Branch 12-32
  Setting the Retry Message 12-32
Configuring the Number of Retries  12-33
  The Retry Branch  12-33
The False Recognition Branch  12-34
Confirming the Caller Input  12-35
Localizing the Prompt Language  12-36
Completing the Input Confirmation  12-38
  The Caller Does Not Give Confirmation  12-39
Configuring the Retries  12-39
The Caller With Retries Gives Confirmation  12-40
  The Play Prompt Step  12-40
  The Increment Step  12-40
The Caller Does Not Give Confirmation  12-41
The Extension is Confirmed as Correct  12-41
Transferring the Call  12-41
  Successfully Transferring the Call  12-42
    The Set Contact Info Step  12-43
    The End Step  12-43
  Receiving a Busy Signal  12-43
Registering an Invalid Transfer Extension  12-44
Unsuccessfully Transferring the Call  12-44
  The If Step  12-45
    The True Output Branch  12-45
    The False Output Branch  12-46
The DialByName Output Branch of the Simple Recognition Step  12-46
  The Label Step  12-47
  The Create Container Prompt Step  12-48
  The Set Step  12-48
  The Name To User Step  12-48
    The Successfully Receiving Caller Input  12-51
    The Get User Info Step  12-53
The If Step 12-54
The Implicit Confirmation Step 12-54
The No Output Branch of the Simple Recognition Step 12-55
Get User Info Step 12-57
The First Create Generated Prompt Step 12-57
The Second Create Generated Prompt Step 12-58
The First Create Conditional Prompt Step 12-59
The If Step 12-60
  True Branch—Create Language Prompt 12-60
  False Branch—Set Prompt 12-61
The Create Container Prompt Step 12-61
The Set Step 12-62
The Explicit Confirmation Step 12-62
The If Step 12-65
  The True Output Branch 12-65
  The False Output Branch 12-66
The Yes Output Branch 12-66
  The Label Step 12-68
  The First If Step 12-68
The Call Redirect Step 12-69
  The Successful Output Branch 12-69
  The Busy Output Branch 12-70
  The Invalid Output Branch 12-71
  The Unsuccessful Output Branch 12-71
  The Second If Step 12-72
The Operator Output Branch of the Simple Recognition Step 12-73
The Label Step (Xfer Operator) 12-74
The Call Redirect Step 12-75
  The Successful Output Branch 12-75
  The Busy Output Branch 12-76
The Invalid Output Branch 12-76
The Unsuccessful Output Branch 12-77
The If Step 12-77
The True Output Branch 12-78
The False Output Branch 12-78
The Concluding Steps of the Script 12-78
The Play Prompt Step 12-79
The Call Redirect Step 12-80
The If Step 12-81
The Play Prompt Step 12-81
The Terminate Step 12-81
The End Step 12-81

CHAPTER 13

Designing Contact-Neutral Scripts 13-1
An Example Contact Neutral (Phone or HTTP) Script Template 13-2
The Start Step (Creating a Script) 13-3
Contact-Neutral Script Variables 13-4
The Accept Step 13-7
The Get Contact Info Step 13-7
The Switch Step 13-8
The HttpContact Output Branch of the Switch Step 13-10
The Get Http Contact Info Step 13-11
The Place Call Step 13-11
   The Successful Output Branch 13-13
   The Other Output Branches 13-17
The CallContact Branch of the Switch Step 13-19
The Get Trigger Info Step 13-20
The Default Branch of the Switch Step 13-22
The End Step 13-22
CHAPTER 14  
Designing a Script with Text-To-Speech (TTS) 14-1
An Example Text-To-Speech (TTS) Script 14-2
The Start Step (Creating a Script) 14-3
TTS Script Variables 14-3
The Accept Step 14-4
The Set Contact Info Step 14-4
The First Create TTS Prompt Step 14-5
The Play Prompt Step 14-7
The Create File Document Step 14-8
The Second Create TTS Prompt Step 14-9
The Annotate Step 14-10
The Menu Step 14-11
The Terminate Step 14-15
The End Step 14-15

CHAPTER 15  
Designing Cisco Unified CCX VoiceXML Applications 15-1
Understanding the Terminology 15-2
A Prerequisite and a Recommendation 15-3
Updating CRS 3.x VoiceXML Applications 15-3
   Converting Documents from VoiceXML 1.0 to VoiceXML 2.0 15-3
   Converting VoiceXML CRS 3.x Scripts to CRS 4.x Scripts 15-4
   Converting VoiceXML CRS 3.x or 4.x Scripts to CRS 5.x Scripts 15-5
Designing Cisco Unified CCX VoiceXML Applications 15-6
Creating VoiceXML Documents 15-6
   Related Documentation 15-7
   A Sample VoiceXML Document 15-8
   Using Document Type Definitions 15-9
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using SRGS Grammar Expressions</td>
<td>15-10</td>
</tr>
<tr>
<td>Using Speech Recognition Input</td>
<td>15-10</td>
</tr>
<tr>
<td>Using DTMF Input</td>
<td>15-11</td>
</tr>
<tr>
<td>Using DTMF for Menu Navigation</td>
<td>15-12</td>
</tr>
<tr>
<td>Receiving Digit String Input</td>
<td>15-13</td>
</tr>
<tr>
<td>Using DTMF Grammar</td>
<td>15-14</td>
</tr>
<tr>
<td>Using Text to Speech Output</td>
<td>15-15</td>
</tr>
<tr>
<td>Understanding Provider Fallback for TTS</td>
<td>15-15</td>
</tr>
<tr>
<td>Understanding Where TTS Prompts are Played</td>
<td>15-16</td>
</tr>
<tr>
<td>Understanding Gender Fallback for MRCP TTS</td>
<td>15-17</td>
</tr>
<tr>
<td>Using The CRTP Protocol</td>
<td>15-18</td>
</tr>
<tr>
<td>Using the Voice Browser Cache</td>
<td>15-18</td>
</tr>
<tr>
<td>Creating Cisco Unified CCX Scripts that Run VoiceXML Documents</td>
<td>15-20</td>
</tr>
<tr>
<td>Related Documentation</td>
<td>15-20</td>
</tr>
<tr>
<td>A Sample Voicebrowser.aef Script</td>
<td>15-20</td>
</tr>
<tr>
<td>Creating a Script that Runs a VoiceXML Document</td>
<td>15-22</td>
</tr>
<tr>
<td>Step 1: The Start Step (Creating a Script)</td>
<td>15-22</td>
</tr>
<tr>
<td>Step 2: Create Two Voicebrowser Script Variables</td>
<td>15-23</td>
</tr>
<tr>
<td>Step 2: Enter the Start Step</td>
<td>15-23</td>
</tr>
<tr>
<td>Step 3: Enter the Accept Step</td>
<td>15-24</td>
</tr>
<tr>
<td>Step 4: Enter the Create URL Document Step</td>
<td>15-24</td>
</tr>
<tr>
<td>Step 5: Enter the Voice Browser Step</td>
<td>15-25</td>
</tr>
<tr>
<td>Step 6: Enter the Terminate Step</td>
<td>15-28</td>
</tr>
<tr>
<td>Step 7: Enter The End Step</td>
<td>15-28</td>
</tr>
<tr>
<td>Specifying TTS Providers in a Cisco Unified CCX Script</td>
<td>15-28</td>
</tr>
<tr>
<td>Designing International Cisco Unified CCX VoiceXML Applications</td>
<td>15-29</td>
</tr>
<tr>
<td>Cisco Unified CCX VoiceXML Application Troubleshooting Tips</td>
<td>15-32</td>
</tr>
</tbody>
</table>
## CHAPTER 16

**Designing Scripts for Cisco Unified IP IVR** 16-1

The Service Control Interface 16-1

Call Variables 16-3

- Using Call Variables 16-3
- Using Expanded Call Variables 16-3
- Using Error Variables 16-4
- Using the Parameter Separator 16-4

Configuring Encoding and Decoding Types 16-5

ICM Script Types 16-7

- Initial Scripts 16-8
- Default Scripts 16-8
- VRU Scripts 16-9

Sample VRU Script Templates 16-10

- Basic Queuing (BasicQ.aef) 16-10
- Visible Queuing (VisibleQ.aef) 16-11
- Collect Digits (CollectDigits.aef) 16-12

## CHAPTER 17

**Designing Cisco Unified CCX Scripts** 17-1

A Sample Cisco Unified CCX Script Template 17-2

The Start Step (Creating a Script) 17-2

Cisco Unified CCX Script Variables 17-3

The Accept Step 17-6

The Get Contact Info Step 17-6

The Get Session Info Step 17-6

The If Steps 17-7

- The First If Step 17-9
- The Second If Step 17-9
- The Third If Step 17-9
- The Fourth If Step 17-10
### Contents

- The Play Prompt Step  17-11
- The Get Digit String Step  17-11
- The Session Steps  17-14
- Choosing a Language  17-21
- Recording a Name  17-24
- The Select Resource Step  17-26
- The Connected Output Branch  17-28
- The Queued Output Branch  17-30
- Using Default Scripts  17-32
  - Variables for a Default Cisco Unified CCX Script  17-32
  - Writing a Default Script  17-34

### Chapter 18

**Designing Cisco Unified Gateway Scripts**  18-1

- Scripting on a Cisco Unified Gateway System  18-2
- Using Variables  18-3
  - Defining Local Cisco Unified CCX Script Variables  18-3
  - Using Cisco Pre-Defined Enterprise Call Variables  18-4
  - Using Enterprise Expanded Call Context (ECC) Variables  18-5
    - Defining ECC Variables in the Cisco Finesse Administration  18-5
    - Defining ECC Variables in the Cisco Unified CCX Editor  18-5
    - Configuring ECC Variables in a Cisco Unified CCX Script  18-7
    - Defining ECC Variables for a Post Call Treatment Script  18-7
  - Using Variables Multiple Times  18-8
- Example Cisco Unified Gateway Post-Routing Scripts  18-9
  - A Sample Cisco Unified CCX Script that Selects a CSQ  18-11
    - Script Variables Used in the PostRouteSelectCSQ.aef Script  18-12
    - Script Flow for the PostRouteSelectCSQ.aef Script  18-13
  - A Sample Cisco Unified CCX Script that Selects an Agent  18-17
Sample VoiceXML Log File Selection  A-3

APPENDIX B

VoiceXML Implementation for Cisco Voice Browser  B-1
VoiceXML 2.0 Element Implementation  B-2
VoiceXML Properties Implementation  B-10
Standard Session Variables Implementation  B-11
Built-in Type Implementation  B-12
The <value> Data Format  B-14

INDEX
Preface

The Cisco Unified Contact Center Express Scripting and Development Series contains three volumes and provides information about how to use the Cisco Unified Contact Center Express (Cisco Unified CCX) Editor to develop a wide variety of interactive scripts:

1. *Volume 1, Getting Started with Scripts* (this book), provides an overview of the Cisco Unified CCX and the Cisco Unified CCX Editor web interface.
2. *Volume 2, Editor Step Reference*, describes each individual step in the Cisco Unified CCX Editor palettes.

The information in all three volumes is included in the Cisco Unified CCX Step Editor online help. This means by searching in one location, the Cisco Unified CCX Step Editor help, you should be able to find any information contained in all three volumes.

This book is Volume 1 and it describes how to:

1. Install the Cisco Unified CCX Editor
2. Navigate the Cisco Unified CCX Editor interface
3. Make use of key features of the Cisco Unified CCX development environment
4. Create scripts that perform a wide variety of tasks
For an overview of the Cisco Unified CCX, see the *Cisco Unified Contact Center Express Administration Guide*, which includes information about configuring the Cisco Unified CallManager, the Cisco Unified CCX Server, and other subsystems of the Cisco Unified CCX Engine.

**Audience**

The *Cisco Unified Contact Center Express Getting Started with Scripts, Release 11.0(1)* is written for application developers who will use the Cisco Unified CCX Editor to create and modify Cisco Unified CCX scripts. This guide targets developers who have the IP telephony knowledge required to create useful applications and who also have some background in programming or scripting. While readers of this guide do not need experience or training with Java, such training is useful to fully utilize the capabilities of the Cisco Unified CCX system.

**Organization**

This guide contains the following chapters.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1</td>
<td><strong>Installing and Starting the Cisco Unified CCX Editor</strong></td>
<td>Describes how to install and start the Cisco Unified CCX Editor on your computer.</td>
</tr>
<tr>
<td>Chapter 2</td>
<td><strong>How To Use the Cisco Unified CCX Editor</strong></td>
<td>Provides a high-level overview of the Cisco Unified CCX Editor and its components.</td>
</tr>
<tr>
<td>Chapter 3</td>
<td><strong>Using Expressions and the Expression Editor</strong></td>
<td>Describes how to use the Expression Editor.</td>
</tr>
<tr>
<td>Chapter 4</td>
<td><strong>Localizing Cisco Unified CCX Scripts</strong></td>
<td>Describes how to localize your Cisco Unified CCX scripts to use prompts in the language your customers use.</td>
</tr>
<tr>
<td>Chapter</td>
<td>Title</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Chapter 5</td>
<td>Advanced Scripting Techniques</td>
<td>Describes advanced features of the Cisco Unified CCX development environment.</td>
</tr>
<tr>
<td>Chapter 6</td>
<td>Designing a Basic Script</td>
<td>Uses the sample script SNU.aef to demonstrate how to use Cisco Unified CCX Editor steps to design a basic script.</td>
</tr>
<tr>
<td>Chapter 7</td>
<td>The Basic Cisco Unified CCX Script</td>
<td>Uses the sample script icd.aef to demonstrate how to use Cisco Unified CCX Editor steps to provide an Cisco Unified CCX solution to queue calls and connect them to available resources.</td>
</tr>
<tr>
<td>Chapter 8</td>
<td>Working with Multiple Contacts</td>
<td>Uses the sample script broadcast.aef to demonstrate how to use Cisco Unified CCX Editor steps to design scripts that handle multiple contacts within the same script. This chapter also provides a good example of handling outbound calls and using subflows.</td>
</tr>
<tr>
<td>Chapter 9</td>
<td>Designing a Web-Enabled Script</td>
<td>Demonstrates how to use Cisco Unified CCX Editor steps to create scripts that take advantage of web server applications.</td>
</tr>
<tr>
<td>Chapter 10</td>
<td>Designing a Web-Enabled Client Script</td>
<td>Demonstrates how to use Cisco Unified CCX Editor steps to create a web-enabled client script.</td>
</tr>
<tr>
<td>Chapter 11</td>
<td>Designing a Database Script</td>
<td>Demonstrates how to use Cisco Unified CCX Editor steps to design a simple script that automatically provides callers with access to information in a database.</td>
</tr>
<tr>
<td>Chapter</td>
<td>Title</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>Chapter 12</td>
<td>Designing a Cisco Unified IP IVR Script</td>
<td>Uses the sample script aa.aef to demonstrate how to use Cisco Unified CCX Editor steps to design a basic IVR script. This chapter also provides examples demonstrating how to design a multi-lingual and/or media-neutral script.</td>
</tr>
<tr>
<td>Chapter 13</td>
<td>Designing Contact-Neutral Scripts</td>
<td>Demonstrates how to use Cisco Unified CCX Editor steps to create a contact-neutral script that accepts either a phone call or an HTTP request as the triggering contact.</td>
</tr>
<tr>
<td>Chapter 14</td>
<td>Designing a Script with Text-To-Speech (TTS)</td>
<td>Uses the sample script TTSsample.aef to demonstrate how to use Cisco Unified CCX Editor steps to design a script that takes advantage of TTS capability.</td>
</tr>
<tr>
<td>Chapter 15</td>
<td>Designing Cisco Unified CCX VoiceXML Applications</td>
<td>Contains information about Cisco Unified CCX support for VoiceXML standards and other information useful in developing applications that take advantage of VoiceXML-enabled web pages.</td>
</tr>
<tr>
<td>Chapter 16</td>
<td>Designing Scripts for Cisco Unified IP IVR</td>
<td>Demonstrates how to use Cisco Unified CCX Editor steps in the Cisco Unified ICME palette to design VRU scripts for use with Cisco Unified IP IVR.</td>
</tr>
</tbody>
</table>
Preface

Related Documentation

See the following documents for further information about Cisco Unified CCX applications and products:

- *Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference*
- *Cisco Unified Contact Center Express Scripting and Development 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 Express Servicing and Troubleshooting Guide
• Cisco Unified Communications Manager Administration Guide
• Cisco Unified Communications Manager Extended Services Administrator Guide
• Cisco Unified Communications Manager System Guide
• Cisco Unified Contact Center Express Design Guide

Glossary

For the complete list of terms used in Cisco Unified CCX and Cisco Unified IP IVR, see

# Conventions

This manual uses the following conventions.

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
</table>
| **boldface** font | Boldface font is used to indicate commands, such as user entries, keys, buttons, and folder and submenu names. For example:  
- Choose **Edit > Find**.  
- Click **Finish**. |
| *italic* font | Italic font is used to indicate the following:  
- To introduce a new term. Example: A *skill group* is a collection of agents who share similar skills.  
- For emphasis. Example: *Do not* use the numerical naming convention.  
- 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  
  <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. |
### Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, security guidelines, and also recommended aliases and general Cisco documents, see the monthly What’s New in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation, at:


### Documentation Feedback

You can provide comments about this document by sending email to the following address:

ccbu_docfeedback@cisco.com

We appreciate your comments.
Installing and Starting the Cisco Unified CCX Editor

The Cisco Unified CCX Editor is a visual programming environment for creating, modifying, validating, and debugging telephony and multimedia application scripts in a Cisco Unified CCX system.

On installing the Cisco Unified CCX Editor:

• Using a web browser, you can download and install the Cisco Unified CCX Editor on any computer (not in the Cisco Unified CCX cluster) that can access the Cisco Unified CCX Administration web page.

This chapter includes the following topics:

• Starting the Cisco Unified CCX Editor, page 1-1
• Prerequisites for a Separate Installation, page 1-3
• Downloading the Cisco Unified CCX Editor for a Separate Installation, page 1-3
• Installing the Cisco Unified CCX Editor, page 1-4

Starting the Cisco Unified CCX Editor

To start the Cisco Unified CCX Editor, do the following:
Procedure

Step 1 Select Start > Programs > Cisco Unified CCX Administration > Cisco Unified CCX Editor.

The Editor Login dialog box appears.

Step 2 Enter a valid Name, Password, and IP address or host name of a node in the Cisco Unified CCX cluster and click Logon.

The Name and Password value for the Cisco Unified CCX Editor must be the same as your Cisco Unified CCX Administration Name and Password value.

Note

- Only users with Administrative rights to the machine on which the Cisco Unified CCX Editor is installed are able to launch the Cisco Unified CCX Editor. Non-administrator users are not able to launch the Editor. This is true for Windows XP, Windows 7 32-bit Ultimate, and Windows 7 64-bit systems.

- After you download and launch the Cisco Unified CCX Editor for the first time, you can select the Log On Anonymously button to run the Cisco Unified CCX Editor without specifying a Name and Password. However, in Anonymous mode, you cannot save scripts to the Repository.

The Cisco Unified CCX Server information can be any IP address or hostname of a valid node in the Cisco Unified CCX cluster. For a local Cisco Unified CCX Editor running in a Cisco Unified CCX cluster, this field is automatically pre-filled with the local host IP address. For a remote Cisco Unified CCX Editor, you must manually enter the Cisco Unified CCX Server ID.

Caution

You must supply a Cisco Unified CCX Server IP address the first time you launch the Cisco Unified CCX Editor so that the Cisco Unified CCX Editor can download additional information from the Cisco Unified CCX Cluster that it needs to become fully functional. In subsequent launches, the Cisco Unified CCX Editor uses the IP address to properly authenticate the user and download updated configuration information. If no IP address is supplied, or if the Cisco Unified CCX Editor is unable to connect to the cluster, the Cisco Unified CCX Editor starts up with the last known IP address and configuration.

First, a window displays the logon progress; then the Cisco Unified CCX Editor window appears.
Prerequisites for a Separate Installation

To install the Cisco Unified CCX Editor independently of a Cisco Unified CCX server, you need to install one of the following operating systems:

- Windows XP Professional
- Windows 7 32-bit Ultimate
- Windows 7 64-bit

Note: You must use Internet Explorer version 9.x or later as your web browser for the Cisco Unified CCX family of products.

Downloading the Cisco Unified CCX Editor for a Separate Installation

To download the Cisco Unified CCX Editor from the Cisco Unified CCX Administration web interface onto a computer not included in the Cisco Unified CCX cluster, do the following:

Procedure

Step 1 From the Cisco Unified CCX Administration menu bar, choose Tools > Plug-ins.

The Plug-ins web page appears.

Note: For instructions on accessing the Cisco Unified CCX Administration web interface, see the Cisco Unified Contact Center Express Administration Guide.

Step 2 Click the Cisco Unified CCX Editor hyperlink.

The Download Cisco Unified CCX Editor web page appears.

Step 3 Click Download and execute the Cisco Unified CCX Editor installer.

Depending on your browser and its configuration, either a File Download dialog box or a Save As dialog box appears.
Installing the Cisco Unified CCX Editor

To install the Cisco Unified CCX Editor on your computer, do the following:

Procedure

Step 1  In the directory where you stored the downloaded Cisco Unified CCX Editor executable file, double-click Cisco Unified CCX Editor.exe.

The default directory for Windows XP is C:\Program Files\wfavvid_1001 and for, Windows 7 is C:\Program Files (x86)\wfavvid_1001.

The InstallAnywhere Wizard appears and begins extracting files for the installation. (This process may take a few minutes.)

Step 2  At the Welcome prompt, click Next.

The Software License Agreements dialog box appears.

Step 3  Read the software license agreements, then click Yes.

The Choose Destination Location dialog box appears.

Step 4  Perform one of the following actions:

- Click Next to accept the default directory option, C:\Program Files\wfavvid_1001 for Windows XP and C:\Program Files (x86)\wfavvid_1001 for Windows 7.

  The Select Components dialog box appears.
Perform the following procedure to choose a different destination:

- Click **Browse**.
  
The Choose Folder dialog box appears.
- Browse to the desired location, and then click **OK**.
  
The Choose Folder dialog box closes, and the destination appears in the Choose Destination Location dialog box.
- Click **Next**.
  
The Select Components dialog box appears.

**Step 5** In the Select Components dialog box, make sure that Cisco Unified CCX Editor check box (the only option) is checked, and click **Next**.

The Select Program Folder dialog box appears.

**Step 6** In the Select Program Folder dialog box, accept the default location to add program icons to the program folder, or take one of the following actions:

- Type the name of the new folder.
- From the list of folders, choose the folder in which you want to store the program icons.

Click **Next**.

The Start Copying Files dialog box appears.

**Step 7** In the Start Copying Files dialog box, take one of the following actions:

- To change any of your previous choices, click **Back**, make the desired changes, and then return to the Start Copying Files dialog box and click **Finish**.
- If you accept all your choices, click **Finish**.

The InstallAnywhere Wizard closes, and the Cisco Unified CCX Editor is installed at the indicated destination.

**Step 8** Restart the system.

**Step 9** Start up Cisco Unified CCX Editor by doing the following:

a. Select **Start > Programs > Cisco Unified CCX Administration > Cisco Unified CCX Editor**.

   The Editor Login dialog box appears.
b. Enter a valid Name, Password, and Cisco Unified CCX Server ID for a Cisco Unified CCX cluster and click **Logon**.

The Name and Password value for the Cisco Unified CCX Editor is the same as your Cisco Unified CCX Administration Name and Password value.

---

**Note**

You must start the Cisco Unified CCX Editor and Logon immediately after installation, while the system where it is installed can still reach the Cisco Unified CCX cluster from which it was downloaded. This step is necessary so that you can specify the IP address of the Cisco Unified CCX Server so that the Cisco Unified CCX Editor can download additional required information from the Cisco Unified CCX cluster.

When you logon for the first time, you also must logon as a named user with a password. You should not attempt to logon anonymously for the first logon.
How To Use the Cisco Unified CCX Editor

The Cisco Unified CCX Editor (referred to in this documentation as the “Cisco Unified CCX Editor”) is a visual programming environment for creating telephony and multimedia application scripts. You can use the Cisco Unified CCX Editor on any computer that has access to the Cisco Unified CCX server.

This introduction to the Cisco Unified CCX Editor contains the following topics:

- About the Cisco Unified CCX Editor, page 2-2
- An Example Cisco Unified CCX Editor Window, page 2-2
- About the Cisco Unified CCX Editor Status Bar, page 2-5
- Menu Bar Function Descriptions, page 2-7
- Tool Bar Function Descriptions, page 2-16
- About the Cisco Unified CCX Editor Step Palettes, page 2-18
- How to Create and Customize a Cisco Unified CCX Editor Script, page 2-25
- Defining, Using, and Updating Script Variables, page 2-31
- Validating and Debugging Your Script, page 2-48
- How To Handle Basic Script Errors, page 2-53
- How and Why To Use the CRTP Protocol, page 2-56
- The Script Templates Installed with the Cisco Unified CCX Editor, page 2-63
Within the Cisco Unified CCX Editor, you can also use the Cisco Unified CCX Expression Editor to enter or modify expressions in a Cisco Unified CCX script. For instructions on how to use the Cisco Unified CCX Expression Editor, see Using Expressions and the Expression Editor.

**About the Cisco Unified CCX Editor**

The Cisco Unified CCX Editor enables you to develop a wide variety of interactive scripts.

The Cisco Unified CCX Editor simplifies script development by providing blocks of contact-processing logic in easy-to-use Java-based steps. Each step has its own unique capabilities, from simple increment to generating and playing out prompts, obtaining user input, queuing calls, or performing complex database operations.

Although the steps are written in Java, you do not need to understand Java programming to build a Cisco Unified CCX script. You can assemble a script by dragging step icons from a palette on the left pane of the workspace to the design area on the right pane of the workspace.

The Cisco Unified CCX Editor supplies the code required to connect the steps; you provide the variable definitions and other parameters. You can validate and debug the completed script directly in the Cisco Unified CCX Editor.

**Note**

- The support for Remote Monitoring feature has been ended from Unified CCX 11.0(1) release onward. While upgrading to Unified CCX 11.0, if the Remote Monitoring feature was enabled, it will not function as before after the upgrade is complete.
- If there was any custom script created earlier with the RMON steps, the script will ignore the RMON related steps and continue with the next steps of the script after the upgrade is complete.

**An Example Cisco Unified CCX Editor Window**

This section includes the following topics:

- Cisco Unified CCX Editor Window with a Sample Script, page 2-4
• About the Cisco Unified CCX Editor Status Bar, page 2-5
• Menu Bar Function Descriptions, page 2-7
• Tool Bar Function Descriptions, page 2-16

See also:
• About the Cisco Unified CCX Editor Step Palettes, page 2-18
• How to Create and Customize a Cisco Unified CCX Editor Script, page 2-25
• Defining, Using, and Updating Script Variables, page 2-31
• Validating and Debugging Your Script, page 2-48
Cisco Unified CCX Editor Window with a Sample Script

Figure 2-1  Cisco Unified CCX Editor Window
The preceding example is of a Cisco Unified CCX Editor window with an example Cisco Unified CCX script opened in it. The following table describes the four panes of the Cisco Unified CCX Editor window.

<table>
<thead>
<tr>
<th></th>
<th>Palette pane</th>
<th>Use the Palette pane to choose the steps you need to create your script.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Design pane</td>
<td>Use the Design pane to create your script.</td>
</tr>
<tr>
<td>3</td>
<td>Message pane</td>
<td>Use the Message pane to view messages when you are validating or debugging a script.</td>
</tr>
<tr>
<td>4</td>
<td>Variable pane</td>
<td>Use the Variable pane to create, modify, and view variables for your script.</td>
</tr>
</tbody>
</table>

### About the Cisco Unified CCX Editor Status Bar

Figure 2-2 is an example of the Cisco Unified CCX Editor status bar.

- **Step number**: The first section displays the step number currently selected (step/connection) out of how many steps defined in the script. Step numbers correspond to the order in which they were added to the script and as such do not increment necessarily when you scroll down the list of steps in the script.
- **Line number**: The second section displays the line number of the currently selected step or connection out of how many lines are currently displayed in the script. Expanding a step will increase the total number of lines being displayed.
- **Script status**: The third section displays the script status. The snapshot above shows nothing as the script was not modified.
# About the Cisco Unified CCX Editor Status Bar

<table>
<thead>
<tr>
<th>Script Status Image</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Image" /></td>
<td>The script has been modified and needs to be saved.</td>
</tr>
<tr>
<td><img src="image2" alt="Image" /></td>
<td>The script is being debugged.</td>
</tr>
<tr>
<td><img src="image3" alt="Image" /></td>
<td>Script debugging is temporarily paused.</td>
</tr>
</tbody>
</table>

- **Cluster status:** The fourth section displays the cluster status. The text displayed is the name of the cluster to which the Editor is connected or Unknown if the Editor was started without information about a cluster.

<table>
<thead>
<tr>
<th>Cluster Status Image</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4" alt="Image" /></td>
<td>The Editor is connected to a cluster allowing it to debug scripts.</td>
</tr>
<tr>
<td><img src="image5" alt="Image" /></td>
<td>The Editor is not connected to a cluster because all its engines are down so no debugging is possible.</td>
</tr>
<tr>
<td><img src="image6" alt="Image" /></td>
<td>The Editor was started without information about a cluster.</td>
</tr>
</tbody>
</table>

- **User name:** The fifth section displays information about the logged in user. The text displayed is the name of the user or Anonymous when the user logs into the Editor anonymously.

<table>
<thead>
<tr>
<th>User Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7" alt="Image" /></td>
<td>The Editor user is logged in by name.</td>
</tr>
<tr>
<td><img src="image8" alt="Image" /></td>
<td>The Editor user is logged in anonymously.</td>
</tr>
</tbody>
</table>
• **Available memory**: The sixth section displays a progress bar with the total available memory for the Editor and the amount of memory currently in use. This is meant as a gauge for the user to identify when the Editor will have an out-of-memory condition because either too many scripts are opened or because the script being edited is too big. The progress bar changes to red when there is about 10 MB of memory left before reaching the out-of-memory condition.

• **Button for freeing memory**: The final section is a button that can be used or not to free up memory not yet recollected by the Java VM. You do not need to use this button since the Java Virtual Memory (JVM) automatically frees up memory when it can be freed.

See also:
- Menu Bar Function Descriptions, page 2-7
- Tool Bar Function Descriptions, page 2-16

### Menu Bar Function Descriptions

This section describes how to use the menu bar options in the Cisco Unified CCX Editor window:

- The File Menu, page 2-8
- The Edit Menu, page 2-9
- The Tools Menu, page 2-10
- The Debug Menu, page 2-10
- The Window Menu, page 2-11
- The Settings Menu, page 2-11
- The Help Menu, page 2-15
The File Menu

Use File menu options to perform a variety of tasks with files.

<table>
<thead>
<tr>
<th>Table 2-1</th>
<th>File Menu Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>New</td>
<td>Opens the script template window from which you select a template and click OK. Then creates a new script based on the selected template and places a Start step and End step (and other steps, depending on the template, in the Design pane. (The Start step is the first step of every new script and the End step is the concluding step in a script.)</td>
</tr>
<tr>
<td>Open</td>
<td>Displays a standard Open window that allows you to choose and open an existing script (.aef) file. Note The default location for user scripts are: C:\ProgramFiles\wfavvid_1001\Scripts\User\Default for Windows XP and C:\ProgramFiles(x86)\wfavvid_1001\Scripts\User \Default for Windows 7. When connected to a cluster, this option allows you to browse all scripts uploaded to the cluster's script repository and load one directly from there. Use the Open option to access and modify an existing user script. Note Never use File &gt; Open to load a Cisco Unified CCX Cisco-supplied system script. Doing so will only work on servers and not remote editors and overwriting that file corrupts the installation making the script not loadable, as the system responds with a license violation if a system script is modified. The only course of action after having corrupted an installation is to use the recover option of the Cisco Unified CCX installer to get the original system script re-installed properly.</td>
</tr>
<tr>
<td>Close</td>
<td>Closes the current script file.</td>
</tr>
</tbody>
</table>
## Table 2-2: Edit Menu Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undo</td>
<td>Undoes last action.</td>
</tr>
<tr>
<td>Redo</td>
<td>Redoes last action.</td>
</tr>
<tr>
<td>Cut</td>
<td>Cuts selected items.</td>
</tr>
<tr>
<td>Copy</td>
<td>Copies selected items.</td>
</tr>
<tr>
<td>Paste</td>
<td>Pastes selected items.</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes selected items.</td>
</tr>
<tr>
<td>Find</td>
<td>Displays a window you can use to search for specific text.</td>
</tr>
<tr>
<td>Find Label</td>
<td>Displays a window you can use to search for a specific label.</td>
</tr>
<tr>
<td>Find Next</td>
<td>Searches for another occurrence of text entered in the Find window.</td>
</tr>
<tr>
<td>Expand All</td>
<td>Displays all branches in the steps in the Design pane.</td>
</tr>
</tbody>
</table>
**The Tools Menu**

The only Tools menu option is Validate.

Use the Validate menu option to check that your script sequence and your step properties usage conform to the general syntax that the Cisco Unified CCX Engine requires.

**The Debug Menu**

Use the Debug menu options to test your completed script on a local or remote Cisco Unified CCX Engine.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start/Continue</td>
<td>Runs the current script in debug mode.</td>
</tr>
<tr>
<td>Break</td>
<td>Stops the script to allow you to view or change the current values of variables and step properties before resuming execution.</td>
</tr>
<tr>
<td>End</td>
<td>Ends the current script.</td>
</tr>
<tr>
<td>Step Over</td>
<td>Executes one step.</td>
</tr>
<tr>
<td>Evaluate</td>
<td>Use the <strong>Evaluate</strong> option to evaluate an expression in the current context of execution during the debug run. You may press the <strong>Evaluate</strong> button at any time during active/reactive debugging. This will open a window similar to the Expression Editor. Specify the expression to be evaluated in the <strong>Value</strong> tab. The expression may also contain any variables used in the script. When you select the <strong>Evaluate</strong> option, the expression is evaluated using the current value for the variables as they stand, (till the current point of execution) and the result is displayed in the <strong>Result</strong> tab.</td>
</tr>
</tbody>
</table>


Table 2-4 Window Menu Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cascade</td>
<td>Displays files as stacked windows.</td>
</tr>
<tr>
<td>Tile Horizontally</td>
<td>Displays files as equal windows tiled horizontally.</td>
</tr>
<tr>
<td>Tile Vertically</td>
<td>Displays files as equal windows tiled vertically.</td>
</tr>
</tbody>
</table>

The Window Menu

Use the Window menu options to control how multiple files appear in the Design pane.

Table 2-3 Debug Menu Options (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert/Remove Breakpoint</td>
<td>Inserts a breakpoint at the currently selected step. This insertion causes the script to halt whenever it runs in debug mode, but it does not affect the run-time version of the script.</td>
</tr>
<tr>
<td>Enable/Disable Breakpoint</td>
<td>Toggles the selected breakpoint on or off.</td>
</tr>
<tr>
<td>Clear All Breakpoints</td>
<td>Removes all breakpoints from the script.</td>
</tr>
<tr>
<td>Reactive Script</td>
<td>Prompts for the name and timeout setting of the event-triggered script to be debugged.</td>
</tr>
<tr>
<td>Pending Response</td>
<td>Displays a list of all reactive scripts that have been registered but not yet started. (This allows you to see what reactive debugging requests are still pending.)</td>
</tr>
</tbody>
</table>

The Settings Menu

Use the Settings menu options to customize the Cisco Unified CCX Editor and to define expanded call-context variables.
Table 2-5  Settings Menu — Editor Options

<table>
<thead>
<tr>
<th>Editor Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>View tab Formatting Options</td>
<td>Allow you to format Cisco Unified CCX script Annotations, Labels, Names, Descriptions, and Connections according to your color choice, italics, bolding, and or underlining.</td>
</tr>
</tbody>
</table>
Table 2-5  Settings Menu — Editor Options  (continued)

<table>
<thead>
<tr>
<th>Editor Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>General options tab</td>
<td>Whenever you open a Cisco Unified CCX script created in a lower version of the Cisco Unified CCX Editor than the one currently open, the script is automatically converted to the current Cisco Unified CCX version and opens successfully. Selecting this option enables the display of a confirmation message of that conversion.</td>
</tr>
<tr>
<td>Confirm conversion at Open</td>
<td></td>
</tr>
<tr>
<td>Auto-maximize frame at Open</td>
<td>Selecting this option means that the Cisco Unified CCX Editor will always open in a maximized (full) window.</td>
</tr>
<tr>
<td>Recently used file list</td>
<td>Enables you to select the number of most recently opened Editor files that you want listed in the File menu display.</td>
</tr>
<tr>
<td>Double-click to open customizers</td>
<td>Enables the display of the customizer window for any step when you double click on it. Otherwise, you need to right click on the desired step and then select the Properties option from the pop-up menu list.</td>
</tr>
</tbody>
</table>
Menu Bar Function Descriptions

Table 2-5 **Settings Menu — Editor Options (continued)**

<table>
<thead>
<tr>
<th>Editor Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Palettes</strong> tab</td>
<td>Palette selection boxes and buttons</td>
</tr>
<tr>
<td></td>
<td>Allow you to customize which steps appear in the Cisco Unified CCX Editor palettes. Beginning with CRS 4.0, the CRS Editor no longer enforces CRS licensing; instead, the Cisco CRS Engine enforces licensing at runtime. This means that you can add any step to any script regardless of what licenses you have purchased. However, if a script contains unlicensed steps, the Cisco CRS Engine will reject the script at runtime with a license violation. The Synchronize License button can let you hide steps that you have not purchased. The Synchronize License button is available to communicate with the Cisco Unified CCX cluster and automatically show or hide palette steps according to the currently installed licenses. If you request license synchronization when the Cisco Unified CCX Editor cannot access the latest license on the cluster or when the Cisco Unified CCX server is down, then the Cisco Unified CCX Editor will synchronize the licensed Cisco Unified CCX Editor palettes with the ones listed in the local license on your machine, if it exists. <strong>Note</strong> The Cisco Unified CCX editor has to synchronize the license on the user's local machine with its license on the server at least once in order for it to copy that license from the server and store it on the user's local disk.</td>
</tr>
</tbody>
</table>
### Table 2-6  Settings Menu — Expanded Call Variables

<table>
<thead>
<tr>
<th>Menu Selection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanded Call Variables</td>
<td>Enables you to define the expanded call variables used by the Get Enterprise Call Info and Set Enterprise Call Info steps.</td>
</tr>
</tbody>
</table>

**Note**  If you are using Cisco Unified IP IVR, you must define expanded call variables before using them in the Enterprise Call Info steps.

## The Help Menu

The only Help menu option is Help.

Use the Help menu option to search the contents of the Help file.
Tool Bar Function Descriptions

The Cisco Unified CCX Editor tool bar provides icons you click to choose some of the same Cisco Unified CCX Editor options that you access from the menu bar. Depending on the work you are doing in a script, some of these icons are greyed out, not allowing those specific options.

Figure 2-3 Cisco Unified CCX Editor Toolbar

Table 2-7 Cisco Unified CCX Editor Toolbar Tool Functions

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Icon" /></td>
<td>Creates a new script.</td>
</tr>
<tr>
<td><img src="image2" alt="Icon" /></td>
<td>Opens a script.</td>
</tr>
<tr>
<td><img src="image3" alt="Icon" /></td>
<td>Saves a script.</td>
</tr>
<tr>
<td><img src="image4" alt="Icon" /></td>
<td>Prints selected file.</td>
</tr>
<tr>
<td><img src="image5" alt="Icon" /></td>
<td>Cuts selected item.</td>
</tr>
<tr>
<td><img src="image6" alt="Icon" /></td>
<td>Copies selected item.</td>
</tr>
<tr>
<td><img src="image7" alt="Icon" /></td>
<td>Pastes selected item.</td>
</tr>
<tr>
<td><img src="image8" alt="Icon" /></td>
<td>Undoes previous command.</td>
</tr>
<tr>
<td><img src="image9" alt="Icon" /></td>
<td>Redoes previous command.</td>
</tr>
</tbody>
</table>

Table 2-7  
Cisco Unified CCX Editor Toolbar Tool Functions (continued)

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
</tr>
</thead>
</table>
| ![Start] | Starts running the script.  
   **Note**  
   Only use this option for scripts that do not need to be triggered by an external event, such as an inbound call or an inbound HTTP request. (This is referred to as normal debugging.) |
| ![Pause] | Pauses the debugging process. |
| ![Stop] | Stops debugging process. |
| ![Step] | Executes the next step, only.  
   **Note**  
   - This allows you to execute one step at a time during a debugging session in order to verify the results.  
   - If the next step is a CallSubflow step, the subflow invoked will run to completion and the debugging will then stop at the next step after the CallSubflow step. |
| ![Breakpoint] | Inserts/removes a breakpoint at the currently selected step. This instructs the Cisco Unified CCX Editor to stop debugging just before executing this step.  
   A hand and diamond icon displays in front of steps set with a breakpoint if the breakpoint is enabled.  
   If the breakpoint is disabled, then only a diamond icon displays.  
   If the currently selected step already has a breakpoint set, then this icon changes to a different one showing an arrow coming out indicating the breakpoint can be removed. |
About the Cisco Unified CCX Editor Step Palettes

The Palette pane of the Cisco Unified CCX Editor contains all the steps available for developing scripts. The steps are organized into general categories in a tree hierarchy.

Figure 2-4  Cisco Unified CCX Editor Palette Pane

This section contains the following topics:

- The Editor Palettes Available in Each Cisco Unified CCX Product, page 2-19
- The Steps in Each Cisco Unified CCX Editor Palette
**The Editor Palettes Available in Each Cisco Unified CCX Product**

Table 2-8 lists the Cisco Unified CCX Editor step palettes available for each license option.

Note

All the palettes listed in the following table are displayed in the Cisco Unified CCX Editor by default. However, the Cisco Unified CCX Engine enforces licensing at run time; if a script uses a step for which your system is not licensed, the Cisco Unified CCX Engine prevents the script from being loaded.

<table>
<thead>
<tr>
<th></th>
<th>Cisco Unified IP IVR</th>
<th>Cisco Unified CCX Standard</th>
<th>Cisco Unified CCX Enhanced</th>
<th>Cisco Unified CCX Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Session</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Contact</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Call Contact</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Email Contact</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>HTTP Contact</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Media²</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>User</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Prompt³</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Grammar</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
### About the Cisco Unified CCX Editor Step Palettes

Table 2-8  **Step Palette Availability with Unified CCX License Options (continued)**

<table>
<thead>
<tr>
<th>Step Palette</th>
<th>Cisco Unified IP IVR</th>
<th>Cisco Unified CCX Standard</th>
<th>Cisco Unified CCX Enhanced</th>
<th>Cisco Unified CCX Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doc</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DB</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ACD</td>
<td>X^4</td>
<td>X^5</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ICM</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Java^6</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

1. The ‘Get Reporting Statistic’ step is only available with the Cisco Unified CCX packages.
2. The ‘Voice Browser’ step is only available with the Cisco Unified IP IVR or Cisco Unified CCX Premium packages.
3. The ‘Create TTS Prompt’ step is only available with the Cisco Unified IP IVR or Cisco Unified CCX Premium packages.
4. The ‘Set Priority,’ and ‘CreateCSQSpokenNamePromptStep’ steps are not available with Cisco Unified CCX Standard.
5. The ‘Set Priority,’ and ‘CreateCSQSpokenNamePromptStep’ steps are only available with Cisco Unified CCX Enhanced or Cisco Unified CCX Premium.
6. When the step in the Java palette is enabled, the Java functionality of the expression language is also enabled.
The Steps in Each Cisco Unified CCX Editor Palette

Table 2-9 lists the steps in each Cisco Unified CCX Editor palette.

<table>
<thead>
<tr>
<th>Palette</th>
<th>Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>![Diagram of General palette steps]</td>
</tr>
<tr>
<td>Session</td>
<td>![Diagram of Session palette steps]</td>
</tr>
<tr>
<td>Contact</td>
<td>![Diagram of Contact palette steps]</td>
</tr>
<tr>
<td>Palette</td>
<td>Steps</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>Call Contact</td>
<td>Call Contact</td>
</tr>
<tr>
<td></td>
<td>Call Connect Transfer</td>
</tr>
<tr>
<td></td>
<td>Call Hold</td>
</tr>
<tr>
<td></td>
<td>Call Redirect</td>
</tr>
<tr>
<td></td>
<td>Call Unhold</td>
</tr>
<tr>
<td></td>
<td>Get Call Contact Info</td>
</tr>
<tr>
<td></td>
<td>Get Enterprise Call Info</td>
</tr>
<tr>
<td></td>
<td>Place Call</td>
</tr>
<tr>
<td></td>
<td>Set Enterprise Call Info</td>
</tr>
<tr>
<td>Email Contact</td>
<td>eMail Contact</td>
</tr>
<tr>
<td></td>
<td>Attach To eMail</td>
</tr>
<tr>
<td></td>
<td>Create eMail</td>
</tr>
<tr>
<td></td>
<td>Send eMail</td>
</tr>
<tr>
<td>HTTP Contact</td>
<td>Http Contact</td>
</tr>
<tr>
<td></td>
<td>Get Http Contact Info</td>
</tr>
<tr>
<td></td>
<td>Http Forward</td>
</tr>
<tr>
<td></td>
<td>Http Include</td>
</tr>
<tr>
<td></td>
<td>Http Redirect</td>
</tr>
<tr>
<td></td>
<td>Send Http Response</td>
</tr>
<tr>
<td></td>
<td>Set Http Contact Info</td>
</tr>
<tr>
<td>Media</td>
<td>Media</td>
</tr>
<tr>
<td></td>
<td>Explicit Confirmation</td>
</tr>
<tr>
<td></td>
<td>Extended Get Digit String</td>
</tr>
<tr>
<td></td>
<td>Extended Play Prompt</td>
</tr>
<tr>
<td></td>
<td>Get Digit String</td>
</tr>
<tr>
<td></td>
<td>Implicit Confirmation</td>
</tr>
<tr>
<td></td>
<td>Menu</td>
</tr>
<tr>
<td></td>
<td>Name To User</td>
</tr>
<tr>
<td></td>
<td>Play Prompt</td>
</tr>
<tr>
<td></td>
<td>Recording</td>
</tr>
<tr>
<td></td>
<td>Send Digit String</td>
</tr>
<tr>
<td></td>
<td>Simple Recognition</td>
</tr>
<tr>
<td></td>
<td>Voice Browser</td>
</tr>
</tbody>
</table>
### Table 2-9  The Cisco Unified CCX Editor Palettes (continued)

<table>
<thead>
<tr>
<th>Palette</th>
<th>Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Authenticate User, Get User, Get User Info, Get User Info</td>
</tr>
<tr>
<td>Prompt</td>
<td>Create Conditional Prompt, Create Container Prompt, Create Generated Prompt, Create Language Prompt, Create TTS Prompt, Upload Prompt</td>
</tr>
<tr>
<td>Grammar</td>
<td>Create Language Grammar, Create Menu Grammar, Upload Grammar</td>
</tr>
<tr>
<td>Database</td>
<td>DB Get, DB Read, DB Release, DB Write</td>
</tr>
</tbody>
</table>
Table 2-9  The Cisco Unified CCX Editor Palettes (continued)

<table>
<thead>
<tr>
<th>Palette</th>
<th>Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACD</td>
<td><img src="image1" alt="ACD Steps" /></td>
</tr>
<tr>
<td>ICM</td>
<td><img src="image2" alt="ICM Steps" /></td>
</tr>
<tr>
<td>Java</td>
<td><img src="image3" alt="Java Steps" /></td>
</tr>
</tbody>
</table>

Note: For complete descriptions of the steps in every Cisco Unified CCX Editor palette, see the *Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide*.

How To Use the Cisco Unified CCX Editor Palettes

- To display the contents of a palette:
  Click the plus sign (+) to the left of the palette icon in the Palette pane tree.
- To create your script:
  Drag the steps you want from the Palette pane and drop them, in their desired order, into the Design pane.
Each step performs a specific function and creates a portion of the underlying programming. You can customize all of the steps once you have placed them in the Design pane.

Your cursor displays the international prohibited sign until you move a step into a location that the Cisco Unified CCX Editor allows. In addition, the step or branch under which the step would be inserted is also highlighted.

Here are some tips about dragging steps:

- Before you drag a step to the Design pane, close any open customizer window(s). (If you try to drag a step to the Design pane when a customizer window is open, the Design pane does not accept the step.)
- While dragging a step, move the cursor close to any edge of the script window to scroll the script in that direction in order to drop the step in the desired location.
- While dragging a step, the collapsed steps do not immediately expand. To expand a collapsed step, move the cursor over the collapsed step for two seconds; the step or connection then expands.

**Note**
Custom steps are not supported in Cisco Unified CCX.

---

### How to Create and Customize a Cisco Unified CCX Editor Script

This section contains the following topics:

- Creating a Script, page 2-25
- Customizing a Step, page 2-28

### Creating a Script

- To begin a new script, select the blank script button in the Cisco Unified CCX Editor tool bar. The blank script template opens in the Design pane with the Start and End steps providing you with the starting and end points of your script.
• To begin a new script, click the new script button in the Cisco Unified CCX Editor tool bar. A blank script opens in the Design pane with the Start step providing you with the starting point of your script.
• To add a step to your script, drag the step icon from the Palette pane and drop it onto the step it will follow in the Design pane. Place the steps in logical order for the script you are building.
• To change the order of a step in the script, drag the individual step icon from its old location to its new location.
• To delete a step, select the step icon and press the Delete key.
• To expand the script under a step, click the plus sign to the left of the step icon.
• To contract the script under a step, click the minus sign to the left of the step icon.
How to Create and Customize a Cisco Unified CCX Editor Script

Figure 2-5 shows an example of how a script displays in the Cisco Unified CCX Editor Design pane.

**Figure 2-5  Script Example in the Design Pane**

```plaintext
Start

// THIS IS A SAMPLE SCRIPT */
Accept (--Triggering Contact--)

/* Check if we support ASR */
Get Contact Into (--Triggering Contact--)
// Initialize Prompts */

menuPrompt = Create Conditional Prompt (asr ? SP(AAAAMainMenu_ASR) : SP(AAAAMainMenu))
exitnPrompt = Create Conditional Prompt (asr ? SP(AAAEnterExtn_ASR) : SP(AAAEnterExtn))
namePrompt = Create Container Prompt Escalation (SP(AAANameDecli_ASR) || SP(AAANameDeclii_ASR) ||...) 
namePrompt = Create Conditional Prompt (asr ? namePrompt : SP(AAAANameDial))

// Play Welcome Prompt without any interruptions or barge-in being enabled. */
Play Prompt (--Triggering Contact-- , welcomePrompt)
MainMenu:

If (asr || AlwaysEnableDialByMenu) Then

prefixPrompt = Create Container Prompt Escalation (prefixPrompt + menuPrompt || menuPrompt)

/* Clear Prefix */
Set(prefixPrompt = F)
Simple Recognition (--Triggering Contact-- , prompt, SG(AAAAMainMenu))

/* We could not recognize anything or transfer anywhere */
Play Prompt (--Triggering Contact-- , prefixPrompt + SP(AAAA/Sorry))
Cell Redirect (--Triggering Contact-- to openExtn)

If (attempts < MaxRetry) Then

True

/* We are not able to transfer to the operator.
Playback the prompt and simply exit the application.
The system default treatment will kick in. */
Play Prompt (--Triggering Contact-- , prefixPrompt + DPL[1000])
Terminate (--Triggering Contact--)

False

End

Many steps have output branches under which you add steps to provide desired script logic based on the exit condition of the step.

For example, in Figure 2-5, the Place Call step shown has six output branches:

- Successful
- NoAnswer
• Busy
• Invalid
• NoResource
• Unsuccessful

Output branches often contain steps and other output branches. In Figure 2-5, the Successful output branch contains three steps below it.

At run time, each script follows a hierarchical sequence, as indicated by the vertical lines connecting steps.

In Figure 2-5:
• If the script reaches the NoAnswer or Busy output branch of the Place Call step, it will fall through to the End step.
• If the script reaches the Invalid, NoResource, or Unsuccessful branch of the Place Call step, it will fall through to the next step in the flow, which—in this example—is the Terminate step.

### Customizing a Step

You can customize all of the steps in the Cisco Unified CCX Editor by opening windows called customizer windows. A customizer window contains fields you can configure to meet the needs of your script. The configuration fields on the customizer windows are called properties.

To display the customizer window for a Cisco Unified CCX Editor step, do the following.

---

**Step 1**
In the tool bar, select the blank script button.
The Start icon and End icons appear in the Design pane.

**Step 2**
In the Editor palette, select **Contact > Accept** and drag the Accept icon from the palette into the Design pane under the Start icon.

**Step 3**
Right-click the Accept icon.
The Properties popup menu appears.
How to Create and Customize a Cisco Unified CCX Editor Script

Chapter 2      How To Use the Cisco Unified CCX Editor

How to Create and Customize a Cisco Unified CCX Editor Script

Figure 2-6        Properties Popup Menu—Menu Step

Step 4  Select Properties.

The customizer window of the Accept step appears.

Figure 2-7        Menu Customizer Window

Use the customizer window of each step to configure the properties of that step.

Customizer windows have text fields and or selection fields that you use to configure properties. They might have multiple tabs.

Each customizer window contains four buttons:

• **OK**—Applies the changes and closes the customizer window.

• **Apply**—Applies the changes without closing the customizer window.
- **Cancel**—Closes the customizer window without applying any changes.
- **Help**—Displays context-sensitive help for this step.

Customizer windows might also have additional buttons that you can use to modify and display various properties within a step.

In addition, customizer windows typically display three tabs with icons at the top left corner of the window.

<table>
<thead>
<tr>
<th>Table 2-10 Step Editor Customizer Window Tabs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tab</strong></td>
</tr>
<tr>
<td>Top Tab</td>
</tr>
<tr>
<td>Middle Tab</td>
</tr>
<tr>
<td>Bottom Tab</td>
</tr>
</tbody>
</table>

**Note**

The following are the exceptions to the previous tab convention:

- The Label step, which displays only two tabs (Label and Annotate); and the Annotate step, which displays only two tabs (Annotate and Label). This is because these steps are actually doing nothing else then providing a label or an annotation which can now be done by all other steps.

- The OnExceptionGoto and the Goto steps also display only two tabs: their properties tab and the annotate tab. They do not display a label tab because these two steps are used as branching steps.
Defining, Using, and Updating Script Variables

Any step in your script can use variables once you define them in the Variable pane of the Cisco Unified CCX Editor window. A script variables store data while a script executes and the value of the variable can change during script execution.

This section includes the following topics:

- How to Reorganize the Display of Script Variables in the Editor, page 2-32
- How To Define Local Script Variables in the Cisco Unified CCX Editor, page 2-32
- How To Map a Script Variable to a Subscript Variable, page 2-34
- Using Enterprise Expanded Call Context (ECC) Variables, page 2-35
- How To Define ECC Variables in the Cisco Unified CCX Editor, page 2-35
- The Types of Local Variables Available in the Cisco Unified CCX Editor, page 2-37
- How and Why To Export Variables, page 2-43
- How and When To Configure the Encoding and Decoding of Variable Types, page 2-44
- Using Multiple Values in a Variable, page 2-47
How to Reorganize the Display of Script Variables in the Editor

By clicking one of the headers in the Cisco Unified CCX Editor Variable pane, you can reorganize a script’s variable list display according to the header.

How To Define Local Script Variables in the Cisco Unified CCX Editor

This section describes how to define a local script variable, a variable created in a script and specific only to that script.

Note
In addition to defining local script variables, you can also define expanded call variables for use with the Enterprise Call Info steps. See How To Define ECC Variables in the Cisco Unified CCX Editor, page 2-35 for how to do this.

To define a new local script variable, click the New Variable icon at the top left corner of the Variable pane of the Cisco Unified CCX Editor window.

The New Variable dialog box appears.
After you use the New Variable dialog box to define your variables, the variables appear in the Cisco Unified CCX Script Editor Variable pane.

You can select a listed variable and use the **Modify** or **Delete** icons in the toolbar of the Variable pane to make any necessary changes.

The table below describes the fields in the New and Edit Variable dialog boxes.

### Table 2-11 New and Edit Variable Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
</table>
| Type     | (Drop-down list.) Type of variable you want to declare. This is either a friendly data type or a fully qualified Java class name (for example, java.util.ArrayList).  
  **Note** For a list of available Cisco Unified CCX variable types, see Table 2-12 |
| Name     | Name of the variable you want to declare. |
| Value    | (Expression.) Data you initially assign to a variable. The type of data you enter must match the data type you declared in the Type field.  
  Data can consist of valid expressions of the same type and can include final variables (if the variable for which the value is defined is not marked final).  
  The Cisco Unified CCX Editor evaluates initial values for variables before the first step in the script is executed. For example, an expression such as `new Date()` would be evaluated at the time the script executes and results in a data object representing the current date.  
  **Note** The same expression can be written as `D[now]` for simplicity. |
| Final    | (Checkbox.) If enabled, marks the variable as one that cannot have its value changed. Such a variable is known as a constant and can be used to define other non-final variable initial values.  
  The keyword final can also be prefixed to the data type for the same result, to make a variable final of type integer, as in the following example:  
  ```java
  final int
  ``` |
How To Map a Script Variable to a Subscript Variable

You can also map variables you define for your script to variables you define in a subflow. A subflow can use and manipulate a variable, then return the data that is stored in the variable to the primary script.

Scripts cannot share variables with other scripts, except in the case of default scripts, in which the primary script automatically transfers the values of its variables to a default script. (See Using Default Scripts, page 5-19.)

You can also map a local variable to a Web cookie, an environment variable, and HTTP header, a keyword, or a Cisco Unified CCX application parameter. See the description of the Keyword Transform Document step for how to map a variable to a keyword. See the description of the of the Set Http Contact Info step for how to map a Web cookie, and see the description of the Get Http Contact Info step for how to map an environment variable, an HTTP header, and a Cisco Unified CCX application parameter.

Note

For complete details on using variables in scripts, see the Cisco Unified CCX Scripting and Development Series: Volume 3, Expression Language Reference.
Using Enterprise Expanded Call Context (ECC) Variables

Enterprise Expanded Call Context (ECC) data fields are used by all applications in the Cisco Unified CCX Cluster. There can be as many as 200 user-defined fields defined in the Field List (index numbers 0-199) of expanded call variables. These field values do not appear in the ContactCallDetail records as there are no fields reserved for them.

The Cisco Unified CCX system, and the Cisco Finesse Desktop can pass ECC variables to each other.

Cisco Unified CCX has some pre-defined ECC variables. For a list of the Cisco Unified CCX system default ECC variables, see Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.

The Cisco Unified CCX Editor Set and Get Call Info steps are specifically designed to use enterprise call variables. For how to use ECC variables with these steps, see the individual step descriptions.

How To Define ECC Variables in the Cisco Unified CCX Editor

Note

Every Enterprise ECC variable must be separately defined on all parts of the system that sends and receives the variable data: the Cisco Unified CCX Editor in Cisco Unified CCX, and the Cisco Finesse Desktop. This procedure deals only with the Cisco Unified CCX Editor. For further information, see Designing Cisco Unified Gateway Scripts, page 18-1.

To define an ECC variable in the Cisco Unified CCX Editor, do the following.

**Step 1**

From the Cisco Unified CCX Editor menu bar, choose Settings > Expanded Call Variables.

The Expanded Call Variables window appears.
Step 2 In the toolbar, click the Add New Variable icon. The Edit Expanded Call Variable dialog box appears.

Step 3 In the Name text field, enter the ECC variable name as defined in the Cisco Unified ICME configuration (or the Cisco Finesse Administration using Cisco Unified CCX).

Note All user-defined ECC variable names should begin with "user."

Step 4 In the Type drop-down menu, choose the type of expanded call variable (scalar or array).

Step 5 In the Description text field, enter a description of the variable.

Step 6 Click OK.
The Edit Expanded Call Variable dialog box closes, and the variable name, type, and description appear under their respective columns in the Cisco Unified ICME Expanded Call Variables window (or the Cisco Finesse Administration using Cisco Unified CCX).

**Step 7** Click the dialog box’s **Close (X)** button.

The Expanded Call Variables window closes, and the ECC variable is now available to your script. It will be listed in the Enterprise Call Info step’s drop-down list as ---name---, where *name* is the value you entered in the Variable Name field.

---

**The Types of Local Variables Available in the Cisco Unified CCX Editor**

Table 2-12 describes the types of local variables available in the Cisco Unified CCX Editor.

| **Note** | This table provides brief descriptions and examples of each of the built-in variable types available to Cisco Unified CCX. For complete details on using each variable, see *Cisco Unified CCX Scripting and Development Series: Volume 3, Expression Language Reference* and the *Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide*. |
### Table 2-12  Available Cisco Unified CCX Variable Types

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| Byte          | A Byte variable represents an integer value with a value range from -128 to +127. Examples:  
  • (byte)23  
  • (byte)-45 |
| Contact       | A contact variable represents an internal contact created as a result of an external event, such as an incoming call, e-mail message or HTTP request. It can also represent an outbound contact, such as an outbound call or an outbound email. A variable of this type references the resources related to the contact and lets you indicate which contacts a step should act upon. You cannot manually enter a contact as a variable value. Contact variables result only from the Create eMail step (from the eMail palette), the Place Call step (Call Contact palette), and/or the Get Trigger Info step (Contact palette). |
| Short         | A Short variable represents an integer value with a value range of -32768 to +32767. Examples:  
  • (short)3456  
  • (short)7239 |
| User          | A User variable represents a configured Cisco Unified CallManager User. A user variable can be returned by steps such as Name To User, Get User, or Select Resource step, and is used in other steps to extract information from the variable. |
Session
A Session variable tracks contacts across the system. As the contact moves from one place to another, information can be tagged along and retrieved by a script. A Session variable can be thought of as a “shopping cart” in a web application.

You cannot manually give a Session variable a value. Session variables can only be returned from the Get Contact Info step (Contact palette) and/or the Get Session step (Session palette).

Prompt
A Prompt variable contains information about what to play to a caller when a call is passed to a Media step. It can reference audio files in the prompt repository or on disk, concatenation of multiple prompts, or more complicated types of prompts.

Examples:
- P[] or SP[]—An empty prompt. (No prompt gets played back.)
- P[AA\AAWelcome.wav]—A user-defined prompt located in the User Prompts directory.

Grammar
The Grammar variable represents different options that can be selected by a caller using a Media input step (such as the Menu step). A grammar variable can represent grammars uploaded to the grammar repository or created using some of the existing steps.

Examples:
- G[], SG[]—An empty grammar. (No value gets recognized.)
- G[grammar.grxml]—A user-defined grammar located in the User Grammars directory.

Table 2-12
Available Cisco Unified CCX Variable Types (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session</td>
<td>A Session variable tracks contacts across the system. As the contact moves from one place to another, information can be tagged along and retrieved by a script. A Session variable can be thought of as a “shopping cart” in a web application. You cannot manually give a Session variable a value. Session variables can only be returned from the Get Contact Info step (Contact palette) and/or the Get Session step (Session palette).</td>
</tr>
</tbody>
</table>
| Prompt        | A Prompt variable contains information about what to play to a caller when a call is passed to a Media step. It can reference audio files in the prompt repository or on disk, concatenation of multiple prompts, or more complicated types of prompts. Examples:
- P[] or SP[]—An empty prompt. (No prompt gets played back.)
- P[AA\AAWelcome.wav]—A user-defined prompt located in the User Prompts directory. |
| Grammar       | The Grammar variable represents different options that can be selected by a caller using a Media input step (such as the Menu step). A grammar variable can represent grammars uploaded to the grammar repository or created using some of the existing steps. Examples:
- G[], SG[]—An empty grammar. (No value gets recognized.)
- G[grammar.grxml]—A user-defined grammar located in the User Grammars directory. |
Table 2-12: Available Cisco Unified CCX Variable Types (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| Language      | A Language variable is used to localize a particular resource in the system. It can be associated with a contact to customize what prompts and grammars should be retrieved from the repository when required. Examples:  
  - L[en_US]  
  - L[fr_CA] |
| Currency      | The Currency variable is used to identify a given currency, such as the American Dollar (USD), and is useful when creating generated currency prompts that need to be tailored based on a given currency. Examples:  
  - C[USD]  
  - C[CAD] |
| Iterator      | The Iterator variable corresponds to the Java java.util.Iterator class. |
| boolean       | A Boolean variable can be either true or false, and is primarily used by the If step in the General palette of the Cisco Unified CCX Editor. |
| char          | A Character variable consists of characters, such as the letters in an alphabet. Examples:  
  - ‘a’, ‘1’, ‘Z’  
  - Any escape sequence: ‘\t’, ‘\r’, ‘\0’, ‘\n’, ‘\f’, ‘\v’, ‘\’” |
### Table 2-12  Available Cisco Unified CCX Variable Types (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| Document      | A Document variable can be any type of document, such as a file, a URL, or a recording.  

Examples:
- FILE[C:\Documents\mydoc.txt]
- URL[http://cvbuweb/mydoc.asp?number=23]
- TEXT[Some text to be stored in document] |
| float         | A Float variable consists of decimal numbers.  

Examples:
- 3.14159
- 2E-12
- -100 |
| int           | An Integer variable consists of whole numbers, from -2147483648 to 2147483647, inclusive.  

Examples:
- 234556789
- 0
- -23 |
| String        | A String variable consists of a set of Unicode characters, from “\u0000” to “\uffff” inclusive.  

Examples:
- “Hello”, “C:\WINNT\win.ini”—Supports any escape characters or Unicode characters.
- u""This is a quoted string"", u“tHello”, u“u2222\u0065”, u“C:\\WINNT\win.ini”—Supports the same escape sequences or Unicode characters described for the Character type. |
### Table 2-12: Available Cisco Unified CCX Variable Types (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| Date          | The Date variable contains date information.  
   Examples:  
   - D[now]  
   - D[12/13/52]  
   - D[Dec 13, 1952] |
| Time          | The Time variable contains time information.  
   Examples:  
   - T[now]  
   - T[3:39 AM]  
   - T[11:59:58 PM EST] |
| BigDecimal    | The BigDecimal variable consists of an arbitrary-precision integer along with a scale, where the scale is the number of digits to the right of the decimal point.  
   Examples (same as Float variable):  
   - 3.14159 DB  
   - 2E-12 DB  
   - -100 DB |
| BigInteger    | The BigInteger variable represents arbitrary-precision integers.  
   Examples (same as Integer variable):  
   - 234556789 IB  
   - 0 IB  
   - -23 IB |
Table 2-12  Available Cisco Unified CCX Variable Types (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| double        | The Double variable represents an expanded Float variable. Examples:  
  - 3.14159 D  
  - 2E-12 D  
  - -100 D |
| long          | The Long variable is an expanded Integer variable. Examples (same as Integer variable):  
  - 23456789 L  
  - 0 L  
  - -23 L |
| Customer      | Customer is organization’s customer when used with reference to Context Service data, for instance the caller's data. Here organization represents Cisco’s customer.  
  You cannot manually enter a customer as a variable value. Customer can only be obtained using 'Lookup Customers' step. |
| POD           | Instances of the POD class represent a piece of data that presents an activity between the Organization and its customer. POD is referred to as an activity in the Finesse UI. Here, the Organization represents Cisco’s customer.  
  You cannot manually enter a POD as a variable value. POD can only be obtained using the Create POD and Retrieve POD steps. |

How and Why To Export Variables

You can declare variables as parameters by checking the Parameter check box in the New or Edit Variables dialog box.
This feature allows you to set the value for a parameter in the Cisco Unified CCX Administration web interface. Because the value is initialized at configuration time for the script that uses it, you can change the value without having to edit the script in the Cisco Unified CCX Step Editor. Such a variable is called an *exported* variable.

For example, when you create an application of type “Cisco Script Application,” you can choose either a script or a default script. The system then refreshes the web page and provides a list of the parameters with their default or current values. You can modify the values in this list.

**Note**
The Cisco Unified CCX Step Editor supports all variable types as parameters.

### How and When To Configure the Encoding and Decoding of Variable Types

When the Cisco Unified CCX system receives variables from the Cisco Unified ICME Server, the variables do not have an associated type (such as Integer or Float). To use these variables in the Cisco VRU or Cisco Unified CCX scripts, the Cisco Unified CCX system first decodes them to one of the available types. When the script sends variables back to the Cisco Unified ICME Server, the Cisco Unified CCX system then encodes them into a form that is a string that the Cisco Unified ICME Server can use, depending on the type of the local Cisco Unified CCX script variable.
This type of encoding is used in all steps that support automatic conversion to and from String. Among these steps are the Get and Set EnterpriseInfo, Set, VoiceBrowser, and Keyword Transform Document steps.

The conversion also does not need to be specified by the script designer unless there are multiple choices like in the case of Date and Time. In these cases you can use the Expression Editor panel in the Step customizer window to enter the correct values. The following two examples of the expression panel are from the GetEnterpriseInfo step using the Expression Editor.

Figure 2-11 Example Expression panel without a value

![Image of expression panel without a value]

In the Expression Panel, you can either type an expression directly into the input text field, or select from a list of choices, or click the Expression Editor (…) button to open the Expression Editor and create a new expression. The following example expression panel contains user input and a list of choices.

Figure 2-12 Example Expression panel with user input

![Image of expression panel with user input]

The second drop down list that appears, provides encoding options whereas the first text box is the area where the expression value is entered.

Table 2-13 lists many of the encoding types that the Cisco Unified CCX system supports.

Note

The Input format is the data decoded from the Cisco Unified ICME Server variables to the Cisco Unified CCX script local variables. The Output format is the data encoded from the Cisco Unified CCX script local variables to the Cisco Unified ICME Server variables.
### Table 2-13  Encoding Types That Cisco Unified CCX Supports

<table>
<thead>
<tr>
<th>Encoding Type</th>
<th>Input Format</th>
<th>Example Input</th>
<th>Output Format</th>
</tr>
</thead>
</table>
| Integer—32-bit signed integer | The Cisco Unified CCX Editor supports three formats:  
• Decimal—a sequence of digits without a leading 0. Digits can range from 0 to 9.  
• Hexadecimal—in the form 0x\text{Digits}, where Digits can range from 0 to 9, a to f, and A to F.  
• Octal—in the form 0\text{Digits}, where Digits can range from 0 to 7. | Decimal:  
• 25  
• -34  
• 900  
Hexadecimal:  
• 0x1e  
• 0x8A5  
• 0x33b  
Octal:  
• 033  
• 0177 | Decimal digits from 0 to 9 with no leading 0 |
| Long—64-bit signed integer | Float—32-bit floating number                     | 3.1415927f             | Same as input                     |
| Float—32-bit floating number | [-]Digits.DigitsExponentTrailer where:  
• Digits are digits from 0 to 9.  
• Exponent is an optional exponent with a leading e or E.  
• Trailer is one of f, F, d, or D to specify a float or a double. The trailer is optional. | 6.02e23F              | Same as input                     |
| Double—64-bit floating number | Boolean                                          | True                   | Either true or false              |
| Boolean                   | To designate this non-case-sensitive type:  
• True—Use 1, t, y, true, or yes.  
• False—Use 0, f, n, false, or no. | Yes  
F  
0  
F  
0 | Same as input                     |
| String                    | Type requires no conversion.                     | Hello world            | Same as input                     |
Using Multiple Values in a Variable

You can send multiple values—or tokens—within one variable, so you can avoid using many variables at the same time. For how to do this, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.

### Table 2-13 Encoding Types That Cisco Unified CCX Supports (continued)

<table>
<thead>
<tr>
<th>Encoding Type</th>
<th>Input Format</th>
<th>Example Input</th>
<th>Output Format</th>
</tr>
</thead>
</table>
| Date          | Use the format `mm/dd/yyyy` where `mm` is the month, `dd` is the day, and `yyyy` is the year. | 10/22/1999
|               |                                              | 3/30/2000         | Same as input   |
| Time          | Use the format `Hh:Mm:Tod` where `Hh` is the hour, `Mm` is the minute, and `Tod` is am or pm. This type is not case-sensitive. | 12:20am
|               |                                              | 09:05PM           | Same as input   |
Validating and Debugging Your Script

Once you complete your script and are ready to validate it and debug it. You can debug it in two ways depending on the type of script.

This section covers the following topics:
- How to Validate Your Script, page 2-48
- How to Debug Your Script, page 2-48

How to Validate Your Script

To validate your script, once you have finished it and with the script open, in the Cisco Unified CCX Editor menu bar, select Tools > Validate:
- If all steps have been properly customized and all execution paths terminate with an End step, then you will get a Validation Ok message.
- If there are errors, they are displayed in the Cisco Unified CCX Editor message windows.

To get to the location of an error in the script, click on the error message in the Cisco Unified CCX Editor message window.

How to Debug Your Script

This section includes the following topics:
- Using BreakPoints, page 2-48
- Using Reactive and Active Debugging, page 2-49
- Using Non-Reactive Debugging, page 2-52

Using BreakPoints

When you debug a script, you can insert, delete, enable, and disable breakpoints in the script by selecting those functions from the Cisco Unified CCX Editor menu bar.
You can insert a **breakpoint** at a step to stop the debug process at that step.

You can continue the process by choosing one of the following two debug menu options from the Cisco Unified CCX Editor menu bar:

- Debug > Continue
- Debug > Step Over

When you choose **Debug > Step Over**, the debug process proceeds one step at a time, then halts. You must therefore continue to choose **Debug > Step Over**, or press the **F10** function key, until you reach the end of the script. You can also remove the breakpoint by choosing **Debug > Remove Breakpoint**.

### Using Reactive and Active Debugging

Use the Reactive Debugging procedure to debug scripts that depend on external events for their execution. For example, the Cisco Unified CCX script `aa.aef` depends on an external call event (an incoming call) to trigger its execution.

Use active debugging in the case where the script does not depend on any external events for its execution.

When a script is debugged, the execution of the script happens on the Cisco Unified CCX Engine.

You need to login to the Cisco Unified Editor for doing either type of debugging. Both the Cisco Unified Editor and the Cisco Unified Engine need to be aware of one another before beginning the debug session.

### Using Reactive Debugging

This procedure is also the only way you can debug Voice Response Unit (VRU) scripts, by registering for the script filename. When the call starts, the Cisco Unified CCX Engine runs the associated scripts normally until the system reaches the one for which you registered a reactive debugging session. The system starts debugging the script at that point.

---

**Note**

The Cisco Unified CCX Editor can save script information directly to the Script Repository. However, before the Cisco Unified CCX Engine can use a script for call processing, you must refresh the application that uses the script through the Cisco Unified CCX Administration web interface. In addition, every time you edit
Validating and Debugging Your Script

To upload and refresh a script, you must use the Cisco Unified CCX Administration Script Management web page. For more information, see the Cisco Unified Contact Center Express Administration Guide.

To debug a reactive script, do the following.

**Step 1** From the Cisco Unified CCX Editor menu bar, choose **Debug > Reactive Script**.

The Reactive Debugging Script dialog box appears.

![Reactive Debugging Script](image)

**Step 2** In the Script File Name text field, enter the expression of the script you want to debug just as you entered in the Cisco Unified CCX Administration on the Application Configuration web page, or use the drop-down menu to choose the desired script.

You can specify a script as a string (for example: “aa.aef”) or a script object for the subflow. The following is the format for specifying a Cisco Unified CCX Editor script object in the dialog box.
### Table 2-1 The Format for Specifying Script Objects in a Script

<table>
<thead>
<tr>
<th>Format for Specifying a Script</th>
<th>Of this type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCRIPT[filename.aef]</td>
<td>User script in the script repository</td>
</tr>
<tr>
<td>For example: SCRIPT[myscript.aef]</td>
<td></td>
</tr>
<tr>
<td>SSCRIPT[filename.aef]</td>
<td>System script</td>
</tr>
<tr>
<td>For example: SSCRIPT[aa.aef]</td>
<td></td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>System scripts should not be edited by a user and are not listed in the drop-down menu.</td>
</tr>
<tr>
<td>SCRIPT[FILE[drive:\directory location\filename.aef]]</td>
<td>User File script in the specified location</td>
</tr>
<tr>
<td>For example: SCRIPT[FILE[C:\Windows\aa.aef]]</td>
<td></td>
</tr>
<tr>
<td>SCRIPT[URL[<a href="http://UrlAddress/filename.aef">http://UrlAddress/filename.aef</a>]]</td>
<td>User URL script at the specified URL</td>
</tr>
<tr>
<td>For example: SCRIPT[URL[<a href="http://localhost/aa.aef">http://localhost/aa.aef</a>]]</td>
<td></td>
</tr>
</tbody>
</table>

**Step 1** From the Cisco Unified CCX Editor menu bar, choose **Debug > Reactive Script**. The Reactive Debugging Script dialog box appears.

**Step 2** In the Script File Name text field, enter the file name of the script you want to debug or use the drop-down menu to choose the desired script.
Validating and Debugging Your Script

Note
The script name must exactly match the one you supply when configuring the script in the application configuration web page or in the VRU script configuration page on the Cisco Unified CCX Administration web interface.

Step 3
In the Wait Time (Secs) text field, enter the amount of time you want the Cisco Unified CCX Engine to wait for the result of a triggering event or to wait for a Run VRU Script request to be received from Cisco Unified ICME software.

The Cisco Unified CCX Engine must be running, and the computer you are using must have a connection to the Cisco Unified CCX server.

Step 4
Click OK.

How the event is invoked depends on the type of event required. For example, for the Cisco Unified IP IVR (Interactive Voice Response) script aa.aef, the system makes a call to the required number and the script window appears in the Design pane of the Cisco Unified CCX Editor.

Step 5
Choose Debug > Continue to allow the system to continue debugging, or Debug > Step Over to debug one step at a time.

Step 6
Correct any errors flagged by the system prompt in the Cisco Unified CCX Editor.

Using Non-Reactive Debugging

You can develop scripts and debug them when connected to the Cisco Unified CCX server and once the script is working, you can upload it and create an application for using it.

Use the following procedure to debug scripts that do not require external events for their execution. This procedure is also useful for debugging script segments or subflows.

Tip
You can create a script that first uses the Place Call step to place an outbound call, and then continues the script using that outbound call. This procedure makes it easy to debug a script that is triggered by calls, without the complexity of uploading the script to the script Repository every time you want to debug and test it. All Media and Call Control steps need to use the call object that the Place Call step returns instead of the default “-- Triggering Contact --”.

How To Handle Basic Script Errors

The Cisco Unified CCX Editor allows you to provide scripts with a variety of ways to handle errors.

This section describes the two basic ways that scripts can handle errors:

- **Using the “Continue on Prompt Errors” Option**, page 2-53
- **Using Error Output Branches**, page 2-55

### Using the “Continue on Prompt Errors” Option

The Continue on Prompt Errors option allows the script to continue to execute when the script receives invalid input (for example, Invalid Audio Format or File Not Found).
This section covers the following topics:

- Enabling the "Continue On Prompt Errors" Option, page 2-54
- Script Execution When Enabling the "Continue On Prompt Errors" Option, page 2-55
- Script Execution When Disabling the "Continue On Prompt Errors" Option, page 2-55

**Enabling the "Continue On Prompt Errors" Option**

To enable this option, select “Continue on Prompt Errors” in the customizer windows of steps in the Media palette. (The figure below shows this option on the Prompt tab of the Get Digit String customizer window.)

**Figure 2-13 Continue on Prompt Errors Option—Prompt Tab of the Get Digit String Customizer Window**
Script Execution When Enabling the "Continue On Prompt Errors" Option

When enabled, the step continues with the next prompt in the list of prompts to be played back, or, if it is the last step in the list, it waits for caller input.

When you enable Continue on Prompt Errors, you instruct the script to ignore prompt errors and continue as if the playback of a particular prompt was successful.

For example, in a sequence of prompts “1 + 2 + 3:"

- If prompt #1 fails, the step continues with prompt #2.
- If prompt #3 fails, the step continues, waiting for caller input as if prompt #3 had been properly played back.

Script Execution When Disabling the "Continue On Prompt Errors" Option

When you disable Continue on Prompt Errors, the media steps generate an exception, which can then be handled in the script.

Prompt exceptions are as follows:

- PromptException
- UndefinedPromptGenerator
- TTSPromptProviderException
- UndefinedPromptException
- InvalidPromptArgumentException
- UnsupportedPromptExpression

Using Error Output Branches

Use Error output branches to provide instructions on what to do when typical errors occur.

Figure 2-14 shows error output branches under a Call Redirect step in a script.
How and Why To Use the CRTP Protocol

You can use Cisco Unified CCX repositories to store and manage documents, prompts, grammars and scripts.

To fetch data in a Cisco Unified CCX repository for a Cisco Unified CCX script or a VoiceXML document, you need to specify a Uniform Resource Identifier (URI) using the Cisco Repository Transfer Protocol (CRTP). This is a protocol used only by the Cisco Unified CCX system and allows access to the resources in the various Cisco Unified CCX repositories without having to specify on which server they physically reside.

This is a Cisco proprietary protocol, and so no "non-Cisco" user agents are expected to recognize it. If you are in a script or a VoiceXML document and you must pass a CRTP URI to a non-Cisco user agent, first convert the URI, while it is in the Cisco Unified CCX system, to its HTTP protocol equivalent. You should do the conversion immediately before (and not sooner than) the resource is needed to be fetched, as the conversion depends on the context at the time of the fetch.

A URI (Uniform Resource Identifier) is an Internet protocol element, defined by a W3 standard, consisting of a short string of characters that contain a name or address that can be used to reference a resource.

Examples of different types of URIs are:
• **URL** for specifying addresses on the web.
  For example: http://www.ietf.org/rfc/rfc2396.txt.

• **Mailto** for enabling e-mails to be sent from a Web page.
  For example: mailto:John.Doe@example.com

• **FTP** (File Transfer Protocol) for sending files over the web.
  For example: ftp://ftp.is.co.za/rfc/rfc1808.txt

• **Telnet** for remotely logging into a computer.
  For example: telnet://192.0.2.16:80/

A CRTP URI can be used in most places that an HTTP URL can be used within the Cisco Unified CCX system.

The CRTP protocol is similar to HTTP. However, in place of the Hostname and port number, the CRTP protocol contains a repository identifier and a language specifier.

### CRTP URI Protocol Syntax

The CRTP protocol references files uploaded in the Cisco Unified CCX repositories. In the syntax:

- Angle brackets indicate appropriate content to be specified in place of the syntax example word.
- Square brackets indicate an argument is optional:

The syntax for specifying the CRTP URI protocol is as follows:

```
crtp://<repository>[/<languages>]/<path>[/<params>][#<ref>]
```

where:
### Command Argument Specifications

<table>
<thead>
<tr>
<th>Command Argument</th>
<th>Specifies</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;repositor&gt;</code></td>
<td>The name of the Cisco Unified CCX repository from which you want to get a resource. The current Cisco Unified CCX repositories are of two types:</td>
</tr>
</tbody>
</table>

- **System** repositories only contain resources that are preloaded and used by the system. They cannot be modified. The system repositories are:
  - SPrompts
  - SGrammars
  - SDocuments
  - SScripts

- **User** repositories are not preloaded and can be modified by the user. The user repositories are:
  - Prompts
  - Grammars
  - Documents
  - Scripts

**Note** In CRS 4.0, you cannot access scripts with the CRTP protocol.
### Command Argument | Specifies
--- | ---
<languages > | Optional. A priority ordered list of languages, each separated by a “,” (comma).

Languages specified here have priority over the system default locale language. If no languages are specified here, then the system configured default language is used for the search.

Each accepted language is defined as a locale string composed of a 2-letter ISO 639 code representing the locale's language. For example, “en” is for English.

If you specify a language region or country after the language, then you need to add a dash (“-”) after the locale, and follow it with the 2-letter ISO 3166 code representing the locale's region or country. For example “en-US” for English in the United States.

In the CRTP specification, you must replace any underscore “_” used in a Cisco Unified CCX repository name with a dash (“-”). This is defined by the RFC 1766 standard.

Optionally, following the region specification is another dash and variant code, if there is such. For example: “en-US-NY” for New York English.

The list of languages must be prefixed with the string "lang," For example: "lang,en-US,en-GB"
<table>
<thead>
<tr>
<th>Command Argument</th>
<th>Specifies</th>
</tr>
</thead>
</table>
| `<path>`         | Any valid path to a file within a Cisco Unified CCX repository as defined in the Cisco Unified CCX Expression Editor syntax. Enter a path just like you would specify a subdirectory in a URL in HTML.  
**Note** In an HTTP URL and in a CRTP URL, a path does not include the computer disk drive.  
For example: if the file “grammar.grxml” exists in the User grammar repository under a folder named `myApp`, the CRTP URI would be as follows:  
`crtp:/grammar/myApp/grammar.grxml`  
**Note** In Cisco Unified CCX 4.0, Only the script repository does not support directories. All other repositories do support directories. |
| `<params>`       | Two optional query parameters:  
• **accept**  
  Specifies the data at the end of the path when it is other than a file.  
  Format: `[?]accept=query`  
  Where  
  ```  
  ? specifies the start of the query part of the URL.  
  query specifies a value of mime type or a comma separated mime list.  
  ```Mime (Multipurpose Internet Mail Extensions) is a standard for multi-part, multimedia (non-textual data, such as graphics and audio) electronic mail messages and World Wide Web hypertext documents on the Internet.}
How and Why To Use the CRTP Protocol

<table>
<thead>
<tr>
<th>Command Argument</th>
<th>Specifies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• index</td>
<td>Returns the grammar specified in the index of a compound grammar. The index is 0 based. A compound grammar is similar to an array of grammars indexed from 0 to n. Format: &amp;Index=x[,n] where: &amp; separates the index string from the rest of the query string preceding the ampersand. x is an index entry number. There can be more than one. n is the last index entry number. Multiple index entries are separated by commas and are used to recursively access a grammar in a compound grammar. You can dereference (access the indexed grammar in) a recursive compound grammar (a compound grammar defined within another compound grammar) by supplying multiple indexes, each separated by commas. For example: &amp;index=0,2,1</td>
</tr>
</tbody>
</table>

<ref> Optional. An anchor reference, beginning with the pound sign (#), linking to a section within a file. |

Example CRTP URI Specifications

The following are example CRTP protocol URIs:

• crtp:/Prompts/AA/Welcome
• crtp:/SPrompts/lang,en-US,fr-FR-EURO/gen/number/one.wav
• crtp:/Documents/lang,en-GB/VXML/main_menu.vxml
• crtp://SGrammars/lang,en-US-NY/AA/main_menu.tgl?accept=application/srgs+xml, text/uri-list&index=0,2,1

In the last, most complex example:

- The main_menu.tgl system grammar file is referenced in the AA directory, located by searching the language context defined by the language named “en-US-NY.”

- The grammar requested in the main_menu.tgl system grammar file is a SRGS and XML grammar or a text grammar from a URI-list of sub-grammars.

- The uri-list of sub-grammars in this case is a compound grammar that contains compound grammars.

- The requested grammar is accessed from the list of compound grammars through the index pointers, starting with #0.

- Index #0 indicates the first grammar in the compound grammar at the first level. Index #2 indicates the third grammar in the compound grammar in the second level, pointed to by index #0 in the first level. Index #1 is the second grammar in the compound grammar in the third level, pointed to by index #2 in the second level.
How To Use Cisco Unified CCX Script Templates

You can access Cisco Unified CCX script templates from both the Cisco Unified CCX server and from the Cisco.com web site. This section covers the following topics:

- The Script Templates Installed with the Cisco Unified CCX Editor, page 2-63
- Obtaining Technical Assistance, page 2-70

The Script Templates Installed with the Cisco Unified CCX Editor

Your Cisco Unified CCX system includes script templates stored as .aef files. These scripts have been built using Cisco Unified CCX Editor steps, including prerecorded prompts. You can use these scripts to create applications without performing any script development, or you can use these scripts as models for your own customized scripts.

Note

The included script templates are bundled with the Cisco Unified CCX system solely as samples, and are not supported by Cisco Systems.

This section includes the following topics:

- How do I find the script templates installed with the Cisco Unified CCX Editor?, page 2-64
- Default Script Template Descriptions, page 2-65
- How to Create Your Own Script Template, page 2-67
- How to Create Your Own Script Template Directory, page 2-68
- Where Sample Prompts for Your Scripts Are Stored, page 2-68
How do I find the script templates installed with the Cisco Unified CCX Editor?

The script templates are listed in the Cisco Unified CCX Templates window displayed when you select File > New from the Cisco Unified CCX Editor.

To access the script templates on your system:

**Step 1** Open the Cisco Unified CCX Editor. Select Start > Programs > Cisco Unified CCX Developer > Cisco Unified CCX Editor and at the prompt, log on.

**Step 2** In the Cisco Unified CCX Editor menu bar, select File > New. The Templates dialog box displays.

**Step 3** In the Templates dialog box, select the script template that you want to open in the Cisco Unified CCX Editor, and click OK.

When you have finished editing your new script, select File > Save as and save the script with the file name of your choosing. The file extension is automatically named .aef.
Default Script Template Descriptions

The following tables describe the Cisco Unified CCX script templates automatically included with your Cisco Unified CCX system.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every Cisco Unified CCX product includes every Cisco Unified CCX Editor step and all the Cisco Unified CCX script templates. However, you can only run those scripts for the product for which you are licensed.</td>
</tr>
</tbody>
</table>

### Table 2-14  Context Service Script Templates

<table>
<thead>
<tr>
<th>Script Template</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ContextService Steps Demo</td>
<td>Contains all the steps available in Context Service. Use this Script template to perform Context Service operations.</td>
</tr>
<tr>
<td>ContextService Steps ICD</td>
<td>Allows the Script to perform Context Service operations, such as Lookup Customers, Create POD, and Update POD, through ICD call.</td>
</tr>
</tbody>
</table>

### Table 2-15  General Script Template

<table>
<thead>
<tr>
<th>Script Template</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank Script</td>
<td>Contains only the Start and End tag. Use this script template to create your script if the other templates are inappropriate for your needs. Clicking the New Script button in the toolbar, opens the blank script template.</td>
</tr>
</tbody>
</table>
### Table 2-16  IP IVR Script Templates

<table>
<thead>
<tr>
<th>Script Templates</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Attendant</td>
<td>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 might simply speak the extension or the user name. Previously named “:aa.aef.”</td>
</tr>
<tr>
<td>Spoken Name Upload</td>
<td>Enables Cisco Unified CallManager users to call in, authenticate their identities, and replace their spoken names with newly recorded announcements on their telephones. Previously named “snu.aef.”</td>
</tr>
</tbody>
</table>

### Table 2-17  Queuing Script Templates

<table>
<thead>
<tr>
<th>Sample Script Templates</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Queuing</td>
<td>This basic Cisco Unified CCX script establishes a simple call queue and routes callers to a group of agents as the agents become available. Previously named “icd.aef.”</td>
</tr>
</tbody>
</table>

### Table 2-18  VRU Script Templates

<table>
<thead>
<tr>
<th>Sample Script Templates</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Queuing</td>
<td>Greets a caller and puts the call on hold while waiting for an available agent. Previously named “BasicQ.aef.”</td>
</tr>
<tr>
<td>Collect Digits</td>
<td>Acquires an account number (or other numbers) from a caller. Previously named “CollectDigits.aef.”</td>
</tr>
<tr>
<td>Visible Queuing</td>
<td>Greets a caller, provides feedback about the estimated time until the caller will be connected, and puts the call on hold while waiting for an available agent. Previously named “VisibleQ.aef.”</td>
</tr>
</tbody>
</table>
### How to Create Your Own Script Template

To create your own script template, do the following.

- **Step 1**: Open your script in the Cisco Unified CCX Editor.
- **Step 2**: From the menu bar, choose **File > Save As**.
- **Step 3**: In the Save Script As dialog box, browse to the directory where you installed the Cisco Unified CCX Editor.
- **Step 4**: From the directory list, select the **Scripts** main directory.
- **Step 5**: From the Scripts directory list, select the **Templates** subdirectory.
- **Step 6**: From the Templates subdirectory, select the directory where you want to save the file.
- **Step 7**: Click **Save**.

When you choose **File > New** again, the template dialog box includes the file you saved in the template directory. You can create a new script using the file as a script template.

---

**Table 2-19  Sample Voice Browser Script Templates**

<table>
<thead>
<tr>
<th>Sample Script Template</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outbound Voice Browser</td>
<td>Gets a phone number to call from a VoiceXML-enabled web site, places the call, and responds in various ways depending on how the call is answered or not answered. Previously named “OutboundVoiceBrowser.aef.”</td>
</tr>
<tr>
<td>Voice Browser</td>
<td>Uses ASR functionality to allow a caller to access information from VoiceXML-enabled web sites. Previously named “VoiceBrowser.aef.”</td>
</tr>
</tbody>
</table>
How to Create Your Own Script Template Directory

To create your own script template directory, do the following.

**Step 1**
Open in the Cisco Unified CCX Editor a script that you want to be in a new script template directory.

It is possible to save a user-defined template with the same name as a system-defined template. The user-defined template will take priority in such a case and be opened instead of the system-defined template.

User-defined templates are only accessible when the editor is connected to a cluster.

**Note** You must have a script file opened in order to create a new template subdirectory.

**Step 2**
From the menu bar, choose **File > Save As**.

**Step 3**
In the Save Script As dialog box, browse to the directory where you installed the Cisco Unified CCX Editor.

**Step 4**
From the directory list, select the **Scripts** main directory.

**Step 5**
From the Scripts directory list, select the **Templates** subdirectory.

**Step 6**
Click the Create New Folder button (next to the directory selection box).

**Step 7**
In the Save as dialog box, enter the folder name.

Open the new folder in the Save as dialog box to save your opened template file and click **Save**.

When you choose **File > New** again, the template dialog box includes the file you saved in the template directory. You can create a new script using the file as a script template.

Where Sample Prompts for Your Scripts Are Stored

Prior to Cisco CRS release 4.0(1), during installation, there were prompts that were installed in the prompts\User folder. These prompts were intended to be used by some of the system sample scripts (for example, aa.aef and basicQ.aef).
With Cisco CRS release 4.0(1) and after, these prompts are now installed in the prompt\system folders as System prompts.

If a system is upgraded from 3.x to 4.x, the system will migrate all of the prompts in the prompts\user folder. However, if a 3.x script is used on a 4.x system without going through the upgrade process, you must manually upload them using CRS Administration’s Prompt Management web page and ensure that they are in the appropriate location.

If a 3.x script is used on a 4.5 system, you must manually upload the script using the CRS Administration’s Prompt Management web page and ensure that it is in the appropriate location.

The Cisco Unified CCX Edition Script Web Repository

This collection of scripts are tested examples of product functionality and common business scenarios developed by Cisco experts for easy download and use by Cisco Unified CCX users.

In addition to the scripts that are already provided as examples, Cisco wants to hear from Cisco representatives in the field, partners and customers. If you have a helpful script that you use often please submit it for inclusion in the Cisco Unified CCX script repository. This repository is designed to be a dynamic resource for all Cisco Unified CCX users to take advantage of as well as to help it grow — adding to its usefulness as a resource.

This section includes the following topics:

- The Cisco Unified CCX Script Web Repository Location, page 2-69
- How do I add my favorite Cisco Unified CCX script to the Web repository?, page 2-70

The Cisco Unified CCX Script Web Repository Location

The Cisco Unified CCX script Web repository is located on Cisco.com in a .zip file at http://www.cisco.com/en/US/products/sw/custcswlps1846/products_implementation_design_guides_list.html. Before using the scripts please take time to review the Script Repository Read Me file, which describes the structure and intended use or uses of the accompanying scripts. Also, each script comes with a read me
document which provides an introduction and details regarding the script. These are important to review to be sure the script meets your specific needs before implementing it.

**Note**
The Cisco Unified CCX script repository will be updated on an as-needed basis with new scripts as they are received and approved. To receive these new scripts it will be necessary to re-download the repository. A notification will be sent to the field as the Cisco Unified CCX script repository is updated.

**How do I add my favorite Cisco Unified CCX script to the Web repository?**

If you have a script that you find particularly useful and would like to share it with the Cisco Unified CCX user community feel free to submit it for consideration to be added to the script repository. To submit a script, complete the Cisco Unified CCX Script Submission Template at the script repository web site and e-mail to Cisco Unified CCX-script-repository@external.cisco.com.

**Obtaining Technical Assistance**

Technical assistance is not available for the sample scripts. They are intended to be samples that can be easily modified to suit a particular need, as well as provide a visual "how to" for Cisco Unified CCX Application developers.

Should you require assistance in the development of your own script, there are several avenues available to you. First, you might solicit aid from the Cisco Unified CCX support mailer alias, ask-icd-ivr-support@external.cisco.com.

If the issue is with your Cisco Unified CCX system as a whole (that is: Subsystems out of service, Cisco Unified CCX installation issues, and so on) and you have a valid support contract, please open a TAC case by calling 800-553-2447. For faster assistance, please open a case on the web at http://tools.cisco.com/ServiceRequestTool/create/launch.do by clicking the "Create a new TAC Service Request" link.
Using Expressions and the Expression Editor

This chapter covers the following topics:

- How to Access the Cisco Unified CCX Expression Editor, page 3-1
- How to Use the Expression Editor, page 3-2
- About the Expression Editor Toolbar, page 3-4
- About the Expression Editor Syntax Buttons, page 3-9
- About Expression and Java Licensing, page 3-9

For an explanation of each toolbar on each Expression Editor tab, see Using Expressions and the Expression Editor, page 3-1.

How to Access the Cisco Unified CCX Expression Editor

Whenever you see this 3-dot button \[ ... \] in a Cisco Unified CCX Editor step properties window, you can click on it to open the Expression Editor to edit the value of the field to the left of the button. The following figure shows the Expression Editor button in the Set step properties window.
How to Use the Expression Editor

Use the Expression Editor to enter or modify expressions in a Cisco Unified CCX script.

This section includes the following topics:

- How To Enter Expressions in the Expression Editor, page 3-2
- About the Expression Editor Toolbar, page 3-4
- About the Expression Editor Syntax Buttons, page 3-9
- About Expression and Java Licensing, page 3-9

How To Enter Expressions in the Expression Editor

Expressions are useful if you do not know an exact value at design time and instead need to enter a formula that can be evaluated at run time.
Note: The resulting type of expression must match the expected input type or types (which you check at design time).

In the Expression Editor window, you can enter or edit an expression in the Value input text box and you can use the All Variables selection box to get quick access to a variable you have previously defined in the script to paste it into the expression.

When you choose a variable from the All Variables selection box, the variable name appears in the Value input text box.

After you enter the expression, click OK and the Expression Editor closes.
About the Expression Editor Toolbar

Below the Expression Editor Value input text box and buttons is a versatile toolbar.

Note The toolbar changes to suit the type of data or feature you select in the toolbar tabs at the bottom of the Expression Editor window.
This section includes the following topics:

- Toolbar Tabs, page 3-5
- A Pop-Up Menu, page 3-7
- Showing or Hiding the Expression Editor Toolbar, page 3-8

### Toolbar Tabs

By clicking on the appropriate tab below the toolbar, the toolbar changes to include the tools useful for editing the selected type of data indicated by the selected tab. For example, in Figure 3-2, the Character toolbar is selected and so tools appropriate for editing or entering character data are displayed.

The toolbar scripting tools (or aids) include:

- **Variables**: A selection box listing all the variables of the toolbar type selected (for example, character) currently contained in the open script.
- **Constructors**: A selection list of the public Java constructors available for creating and initializing new objects of the selected data type.
- **Methods**: A selection list of public Java methods for all the operations you can perform on the selected data type. A method has four basic parts:
  - The method name
  - The type of object the method returns
  - A list of parameters
  - The body of the method
- **Attributes**: A selection list of all the public Java attributes available for the selected data type. These are the things that differentiate one object from another in the selected data type. For example, color or size.
- **Constants** and **Keywords**: In some cases, constants and keywords for the selected data type or object are included.
- **Syntax** button. Buttons for quickly entering data of the selected type with the correct syntax. The question marks on the buttons indicate command parameters which you need to supply.
- Easy access to **Prompts**, **grammars**, **documents**, and **scripts** stored inside the Cisco Unified CCX repository.
When you click a button or select an item from a list, the Cisco Unified CCX Editor inserts the selected expression text at the cursor position in the text input field.

For example, if you are creating an expression that accesses the current time, on the Time tab, click the `now` button, and the Cisco Unified CCX Editor will insert the Java code that retrieves the current time when the script runs.

**Note**

The Java tab contains a selection list of the constructors, methods, attributes, and syntax buttons of the selected Java object within the open script. Therefore, the contents of this tab will vary.

The Java tab allows you to enter a class name of your own in order to have its set of constructors, methods or attributes listed in the selection boxes. This enables an easy lookup of what is available so you can paste it into the expression directly. The Java toolbar is populated with the constructors, methods or attributes of the class you enter. A selection box drop-down arrow is disabled if the class entered is invalid or does not have any constructors, methods or attributes.
A Pop-Up Menu

Right click in the Expression Editor window to access the pop-up menu. This enables you to access editing functions such as Undo, Cut, and Paste. See Figure 3-3.

The popup menu also provides two special functions:

- One allows you to parse an expression immediately in order to pinpoint errors
- The other allows you to automatically reduce the expression to a smaller and yet equivalent expression (for example $3 + 2$ would be reduced to $5$). 

Figure 3-2   Example Expression Editor Window with the Language Toolbar Selected
Showing or Hiding the Expression Editor Toolbar

To show or hide the Expression Toolbar, click on the arrow buttons on the bottom left of the Expression Editor text window. This alternately removes or displays the tabbed toolbar.

Figure 3-3  Expression Editor Window without the Toolbar but with the Pop-up Menu
About the Expression Editor Syntax Buttons

The toolbar syntax buttons indicate the different ways you can operate on a data type. This syntax is the same as the Java language syntax plus additional syntax aids for handling prompts and documents.

About Expression and Java Licensing

Beginning with Cisco CRS 4.x, expressions are validated against installed licenses to make sure that they do not violate license agreements. This validation is performed by the Cisco CRS Engine whenever a script is loaded or whenever a prompt template or grammar template is accessed and evaluated.

For script expressions containing TTS or Java features to work during runtime, you must have either a Cisco Unified IP IVR, a Cisco Unified CCX Enhanced, or a Cisco Unified CCX Premium license.

Note
In Cisco Unified CCX Standard, you can enter only simple expressions unless you also have a Java license. You automatically have a Java license with the other four Cisco Unified CCX products.

An example of a TTS feature is a TTS prompt complex literal. A Java feature is a complex expression block, a Java-like statement, method, constructor invocation expression, or a field access expression.

Any license violation will be recorded in the logs and prevent the scripts from being loaded in memory.
About Expression and Java Licensing
You can localize your Cisco Unified CCX scripts to use prompts in the language your customers use.

This chapter covers the following topics:
- Installing Language Groups, page 4-1
- When Do You Need a Language Group?, page 4-2
- Changing a Cisco Unified CCX Installed Language, page 4-4
- Language Restrictions, page 4-4
- Creating a Custom Country-Specific Language, page 4-4
- Using VXML to Implement a Language Not Available in Cisco Unified CCX, page 4-5

Installing Language Groups

When you install a Cisco Unified CCX application, you are prompted to install the language used for prompts. Since the same language can vary from place to place, you first select a language group and then the country where the language is spoken. The default language group and country is US English.
The language groups that you can install at installation time consist of a set of system prompts. These prompts are used internally by some script steps and by the Cisco Unified CCX prompt generator rules that decide how to combine prompt input to form a number (for example, a social security number or a telephone number) or to spell out a string.

However, you are not restricted to using only the languages available with Cisco Unified CCX 4.0. Prompts and rules are accessible to your Cisco Unified CCX scripts either in the language that you install or in the language that you provide in your own prompts through the Cisco Unified CCX Administration Prompt Management or by using VXML.

When Do You Need a Language Group?

The language group (also called “pack”) is needed in the following three situations:

- In only two types of steps: The Media steps and the Create Generated prompt step require a language group. The other Cisco Unified CCX script steps are not affected by the language you are running or have installed.

  The Play prompt, the Extended Play prompt, the Voice Browser step, and the Recording step, these four script features are not affected by the language group since they do not need data from the language group.

  **Note** If you are not going to use the Media steps or the Create Generated prompt step, then you do not need a language group and you can upload your own prompts into the scripts in your own language rather than installing a language group at installation time.

- For system default treatment prompts when there is an error in your script: For example, if there is a script error, the system might play in the language corresponding to the call: “We are currently experiencing system difficulties, please call back later.”

  When you configure an application in the Cisco Unified CCX Administration web page, you have the ability to configure your own script to act as a default treatment script. But if your default treatment script has an error, then the system falls back on the system default treatment script.
When Do You Need a Language Group?

Store your default treatment prompt with the name unrecov_error in the user repository under the language you wish.

---

**Note**  
*All* calls defined with that language for *all* applications will use the system error prompt you created for the system default treatment.

---

- For system retry prompts when there is a user-input error: During a retry attempt, some system prompts are played back. For example, if you entered invalid digits or are timed out, the prompt will tell you that and ask you to retry. The Cisco Unified CCX script steps get these prompts from the installed language group. If you do not have a language group installed, then the script plays the prompt in US English.

You can circumvent this behavior in an application by configuring those steps to not do the system retry but rather do a retry that you yourself create. That is one way you can customize your application to work without a language group.

For example, take the Get Digit string where you want to collect a social security number. If you configure the Get Digit string to do a retry, for example to do two attempts and after two attempts fail, when it fails, the application will prompt you with whatever prompt you create to re-enter your social security number.

To disable the default retry script, you can set the MAX retry in the script to zero. In that case, the application will ask you the question only once, and if it fails, it will go into an error right away and implement your own retry by looping back to whatever prompt you have selected.

---

**Note**  
The Name to User step is the one step that does not have the capability of circumventing the default retry behavior. That step requires a language group.
Changing a Cisco Unified CCX Installed Language

Once you have installed Cisco Unified CCX, the only way you can install another Cisco Unified CCX language available in the Cisco Unified CCX installable language packs, is to reinstall Cisco Unified CCX.

Language Restrictions

If you use VXML, you can provision additional language grammars by using the grammar management facility. This can be found at Applications > Grammar Management in the Cisco Unified CCX Applications Administration window. But:

- If you are using ASR-enabled Cisco Unified CCX scripts, you are restricted to the languages available and installed for the installed ASR vendor(s) and for which Cisco Unified CCX has localized grammars.
- If you are using TTS-enabled scripts, you are restricted to the languages available and installed for the installed TTS vendor(s).

Creating a Custom Country-Specific Language

If you want to create a custom country-specific language, at installation time, in the Language Installation window, select not only the Language Group but also the Group Default for that language. If you install a language as a Group Default, you can take advantage of that base to build your own customized language for system prompts. For example, say you speak New Zealand English, but it is not available as a selection. In that case, you would select English as the Language Group and you might select the United Kingdom as the Group Default.

If there is an error in your customized script prompt, the script falls back on the group default language. If the group default language is not installed, the script falls back on the group parent language. If that is not available, then the script falls back on US English.
Using VXML to Implement a Language Not Available in Cisco Unified CCX

MRCP (Media Resource Control Protocol) is an application-level protocol that enables client devices requiring audio/video stream processing to control media service resources like Speech Synthesizers (TTS), Speech Recognizers (ASR), Signal Generators, Signal Detectors, Fax Servers, and so on over a network.

To implement an MRCP ASR and TTS-enabled script for a language outside the set available with Cisco Unified CCX (but within the set available from an MRCP vendor) using VXML, you must do the following:

**Step 1** Install and configure the appropriate MRCP ASR and/or TTS language pack(s). See your MRCP vendor documentation for ASR/TTS language pack installation/configuration instructions.

**Step 2** If your VXML script uses prompts, then you need to record suitable G711 u-Law encoded prompts and store them on a server that is accessible to the running VXML script. Only G711 prompts are supported by MRCP.

**Note** When generating a wav file prompt specifically for Nuance, you must take into account where the prompt is to be played. If the prompt is to be played by the Nuance Speech Server, then the wav file needs a “Sphere” (SPeech HEader RESources) header. If it is to be played by the Cisco Unified CCX server, it needs a normal “RIFF” (Resource Interchange File Format) header. Nuance provides a tool to convert wav files from “RIFF” to “Sphere” header files. ScanSoft uses "RIFF" headers.

**Step 3** Provide a VXML script, referencing the recorded prompts (if used) and using any necessary built-in grammars provided by the vendor or script-writer provided grammars which are specified either in the VXML script or a location specified by the "src" attribute of the grammar element.

**Step 4** Provide localized prompts for default event handlers and system-level errors. Cisco Unified CCX does not completely implement the notion of platform-specific audio, as defined by World Wide Web Consortium (W3C), see [http://www.w3.org/](http://www.w3.org/), since system prompts are played instead. A default script is...
Using VXML to Implement a Language Not Available in Cisco Unified CCX

provided with Cisco Unified CCX which you can associate with the script's trigger to localize default event handlers (See When Do You Need a Language Group?, page 4-2).
Advanced Scripting Techniques

This chapter describes advanced techniques you can use when designing custom scripts in the Cisco Unified CCX Step Editor.

This section contains the following topics:
- Managing Contacts in Your Scripts, page 5-1
- Managing Sessions in Your Scripts, page 5-3
- Using Grammars in Your Scripts, page 5-4
- Using Prompts in your Scripts, page 5-11
- Advanced Error Handling, page 5-18
- About Script Interruption, page 5-22
- Using Different Media in your Scripts, page 5-24
- Using a Voice Browser in Your Scripts, page 5-28

Managing Contacts in Your Scripts

The key element in a Cisco Unified CCX script is a contact, which represents one form of connection with a remote customer. A contact can be a telephone call, an e-mail message, or an HTTP request.

Scripts use contacts to track connections through the system. The contact is established when the connection is made. The contact lasts until the connection is terminated, as when the script transfers or disconnects a telephone call, responds to an HTTP request, or sends an e-mail message.
The script performs actions on contacts through one or more of the following types of channels:

- CTI port
- CMT dialog channel
- HTTP control channel
- Cisco Unified ICME channel
- MRCP dialog channel
- E-mail control channel
- Cisco Unified CCX channel

You can write scripts to use generic contacts, which are independent of the contact type. This allows you to create subflows that are independent of the way in which the call has originated (without regard, for example, to whether the call originated as an inbound or outbound call).

You can configure each step that acts on contacts to accept the implicit contact (by choosing the “-- Triggering Contact --” default) or to use a variable that can hold the handle to this contact. With the Get Trigger Info step of the Contact palette, the script can receive a handle to the implicit contact and save it as a Contact variable that the script can use later in steps or subflows.

You can use also use the Set Contact Info step of the Contact palette to mark the contact as Handled, which is important for reporting purposes.

---

**Note**

If you do not use the Set Contact Info step to mark contacts as Handled, real-time and historical reports may not show that the contact was successfully handled.

Using the functionality of the concept of a contact, you can design contact-neutral scripts that can contain small logic sections that can be independent of the type of contact.

Because you can keep a handle to a contact inside the script, you can design a script that manages more than one of these contacts at the same time. A single script can now be triggered in one way, create outbound calls, and then play prompts on each call individually. This feature offers a new range of possibilities. For an example of a script that handles multiple contacts, see [Working with Multiple Contacts](#).
Managing Sessions in Your Scripts

A session provides script designers with an easy way to associate information with a customer (caller) as the call moves through the system (similar to an in-memory database or a shopping cart on the web).

The script automatically associates a call contact with a session object when the contact is received (inbound) or initiated (outbound). You can also create sessions manually, using the Get Session step of the Session palette; this feature may be useful when you want to use sessions for HTTP or e-mail contacts.

Customer information stored in a session object can persist for a specified length of time after the contact ends and be made available to a subsequent contact. This feature can save customers the need to re-enter information such as credit card account digits.

You can store any type of information in these session objects, and retrieve the information with the Set Session Info and Get Session Info steps of the Session palette.

Note
A session is maintained on a single Cisco Unified CCX server only; for example, information entered on Cisco Unified CCX Server #1 will not be available if the call arrives at or is transferred to Cisco Unified CCX Server #2.

Using Mapping Identifiers

A Cisco Unified CCX script uses one or more mapping identifiers to identify sessions. These mapping identifiers allow a script to tag a given session with customer-specific information that the script then retrieves on a subsequent call or HTTP request. You can use any kind of information that can be received by the script as a mapping identifier.

For example, suppose a caller places a call and enters information, including an account number that the system uses as a mapping identifier. If the caller places a second call relatively soon after the first call, and re-enters the account number, the script retrieves the earlier session that contains all the previously entered information.

In this case, the script re-assigns the original session object to the call to replace the one that was created when the caller placed the second call.
A session for which a mapping identifier has been added by a script will typically persist in memory for 30 minutes after the contact has ended. You can configure this value in the System Parameters section of the Cisco Unified CCX Applications Administration web interface.

Tip
If you need to lessen session impact on the memory consumption of the Cisco Unified CCX server, lessen the length of time that sessions persist in memory.

Using Session Objects

Session palette steps can be useful in many situations. Some examples:

- The script transfers a call contact back to a Cisco Unified IP IVR application, or redirects the call contact from one application to another application on the same Cisco Unified CCX server—This feature makes information about the original caller available to the script.

- You want general information to be accessible by multiple scripts independently of contacts or customers—If you create and identify a session with a hard-coded mapping identifier, all scripts can access this session and access or alter information kept there.

Note
The created session, if not associated with a contact, is subject to deletion after the system default session timeout. However, each time the Get Session step retrieves the session, the timeout is reset.

- You want to access real-time information using the real-time reporting client—This feature lets you see all sessions in the system and their associated values.

For an example that shows the use of Session palette steps, see Chapter 15, “Designing Cisco Unified CCX Scripts.” For an example that shows the use of Session palette steps, see Chapter 17, “Designing Cisco Unified CCX Scripts.”

Using Grammars in Your Scripts

This section includes the following topics:
About Grammars

In a Cisco Unified IP IVR script, you use grammars to specify a set of all possible spoken phrases and/or DTMF digits that the system can recognize and act upon during runtime.

The Cisco Unified CCX Engine uses two types of grammars:

- **System grammars**—Used internally by Cisco modules and Cisco sample scripts.

  - **Note** System grammars are provided by Cisco. Cisco makes no guarantees about the continued availability of system grammars in future releases.

- **User grammars**—Configured by the user, and manageable by the administrator by means of the Cisco Unified CCX Applications Administration web interface.

  The system retrieves grammars from the Grammar Repository, which you configure from the System Parameters configuration web page of the Cisco Unified CCX Administration web interface.

  The Cisco Unified CCX Script Editor contains a Grammar palette with the following three steps:

  - **Create Language Grammar step**—Chooses a set of grammars based on the language context of the call.
  - **Create Menu Grammar step**—Creates spoken word and/or DTMF menus.
• Upload Grammar step—Stores grammars in the Grammar repository, where they are made accessible to all Cisco Unified CCX servers in the cluster.

For more information on using these steps, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.

Grammar Search Algorithm

The script locates grammars by means of a standard language search algorithm based on the language context of the call.

For example, assuming a language context of \{L[fr_FR_Judy], L[en_GB]\}, a search will return the first grammar defined for the following directories:

• ...\fr_FR_Judy
• ...\fr_FR
• ...\fr
• ...\en_GB
• ...\en
• ...\default

This type of algorithm allows you to place grammars that are common to all languages in the “default” directory, or grammars that are common to all French languages in the “fr” directory. You can override these common grammars by placing a grammar with the same filename under a different directory, such as “fr_FR”.

Cisco Unified CCX supports the following file extensions:

• .grxml—for MRCP grammars

Note: The Nuance Grammar language format extension, .gsl, is no longer supported.

• .digit—for digit grammars
• .jrx—for regex grammars used by the DTMF voice browser only
• .tgl—for template grammars
For more information on grammars algorithms and files, see the *Cisco Unified Contact Center Express Scripting and Development Series: Volume 3, Expression Language Reference Guide*.

If you do not provide an extension, the script locates the grammar file based on the media type of the call when referenced as a user grammar in a Cisco Unified CCX script:

- All the supported extensions listed above.
- The type of media supported by the call; if MRCP ASR is supported, the search starts with .grxml. Otherwise, the search starts with .digit.

### File Grammar Formats

Cisco Unified CCX supports the following file grammar formats:

- **The SRGS File Grammar Format**, page 5-7
- **The Digit File Grammar Format**, page 5-7

Cisco Unified CCX no longer supports **The GSL File Grammar Format** (deprecated), page 5-8

### The SRGS File Grammar Format

For an example of SRGS grammar format, see “Using the SRGS Grammar Format” in the *Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide*.

### The Digit File Grammar Format

The Digit file grammar format (".digit") is based on Java Properties File, in which a key is defined as “dtmf-x”, where “x” is from the set “0123456789*#ABCD” and its value is the corresponding tag to be returned when a key is pressed or recognized.

You can use an optional entry defined as “word=true” to specify that the word representation of each DTMF digit should be automatically included during a recognition; for example:
For an example of Digit File grammar format, see “Using the Digit File Grammar Format” in the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.

The GSL File Grammar Format (deprecated)

The GSL file grammar format (".gsl") supports full Nuance Grammar Specification Language format.

You must define the grammar with a single main rule (prefixed with ".").

You must have a slot named “tag” if you use the grammar as a main grammar in a recognition; for example:

```plaintext
.Main [   hi  {<tag hi>}   dtmf-star {<tag bye>}   dtmf-4 {<tag 4>}   joy {<tag lg>} ]
```

Automatic Conversion

The script uses grammars independently from the following types of supported media:

- Cisco Media Termination (CMT)—DTMF digits
- Automatic Speech Recognition (ASR)—Speech

The script automatically converts grammars from one type to the other, based on the media type of the call.

If the call uses a CMT Dialog channel and you have specified a SRGS (.grxml) grammar, the script automatically analyzes the grammar and extracts all defined digits to create a corresponding digit grammar.
If the call uses an ASR Dialog channel and you have specified a digit grammar, the script automatically converts the grammar to a corresponding SRGS (.grxml) grammar. If the grammar is marked with “word=true”, the script includes the spoken representation of the digit, in the current language of the call, in the SRGS grammar.

**Passing Grammars to Steps**

You can pass grammars to the following steps in a script:

- Simple Recognition step—Use the Simple Recognition step customizer window to specify all tags in the grammar. A tag is a grammar element.
- Explicit Confirmation step—Use the Explicit Confirmation step customizer window to associate the tags with the value “yes” to represent a successful confirmation, or “no” for a negative confirmation.

**Note** Tags for grammars are case-sensitive.

**Grammar Template**

Cisco Unified CCX 4.0 and after adds support for a new type of grammar file to the user and system grammars already available. This file has the filename extension .tgl and can be referenced in a script just like other grammar files.

In addition, not related to the expression, Cisco Unified CCX 4.0 and after adds support for one new grammar file extension: .grxml. Files ending with this extension are expected to be text files written as SRGS (Speech Recognition Grammar Specification) grammars. Effective with Cisco Unified CCX 3.0, when referencing a user or system prompt, the extension of the file was optional and a search among valid extensions was performed to locate a file in the grammar repository. Effective with Cisco Unified CCX 4.0, the search order is: .grxml, .gsl, .digit and .tgl.
When a user or system grammar with the .tgl extension is located, it is loaded as a text file and parsed, and the result is a grammar object. The expression specified in the text file does not have access to script variables. However, if defined using a complex block expression, the block can be parameterized like a method declaration, allowing for scripts to customize the evaluation of the expression. This is similar in concept to the prompt template file described in About Prompt Templates, page 5-14.

Compound Grammar

A compound grammar combines multiple grammars together. All grammars combined together are activated at the same time when a recognition or an acquisition is performed. Priority is always given to the grammar that comes to the right of another. So if an additional grammar is combined with a first one and it defines the same choices, it will be the one taking precedence in the recognition. Compound grammars may have some special treatment based on the media chosen. For Cisco Media Termination (CMT) media termination, all Dual Tone Multi-Frequencies (DTMFs) are combined together to form a single grammar to be used when acquiring DTMF digits from a caller.

For example, the grammar expression:

\[ G[G1] \ | \ G[G2] \ | \ GG[Hello|dtmf-2] \]


Compound Grammar Indexing

It is possible to index a compound grammar like an array in order to reference a single grammar contained in the compound grammar. This is done using the \[ \] operator as when indexing an array, whether the
compound grammar is represented with the || operator (see Compound Grammar, page 5-10) or the grammar is from the grammar repository that results in a compound grammar.

If the supplied index is out of bounds, a parse time or an evaluation time ExpressionArrayIndexOutOfBoundsException might be thrown as a result. If the grammar being indexed does not represent a compound grammar, then an ExpressionClassCastException is thrown.

Examples of compound grammar indexing expressions that all result in grammar expressions are shown in Table 5-1.

<table>
<thead>
<tr>
<th>Table 5-1</th>
<th>Compound Grammar Indexing Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 G[grammar.tgl][1]</td>
<td></td>
</tr>
<tr>
<td>2 (G[grammar1.digit]</td>
<td></td>
</tr>
<tr>
<td>3 ((DG[dtmf-1</td>
<td>word=true]</td>
</tr>
</tbody>
</table>

Using Prompts in your Scripts

This topic covers the following topics:

- About Prompts, page 5-11
- Prompt Types You Can Create, page 5-13
- The Prompt Search Algorithm, page 5-13
- About Prompt Templates, page 5-14
- How To Create or Customize a Prompt, page 5-15
About Prompts

The Cisco Unified CCX Editor uses the following two kinds of prompts:

- **System prompts**—Used internally by Cisco modules and Cisco sample scripts.

  **Note** System prompts are used internally by the system. Cisco makes no guarantees about the continued availability of any system prompt in future releases.

- **User prompts**—Defined by the user, and manageable by the administrator by means of the Prompt Management configuration web page of the Cisco Unified CCX Administration web interface.

  **Note** For complete details on creating complex prompts in scripts, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume 3, Expression Language Reference Guide.

All Media and Prompt steps support prompts specified in the following three ways:

- **String expression**—User-defined prompts located in the User Prompts directory of the Cisco Unified CCX Administration web interface.

- **Document expression**—Recorded audio streams. Document objects are returned by the Recording step (Media palette), Get User Info step (User palette), DB Get step (Database palette), the Create File Document step and Create URL Document steps of the Document palette, or any valid document expressions.

- **Prompt expression**—Dynamically created at run time.

  **Note** You must define all prompts played back and recorded with a RIFF header of type WAVE and G711 u-law format.
The script retrieves both user and system prompts from the Prompt Repository. You can manage these prompts from the Prompt Management Configuration web page of the Cisco Unified CCX Administration web interface. (For more information on configuring the Prompt Management Configuration web page, see the Cisco Unified Contact Center Express Administration Guide.)

**Prompt Types You Can Create**

You can use the steps in the Prompt palette of the Cisco Unified CCX Script Editor to create the following prompts:

- **Conditional Prompt**—Creates one of two specified prompts, based on the result of evaluating a specified Boolean expression.

- **Container Prompt**—Creates one of the three prompts:
  - **Concatenated Prompt**—Creates a prompt that combines multiple prompt phrases into one prompt.
  - **Escalating Prompt**—Creates a prompt that plays back one prompt phrase at a time, starting with the first in a series and moving to the next one on each retry within a Media step.
  - **Random Prompt**—Creates a prompt that plays back one phrase from the supplied list in a random order.

- **Generated Prompt**—Generates a prompt using generators that act on variables (currency, date, digit, string, and time).

- **Language Prompt**—Selects a prompt from the set of prompts specified based on the language context of the call at run time.

- **TTS Prompt**—Creates a prompt based on the text from a string expression or a document expression to be played back as speech, using the system default TTS provider.

---

**Note**

For scripts running with ASR, you cannot use multiple Play Prompt steps to concatenate prompts together if you expect the prompts to be interrupted by speech (that is, when barge-in is enabled), because speech cannot be buffered (like DTMF) on the first step and then used on the last step for recognition. You must prepare a grammar to be ready to perform the recognition if the prompts are interrupted by a caller barge-in.
The Prompt Search Algorithm

Similar to the way it handles grammars, the script locates prompts by means of a standard language search algorithm based on the language context of the call.

For example, assuming a language context of \{L\[fr_FR_Judy\], L\[en_GB\]\}, a search returns the first prompt defined for the following directories:

- \..\fr_FR_Judy
- \..\fr_FR
- \..\fr
- \..\en_GB
- \..\en
- \..\default

Note  If no extension is provided, the system searches for files with the following extensions: .wav, .ssml, .tts, and .tpl (in that order).

This type of algorithm allows you to place prompts that are common to all languages in the “default” directory, or place prompts that are common to all French languages in the “fr” directory. You can override these common prompts by placing a prompt with the same filename under a different directory, such as “fr_FR”.

About Prompt Templates

A prompt template is a prompt represented as an expression and evaluated at the time it is queued up for playback.

Cisco Unified CCX 4.0 and after adds support for a new type of prompt file to the user and system prompts already available. This new file has the filename extension .tpl and can be referenced in a script just like the other .wav prompt files could.
In addition, not related to the expression, Cisco Unified CCX 4.0 and after adds support for two new prompt file extensions: .tts and .ssml. Files ending with these extensions are expected to be text files containing the text to be rendered as audio using a configured TTS server.

For descriptions of the currently available prompt templates and the various ways of entering prompts in scripts, see Cisco Unified CCX Scripting and Development Series: Volume 3, Expression Language Reference.

How To Create or Customize a Prompt

Through Cisco Unified CCX Administration Media Configuration, you can create and modify the prompts that your scripts use. You can also upload spoken names for each person in the organization, so callers receive spoken names rather than spelled-out names when the automated attendant is asking the caller to confirm which party they want.

These topics describe how to customize these features:
- Recording the Welcome Prompt, page 5-15
- Configuring the Welcome Prompt, page 5-16
- Uploading a Spoken Name, page 5-18

Recording the Welcome Prompt

This section uses the Cisco AutoAttendant as an example situation where you might want to record your own prompt.

The Cisco AutoAttendant 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 the welcome prompt if the software can save the prompt in the required file format. You can record a different welcome prompt for each instance of Cisco AutoAttendant that you create.

This section describes how to record the welcome prompt by using Microsoft Sound Recorder. Save the prompt as a .wav file in CCITT (u-law) 8-kHz, 8-bit, mono format.
Mu-Law is the standard codec (compression/decompression) algorithm for pulse code modulation (PCM) from the Consultative Committee for International Telephone and Telegraph (CCITT).

You must have a microphone and speakers on your system to use the software.

**Procedure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Start the Sound Recorder software; for example, by choosing <strong>Start&gt;Programs&gt;Accessories&gt;Entertainment&gt;Sound Recorder</strong>.</td>
</tr>
<tr>
<td>2</td>
<td>Click the <strong>Record</strong> button and say your greeting into the microphone.</td>
</tr>
<tr>
<td>3</td>
<td>When you finish the greeting, click the <strong>Stop</strong> button.</td>
</tr>
</tbody>
</table>
| 4    | To check your greeting:  
|      | a. Click the **Rewind** button (also called “Seek to Start”) or drag the slider back to the beginning of the recording.  
|      | b. To play the recording, click the **Play** button. Rerecord your greeting until you are satisfied. |
| 5    | When you are satisfied with your greeting, save the recording:  
|      | a. Choose **File> Save As**.  
|      | b. To set the recording options, click **Change**. (You can also do this by choosing **Properties** from the Sound Recorder File menu). Choose these options:  
|      | • Name—Choose **[untitled]**.  
|      | • Format—Choose **CCITT u-law**.  
|      | • Attributes—Choose **8.000 kHz, 8 Bit, Mono 7 kb/sec**.  
|      | You can save these settings to reuse later by clicking **Save As** and entering a name for the format.  
|      | c. To close the Sound Selection window, click **OK**.  
|      | d. Browse to the directory where you want to save the file, enter a file name, and click **Save**. Use the .wav file extension. |
Configuring the Welcome Prompt

Cisco AutoAttendant can only use welcome prompts that are stored on the Cisco Unified CCX Engine. To configure your automated attendant to use a customized welcome prompt, you must upload it to the server and configure the appropriate Cisco AutoAttendant instance.

Tip
To start Cisco Unified CCX Administration, open http://servername/AppAdmin in your web browser, where servername is the DNS name or IP address of the application server. Click Help for detailed information on using the interface.

Procedure

Step 1
From the Cisco Unified CCX Administration main menu, choose Applications > Prompt Management.

The Prompt Management window displays.

Step 2
From the Language Directory drop-down menu, choose the specific language and directory where the prompt should be uploaded.

Step 3
To add a new prompt

a. Click the Add a new prompt hyperlink.

The Prompt File Name dialog box displays.

b. To open the Choose file dialog box, click Browse.

c. Navigate to the source .wav file folder and double-click the .wav file that you want to upload to the Cisco Unified CCX Engine.

d. Confirm your choice in the Destination File Name field by clicking in the field.

e. To upload the .wav file, click Upload.

The system displays a message that the upload was successful.

f. Click the Return to Prompt Management hyperlink.

The window refreshes, and the file displays in the Prompt Management window.
Step 4  To replace an existing prompt with a new .wav file

a. Click the arrow in the Upload column for the prompt that you want to modify. The Choose file dialog box opens.

b. Enter the name of the .wav file that you want to use to replace the existing prompt.

c. When you have provided the .wav file and prompt name information, click Upload.

Uploading a Spoken Name

By default, the Cisco AutoAttendant spells out the names of parties when it asks a caller to choose between more than one matching name or to confirm that the user wants to connect to the party. You can upload spoken names to the system, so your automated attendant plays spoken names rather than spelling them out.

To upload Cisco Spoken Names in your users’ voices, upload the corresponding .wav files into the directory by performing the following steps:

Procedure

Step 1  Ask users to record their names in the manner that is described in the Recording the Welcome Prompt, page 5-15, and to save their files as userId.wav, where userId is their user name.

Step 2  Connect to Cisco Unified CCX Administration and click Tools > User Management. The User Management window displays.

Step 3  From the menu on the left, click the Spoken Name Upload link.

The Spoken Name Prompt Upload window displays. In the User ID field, enter a unique identifier of the user for which the spoken name is to be uploaded.

Step 4  In the Codec field, the codec chosen during installation for this Cisco Unified CCX server is automatically displayed.

Step 5  In the Spoken Name (.wav) field, browse to the .wav file you wish to upload. Click it and then click Open.

Step 6  From the Spoken Name Prompt Upload page, click Upload.
Advanced Error Handling

The Cisco Unified CCX Script Editor allows you to provide scripts with two advanced ways to handle errors.

The following sections describe these two advanced error handling techniques:

- Using the On Exception Goto Step, page 5-19
- Using Default Scripts, page 5-19

Using the On Exception Goto Step

The On Exception Goto step of the General palette of the Cisco Unified CCX Editor sends the execution to a specified place in the script when an exception is generated, which allows you to provide logic in the script for handling exceptions.

Note
You must check the engine log file, present in [Cisco Unified CCX Install Directory]/log/MIVR directory, corresponding to the time of exception to recognize the specific exception that has occurred. For example: com.cisco.wf.subsystem.obj.WFInvalidStateException.

By using the On Exception Goto step for a specific exception in a script, you can register a new handler for a given exception or override a previously existing one.

The registration process is for the complete script, so it does not matter where the exception occurs (before, during, or after the given step). Once the step executes, the handler is registered until either a new one is re-registered or the exception is cleared with the On Exception Clear step of the General palette.

If an exception results in a subflow, the script first consults the exception handlers of the subflows. If none are defined for the given exception, the exception aborts the subflow and the Cisco Unified CCX Engine looks for exception handlers in the parent script and so on until either an exception handler is found or the script aborts completely.

If no exception handlers are registered, the script aborts and error handling falls back to the last level of error handling, which is the default script.
Using Default Scripts

The default script is the last level of user-defined error handling before the system kicks in and applies a default system treatment to all active contacts.

You can also configure a separate, default script when you provision a Cisco script application. The system invokes this default script under the following conditions:

- When the main script aborts, either because of an uncaught exception or because the Cisco Unified CCX server is unable to invoke the primary script because it has not been properly validated.

  Note The default script can access the exception reason for why the main script aborted. You do this by using the GetTriggerInfo step to extract the exception value into a script variable.

- When an incoming call must be aborted because the Cisco Unified CCX server has reached its limit for the number of simultaneous sessions for the application.

- When the Cisco Unified CCX Engine is currently out of available tasks to run the script for an incoming call.

In each of these scenarios, the script marks all active contacts as aborting before the default script is executed. The final state of these contacts will be ABORTED even if they are transferred or redirected as a result of the execution of the default script.

  Note Remember that the purpose of the default script is to gracefully terminate the call when the main script fails, not to have a fall back to provide the original services intended by the primary script. This distinction is important because using system resources to execute this default script may impair system performance. If the primary script fails too often, then you should fix the primary script rather than providing another script to attempt the same task.

The default script performs the following tasks:

- Redirects the call to an operator or to another extension for further processing
- Provides a customized error message to an HTTP request
• Plays back a graceful excuse to the caller for the system problems before hanging up

You can transfer the state of the primary script to the default script before the primary script starts. To do this, define variables in the default script with exactly the same name and type as the variables in the main script. The variables in the default script are then automatically populated with the last values that were held by the corresponding variables in the primary script.

By doing so, you may, for example, be able to tell how many calls were active and terminate all of them gracefully, or you may be able to gain access to information about the caller and use it in your customized message.

Just as in the primary script, you can configure the default script at provisioning time by defining variables as parameters.

For Cisco Unified ICME scripts, the default script executes if the Cisco Unified ICME script issues a request for connecting to the default treatment. The default script, however, can execute only once, so if it has already executed because of a Cisco Unified ICME connect request to a default treatment, it will not be re-executed if the default script fails.

The default script does not execute if the primary script ends normally, even if contacts are still active. In this case, it is considered to be a design problem for the primary script. In such a case, all active contacts not marked as handled abort, and all active contacts marked as handled are simply terminated.

---

**Note**

Remember that the default script provides only a final feedback to the contact regarding the system problem and does not continue the service or restart the service. You should therefore make the default script short and to the point.

---

The default treatments that the system applies if the contact is still active after the system executes the default script (if any) are:

• CallContact—Plays back the prompt, “We are currently experiencing system problems, please call back later” as an announcement, followed by a fast busy signal.

• HTTP Contact—Returns an INTERNAL SERVER ERROR (code 500).

• eMail Contact—There is no system default treatment for an e-mail contact.
About Script Interruption

Script interruption is a feature that allows external events to interrupt the current processing of a script in order to return to another part of the script or stop the execution of the script.

Script interruption is typically used in the following situations:

- The script plays in an ACD environment in which it provides features such as service-on-hold or music-on-hold to a caller waiting in a queue for the system to transfer the call to an available agent.
- The script needs to be notified that one of its contacts has been remotely terminated, as when, for example, the caller hangs up.
- You are using the Cisco Unified CCX Script Editor to debug a script and the Cisco Unified CCX Script Editor makes a request to end the debugging session in the middle of that script.

Note

In every case, any event that triggers the need to interrupt the script can occur at any time while the script executes other steps. In previous Cisco Unified CCX releases, script interruption could happen only for some of these events and only in some of the steps.

By default, scripts are automatically interruptible before any step is executed. Should any external event (such as those described above) interrupt the script, it will continue processing based on the proper handling for the particular event before it begins to execute the next step.

If you want two consecutive steps to execute without the possibility of interruption, you must move these two steps to a subflow where you can disable interruptions completely while the script processes that subflow.

Some steps contain an “interruptible” option, which allows you to indicate whether or not the script can interrupt the step from within when an external event occurs.

Note

For Media steps, the old “interruptible” option that allowed a caller to stop the playback of the prompts using either DTMF or voice, as in case of ASR calls, now called “barge-in” calls.
The following paragraphs describe in more detail the external events that can cause interruptions and the default processing associated with them:

- A contact is remotely terminated.
  
  When a caller hangs up, the script will be interrupted (if possible) and a ContactInactiveException will be generated. This exception can then be caught with the OnExceptionGoto step of the General palette and properly handled.

  If a caller hangs up and you have not provided any exception handling logic, the script immediately aborts.

  When managing multiple contacts, the OnExceptionGoto step cannot differentiate which contact was remotely terminated. Instead, it must specify a Label to which it can loop through all known contact variables and use the Get Contact Info step of the Contact palette to search for an Active flag.

- A debugging session is terminated.

  When you click the End button on the toolbar of the Cisco Unified CCX Editor, the script is interrupted and aborts without the possibility of catching or handling this case.

- A Cisco Unified CCX agent becomes available.

  This event occurs only if the script has previously executed a Select Resource step from the ACD palette. When an agent becomes available, the script is interrupted and control is returned to the Select Resource step, exiting through either the Selected or Connected branches depending on the configuration.

- A Cisco Unified ICME agent becomes available.

  The script is automatically interrupted without the possibility of catching or handling this case.

If an interrupting event happens when the script is not currently interruptible, the script is automatically interrupted whenever it becomes interruptible again. For example, although a script is not interruptible when it is running a subflow marked to disable interruptions, it will process the interruption as soon as the subflow terminates and control is returned to the parent (if that primary script is interruptible).
As another example, although a script is not interruptible while waiting for the results of a database fetch, it will process the interruption as soon as the results return and before the script executes the next step (unless the interruptible option has been disabled).

Figure 5-1 shows the Disable Interruptions option in the General tab of the Call Subflow customizer window.

**Figure 5-1 Disable Interruptions Option—Call Subflow Step (General Tab)**

This section covers the following topics:

- About Media, page 5-25
- Media-Less Calls, page 5-25
- Media Neutrality, page 5-26
- Media Steps, page 5-26
About Media

You can configure the type of media that you want to associate with each trigger. The following three media types are available:

- Cisco Media Termination (CMT)
- MRCP Automatic Speech Recognition (ASR)
- None (for calls without media)

All calls you configure to use media are counted toward the number of licensed IVR ports.

All calls you configure to use ASR are counted toward the number of licensed ASR ports.

To allow for better provisioning, you can configure more CTI ports than the number of licensed IVR ports and more ASR channels than the number of licensed ASR ports.

At run time, the system will automatically reject a call received that requires media if accepting it would exceed the number of licensed Cisco Unified IP IVR ports.

The system will also automatically reject a call that requires ASR if accepting it would exceed the number of licensed ASR ports. In this case, the system will not fall back to the secondary dialog group if an ASR channel was available in the primary dialog group.

Media-Less Calls

You use a media-less call when you expect no media interactions with the caller (interactions such as prompting, getting DTMF digits, or speech recognition).

Examples of applications that require no media are e.911 redirect and simple queuing.

Note

You can generate Music on Hold to a caller for a media-less call, because this function is not controlled by the Cisco Unified CCX Engine. This type of call uses fewer CPU resources on the Cisco Unified CCX server than other types of calls, which may allow you to increase the capacity of the Cisco Unified CCX Engine.
Media Neutrality

All Media palette steps of the Cisco Unified CCX Editor are designed to work on both types of media (DTMF and ASR), with the exception of the Voice Browser step, which can work only with ASR.

You can query the Get Contact Info step of the Contact palette to check if ASR is supported for a given call, and you can create conditional prompts to play different prompts (if required) based on the result of the query.

The system automatically converts grammars from one format to the other based on the current media type of a call.

**Note**

For scripts running with ASR, you cannot use multiple Play Prompt steps to concatenate prompts together if you expect the prompts to be interrupted by speech (that is, when barge-in is enabled), because speech cannot be buffered (like DTMF) on the first step and then used on the last step for recognition. You must prepare a grammar to be ready to perform the recognition if the prompts are interrupted by a caller barge-in.

Media Steps

The following sections describe some of the steps that take advantage of the media capabilities of the Cisco Unified CCX Editor:

- Name To User Step, page 5-27
- Recording Step, page 5-27
- Explicit Confirmation Step, page 5-27
- Implicit Confirmation Step, page 5-28
- Simple Recognition Step, page 5-28
Name To User Step

The Name To User step is a modified version of the Name To Address step in previous releases. The step now returns a User object that you can later query with the Get User Info step to retrieve the user’s extension, e-mail address, and spoken name. If you request the operator option, the Name To User step returns control through a new Operator output branch. The system can match only user names that are defined with characters from the English alphabet (unless the step is used with an ASR channel).

Recording Step

The Recording step allows you to record an audio segment from the caller and return it as a Document object that can, for example, be uploaded as a spoken name, saved to disk or to a database, or e-mailed. The system defines all recordings as Document objects with a RIFF header of type WAVE and encoded using G711 u-law format.

Explicit Confirmation Step

The Explicit Confirmation step provides a simple building block for confirming a question, and is a limited version of a Menu or Simple Recognition step. You define the Explicit Confirmation step with a default grammar that accepts the following input:
- CMT—1 for yes and 2 for no
- ASR—typical yes/no grammar in proper language
You can also override the default grammar with a user-defined grammar. See Using Grammars in Your Scripts, page 5-4 for more information on defining and using grammars.
Implicit Confirmation Step

You typically use the Implicit Confirmation step in speech-enabled applications in order to provide the caller with a way to confirm an action without having to ask a question.

The script plays back a prompt explaining the action to be taken and then waits a configured number of seconds for any input from the caller.

If the caller presses any DTMF digits or speaks before the end of the prompt or the configured timeout, the confirmation is considered to have failed.

An implicit confirmation executed over a CMT dialog channel will ignore speech; only DTMF digits pressed by the caller will fail the confirmation.

Simple Recognition Step

The Simple Recognition step is an extension to the original Menu step that allows the designer to pass any user-defined grammar to be used for matching user input.

The Simple Recognition step works over CMT. Only DTMF digits can be matched against the specified grammar.

Using a Voice Browser in Your Scripts

The Voice Browser feature allows you to design voice-enabled applications using standard VoiceXML. The Voice Browser currently supports VoiceXML 2.0 elements.

This section includes the following topics:

- Understanding VoiceXML, page 5-29
- Voice Browser Architecture, page 5-30
- Voice Browser Development Tools, page 5-32

For more information on developing voice-enabled applications, see Chapter 15, “Designing Cisco Unified CCX VoiceXML Applications.”

For more information on using the Voice Browser step in the Cisco Unified CCX Editor, see the Cisco Unified CCX Scripting and Development Series: Volume 2, Editor Step Reference.
For more information on developing voice-enabled applications, see Designing Cisco Unified CCX VoiceXML Applications.

Understanding VoiceXML

VoiceXML is designed for creating audio dialogs that feature synthesized speech, digitized audio, recognition of spoken and DTMF key input, recording of spoken input, telephony, and mixed-initiative conversations. The main goal of VoiceXML is to bring the full power of web development and content delivery to voice response applications, and to free the authors of such applications from low-level programming and resource management. VoiceXML enables integration of voice services with data services that use the familiar client-server paradigm. A voice service is viewed as a sequence of interaction dialogs between a user and an implementation platform.

Document servers, which may be external to the implementation platform, provide the dialogs. Document servers maintain overall service logic, perform database and legacy system operations, and produce dialogs. A VoiceXML document specifies each interaction dialog to be conducted by a VoiceXML interpreter. User input affects dialog interpretation and is collected into requests submitted to a document server. The document server may reply with another VoiceXML document to continue the user session with other dialogs.

VoiceXML is a markup language that performs the following tasks:

- Minimizes client/server interactions by specifying multiple interactions per document
- Shields application authors from low-level and platform-specific details
- Separates user interaction code (in VoiceXML) from service logic (CGI scripts)
- Promotes service portability across implementation platforms; VoiceXML is a common language for content providers, tool providers, and platform providers
- Provides an easy programming language to use for simple interactions, and yet provides language features to support complex dialogs

The VoiceXML language describes the human-machine interaction provided by voice response systems, which include the following:

- Output of synthesized speech (Text-To-Speech, or TTS)
• Output of audio files
• Recognition of spoken input
• Recognition of DTMF input
• Recording of spoken input
• Provision of telephony features such as call transfer and disconnect

VoiceXML provides the means for collecting character and/or spoken input, for assigning the input to document-defined request variables, and for making decisions that affect the interpretation of documents written in the language. You can use URLs to hyperlink a document to other documents.

**Voice Browser Architecture**

Voice Browser consists of the following three components:


• VoiceXML Interpreter—Processes the document. The VoiceXML interpreter executes the VoiceXML application, doing prompting and voice recognition via the Cisco Unified CCX Engine. The VoiceXML interpreter processes the input and may then branch or submit information to the document server according to the application logic.

  The Voice Browser interprets VoiceXML documents and performs the dialog with the user. The web application model is a client server model. The role of the Voice Browser is that of a web client, fetching documents from a web server.

• Implementation Platform—Detects and answers incoming calls and responds to other telephony events. It is also responsible for prompting and receiving user input. The VoiceXML interpreter controls the Cisco Unified CCX implementation platform.
Figure 5-2 shows the architecture for the Voice Browser system. See the steps below the figure for an explanation of the process that the diagram illustrates.

**Figure 5-2  Voice Browser Architecture**

The following is an example of a VoiceXML process flow:
1. The user makes a call to a phone number.
2. The Cisco Unified CCX system answers the call and invokes the VoiceXML interpreter to perform the dialog.
3. The VoiceXML interpreter makes a request “http://abc/HelpDesk.vxml”.
4. The document server receives the request. It processes, formats, and returns the document.
5. The VoiceXML interpreter interprets the document.
6. The interpreter performs prompting and voice recognition through the Cisco Unified CCX Engine.
7. Based on user input, the application continues. For example, it may loop back to Step 3 to make another request with information gathered to the document server.
Voice Browser Development Tools

You can use VoiceXML and the following tools to develop voice applications:

- Voice Browser
- Web application server
- VoiceXML development tool (optional)

The Voice Browser interprets the VoiceXML documents and executes dialogs with the user. The role of the Voice Browser is as a web client, fetching documents from a web server.

For information on configuring VoiceXML applications using the Voice Browser, see the Cisco Unified Contact Center Express Administration Guide.

For information on the Cisco implementation of VoiceXML, see Appendix B, “VoiceXML Implementation for Cisco Voice Browser.”

You can use any web application server for deploying VoiceXML applications that use Voice Browser. In addition to acting as a document repository and server, the web application server often supports server-side scripts for generating dynamic documents. Some examples are J2EE (Java 2 Platform Enterprise Edition) technologies such as servlets and JSP (Java Server Pages), .NET technologies, and Perl scripts. The web application server often provides backend integration, security and XML/XSLT presentation support.

Users already running a web server for HTML-based applications can leverage the existing infrastructure to serve voice applications. This functionality also means you can use a single model for developing HTML and voice applications.

Note

You can also use the file system or anonymous FTP server as the document server. Further, you can obtain documents, prompts and grammars from the repository by specifying a CRTP URL. See How and Why To Use the CRTP Protocol, page 2-56, for more details on using CRTP URLs.

In these cases you can deploy only static VoiceXML documents. This functionality is useful for running simple applications with minimal setup and system requirements.
The Voice Browser does not require or provide any VoiceXML editor or Integrated Development Environment (IDE). Since VoiceXML is a text-based XML document, you can use numerous authoring tools, including simple text editors, server scripting languages, and third-party VoiceXML editors.
A Script for Incrementing the Current Date

The following example script, GetFutureDate.aef, (see Figure 5-3) shows you how to increment the current date by x number of days. For example, you might want to do this to calculate a due date.

Figure 5-3  Example GetFutureDate.aef Script

```java
// GetFutureDate.aef

import java.util.Calendar;
import java.text.SimpleDateFormat;

public class GetFutureDate {
    public static void main(String[] args) {
        Calendar calendar = Calendar.getInstance();
        String today = calendar.get(Calendar.DAY_OF_YEAR) + "\t" + calendar.get(Calendar.DAY_OF_MONTH) + "\t" + calendar.get(Calendar.YEAR);

        Calendar futureDate = calendar.add(Calendar.DAY_OF_YEAR, x);
        String futureDateStr = futureDate.get(Calendar.DAY_OF_YEAR) + "\t" + futureDate.get(Calendar.DAY_OF_MONTH) + "\t" + futureDate.get(Calendar.YEAR);

        System.out.println("Today: 

        " + today + "\n
        " + futureDateStr);
    }
}
```

This script demonstrates how to increment the current date by a specified number of days. The `Calendar` class is used to retrieve and manipulate date and time information.

---

Cisco Unified Contact Center Express Getting Started with Scripts, Release 11.0(1)
A Script Example Showing Timeout or Retry Logic

You can create a Cisco Unified IP IVR script that hangs up after a certain period of inactivity.

Figure 5-4 shows how you can include timeout or retry logic in your Cisco Unified IP IVR scripts so that if the caller fails to reply after so many times or after a certain amount of time, then the script releases the call. This causes the GW port to go on hook and the Cisco Unified IP IVR port to be freed to handle another call.

Remember that if the caller is still there, then a “GOTO” back to the queue is required to stop the caller from being disconnected.

Figure 5-4  Example AreYouThere.aef Script
CHAPTER 6

The Basic Cisco Unified CCX Script

Cisco Unified Contact Center Express provides contact center solutions for automatic call distribution (ACD) and other call center requirements.

You can use the Cisco Unified CCX Editor to create any number of Cisco Unified CCX scripts that provides a way to use Cisco Unified CCX to queue telephone calls and connect them to available resources.

This chapter describes the design of such an Cisco Unified CCX script, icd.aef, which is included as a script template with the Cisco Unified CCX Editor.

This section contains the following topics:

- The Example Cisco Unified CCX Basic Script Template, page 6-2
- The Start Step (Creating a Script), page 6-2
- Script Variables for icd.aef, page 6-3
- The Accept Step, page 6-5
- The Play Prompt Step, page 6-6
- The Select Resource Step, page 6-7
- The End Step, page 6-14
The Example Cisco Unified CCX Basic Script Template

The icd.aef script template accepts a call, plays a welcoming prompt, and then either connects the caller to an available resource or queues the call until a resource becomes available. While queued, the caller periodically hears a prompt explaining that the call is still in the queue and still waiting for an available resource. When the resource becomes available, the script connects the call.

Figure 6-1 shows the icd.aef script as it appears in the Design pane of the Cisco Unified CCX Editor window.

The Start Step (Creating a Script)

Begin to build the sample script by choosing File > New from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click OK.

A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

Begin to build the sample script by choosing File > New from the Cisco Unified CCX Editor menu bar. The Cisco Unified CCX Editor places a Start step in the Design pane of the Cisco Unified CCX Editor window.
The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar.

Our example script is called icd.aef.

### Script Variables for icd.aef

Begin the icd.aef script design process by using the Variable pane of the Cisco Unified CCX Editor to define script variables.

---

**Note**

For more information about defining variables, see the “Defining, Using, and Updating Script Variables” section on page 2-31.

---

*Figure 6-2 shows the variables of the icd.aef script as they appear in the Variable pane of the Cisco Unified CCX Editor window.*

*Figure 6-2 Variable Pane of the icd.aef Script*
Table 6-1 describes the variables used in the icd.aef script.

Table 6-1 Variables in the icd.aef Script

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Parameter</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note</td>
<td></td>
<td></td>
<td></td>
<td>Select the Parameter checkbox for variables whose value the administrator will have the option to change. For more information, see the Cisco Unified Contact Center Express Administration Guide.</td>
</tr>
<tr>
<td>CSQ</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Yes</td>
<td>Stores Contact Service Queue information from which to find a resource.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(For more information, see The Select Resource Step, page 6-7.)</td>
</tr>
<tr>
<td>DelayWhileQueued</td>
<td>Integer</td>
<td>30</td>
<td>Yes</td>
<td>Stores the length of time for the delay.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(For more information, see The Delay Step, page 6-12.)</td>
</tr>
<tr>
<td>QueuePrompt</td>
<td>Prompt</td>
<td>SP[IDC:IDCQueue.wav]</td>
<td>Yes</td>
<td>Stores the user prompt that informs the caller that the call is still in queue.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(For more information, see The Play Prompt Step, page 6-11.)</td>
</tr>
<tr>
<td>SRS_TempResource SelectedVar2</td>
<td>User</td>
<td>null</td>
<td>No</td>
<td>Identifies the selected agent or resource</td>
</tr>
</tbody>
</table>
The Accept Step

Continue the icd.aef script by dragging an Accept step from the Contact palette (in the Palette pane) to the Design pane of the Cisco Unified CCX Editor window. A script uses an Accept step to accept a contact. (A contact can be a telephone call, an e-mail message, or an HTTP request. In the icd.aef script, the contact is a call.)

The default Contact is “--Triggering Contact--”, which simply means that whichever contact triggers the execution of the script is the triggering contact for this step.

For more information on configuring the Accept step, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume II, Script Reference Guide.

### Table 6-1 Variables in the icd.aef Script (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Parameter</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>WelcomePrompt</td>
<td>Prompt</td>
<td>SP[ICD\ICDWelcome.wav]</td>
<td>Yes</td>
<td>Stores the user prompt that welcomes the caller. (For more information, see The Play Prompt Step, page 6-6.)</td>
</tr>
<tr>
<td>resourceID</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>No</td>
<td>Stores the Resource ID of the chosen agent. (For more information, see The Select Resource Step, page 6-7.)</td>
</tr>
</tbody>
</table>
The Play Prompt Step

Continue the icd.aef script by dragging a Play Prompt step from the Media palette to the Design pane.

Next, configure this Play Prompt step to play a welcoming prompt to the caller.

Note When developing scripts that prompt callers, remember to accommodate the needs of hearing-impaired customers. To make your application fully accessible to these callers, set up scripts to interact with devices such as a Telecommunications Relay Service (TRS) or Telecommunications Device for the Deaf (TTY/TDD).

Figure 6-3 shows the configured Prompt tab of the Play Prompt customizer window.

Figure 6-3  Play Prompt Customizer Window—Configured Prompt Tab

Configure the Play Prompt step as follows:

- General tab:
  - Contact—Triggering Contact
    The step operates on the contact that triggers the execution of the script.
  - Interruptible—Yes
    External events can interrupt the playing of the prompt. (At this point the script has not yet queued the call, so this configuration has no effect.)
The Select Resource Step

Continue the icd.aef script by dragging a Select Resource step from the ACD palette to the Design pane.

Next, configure the Select Resource step to connect a call or to queue it to a specific set of agents configured in the Cisco Unified CCX Administration web interface.

Note
For more information on configuring agents, see the Cisco Unified Contact Center Express Administration Guide.
Figure 6-4 shows the configured Select Resource customizer window.

Configure the Select Resource customizer window as follows:

- **Contact—**Triggering Contact
  The call that triggered the contact is the one that the step connects to the resource.

- **Routing Target Type—**Contact Service Queue
  Variable indicating the routing method. One of the following:
  - **Contact Service Queue** - Call will be routed to an available agent in the specified CSQ.
  - **Resource** - Call will be routed to the specified agent. Select this option for Agent Based Routing feature.

**Note** If you set this field to Resource, the CSQ Target field is renamed to Resource Target. Resource Routing Target Type is only available for Cisco Unified CCX Enhanced Edition. If you use Resource Routing Target Type with Cisco Unified CCX Standard edition, Cisco Unified CCX Engine will be unable to load the script.
The Select Resource Step

- **CSQ Target—CSQ**
  The CSQ variable stores Contact Service Queue information from which to find a resource.

- **Connect—Yes**
  The step automatically connects the call to the available resource the instant the resource becomes available.

  **Note**
  If you choose the No option, the step chooses the resource, if available, but does not yet connect the call. You can choose this configuration if you want to add additional Cisco Unified CCX Editor steps to the Selected output branch before using a Connect step to connect the call to the resource. (If the resource is unavailable, the step queues the call.)

- **Timeout—12**
  The value 12 seconds is the length of time before the step retrieves the contact back into the queue.

- **Resource Selected—SRS_TempResourceSelectedVar2**
  The SRS_TempResourceSelectedVar2 user variable identifies the selected agent or Resource.

The Select Resource step contains two output branches, Connected and Queued:

- **Connected**—If a resource is available, the Connected output branch executes, and the Select Resource step connects the call.

- **Queued**—If a resource is not available, the Queued output branch executes, and the call is placed in a queue.

The following sections describe the two output branches of the Select Resource step:

- **The Connected Output Branch, page 6-10**
- **The Queued Output Branch, page 6-10**
The Connected Output Branch

If the Select Resource step locates an available resource, the script executes the Connected output branch, and Select Resource step connects the call to the available resource according to the configured information in the Select Resource customizer window.

The script falls through to the End step, which ends the script.

The Queued Output Branch

If the Select Resource step fails to locate an available resource, the script executes the Queued output branch.

Configure the Queued output branch of the Select Resource step to set up a loop that plays a prompt, waits for a certain length of time, and then plays the prompt again, until a resource becomes available.

When the resource does become available, the Select Resource step connects the call, and then continues to the End step, which ends the script.

The queue loop contains the following steps:

- The Label Step, page 6-10
- The Play Prompt Step, page 6-11
- The Delay Step, page 6-12
- The Goto Step, page 6-14

The Label Step

Begin to build the Queued output branch of the Select Resource step by dragging a Label step from the General palette into the Design pane and dropping it into the Queued icon under the Select Resource step.

Next, configure the Label step (which is the beginning of the loop) to provide a target for the subsequent Goto step.

Note For more information about configuring the Label step, see the Cisco Unified Contact Center Express Editor Step Reference Guide.
Figure 6-5 shows the configured Label customizer window.

Configure the Label customizer window by entering the name `queueLoop` in the Enter Label Name text field, and then clicking **OK**.

Next configure the subsequent Goto step to send the script to the Label with this name.

**The Play Prompt Step**

Continue building the Queued output branch of the Select Resource step by dragging a Play Prompt step from the Media palette in the Design pane and dropping it into the Queued icon under the Select Resource step.

Next, configure the Play Prompt step to play back a prompt informing the caller that the call is still in queue and awaiting an available resource.
Figure 6-6 shows the configured Prompt tab of the Play Prompt customizer window.

Figure 6-6   Play Prompt Customizer Window—Configured Prompt Tab

Configure this Play Prompt customizer window with the same properties as in the first Play Prompt step of the icd.aef script (see The Play Prompt Step, page 6-6), with one exception:

- Prompt tab
  - Prompt—QueuePrompt

QueuePrompt is the prompt variable that stores the .wav file that informs the caller that the call is still in queue.

Because you enable the Interruptible option, a newly available resource interrupts the Play Prompt step and the Select Resource step connects the call.

The Delay Step

Continue building the Queued output branch of the Select Resource step by dragging a Delay step from the General palette into the Design pane and dropping it into the Queued icon under the Select Resource step.

Next, configure the Delay step to set the length of time, in seconds, before the subsequent Goto step sends the call back to the beginning of the queue loop.
Configure the Delay step as follows:

- **Delay time**—*DelayWhileQueued*
  
  This variable stores the length of time for the delay.

- **Interruptible**—*Yes*
  
  An available resource interrupts the Delay step and the Select Resource step connects the call.

The caller hears nothing while the Delay step is waiting for the specified amount of time to elapse.

---

**Tip**

If the administrator has configured a Music On Hold server in Cisco Unified CallManager, you can place a Call Hold step just before the Delay step and a Call Unhold step just after the Delay step to play music to the caller while on hold. (You use the Call Unhold step to retrieve the call so that the script plays *QueuePrompt* before placing the call on hold again.) This option does not increase the CPU usage of the Cisco Unified CCX server, because the music streaming is performed by the Music On Hold server and not by the Cisco Unified CCX server. You can also replace the Delay step with a Play Prompt step that plays a prompt recorded with the same amount of music as required by the original Delay step. However, this option increases CPU usage because the Cisco Unified CCX server streams this recorded music prompt to all callers in queue.
The Goto Step

End the Queued output branch of the Select Resource step by dragging a Goto step from the General palette into the Design pane and dropping it into the Queued icon under the Select Resource step.

Next, configure the Goto step to provide the name of the Label step to which the script returns to begin the queue loop again.

Figure 6-8 shows the configured Goto customizer window.

![Figure 6-8 Configured Goto Customizer Window](image)

Configure the Goto customizer window by choosing *queueLoop* from the Select a Label drop-down menu. This variable is the name you assigned in the previous Label step to indicate the beginning of the queue loop.

The End Step

Use the End step at the end of a script to complete processing and free all allocated resources.

This step has no properties and does not require a customizer.
Designing a Basic Script

You can use the Cisco Unified CCX Editor to create a number of basic scripts. This chapter describes the steps used to create a Spoken Name Upload (SNU) script, SNU.aef, which is included as a script template with the Cisco Unified CCX Editor.

This section contains the following topics:

- An Example Basic Script, page 7-2
- The Start Step (Creating a Script), page 7-4
- SNU Script Template Variables, page 7-4
- The Accept Step, page 7-7
- The Accept Step, page 7-7
- The Play Prompt Step, page 7-8
- The Label Step (GetUser), page 7-11
- The Name To User Step, page 7-11
- The Get Digit String Step, page 7-25
- The Authenticate User Step, page 7-32
- The Recording Step, page 7-37
- The Menu Step, page 7-40
- The Closing Steps of the SNU.aef Script, page 7-47
An Example Basic Script

The SNU.aef script template allows users to record their names over the phone so that the script can play back their spoken names to prospective callers. This script contains good examples of the use of steps in the Contact, Prompt, and User palettes. It also demonstrates the use of the If and Set steps from the General palette.

Figure 7-1 shows how the SNU.aef script template appears in the Design pane of the Cisco Unified CCX Editor window.
The SNU.aef script performs the following tasks:

1. Accepts the call and plays a welcoming prompt.
2. Retrieves attributes for the triggering contact.
3. Prompts the caller to enter a name, using either Dual Tone Multi-Frequency (DTMF) digits or speech.
4. Compares the caller input to names in a directory.
5. If a match is found, prompts the caller to enter a Personal Identification Number (PIN).
6. Authenticates the user using the PIN.
7. Records the name of the caller.
8. Allows the caller to confirm the recording, or to try again.
9. Plays a final prompt to say good-bye to the caller, and then terminates the call.

---

**Note**
In designing scripts, remember that any step that requires caller input can fail to receive an acceptable response, which is why even a simple script often requires a number of steps and output branches to handle errors and failures.

---

**The Start Step (Creating a Script)**

Begin to build the sample script by choosing **File > New** from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click **OK**.

A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar.

Our example script is called snu.aef.

**SNU Script Template Variables**

Begin the SNU.aef script design process by using the Variable pane of the Cisco Unified CCX Editor to define script variables.
For more information about defining variables, see the “Defining, Using, and Updating Script Variables” section on page 2-31.

Figure 7-2 shows the variables of the SNU.aef script template as they appear in the Variable pane of the Cisco Unified CCX Editor window.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Value</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>currentRecording</td>
<td>Document</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>finalPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>firstName</td>
<td>String</td>
<td>&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>fullName</td>
<td>String</td>
<td>&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>instructPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>language</td>
<td>Language</td>
<td>[en_US]</td>
<td></td>
</tr>
<tr>
<td>lastName</td>
<td>String</td>
<td>&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>namePrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>pin</td>
<td>String</td>
<td>&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>pound</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>recording</td>
<td>Document</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>spelledPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>triesAuthentication</td>
<td>int</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>triesGetDigit</td>
<td>int</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>triesMaxAuthentication</td>
<td>int</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>triesMaxGetDigit</td>
<td>int</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>triesMaxRecord</td>
<td>int</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>triesRecord</td>
<td>int</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>telPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>user</td>
<td>User</td>
<td>null</td>
<td></td>
</tr>
</tbody>
</table>
Table 7-1 describes the variables used in the SNU.aef script template.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>currentRecording</td>
<td>Document</td>
<td>null</td>
<td>Stores a recorded name. (See The Get User Info Step, page 7-16.)</td>
</tr>
<tr>
<td>finalPrompt</td>
<td>Prompt</td>
<td>—</td>
<td>Prompt played back to the caller at the conclusion of the call. The value is dynamically assigned by various steps in the script. (See The Timeout Output Branch, page 7-24, and The Unsuccessful Output Branch, page 7-31.)</td>
</tr>
<tr>
<td>fullName</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the full name of the user. Used by the Create Generated Prompt step. (See The If Step, page 7-17.)</td>
</tr>
<tr>
<td>pin</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores PIN digits entered by the user in the Get Digit String step. Used by the Authenticate User step to authenticate user. (See The Get Digit String Step, page 7-25 and The Authenticate User Step, page 7-32.)</td>
</tr>
<tr>
<td>recording</td>
<td>Document</td>
<td>null</td>
<td>Stores the audio file recorded by the caller. (See The Recording Step, page 7-37.)</td>
</tr>
<tr>
<td>spelledPrompt</td>
<td>Prompt</td>
<td>—</td>
<td>Stores the name of the user, as created by the Create Container Prompt step. (See The If Step, page 7-17 and The Get Digit String Step, page 7-25.)</td>
</tr>
<tr>
<td>triesAuthentication</td>
<td>Integer</td>
<td>0</td>
<td>Stores the number of times authentication has been attempted. (See The Unsuccessful Output Branch, page 7-35.)</td>
</tr>
</tbody>
</table>
Table 7-1 Variable Descriptions (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>triesGetDigit</td>
<td>Integer</td>
<td>0</td>
<td>Stores the number of times the script has attempted to get PIN digits.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The True Output Branch, page 7-30.)</td>
</tr>
<tr>
<td>triesMaxAuthentication</td>
<td>Integer</td>
<td>3</td>
<td>Stores the maximum number of attempts the script will make to authenticate the caller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The Unsuccessful Output Branch, page 7-35.)</td>
</tr>
<tr>
<td>triesMaxGetDigit</td>
<td>Integer</td>
<td>3</td>
<td>Stores the maximum number of retries the script attempts to get PIN digits.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The True Output Branch, page 7-30.)</td>
</tr>
<tr>
<td>triesMaxRecord</td>
<td>Integer</td>
<td>3</td>
<td>Stores the maximum number of attempts the script will make to record the name of the caller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The Key 2 Output Branch, page 7-44.)</td>
</tr>
<tr>
<td>triesRecord</td>
<td>Integer</td>
<td>0</td>
<td>Stores the number of times that recording has been attempted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The Key 2 Output Branch, page 7-44.)</td>
</tr>
<tr>
<td>user</td>
<td>User</td>
<td>null</td>
<td>Stores the values associated with this particular user. First assigned a value by the Name To User step, and used by various other steps.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The Name To User Step, page 7-11, and The Authenticate User Step, page 7-32.)</td>
</tr>
</tbody>
</table>

The Accept Step

Continue the SNU.aef script by dragging an Accept step from the Contact palette into the Design pane of the Cisco Unified CCX Editor window.
A script uses an Accept step to accept a contact. (A contact can be a telephone call, an e-mail message, or an HTTP request. In the SNU.aef script, the contact is a call.)

Figure 7-3 shows the customizer window for the Accept step.

To use the Accept customizer window to configure the Accept step, select a Contact from the drop-down list and click **OK**.

The Accept customizer window closes, and the name of the Contact variable appears next to the Accept step icon in the Design pane of the Cisco Unified CCX Editor.

The default Contact is “--Triggering Contact--”, which simply means that whichever contact triggers the execution of the script is the triggering contact for this step.

---

The Play Prompt Step

Continue the SNU.aef script by dragging a Play Prompt step from the Media palette to the Design pane.

Next, configure this Play Prompt step to play back to the caller the system prompt SP[SNU\welcomeSpokenName.wav], which plays “Welcome to the Cisco Spoken Name Upload Application.”

Figure 7-4 shows the configured Prompt tab of the Play Prompt customizer window.
When developing scripts that prompt callers, remember to accommodate the needs of hearing-impaired customers. To make your application fully accessible to these callers, set up scripts to interact with devices such as a Telecommunications Relay Service (TRS) or Telecommunications Device for the Deaf (TTY/TDD).

Configure the Play Prompt step as follows:

- **General tab**
  - Contact—Triggering Contact
    The step operates on the contact that triggers the execution of the script.
  - Interruptible—No
    External events cannot interrupt the playing of the prompt.

- **Prompt tab**
  - Prompt—SP\SNU\welcomeSpokenName.wav
    SNU\welcomeSpokenName.wav is the prompt that the Play Prompt step plays back to welcome the caller.

Because the .wav file that serves as the welcoming prompt already exists as a system prompt, you do not need to define it as a variable; instead enter the prompt directly by clicking the Expression Editor button and entering the name in the text field of the dialog box that appears.
Figure 7-5  Prompt Address Dialog Box (accessed by Expression Editor button)

Note  For more information about using the Expression Editor, see Chapter 2, “How To Use the Cisco Unified CCX Editor.”.

- Barge in—Yes
  The caller can interrupt the prompt playback.
- Continue on Prompt Errors—Yes
  In the event of a prompt error, the script continues to play back the next prompt in the sequence or waits for caller input.

- Input tab
  - Flush Input Buffer—Yes
The system erases previously entered input before capturing new caller input.

**Note** For more information about configuring the Play Prompt step, see the *Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide*.

---

**The Label Step (GetUser)**

Continue the SNU.aef script by dragging a Label step from the General palette to the Design pane.

Configure the Label step to provide a target for subsequent steps if it becomes necessary to send the caller back for further attempts to successfully execute the Name To User step.

Configure the Label customizer window by entering the name `GetUser` in the Enter Label Name text field and then clicking **OK**.

Configure the subsequent Name To User step to send the script to the Label with this name, if necessary.

**Note** For more information about configuring the Label step, see the *Cisco Unified Contact Center Express Editor Step Reference Guide*.

---

**The Name To User Step**

Continue the SNU.aef script by dragging a Name To User step from the Media palette to the Design pane.

Next, configure the Name To User step to prompt the caller to enter a name and then compare the name received with a directory of names to find out if the name given by the caller exists in the directory.

Configure the three tabs of the Name To User customizer window as follows:

- General tab
The Name To User Step

- **Result User**—*user*
  
  The *user* variable stores the values associated with this particular user. (The subsequent Get User Info step under the Successful output branch uses the *user* variable to find out whether or not a current recording exists for this name.)

- **Announce When Number of Matches Less Than**—**4**
  
  If the number of matches is less than 4, the script prompts the user to choose the correct entry from the list of matches. If the number of matches is greater than or equal to 4, the script prompts the user to enter additional letters to reduce the number of matches.

  **Note**  
  This property applies only if the caller is inputting DTMF digits and is not using an Automatic Speech Recognition (ASR) channel.

- **Operator**—*No*
  
  The caller does not have the choice to ask to speak to an operator, and therefore the Operator output branch of the Name To User step does not appear in the script.

- **Interruptible**—*No*
  
  No external event is allowed to interrupt the execution of the Name To User step.

  • **Prompt tab**
    
    - **Prompt**—Default Prompt
      
      The script plays back to the caller the default prompt included with the Name To User step. The default prompt plays a prompt that starts “Spell the last name followed by the first name. . . .” (You can also choose a customized prompt or choose no prompt playback.)

    - **Barge In**—*Yes*
      
      The caller is allowed to enter a name without having to listen to the entire playback of the prompt.

    - **Continue on Prompt Errors**—*Yes*
      
      In the event of a prompt error, the script continues to play back the next prompt in the sequence or simply waits for input from the caller.
The Name To User Step

- Input tab
  - Input Length—10
    The value 10 is the minimum number of digits required before the step automatically checks for a user match. (This property applies only to non-ASR channels.)
  - Terminating Key—#
    The caller can press the “#” key to indicate completion of input.
  - Cancel Key—*
    The caller can press the “*” key to start over. (The cancel key works only until the number of maximum retries is reached.)
  - Maximum Retries—3
    The step makes three attempts to receive valid input before executing the Unsuccessful output branch.
  - Initial Timeout (in sec)—5
    The system waits 5 seconds for initial input from the caller before executing the Unsuccessful output branch.
  - Interdigit Timeout (in sec)—3
    The system waits 3 seconds after receiving initial input from the caller for the caller to enter the next digit, before executing the Unsuccessful output branch. (This property does not apply for ASR channels.)
  - Flush Input Buffer—Yes
    The system erases previously entered input before capturing new caller input.

Note
For more details on configuring the Name To User step, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.

The Name To User step in this script has three output branches:
- Successful—Executes when the step makes a successful match between the name entered by the caller and a name in the directory.
The Name To User Step

- Timeout—Executes when the step reaches the maximum number of retries and the last attempt times out while waiting for input from the caller.
- Unsuccessful—Executes when the step does not make a successful match between the name entered by the caller and a name in the directory, or because the last attempt failed because the caller pressed the cancel key.

Figure 7-6 Name To User Step Output Branches

The following sections describe the three output branches of the Name To User step:
- The Successful Output Branch, page 7-14
- The Timeout Output Branch, page 7-24
- The Unsuccessful Output Branch, page 7-25

The Successful Output Branch

If the Name To User step makes a successful match between the name entered by the caller and a name in the user directory, the script executes the Successful output branch of the Name To User step.

Figure 7-7 shows the Successful output branch of the Name to User step.
Configure the Successful output branch to authenticate the user and record a spoken name.

The Successful output branch contains the following steps:

1. The Get User Info step
2. The If step
3. The Label step (GetPin)
4. The Get Digit String step

The first two steps of the Successful output branch collect the name of the caller, which is used in the fourth step of the branch to address the caller by name.

The third step (the GetPin step) provides a target for the script in the event the step reaches the timeout limit, so that the script can continue to attempt to receive the PIN number (with the subsequent Get Digit String step) until the step reaches the maximum number of retries.

The fourth and final step (the Get Digit String step) asks for the PIN number of the caller, to make sure the caller has the authority to record this name.
The Name To User Step

This section that follows contains the following topics:

- The Get User Info Step, page 7-16
- The If Step, page 7-17
- The Label Step (GetPin), page 7-23

Note

Because of its multiple output branches, the Get Digit String step is discussed in a separate section, The Get Digit String Step, page 7-25.

The Get User Info Step

Begin to build the Successful output branch of the Name To User step by dragging a Get User Info step from the User palette and dropping it into the Successful icon under the Name To User step in the Design pane.

Next, configure the Get User Info step to retrieve the information stored in the user variable (associated with this contact by the previous Name To User step) to be used by the If step to determine which branch of the If step to execute.

Figure 7-8 shows the configured Get User Info customizer window.

Figure 7-8 Configured Get User Info Customizer Window
Configure the Get User Info customizer window to retrieve the information stored in the `currentRecording` variable, which is a Document variable that holds a recorded name.

To configure the Get User Info customizer window, highlight the Spoken Name attribute and click Set. Then, in the Get User dialog box that appears, choose the `currentRecording` variable from the drop-down menu and click OK. The Get User dialog box closes, and `currentRecording` appears next to the Spoken Name attribute in the list box of the Get User Info customizer window.

**Note**
For more information about configuring the Get User Info step, see the *Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide*.

### The If Step

Because you cannot know in advance whether a recording of the spoken name of any particular caller exists at the time of any particular call, use the If step to provide script logic for each of the two possibilities: that a recording of the spoken name exists, and that a recording of the spoken name does not exist.

Continue building the Successful output branch of the Name To User step by dragging an If step from the General palette and dropping it into the Successful icon under the Name To User step in the Design pane.

Configure the If step to evaluate the value of the `currentRecording` variable (supplied by the previous Get User Info step).

Figure 7-9 shows the configured If customizer window.

**Figure 7-9   Configured If Customizer Window**
The If step evaluates the Boolean expression “currentRecording!= null”, which means that the currentRecording variable is not null.

- If the Boolean expression “currentRecording!= null” is true, the name of the caller is available for use by the Get Digit String step. In this case, the True output branch of the If step executes.
- If the Boolean expression “currentRecording!= null” is false, the name of the caller is not available for use by the Get Digit String step. In this case, the False output branch of the If step executes.

The True Output Branch

If the If step locates a spoken recording of the name of the caller, the script executes the True output branch.

Configure the True output branch of the If step to create a prompt that uses the recording of the spoken name.

Use a Create Container Prompt step to create a concatenated prompt that includes the currentRecording variable.

Figure 7-10 shows the configured Create Container Prompt customizer window.
Configure the Create Container Prompt customizer window as follows:

- **Output Prompt**—`spelledPrompt`
  
  This prompt will contain the recorded name of the caller as stored in the `currentRecording` variable.

- **Prompt Container Type**—**Concatenated Prompt**
  
  This step creates a concatenated prompt containing the prompts listed in the Prompts list box.

- **Prompts**—`currentRecording`
  
  The `currentRecording` variable stores the recorded name of the caller.

- **Override Language**—(blank)
  
  Do not choose to override the language context of the call.
The False Output Branch

If the If step cannot locate a spoken recording of the name of the caller, the script executes the False output branch.

Configure the False output branch of the If step to generate the name, using the spelling generator of the Create Generated Prompt steps.

First, configure a Get User Info step to retrieve the information contained in the firstName, fullName, and lastName variables, in order to make this information available to the Create Generated Prompt steps.

Figure 7-11 shows the configured Get User Info customizer window.
Figure 7-12 shows the first configured Create Generated Prompt customizer window in the False branch.

Figure 7-12 Configured Create Generated Prompt Customizer Window—spelled Prompt

![Create Generated Prompt Customizer Window](image)

Configure the Create Generated Prompt customizer window as follows:

- **Generator Type**—**fullname**
  This step uses the fullname generator type to properly concatenate the last name and the first name of the user based on the country/language settings associated with the call.

- **Constructor Type**—**(firstname, lastname)**
  This drop-down list contains the available constructors for a given generator. In this case, the constructor specifies that two input parameters are required: the first name followed by the last name.

- **Override Language**—(blank)
  Do not choose to override the language context of the call.
• Output Prompt—**spelledPrompt**

This is the prompt that the script will play back to the caller, containing the name of the caller as generated by this step.

*Figure 7-13* shows the second configured Create Generated Prompt customizer window in the False branch.

*Figure 7-13  Configured Create Generated Prompt Customizer Window—tts Prompt*

Configure the Create Generated Prompt customizer window for the TTS prompt in a similar way to *Figure 7-13*.

Finally, insert a Set step to revert to the spelled prompt if TTS is not available. *Figure 7-14* shows the Set step customizer window in the False branch.
The Name To User Step

Figure 7-14  Set Name Customizer Window—namePrompt

Configure the Set customizer window as follows:

- **Variable**—*namePrompt*
  
  This is the name of the variable where the result of evaluating the given expressions will be stored.

- **Assign**—Use the Expression Editor to specify `ttsPrompt ||| spelledPrompt`
  
  This prompt expression defines a prompt which will attempt to play the first prompt (that is, `ttsPrompt`) and—if it fails—the second prompt (that is, `spelledPrompt`).

  This provides a mechanism for the script to adapt itself to the system where it is executed. If the system is configured with TTS, then the script will attempt to use TTS to playback the name of the user. If TTS is not available and attempting to play such a prompt would cause an error to occur, the system falls back to the second prompt and plays that. (In this case, the second prompt does not rely on TTS services.)

The Label Step (GetPin)

Continue building the Successful output branch of the Name To User step by dragging a Label step from the General palette and dropping it into the Successful icon under the Name To User step in the Design pane.

This Label step provides a target for a subsequent Goto step, in order to give callers more attempts at successfully entering digits by using the Get Digit String step that follows this label step.

Configure the Label customizer window by entering the name *GetPin* in the Enter Label Name text field, and then clicking **OK**.
The Name To User Step

For more information about configuring the Label step, see the Cisco Unified Contact Center Express Editor Step Reference Guide.

If the script reaches this Label step, the Get Digit String executes. (See The Get Digit String Step, page 7-25.)

The Timeout Output Branch

If the Name To User step does not receive caller input before reaching the timeout limit, the script executes the Timeout output branch of the Name To User step, as shown in Figure 7-15.

Figure 7-15 Name To User Step—Timeout and Unsuccessful Output Branches

Configure the Timeout output branch to play back a prompt that informs the caller that the call was unsuccessful. The script plays a good-bye prompt, and then terminates the call.

As shown in Figure 7-1, use the Create Container Prompt step to create a prompt called finalPrompt that the Play Prompt step plays at the end of the script, after which a Terminate step terminates the call.

Configure the Create Container Prompt step in similar fashion to the previous Create Container Prompt step (see The True Output Branch, page 7-18), with the exception that you choose finalPrompt as the output prompt of the Create Container Prompt step.

The Goto step, named Bye, sends the script to the Label step named Bye, under which the final sequence of steps conclude the call. (See The Closing Steps of the SNU.aef Script, page 7-47.)
The Unsuccessful Output Branch

If the Name To User step does not make a successful match between the name entered by the caller and a name in the user directory, the script executes the Unsuccessful output branch of the Name To User step, as shown in Figure 7-15. Just as with the Timeout output branch, configure the Unsuccessful output branch to play back a prompt that informs the caller that the call was unsuccessful. The script plays a good-bye prompt, and then terminates the call.

Use the Create Container Prompt step to create a prompt called finalPrompt that the Play Prompt step plays at the end of the script, after which a Terminate step terminates the call.

Configure the Create Container Prompt step in similar fashion to the previous Create Container Prompt step (see The True Output Branch, page 7-18), with the exception that you choose finalPrompt as the output prompt of the Create Container Prompt step.

The Goto step, named Bye, sends the script to the Label step named Bye, under which the final sequence of steps conclude the call. (See The Closing Steps of the SNU.aef Script, page 7-47.)

The Get Digit String Step

Finish building the Successful output branch of the Name To User step by dragging a Get Digit String step from the Media palette and dropping it into the Successful icon under the Name To User step in the Design pane.

This section contains the following topics:

• Configuring the Get Digit String Step, page 7-26
• The Successful Output Branch, page 7-28
• The Timeout Output Branch, page 7-28
• The Unsuccessful Output Branch, page 7-31
Configuring the Get Digit String Step

Configure the Get Digit String step to authenticate the caller before allowing the caller to record a name.

The Get Digit String step asks for the PIN number of the caller (to make sure the caller has the authority to record this name), using a concatenated prompt that addresses the caller by name and then asks the caller to enter a PIN number.

After adding the Get Digit String step to the Design pane of the Cisco Unified CCX Editor, configure properties in the four tabs of the Get Digit String customizer window as follows:

- **General tab**
  - **Contact**—**Triggering Contact**
    The Get Digit String step operates on the contact that triggered this script.
  - **Result Digit String**—**pin**
    The pin variable stores the digits entered by this caller. (The subsequent Authenticate User step uses this pin variable.)
  - **Interruptible**—**Yes**
    External events can interrupt the execution of this step.

- **Prompt tab**
  - **Prompt**—**namePrompt + DP[150] + SP[SNU\enter_pin.wav]**
    This expression is the prompt that the Get Digit String step plays back. (This prompt plays back the name of the caller, a silence of 150 milliseconds, and the system prompt, which plays “please enter your PIN”.)
  - **Barge In**—**Yes**
    The caller can enter a PIN without first having to listen to the playback of the entire prompt.
  - **Continue on Prompt Errors**—**Yes**
    In the event of a prompt error, the script continues to play back the next prompt in the sequence or waits for input from the caller.

- **Input tab**
The Get Digit String Step

– Input Length—25
  The value 25 is the minimum number of digits required before the step automatically checks for a user match. (This property applies only to non-ASR channels.)

– Terminating Key—#
  The caller can use the “#” key to indicate completion of input.

– Cancel Key—*
  The caller can use the “*” key to cancel and to start over. (The cancel key works only until the script reaches the number of maximum retries.)

– Maximum Retries—0
  The number of times the step retries to receive valid input before executing the Unsuccessful output branch is 0.

– Initial Timeout (in sec)—5
  The system waits 5 seconds for initial input from the caller before executing the Unsuccessful output branch.

– Interdigit Timeout (in sec)—3
  The system waits 3 seconds after receiving initial input for the caller to enter the next digit, before executing the Unsuccessful output branch. (This property does not apply for ASR channels.)

– Flush Input Buffer—Yes
  The script erases previously entered input before capturing new caller input.

– DTMF Buffer on Retry—Yes
  The script clears the DTMF buffer and erases previously-entered digits when the step retries to get input from the caller. (However, because you configured this step for 0 retries, this attribute has no effect on the execution of the step.)

• Filter tab
  – All options are checked except “*” and “#”
    The script considers numbers from 0 to 9 to be valid entries, and does not consider the cancel key “*” and the terminating key “#” to be valid digits to collect.
Chapter 7      Designing a Basic Script

The Get Digit String Step

Note
For more information about configuring the Get Digit String step, see the Cisco Unified Contact Center Express Editor Step Reference Guide.

Figure 7-16 shows the three output branches under the Get Digit String step.

Figure 7-16   Get Digit String Step—Output Branches

The Successful Output Branch

If the Get Digit String step successfully receives a PIN number, the script executes the Successful output branch.

Configure the Successful output branch of the Get Digit String step to attempt to authenticate the user. If this process is successful, the caller is then given the chance to record a name.

For a description of the steps under the Successful output branch of the Get Digit String step, see The Authenticate User Step, page 7-32.

The Timeout Output Branch

If the Get Digit String step reaches the timeout limit before receiving input from the caller, the script executes the Timeout output branch.

Configure the Timeout output branch of the Get Digit String step to give the caller further chances to enter a valid PIN number, until the script reaches the maximum number of retries, after which the Unsuccessful output branch executes.
Figure 7-17 shows the scripting under the Timeout output branch of the Get Digit String step.

**Figure 7-17** Get Digit String Step—Timeout Output Branch

Use the first If step to evaluate the expression `pin==" "`. For details on configuring the If step, see “The If Step” section on page 7-17.

If the expression is true, and the `pin` variable is empty, this means that the Get Digit String step has timed out without the caller having entered PIN information. In this case, the True output branch under this If step executes.

If the expression is false, the `pin` variable does contain PIN information, which means that the caller has already entered PIN information.

In this case, the False output branch executes, and a Goto step sends the script to the Label step named Authenticate, which is located directly above the Authenticate User step, as shown in Figure 7-17.
Using the If step in this way is a trick that you can use to allow the caller to enter the PIN without a terminating key and wait for the timeout to let the system deal with the digits collected so far. This trick works well only if the maximum number of retries is set to 0, as it is in this example.

Use the first If step under the Timeout output branch of the Get Digit String step to determine whether or not PIN information exists.

If no PIN information exists, then the True output branch executes, and you then use a second If step to determine whether or not the script has reached the maximum number of retries in the attempt to obtain PIN input information from the caller.

The following sections describe the scripting under the True and False output branches of this second If step:

- The True Output Branch, page 7-30
- The False Output Branch, page 7-31

The True Output Branch

If the first If step determines that the caller has not entered PIN information, the script executes the True output branch.

Configure the True output branch of the first If step to give the caller more opportunities to enter PIN information, until the maximum number of retries limit is reached.

Use a second If step, placed under the True output branch of the first If step, to evaluate the expression “triesGetDigit < triesMaxGetDigit”; or, the value of triesGetDigit is less than triesMaxGetDigit.

The triesGetDigit variable is an Integer variable that has an initial value of 0. The triesMaxGetDigit variable is an Integer variable with a value of 3.

The following steps execute under the True output branch, as shown in Figure 7-17):

- The Set step—Adds 1 to the value of triesGetDigit.
  Configure the Set customizer window by first choosing the triesGetDigit variable from the Variable drop-down menu. Then in the Assign text field, you enter the expression triesGetDigit + 1.
This means that each time the script reaches this Set step, the value of the `triesGetDigit` variable is increased by 1. After three attempts, the value of `triesGetDigit` is 3, which is equal to the value of `triesMaxGetDigit`, so the False output branch of this If step executes.

- The Play Prompt step—Plays the system prompt, SP[SNU\still_there.wav], which asks if the caller is still connected, followed by a silence of 500 milliseconds.
- The Goto step—Sends the script to the Label named GetPin, above the Get Digit String step (see Figure 7-17), in order to give the caller more attempts at entering a PIN number. (See The Label Step (GetPin), page 7-23.)

The False Output Branch

If the second If step reaches the maximum number of retries, the script executes the False output branch.

Configure the False output branch of the second If step to create a final prompt to play back to the caller before ending the call.

Use a Create Container Prompt step to create a prompt named `finalPrompt` that contains the system prompt, SP[SNU\error_try_later.wav], which informs the caller that an error has occurred and asks the caller to call back later.

Next, a Goto step sends the script to the Label named Bye, located above the closing steps of the script (see The Closing Steps of the SNU.aef Script, page 7-47 below), where a Play Prompt step plays `finalPrompt` before the script terminates the contact.

The Unsuccessful Output Branch

If the Get Digit String step does not receive valid input, the script executes the Unsuccessful output branch.

Configure the Unsuccessful output branch of the Get Digit String step to provide a prompt that informs the caller that the call was unsuccessful, and the script moves to the final steps that terminate the contact.
Figure 7-18 shows the scripting under the Unsuccessful output branch of the Get Digit String step.

**Figure 7-18 Get Digit String Step—Unsuccessful Output Branch**

Use the Create Container Prompt step to specify that the prompt `finalPrompt` contains the system prompt, SP[SNU\error\_try\_later.wav], which informs the caller that an error has occurred and asks the caller to call back later.

Next, a Goto step sends the script to the Label named Bye, located above the closing steps of the script (see The Closing Steps of the SNU.aef Script, page 7-47 below), where a Play Prompt step plays `finalPrompt` before the script terminates the contact.

The functionality in this branch of the Get Digit String step is the same as the Create Container Prompt step and the Goto step under the False output branch of the If step. (See The False Output Branch, page 7-31.)

**The Authenticate User Step**

Place a Label step under the Successful output branch of the Get Digit String step. This Label step, named Authenticate, will serve as a target for the subsequent Goto step under the Timeout output branch of the Get Digit String step. (See The Timeout Output Branch, page 7-28.), and provides callers with another opportunity to be authenticated after having already entered PIN information.

Finish building the Successful output branch of the Get Digit String step by dragging an Authenticate User step from the User palette and dropping it onto the Label step (Authenticate) under the Get Digit String step in the Design pane.

Configure the Authenticate User step to authenticate the user, based on the PIN information entered by the caller.
Figure 7-19 shows the configured Authenticate User customizer window.

Configure the Authenticate User step to compare the value of the **pin** variable with information contained in the **user** variable (as configured in the User Administration web page of the Cisco Unified CCX Administration web interface).

Note For more information about configuring the Authenticate User step, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.

If the match is made, the Success output branch executes. If not, the Unsuccessful output branch executes.

The following sections contain these topics:
- The Success Output Branch, page 7-33
- The Unsuccessful Output Branch, page 7-35

**The Success Output Branch**

If the Authenticate User step successfully authenticates the user, the script executes the Success output branch.
Configure the Success output branch of the Authenticate User step to offer the caller the opportunity to record a name.

Figure 7-20 shows the scripting under the Success output branch of the Authenticate User step.

**Figure 7-20  Authenticate User Step—Success Output Branch**

First, insert a Create Generated Prompt step and configure the Create Generated Prompt customizer window as follows:

- **Output Prompt**—`pound`
  
  The name of the variable where the newly created prompt will be stored.

- **Generator Type**—`telephone.number`
  
  This step uses the telephone.number generator type, which provides logic on how to play back a telephone number according to the preferences associated with the country/language of the call.

- **Constructor Type**—`(number)`
  
  This step uses the number constructor type. (A constructor lists the possible arguments that can be passed in a given generator.)

Continue configuring the Success branch of the Authenticate User step by following the instructions in *The Recording Step, page 7-37.*
The Unsuccessful Output Branch

If the Authenticate User step does not successfully authenticate the user, the script executes the Unsuccessful output branch.

Configure the Unsuccessful output branch of the Authenticate User step to allow the caller to retry entering a valid PIN number until the script reaches the maximum number of retries.

Figure 7-21 shows the scripting under the Unsuccessful output branch of the Authenticate User step.

Figure 7-21  Authenticate User Step—Unsuccessful Output Branch

As in the scripting under the Timeout output branch of the Get Digit String step (see The Timeout Output Branch, page 7-28), use an If step to determine whether or not the script has reached the maximum number of retries.

In this case, the If step evaluates the expression “triesAuthentication < triesMaxAuthentication”; or the value of triesAuthentication is less than triesMaxAuthentication.

The triesAuthentication variable is an Integer variable that has an initial value of 0. The triesMaxAuthentication variable is an Integer variable with a value of 3.

This If step has two output branches:

- The True Output Branch, page 7-36
- The False Output Branch, page 7-36
The True Output Branch

If the maximum number of retries has not been reached, the script executes the True output branch.

Configure the True output branch of the If step to provide the caller with more opportunities to be authenticated.

The following steps execute under the True output branch of the If step, as shown in Figure 7-21:

- The Play Prompt step—Plays the system prompt, SP[SNU\error_auth.wav], which informs the caller that the authentication failed, followed by a silence of 500 milliseconds.
- The Set step—Adds 1 to the value of triesAuthentication. After three attempts, the value of triesAuthentication is 3, which is equal to the value of triesMaxAuthentication, so the False output branch of this If step executes.
- Goto—Sends the script to the Label named Get User above the Name to User step, as shown in Figure 7-17, in order to give the caller another chance to enter a name. (See The Label Step (GetUser), page 7-11.)

The False Output Branch

If the script has reached the maximum number of retries, the script executes the False output branch.

Configure the False output branch of the If step to create a final prompt to be played back to the caller, and then to send the script to the closing steps.

The following steps execute under the False output branch of the If step, as shown in Figure 7-21:

- The Create Container Prompt step—Creates a concatenated prompt named finalPrompt that contains the two system prompts, SP[SNU\error_auth.wav] and SP[SNU\error_try_later.wav], which inform the caller that authentication failed, and ask the caller to call back later.
- The Goto step—Sends the script to the Label named Bye, located above the closing steps of the script (see The Closing Steps of the SNU.aef Script, page 7-47), where a Play Prompt step plays finalPrompt before the script terminates the contact.
The Recording Step

In the recording step, you should localize according to your language. For information on localizing scripts, see Chapter 4, “Localizing Cisco Unified CCX Scripts.”

First, place a Label step, named Record, under the Success output branch of the Authenticate User step. This Label step will provide a target for the scripting under the Key 2 output branch of the subsequent Menu step (see The Menu Step, page 7-40) to give callers another opportunity to record a name.

Then continue the SNU.aef script, once the caller has been authenticated, by dragging a Recording step from the Media palette and dropping it on the Success output branch of the Authenticate User step.

Next, configure the Recording step to offer the caller the opportunity to record a name using the three tabs of the Recording customizer window as follows:

- General tab
  - Contact—**Triggering Contact**
    The step operates on the contact that triggered the execution of the script.
  - Result Document—**recording**
    The recording variable stores the audio file recorded by this caller.
  - Media Type—**Voice (uncompressed)**
    The type of media to be recorded is uncompressed voice.

  **Note** Cisco Unified CCX currently supports only uncompressed voice.

  - Recording Duration—**10**
    The script gives the caller 10 seconds to record a name.
  - Interruptible—**No**
    External events cannot interrupt the execution of this step.

- Prompt tab
  - Prompt—**Customize prompt**
    The step plays back a customized prompt to the caller.
The box underneath the Prompt box indicates that the prompt is a concatenation of a system prompt, SP[SNU\rec_name.wav], and a language prompt, instructPrompt.

- **Start Tone—Default Prompt**
  The script plays back a system prompt providing a default start tone to alert the caller that the recording is about to begin.

- **Barge In—Yes**
  The caller is allowed to respond without first having to listen to the entire playback of the prompt.

- **Continue on Prompt Errors—Yes**
  In the event of a prompt error, the script continues to play back the next prompt in the sequence or waits for input from the caller.

- **Input tab**
  - **Maximum Retries—0**
    The number of times the step retries to receive valid input before executing the Unsuccessful output branch is 0.
  - **Flush Input Buffer—Yes**
    The system erases previously entered input before capturing new caller input.

- **Filter tab**
  - **Duration—10**
  - **Terminating Key—#**
    The caller can use the “#” key to indicate completion of input.
  - **Cancel Key—*”**
    The caller can use the “*” key to cancel and start over. (The cancel key works only until the script reaches the maximum number of retries.)

[Note]
For more information about configuring the Recording step, see the *Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.*
The Recording step has two output branches, Successful and Unsuccessful, described in the following sections:

- The Successful Output Branch, page 7-39
- The Unsuccessful Output Branch, page 7-39

The Successful Output Branch

If the Recording step successfully records the spoken name of the caller, the script executes the Successful output branch.

Configure the Successful output branch of the Recording step to play the recording back to the caller.

Figure 7-22 shows the scripting under the Successful output branch of the Recording step.

**Figure 7-22 Recording Step—Successful Output Branch**

Use a Play Prompt step to play the recording back to the caller. To accomplish this, configure the Play Prompt step to play a system prompt combined with the value of the `recording` variable, which stores the recording that results from the Recording step.

The Menu step then offers the caller the choice of approving the current recording or making another recording attempt. (For a description of the scripting under the Menu step, see The Menu Step, page 7-40.)

The Unsuccessful Output Branch

If the Recording step does not successfully record the spoken name, the script executes the Unsuccessful output branch.

Configure the Unsuccessful output branch of the Recording step to create the final prompt that is played back to the caller, and to move the script to the closing steps.
Figure 7-23 shows the scripting under the Unsuccessful output branch of the Recording step.

Figure 7-23  Recording Step—Unsuccessful Output Branch

As in previous Unsuccessful output branches (see, for example, The Unsuccessful Output Branch, page 7-31), use a Create Container Prompt step to create a prompt named finalPrompt that contains two system prompts, SP[SNU\error_rec.wav] + SP[SNU\error_try_later.wav], which inform the caller that an error in recording has occurred, and ask the caller to call back later.

Next, a Goto step sends the script to the Label named Bye, located above the closing steps of the script (see The Closing Steps of the SNU.aef Script, page 7-47 below), where a Play Prompt step plays finalPrompt before the script terminates the contact.

The Menu Step

Continue the SNU.aef script by dragging a Menu step from the Media palette and dropping it on the Play Prompt step under the Successful output branch of the Recording step.

Next, configure the Menu step to give callers the option to re-record a name.

Configure properties in the three tabs of the Menu customizer window as follows:

- General tab
  - Contact—Triggering Contact
    - The step operates on the contact that triggered the execution of the script.
  - Options—Key 1 and Key 2
    - Create two branches under the Menu step, providing the caller the choice to approve the recording or re-record a name.
– Interruptible—Yes
  External events can interrupt the execution of this step.

• Prompt tab
  – Prompt—SP[SNU\menu_re_rec.wav]
    This system prompt offers the caller the choice to re-record a name.
  – Barge In—Yes
    The caller can respond without first having to listen to the entire playback of the prompt.
  – Continue on Prompt Errors—Yes
    In the event of a prompt error, the script continues to play back the next prompt in the sequence or waits for caller input.

• Input tab
  – Timeout (in sec)—3
    The script executes the Timeout output branch if the script receives no input within 3 seconds.
  – Maximum Retries—3
    The step attempts 3 times to receive valid input before executing the Unsuccessful output branch.
  – Flush Input Buffer—Yes
    The script erases previously entered input before capturing new user input.

Note For more information about configuring the Menu step, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.

The Menu step in this script has the following output branches (see Figure 7-24):
• Key 1—Executes if the caller accepts the recording.
• Key 2—Executes if the caller does not accept the recording.
• Timeout—Executes if the step reaches the timeout limit without receiving input.
The Menu Step

- Unsuccessful—Executes if the step receives invalid input

Figure 7-24  Menu Step—Output Branches

The following sections describe the scripting under each of these output branches:

- The Key 1 Output Branch, page 7-42
- The Key 2 Output Branch, page 7-44
- The Timeout and Unsuccessful Output Branches, page 7-46

The Key 1 Output Branch

If the caller decides to accept the recording, the script executes the Key 1 output branch.

Configure the Key 1 output branch of the Menu step to store the new recorded name of the caller in the system, and then to move the script to the closing steps.
Figure 7-25 shows the scripting under the Key 1 output branch of the Menu step.

**Figure 7-25 Menu Step—Key 1 Branch**

Use the Set User Info step to associate the value of the variable `recording` (as created by the Recording step) with the Spoken Name attribute of the `user` variable.

**Figure 7-26 Configured Set User Info Customizer Window**

The Set User Info step has the following two output branches (see Figure 7-25):

- **Success**—If the Set User Step succeeds, a Create Container Prompt step creates a prompt `finalPrompt`, which plays the system prompt `SP[SNU\store_success.wav]`, informing the caller that the recording has been successfully stored.

  A Goto step then sends the script to the Label named Bye, which executes the closing steps of the script.
The Menu Step

- Unsuccessful—If the Set User Step fails, a Create Container Prompt step creates a prompt **finalPrompt**, which plays two system prompts SPU\error\general.wav + SPU\error\try\later.wav, which inform the caller that an error has occurred and ask the caller to call back later.

A Goto step then sends the script to the Label named Bye, which executes the closing steps of the script.

The Key 2 Output Branch

If the caller decides to re-record a name, the script executes the Key 2 output branch.

Configure the Key 2 output branch of the Menu step to provide the caller with more opportunities to record a name.

**Figure 7-27** shows the scripting under the Key 2 output branch of the Menu step.

**Figure 7-27**  **Menu Step—Key 2 Branch**

As in previous sections of the script, use an If step to give the caller multiple chances to record a name, until the script reaches the maximum number of retries. (For examples of the use of the If step, see The Timeout Output Branch, page 7-28 and The Unsuccessful Output Branch, page 7-35.)

In this case, the If step evaluates the expression “triesRecord < triesMaxRecord”; or the value of the **triesRecord** variable is less than the **triesMaxRecord** variable.

The **triesRecord** variable is an Integer variable that has an initial value of 0. The **triesMaxRecord** variable is an Integer variable with a value of 3.

This If step has the following two output branches:
• The True Output Branch, page 7-45
• The False Output Branch, page 7-45

The True Output Branch

If the caller has not reached the maximum number of retries in the attempt to record a name, the script executes the True output branch of the Key 2 output branch of the Menu step.

Configure the True output branch to give the caller more opportunities to record a name, until the maximum number of retries limit is reached.

The following steps execute under the True output branch of the If step (see Figure 7-27):

• The Set step—Adds 1 to the value of triesRecord. After three attempts, the value of triesRecord is 3, which is equal to the value of triesMaxRecord, so the False output branch of this If step executes.
• The Goto step—Sends the script to the Label named Record (see Figure 7-22), in order to give the caller further chances to record. (See The Recording Step, page 7-37.)

The False Output Branch

If the caller has reached the maximum number of retries and has not recorded a name, the script executes the False output branch of the Key 2 output branch of the Menu step.

Configure the False output branch to create a final prompt that will be played back to the caller, and then moves the script to the closing steps.

The following steps execute under the False output branch of the If step (see Figure 7-27):

• The Create Container Prompt step—Creates a prompt finalPrompt, which plays the system prompts SP\[SNU\]error_try_later, asking the caller to try again later.
• The Goto step—Sends the script to the Label named Bye, which executes the closing steps of the script.
The Timeout and Unsuccessful Output Branches

The scripting under both the Timeout and Unsuccessful output branches of the Menu step (see Figure 7-28) is the same as that under the False output branch of the If step in the previous section (see The False Output Branch, page 7-45).

Use the following scripting under both the Timeout and Unsuccessful output branches of the Menu step:

- Create Container Prompt step—Creates a prompt `finalPrompt`, which plays the system prompt SP[SNU\error_try_later.wav], asking the caller to try again later.
- A Goto step then sends the script to the Label named Bye, which executes the closing steps of the script.

*Figure 7-28  Menu Step—Timeout and Unsuccessful Output Branches*
The Closing Steps of the SNU.aef Script

Close the SNU.aef script by using steps that mark the contact as handled, play back a final prompt to the caller, terminate the connection, and end the script. Figure 7-29 shows the steps used to close the script.

Figure 7-29  Closing Steps of the SNU.aef Script

Use the following steps to close the script:

- The Set Contact Info Step, page 7-48
- The Set Step, page 7-49
- The Play Prompt Step, page 7-49
- The Terminate Step, page 7-49
- The End Step, page 7-49
The Set Contact Info Step

Use the Set Contact Info step to mark the contact as Handled, which is important for reporting purposes.

Figure 7-30 shows the configured Set Contact Info customizer window.

Figure 7-30  Configured Set Contact Info Customizer Window

To configure the Set Contact Info step, highlight the Handled attribute and click Set. An “X” appears in the Value column of the Set Contact Info list box.

Note  For more information on configuring the Set Contact Info step, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.
The Set Step

Use the Set step to set the value of finalPrompt (to be played by the subsequent Play Prompt step) to combine the previous value of the finalPrompt variable with SNU\goodbye.wav, which tells the caller good-bye.

Note For more information on configuring the Set step, see the Cisco Unified Contact Center Express Editor Step Reference Guide.

The Play Prompt Step

Configure the Play Prompt step to play finalPrompt back to the caller.

Note For an example of configuring the Play Prompt step, see The Play Prompt Step, page 7-8.

The Terminate Step

Use the Terminate step to terminate the contact by disconnecting the call.

Note For more information on configuring the Terminate step, see the Cisco Unified Contact Center Express Editor Step Reference Guide.

The End Step

Use the End step to complete processing and free all allocated resources.

This step has no properties and does not require a customizer.
The Closing Steps of the SNU.aef Script
The key element in a Cisco Unified CCX script is a contact, which represents one form of connection with a remote customer. A contact can be a telephone call, an e-mail message, or an HTTP request.

Scripts use contacts to track connections through the system. The contact is established when the connection is made. The contact lasts until the connection is terminated, as when the script transfers or disconnects a telephone call, responds to an HTTP request, or sends an e-mail message.

You can use the steps of the Cisco Unified CCX Editor to design scripts that handle multiple contacts within the same script.

This chapter describes the design of such a script, the broadcast.aef script example.

This script also demonstrates the use of the Place Call step, the Call Subflow step, steps from the Java palette, and annotations to explain various sections of the script.

This section contains the following topics:

- An Example Script Template with Multiple Contacts, page 8-2
- The Start Step (Creating a Script), page 8-3
- Script Variables for broadcast.aef, page 8-4
- The Annotate Step, page 8-6
- The Accept Step, page 8-7
- The Get Contact Info Step, page 8-8
- The Recording Step, page 8-8
An Example Script Template with Multiple Contacts

The broadcast.aef script example records a message from a caller and then broadcasts it to a list of extensions by placing multiple outbound calls. If the caller who triggers this script hangs up, the script aborts.
The Start Step (Creating a Script)

Begin to build the sample script by choosing File > New from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click OK.

A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

Begin to build the sample script by choosing File > New from the Cisco Unified CCX Editor menu bar. The Cisco Unified CCX Editor places a Start step in the Design pane of the Cisco Unified CCX Editor window.

Figure 8-1 shows the top level of the broadcast.aef script in the Design pane of the Cisco Unified CCX Editor window.
The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar.

Our example script is called broadcast.aef.

## Script Variables for broadcast.aef

Begin the broadcast.aef script design process by using the Variable pane of the Cisco Unified CCX Editor to define script variables.

**Note**

For more information about defining variables, see the “Defining, Using, and Updating Script Variables” section on page 2-31.

Figure 8-2 shows the variables of the broadcast.aef script as they appear in the Variable pane of the Cisco Unified CCX Editor window.

### Figure 8-2 Variable Pane of the broadcast.aef Script

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Value</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>dest</td>
<td>String</td>
<td>&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>groupCallControl</td>
<td>Int</td>
<td>0</td>
<td>Parameter</td>
</tr>
<tr>
<td>groupDialog</td>
<td>Int</td>
<td>0</td>
<td>Parameter</td>
</tr>
<tr>
<td>lang</td>
<td>Language</td>
<td>[en_US]</td>
<td></td>
</tr>
<tr>
<td>numCells</td>
<td>Int</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>numbersToCall</td>
<td>java.util.Vector</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>obj</td>
<td>Object</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>outCall</td>
<td>Contact</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>recording</td>
<td>Document</td>
<td>null</td>
<td></td>
</tr>
</tbody>
</table>
Table 8-1 describes the variables used in the broadcast.aef script.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>dest</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the current destination number to call as the script loops. (See The Call Subflow Step, page 8-13.)</td>
</tr>
<tr>
<td>groupCallControl</td>
<td>Integer</td>
<td>0</td>
<td>ID of the Call Control Group with which the outbound call is associated. (See The Place Call Step, page 8-21.)</td>
</tr>
<tr>
<td>groupDialog</td>
<td>Integer</td>
<td>0</td>
<td>Identifies the ID of the primary dialog group for handling the outbound call. (See The Place Call Step, page 8-21.)</td>
</tr>
<tr>
<td>i</td>
<td>Integer</td>
<td>0</td>
<td>Stores the current index of the number to call. (See The If Step, page 8-15.)</td>
</tr>
<tr>
<td>Language</td>
<td>language</td>
<td>L[en_US]</td>
<td>Stores the value of the local language used for prompts.</td>
</tr>
<tr>
<td>numCalls</td>
<td>Integer</td>
<td>0</td>
<td>Stores the number of calls to be made. (See The Set numCalls Step, page 8-15.)</td>
</tr>
<tr>
<td>numbersToCall</td>
<td>Java Type</td>
<td>null</td>
<td>Stores all the numbers to call. (See The Set numbersToCall Step, page 8-12.)</td>
</tr>
</tbody>
</table>
The Annotate Step

Continue to build the broadcast.aef script by dragging an Annotate step from the General palette (in the Palette pane of the Cisco Unified CCX Editor window) to the Design pane, as shown in Figure 8-1.

Configure this Annotate step to contain notes describing the function of this script. (This step has no impact on script functionality.)

### Table 8-1 Variables in the broadcast.aef Script (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>obj</td>
<td>Java Type</td>
<td>null</td>
<td>Holds the current destination object as it loops through. This object is then typecast to a string that represents the number to call (outCall). (See The Set Steps, page 8-17)</td>
</tr>
<tr>
<td>outCall</td>
<td>Contact</td>
<td>null</td>
<td>Stores the contact information returned when the Place Call step succeeds. (See The Place Call Step, page 8-21.)</td>
</tr>
<tr>
<td>recording</td>
<td>Document</td>
<td>null</td>
<td>Stores the audio document that the caller records. (See The Recording Step, page 8-8.)</td>
</tr>
</tbody>
</table>
Figure 8-3 shows the configured Annotate step customizer window.

Configure the Annotate customizer window by entering notes in the Enter Comments text field, and then clicking OK.

Note
This script contains four top-level instances of the Annotate step.

Tip
Notes you add about the script are useful to remind yourself of the functions of the script and its various sections. Notes also communicate information about the script to future designers who may need to revise or debug it.

The Accept Step

Continue to build the broadcast.aef script by dragging an Accept step from the Contact palette (in the Palette pane of the Cisco Unified CCX Editor window) to the Design pane.

Because you intend to accept the default contact, no configuration is necessary.
The Get Contact Info Step

Drag a Get Contact Info step from the Contact palette and drop it on the Design pane. Then in the customizer window, set the Language name to the Language variable.

The Recording Step

Continue to build the broadcast.aef script by dragging a Recording step from the Media palette to the Design pane.

Then configure the Recording step to attempt to record the message the caller wants to broadcast.

Configure the Recording step as follows:

- **General tab**
  - **Contact**—Triggered Contact
    This step operates on the contact that triggered the script.
  - **Interruptible**—No
    External events cannot interrupt the execution of this step.
  - **Result Document**—recording
    The **recording** variable stores the audio document recorded by this caller.

- **Prompt tab**
  - **Prompt**—Customized prompt
The step uses a customized prompt.

The text box under the Prompt text box indicates that the prompt is the customized prompt P\[pleaseRecord.wav\], which asks the caller to please record a message.

- **Start Tone—Default Prompt**
  A system prompt providing a default start tone plays back to alert the caller that the recording is about to begin.

- **Barge In—Yes**
  The caller can respond without first having to listen to the playback of the entire prompt.

- **Continue on Prompt Errors—Yes**
  The step continues with the next prompt in the list if an error occurs in a prompt, or if this prompt was the last in the list, awaits caller input.

- **Input tab**
  - **Maximum Retries—3**
    The script makes 3 retries to receive valid input before executing the Unsuccessful output branch.
  - **Flush Input Buffer—Yes**
    The system erases previously entered input before capturing new user input.

- **Filter tab**
  - **Duration—10**
    The caller can record a message of up to 10 seconds.
  - **Terminating Digit—#**
    The caller can use the “#” key to indicate completion of input.
  - **Cancel Digit—***
    The caller can use the “*” key to start over.
    (The cancel key works only until the script reaches the maximum number of retries.)
The Recording step has two output branches, Successful and Unsuccessful. (See Figure 8-4.)

These output branches are described in the following sections:

- The Successful Output Branch, page 8-10
- The Unsuccessful Output Branch, page 8-10

### The Successful Output Branch

If the Recording step successfully records the desired message from the caller, the script executes the Successful output branch, and the scripts fall through to the Play Prompt step, as shown in Figure 8-1, and discussed in The Play Prompt Step, page 8-11.

### The Unsuccessful Output Branch

If the Recording step does not successfully record the desired message from the caller, the script executes the unsuccessful output branch. Configure the Unsuccessful output branch of the Recording step to play back a prompt informing the caller that the recording was unsuccessful; then a Terminate step ends the call, and an End step ends the script and releases all system resources.
Chapter 8  Working with Multiple Contacts

The Play Prompt Step

Begin the Unsuccessful output branch of the Recording step by dragging a Play Prompt step from the Media palette to the Recording step icon in the Design pane.

Then configure the Play Prompt step to play back a prompt that informs the caller that the recording was unsuccessful.

For an example of the configuration of the Play Prompt step, see “The Play Prompt Step” section on page 7-8.

The Terminate Step

Continue the Unsuccessful output branch of the Recording step by dragging a Terminate step from the Contact palette to the Recording step icon in the Design pane.

The Terminate step terminates the connection. Allow the default contact (the Triggering Contact) to be the contact that is terminated.

The End Step

End the Unsuccessful output branch of the Recording step by dragging an End step from the General palette to the Recording step icon in the Design pane.

The End step ends the script and releases all resources. The End step requires no configuration and has no customizer.

The Play Prompt Step

Continue the broadcast.aef script by dragging a Play Prompt step from the Media palette to the Design pane.

Next, configure the Play Prompt step to play back to the caller a prompt that combines the prompt P[thisIsYourMessage.wav] and message recorded by the caller that is stored in the recording variable. The script then moves to the Create Java Object step. (See The Set numbersToCall Step, page 8-12.)
The Set numbersToCall Step

Continue to build the broadcast.aef script by dragging the Set step from the General palette to the Design pane. Use the Set step to create a vector with the expression “new java.util.Vector()” and set that expression equal to the variable numbersToCall.

This step creates a vector to hold the phone numbers the script will use to place the outbound calls. This step does not access the database and the variable does not have value yet.

Figure 8-5 shows the configured General tab of the Set customizer window.

Configure the General tab of the Set customizer window as follows:

- **Variable Name**—`numbersToCall`
  
  The `numbersToCall` variable stores all the numbers to call.
  
  (A call to a subflow populates this variable.)

- **Value**—`java.util.Vector()`
  
  The `java.util.Vector()` expression stores the list of numbers to call.

Note: A vector is a collection class compatible with both Sun SDK Java 1.4.2. It represents a dynamic array of objects.
The Call Subflow Step

Continue to build the broadcast.aef script by dragging a Call Subflow step from the JAVA palette to the Design pane.

Then configure the Call Subflow step to call a subflow that populates the **numbersToCall** variable. (See The Set numbersToCall Step, page 8-12).

Figure 8-6 shows the configured General tab of the Call Subflow customizer window.

![Call Subflow Customizer Window—Configured General Tab](image)

Configure the General tab of the Call Subflow customizer window to call the getNumbersToCall.aef script, which contains the scripting necessary to access the directory of numbers and populate the **numbersToCall** variable in the primary script. Select No for Disable Interruptions.
Figure 8-7 shows the configured Parameter Mapping tab of the Call Subflow customizer window.

**Figure 8-7 Call Subflow Customizer Window—Configured Input Mappings Tab**

Use the Input Mapping tab to map variables between the getNumbersToCall.aef script and the broadcast.aef script.

Configure the input Mapping tab to specify that the `dest` variable in the broadcast.aef script maps to the `numToCallVector` variable in the `getNumbersToCall.aef` script.

There is no need to configure the Output Mappings tab for this sample script.
The Set numCalls Step

Continue to build the broadcast.aef script by dragging a Set step from the General palette to the Design pane.

This step assigns an integer value from the numbersToCall.size() expression to the numCalls variable.

Figure 8-8 shows the configured General tab of the Set customizer window.

![Set Customizer Window—Set numCalls](image)

The Label Step (Call Loop)

Continue to build the broadcast.aef script by dragging a Label step from the General palette to the Design pane. Then configure the Label step (named Call Loop), to provide a target for the beginning of the loop. The loop repeats until all the destination numbers have been called.

The If Step

Continue to build the broadcast.aef script by dragging an If step from the General palette to the Design pane. Then configure the If step to compare the number of calls the script has placed to the total number of calls to be made, and to end the script when this number is equal.
The If step evaluates the expression “i < numCalls” (“the value of the \( i \) Integer variable is less than the value of the \( \text{numCalls} \) Integer variable”). The value of the \( i \) variable increases by 1 every time the script uses a subsequent Increment step to place a call. The If step has two output branches, True and False. (See Figure 8-9.)

Figure 8-9  If Customizer Window—Output Branches

The following sections describe the two output branches of the If step:

- If True Output Branch, page 8-16
- If False Output Branch, page 8-17

If True Output Branch

If the If step determines that the number of calls made is less than the total number of calls to make, the script executes the True output branch.

Configure the True output branch of the If step to begin (or continue) to execute the steps used to place the outbound calls.

The True output branch contains the following steps, each of which is discussed in its own section:

- The Set Steps, page 8-17
The Set Steps

If False Output Branch

If the If step completes its task, the script executes the False output branch, and the script falls through to the Terminate step. (See “The Terminate Step” section on page 8-27.)

The Set Steps

Begin the True output branch of the If step by dragging two Set steps from the General palette to the True icon under the If step in the Design pane.

Then configure the Set steps under the True output branch of the If step to extract the phone number stored at position $i$ inside the vector. Because the vector is a dynamic array that is populated with all the numbers to call, use this method to invoke a method of the vector to return a specific element of the array at the specified index.

This section contains the following steps:

- The First Set Step, page 8-17
- The Second Set Step, page 8-18

The First Set Step

Configure the General tab of the first Step customizer window to specify that the method executes on the **numbersToCall** variable.
Figure 8-10 shows the configured Explore Class Information tab of the Execute Java Method customizer window.

Figure 8-10  
Set Obj= numbersToCall.elementAt(i)

Configure the General tab of the Set customizer window as follows:

- Variable—**obj**
  The **obj** Java Type variable holds the next number to call from the vector of numbers.

- Value
  The expression **numbersToCall.elementAt(i)** which gets the next number to call from the vector of numbers.

The Second Set Step

Configure the General tab of the second Set customizer window to convert the number retrieved from the vector to a String variable so that the Place Call step can use it as the number to dial.
Figure 8-11 shows the configured General tab of the second Set customizer window.

Figure 8-11  

Set dest=dest.valueOf(obj)

Configure the General tab of the Set customizer window as follows:
- Variable—dest
- Value—dest.valueOf(Obj)

The step uses the expression dest.valueOf(Obj) to convert the number stored in the OBJ variable to a string and to assign it to the dest String variable.

The Play Prompt Step

Continue the True output branch of the If step by dragging a Play Prompt step from the Media palette to the True icon under the If step in the Design pane.

Then configure the Play Prompt step to play back the prompt P[calling] + S[dest]. This prompt plays back a message announcing the number of the destination phone call to the original caller.
Figure 8-12 shows the configured Prompt tab of the Play Prompt customizer window.

**The Call Hold Step**

Continue the True output branch of the If step by dragging a Call Hold step from the Call Contact palette to the True icon under the If step in the Design pane.

Then configure the Call Hold step to put the incoming call that triggered the script on hold while the outbound calls are made.
The Place Call Step

Continue the True output branch of the If step by dragging a Place Call step from the Call Contact palette to the True icon under the If step in the Design pane. Then configure the Place Call step to place the outbound calls to the numbers stored in the dest variable.

Figure 8-13 shows the configured Place Call customizer window.

Figure 8-13 Configured Place Call Customizer Window

Configure the Place Call customizer window as follows:

- Destination—dest

The dest variable stores the destination phone numbers placed there by the Set step (see The Second Set Step, page 8-18).
- **Timeout (sec)—30**
  The script waits for 30 seconds before a Ring No Answer condition causes the script to execute the RingNoAnswer output branch of the Place Call step.
- **CallControlGroupId—**
  The variable `groupCallControl` stores the call control group with which the outbound call is associated.
  Define this property as a parameter in order to enable the administrator to properly configure the application with the CTI port group to use for placing the call.
- **Dialog Groups—**
  The variable `groupDialog` stores the identifying number of the primary dialog group for handling the outbound call.
  Define this property as a parameter in order to allow the administrator to configure the dialog group ID that will be used when provisioning an application.
- **Call Contact—**
  The variable `outCall` is where the script returns a handle to the created call when the step succeeds.
The Place Call step has the following six output branches:
- **Successful**—The step successfully places the call.
- **NoAnswer**—The step successfully makes the call but the RNA Timeout limit is reached.
- **Busy**—The step successfully places the call but the line is busy.
- **Invalid**—The step tries to place the call but the extension is invalid.
- **NoResource**—The step cannot place the call because no resource is available to make the call.
- **Unsuccessful**—The step does not place the call because of an internal system error.
If the RNA timeout in the script is longer than the CFNA timer of Cisco Unified Communications Manager, the agent phone goes to Not Ready state after a ring-no-answer. To resolve this issue, change the timeout value in the script to a lower than the CFNA in Cisco Unified Communications Manager.

Figure 8-14 shows the scripting under the six output branches of the Place Call step.

The following sections describe the six output branches of the Place Call step in the True output branch of the If step:

- The Successful Output Branch, page 8-24
- The Other Output Branches, page 8-26
The Successful Output Branch

If the Place Call step in the True output branch of the If step successfully places a call, the script executes the Successful output branch.

The Successful output branch of the Place Call step in the True output branch of the If step contains the following steps:

- The On Exception Goto Step, page 8-24
- The Set Contact Info Step, page 8-24
- The Play Prompt Step, page 8-25
- The Terminate Step, page 8-25
- The Set Contact Info Set, page 8-25
- The Label Step (LABEL0), page 8-25
- The On Exception Goto Step (Clear Exception), page 8-25
- The Call Unhold Step, page 8-26
- The Play Prompt Step, page 8-26

The On Exception Goto Step

Begin the Successful output branch of the Place Call step by dragging an On Exception Goto step from the General palette to the Successful icon under the Place Call step under the True icon under the If step in the Design pane.

Then configure the On Exception Goto step to send the script to the Label named LABEL0 if the script generates a ContactInactiveException.

The script throws this exception if the Contact becomes inactive. In this event, the script skips the Play Prompt step and the Terminate step, and goes to the Clear Exception Step described below.

The Set Contact Info Step

Dragging a Set Contact Info step from the Contact palette to the Successful icon under the Place Call step under the On Exception step in the Design pane.

Then configure the Set Contact Info step to set outcall language name to language.
The Play Prompt Step

Continue the Successful output branch of the Place Call step by dragging a Play Prompt step from the Media palette to the Successful icon under the Place Call step under the True icon under the If step in the Design pane.

Then configure the Play Prompt step to play the prompt recording, created by the Recording step earlier in the script, to the outbound call.

The Terminate Step

Continue the Successful output branch of the Place Call step by dragging a Terminate step from the Contact palette to the Successful icon under the Place Call step under the True icon under the If step in the Design pane.

Then configure the Terminate step to terminate the outgoing call.

The Set Contact Info Set

Dragging a Set Contact Info step from the Contact palette to the Successful icon under the Place Call step under the Terminate step in the Design pane.

Then configure the Set Contact Info step to set the Handled attribute of the outCall contact to marked.

The Label Step (LABEL0)

Continue the Successful output branch of the Place Call step by dragging a Label step from the General palette to the Successful icon under the Place Call step under the True icon under the If step in the Design pane.

Then configure the Label step to provide a target for the On Exception Goto step above.

The On Exception Goto Step (Clear Exception)

Continue the Successful output branch of the Place Call step by dragging another On Exception Goto step from the General palette to the Successful icon under the Place Call step under the True icon under the If step in the Design pane.

Then configure the On Exception Goto step to clear any exceptions.
The Place Call Step

Continue the Successful output branch of the Place Call step by dragging a Call Unhold step from the Call Contact palette to the Successful icon under the Place Call step under the True icon under the If step in the Design pane.

Then configure the Call Unhold step to take the original call off hold, so that the subsequent Play Prompt step can play back a prompt to the original caller.

The Call Unhold Step

The Play Prompt Step

Continue the Successful output branch of the Place Call step by dragging a Play Prompt step from the Media palette to the Successful icon under the Place Call step under the True icon under the If step in the Design pane.

Then configure the On Exception Goto step to play back a prompt informing the original caller that the outgoing call was a success.

The Increment step then increments the value of the \texttt{i} variable by 1, after which a Goto step sends the script back to the Label named Call Loop, located above the If step (see Figure 8-9).

The script loops in this way until the value of the \texttt{i} variable is equal to the value of the \texttt{numCalls} variable, after which the False output branch of the If step executes, the Terminate step terminates the call, and an End step ends the script. (See The If Step, page 8-15.)

The Other Output Branches

If the Place Call step in the True output branch of the If step does not successfully place the call, the script executes the one of the other five output branches:

Configure each of the other five output branches of the Place Call step to play a specific prompt (different for each output branch) that informs the original caller that the call was not placed.

The script then falls through to the Increment step (see The Increment Step (i), page 8-27), and loops back through the steps under the If step until the value of the \texttt{i} variable is equal to the value of the \texttt{numCalls} variable, after which the False output branch of the If step executes, the Terminate step terminates the call, and an End step ends the script.
The Increment Step (i)

Continue the True output branch of the If step by dragging an Increment step from the General palette to the True icon under the If step in the Design pane.
Then configure the Increment step to increase the value of the $i$ variable by one.

The Goto Step (Call Loop)

Conclude the True output branch of the If step by dragging a GoTo step from the General palette to the True icon under the If step in the Design pane.
Then configure the Goto step to move the script back to the Label step named Call Loop.

The Terminate Step

Drag a Terminate step from the Contact palette to the Design pane and place it on the Goto step.
Then configure the Terminate step to terminate the connection.

The Set Contact Info Step

Drag a Set Contact Info step from the Contact palette to the Design pane and place it on the Terminate step. Then configure the value of Handled to Marked.
The End Step

Conclude the broadcast.aef script by dragging an End step from the General palette to the Design pane.

The End step ends the script and releases all resources. The End step requires no configuration and has no customizer.
Designing a Web-Enabled Script

You can use the Cisco Unified CCX Editor to design web-enabled scripts that interact with application servers. A web-enabled script is a script that obtains information from web servers on the Internet or an intranet.

This section describes the design of such a script, hello.aef. This simple “sayhello” server application demonstrates the procedures required to create and implement any server application script.

Note
In Unified CCX 10.0(1), you must use “http://<ipaddress>:9080/<filename>” to access the web pages uploaded in Applications > Document Management > Default > webapps > ROOT.

This chapter contains the following topics:

- An Example Web-Enabled Script Template, page 9-1
- Creating Server Script Web Pages, page 9-3
- Creating the hello.aef Script, page 9-5

An Example Web-Enabled Script Template

The hello.aef sample script template uses a static web page that prompts the user for a name and a dynamic web page that provides a template with an embedded keyword that is substituted dynamically by the script when it runs.
Figure 9-1 shows the hello.aef script template as it appears in the Design pane of the Cisco Unified CCX Editor window.

Figure 9-1   Completed Server Script

The hello.aef script prompts the user for a name, and the application server responds with a “Hello” to the name given.

When the user opens the welcome.html web page, types a name, and clicks Submit, the following code in welcome.html sends the HTTP request “greeting” to the Cisco Unified CCX Engine:

```html
<form action="/greeting" method=GET>
</form>
```

This trigger (/greeting) runs the hello.aef script, which performs the following actions:

2. A Get Http Contact Info step reads the parameter “name” included with the HTTP request.
3. A Get Http Contact Info step updates the local variable mapped to the “name” parameter.
4. A Keyword Transform Document step replaces the keyword %name% in the template file (sayhello.html), and then writes the result to the local variable, doc.
5. A Send Http Response step sends the document in the doc variable to the user’s browser.

After the Cisco Unified CCX server sends the document, the phrase “Hello yourname” appears in the browser window of the user.

This example web-enabled script provides a starting point from which you can develop the kind of application scripts you need.
Creating Server Script Web Pages

Create the following two web pages to use with the sample hello.aef server script:

- Static page (welcome.html)—Prompts the user for a name.
- Dynamic page (sayhello.html)—Provides a template with an embedded keyword that is substituted dynamically by the script when it runs. In this sample script, this page also displays the results to the user.

This section contains these topics:
- Creating a Static Web Page, page 9-3
- Creating a Dynamic Web Page, page 9-4

Creating a Static Web Page

Note

In your development or production environment, place your static HTML pages in a location where they can be read by the HTTP server process and where they are secure from unauthorized access.

To create the sample static web page for your hello.aef script, do the following:

Procedure

Step 1
Use a text or web-page editor to enter the following HTML source code:

```html
<html>
<body>
<form action="/greeting" method=GET>
What is your name <input type="text" name="name">
<input type="submit">
</form>
</body>
</html>
```

Step 2
Save the file as welcome.html and upload it to the Document Management using Unified CCX Web Administration by choosing Applications > Document Management > Default > webapps > ROOT. This location with respect to installationdirectory is /webapps/ROOT.
Step 3  Test the HTML page by accessing it as http://<ipaddress>:9080/welocme.html in different web browsers.

This sample HTML code generates the web page as shown below, which prompts a user for a name.

Figure 9-2  Static HTML Page with User Prompt

You are now ready to create a dynamic web page.

Creating a Dynamic Web Page

To create the dynamic web page for your hello.aef script, do the following:

Procedure

Step 1  Use a text editor or web-page editor to create a template document, entering the following HTML source code:

```
<html>
<body>
Hello %name%
</body>
</html>
```

Step 2  Use the following format to identify the variables you will use when you write the hello.aef script:

`%keyword%`

In this example, `keyword` represents a keyword to be replaced with some textual representation as specified by the Keyword Transform Document step.

Step 3  Use the Keyword Transform Document step in the Cisco Unified CCX Editor to identify the location of the text substitution template.

When you run the hello.aef script, the Keyword Transform Document step replaces each keyword with the data you specify for that keyword.
Creating the hello.aef Script

This section demonstrates the process of writing the hello.aef script, a Cisco Unified CCX Editor script that responds to an HTTP request from a web browser.

This section contains the following topics:

- The Start Step, page 9-5
- Web-enabled Script Variables, page 9-6
- The Get Http Contact Info Step, page 9-8
- The Create File Document Step, page 9-10
- The Keyword Transform Document Step, page 9-11
- The Send Http Response Step, page 9-14
- The End Step, page 9-16

The Start Step

Begin to build the sample script by choosing File > New from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click OK.

A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

Begin to build the sample script by choosing File > New from the Cisco Unified CCX Editor menu bar. The Cisco Unified CCX Editor places a Start step in the Design pane of the Cisco Unified CCX Editor window.
The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting File > Save from the menu bar.

Our example script is called Hello.aef.

**Web-enabled Script Variables**

Begin the process of designing the hello.aef script by defining script variables. Use the Variable pane of the Cisco Unified CCX Editor to define two variables for the hello.aef script, as shown in Table 9-1:

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>String</td>
<td>Contains the value entered by the user. See The Get Http Contact Info Step, page 9-8.</td>
</tr>
</tbody>
</table>

To define the two variables for the hello.aef script, do the following:

**Procedure**

**Step 6** With the Hello.aef file open in the Cisco Unified CCX Editor window, click the New Variable icon in the Variable pane toolbar.

The New Variable dialog box appears.
Step 7 From the Type drop-down menu, choose String. This automatically enters quotation marks in the value field since the value will be enclosed in quotations.

Step 8 In the Name field, enter name. This will be the variable that will hold the name entered by the user.

Step 9 Click OK. The New Variable dialog box closes, and the name of the first variable appears in the Variable pane of the Cisco Unified CCX Editor.

Step 10 To define the second variable, doc, click the New Variable icon in the Variable pane toolbar. The New Variable dialog box appears, as shown in Figure 9-3.

Step 11 From the Type drop-down menu, choose Document. DOC[] appears automatically in the value field.

Step 12 In the Name field, enter doc. This variable will contain the document to be sent in response to the user.

Step 13 Click OK. The New Variable dialog box closes, and the name of the second variable appears in alphabetical order with the first variable in the Variable pane of the Cisco Unified CCX Editor.
The Get Http Contact Info Step

Add a Get Http Contact Info step to the hello.aef script to map parameters from an HTTP request to locally defined variables.

To map the parameter name to a local variable, do the following:

Procedure

Step 1 From the Http Contact Palette in the Palette pane, drag a Get Http Contact Info step to the Design pane, and then drop it over the Start step icon.

The Get Http Contact Info step icon appears in the Design pane, just below, and on the same level as, the Start step icon.

Step 2 Right-click the new Get Http Contact Info step icon.

A popup menu appears.

Step 3 Choose Properties.

The Get Http Contact Info customizer window appears, displaying its General tab.

Step 4 Click the Parameters tab.

The Parameters tab of the Get Http Contact Info window appears.

Step 5 Click Add.

The Add Parameter dialog box appears.
In the Name text field, enter "name".

**Note** You need quotation marks around your text since this is a string variable.

In the Variable drop-down menu, choose `name`.

Click **OK**.

The Add Parameter dialog box closes, and the added values appear under the Parameters section of the Parameters tab of the Get Http Contact Info customizer window.

Figure 9-4 shows the configured Parameters tab of the Get Http Contact Info customizer window.

**Figure 9-4 Get Http Contact Info Customizer Window—Parameters Tab**

Click **OK**.

The Get Http Contact Info customizer window closes.
Creating the hello.aef Script

You are now ready to add the next step to the hello.aef script in the Design pane of the Cisco Unified CCX Editor.

The Create File Document Step

Add a Create File Document step to the hello.aef script to create a file document that represents the HTML template sayhello.html. You will then use this file document in the Keyword Transform Document step.

To create this file document, do the following:

Procedure

Step 1  From the Document palette in the Palette pane, drag a Create File Document step to the Design pane, and then drop it over the Get Http Contact Info step icon. The Create File Document step icon appears in the Design pane, just below, and on the same level as, the Get Http Contact Info step icon.

Step 2  Right-click the new Create File Document step icon.

A popup menu appears.

Step 3  Choose Properties.

The Create File Document customizer window appears.
Step 4 In the Filename text field, enter the following file name, as shown in Figure 9-5: “template\sayhello.html”

This pathname is a relative pathname that uses a predefined subdirectory within the installationdirectory. When you implement a real application in a production environment, make sure that the file and pathname work on the production server.

Step 5 From the Document drop-down menu, choose the variable doc, as shown in Figure 9-5.

This variable contains the document to be sent in response to the user.

Step 6 Click OK.

The Create File Document customizer window closes.

You are now ready to add the next step to the hello.aef script in the Design pane of the Cisco Unified CCX Editor.

---

**Note**

You must create a file document in the Unified CCX customer folder only. You can access the Unified CCX customer folder using the following syntax:

```java
System.getProperty("uccx.customer.dir")
```

For more information on how to retrieve information from the customer folder using CLI commands, refer to the *Command Line Interface Reference Guide for Cisco Unified CCX and Cisco Unified IP IVR* available here:


---

**The Keyword Transform Document Step**

Add a Keyword Transform Document step to the hello.aef script to specify keywords in the file document that will be replaced with text in the dynamic web page by performing the following procedure.

**Procedure**

Step 1 From the Document palette, drag a Keyword Transform Document step to the Design pane, and then drop it over the Create File Document step icon.
The Keyword Transform Document step icon appears in the Design pane.

Step 2  Right-click the new **Keyword Transform Document** step icon.
        A popup menu appears.

Step 3  In the popup menu, choose **Properties**.
        The Keyword Transform Document customizer window appears.

*Figure 9-6  Keyword Transform Document Customizer Window*

Step 4  From the Keyword Template drop-down menu, choose **doc**.
        This variable represents the sayhello.html template document, which contains the
        embedded keyword to be replaced.

Step 5  From the Document drop-down menu, choose **doc**.
        This choice specifies that the completed document is stored back in the same
        variable.

Step 6  Click **Add**.
        The Add Keyword dialog box appears.
Step 7 In the Name text field, enter “name”, as shown in Figure 9-7.

Step 8 From the Local Variable drop-down menu, choose name, as shown in Figure 9-7. This choice specifies that the system supplies the correct String data type.

Note You need to enter quotes since this is a string variable.

This choice specifies that name is the name of the keyword in the sayhello.html template, as shown below:

```html
<html>
<body>
Hello %name%
</body>
</html>
```

Step 9 Click OK.
The Add Keyword dialog box closes, and appears in the Keyword Transform Document customizer window, as shown in Figure 9-8.

Figure 9-8 Configured Keyword Transform Document Customizer Window

Step 10 Click OK.

The Keyword Transform Document customizer window closes, and the name of the source document variable appears next to the Keyword Transform Document step icon in the Design pane of the Cisco Unified CCX Editor.

You are now ready to add the next step to the hello.aef script in the Design pane of the Cisco Unified CCX Editor.

The Send Http Response Step

Add a Send Http Response step to the hello.aef script to send back the completed document, in which the value of the name parameter has been substituted for a keyword embedded in the sayhello.html template.
Procedure

Step 1  From the Http Contact palette, drag the Send Http Response step to the Design pane, and then drop it over the Text Substitution for Keywords step icon in the Design pane.

The Send Http Response step icon appears in the Design pane, just below, and on the same level as, the Keyword Transform Document step icon.

Step 2  Right-click the new **Send Http Response** step icon.

A popup menu appears.

Step 3  Choose **Properties**.

Step 4  The Send Http Response customizer window appears.

![Figure 9-9  Configured Send Http Response Customizer Window](image)

Step 5  From the HTTP Contact drop-down menu, choose **Triggering Contact**, as shown in Figure 9-9.

This allows the contact that triggers the script to trigger the execution of this step.

Step 6  From the Document drop-down menu, choose the **doc** variable, as shown in Figure 9-9.

This variable stores the document that is sent to the browser.

Step 7  Click **OK**.

You are now ready to add the next step to the hello.aef script in the Design pane of the Cisco Unified CCX Editor.

---

**The End Step**

Use the End step to complete each script you create with the Cisco Unified CCX Editor. The End step needs no configuration and has no customizer window.

To end the hello.aef script, follow this procedure:

**Procedure**

**Step 1**

From the General palette, drag the End step to the Design pane, and then drop it over the Send Http Response step icon in the Design pane.

The End step icon appears in the Design pane, just below, and on the same level as, the Send Http Response step icon.

**Step 2**

Save the file as hello.aef.

---

**Managing the hello.aef Script**

This section demonstrates the process of managing the hello.aef script, a Cisco Unified CCX Editor script that responds to an HTTP request from a web browser.

This section contains the following topics:

- Uploading the hello.aef Script, page 9-17
- Creating the Application for hello.aef Script, page 9-17
- Creating the HTTP Trigger, page 9-17
- Testing the script, page 9-18
Uploading the hello.aef Script

To upload the script, do the following:

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Navigate to Applications &gt; Script Management &gt; Upload scripts.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Browse to locate the script you want to upload.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Click Upload. Now you can view the uploaded script file listed on the Script Management page.</td>
</tr>
</tbody>
</table>

Creating the Application for hello.aef Script

To create the application for hello.aef, do the following:

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Browse to Applications &gt; Application Management &gt; Add New.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Select Application type as Cisco Script Application and click Next.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Provide a name for the Application as sayhello.</td>
</tr>
<tr>
<td>Step 4</td>
<td>For the Script field, select SCRIPT[hello.aef] from the drop-down list.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Click Add. This saves the application.</td>
</tr>
</tbody>
</table>

Creating the HTTP Trigger

To create a HTTP trigger to use with this hello.aef application, do the following:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Create a Trigger by following either of the steps:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• From the Unified CCX Web Administration, browse to Applications &gt; Application Management and then select the sayhello application that you created and then click Add New Trigger.</td>
<td></td>
</tr>
<tr>
<td>• Browse to Subsystems &gt; HTTP and then click Add New.</td>
<td></td>
</tr>
</tbody>
</table>
Step 2 In the URL field, provide a value greeting, which is the trigger you have configured in the welcome.html page.

Step 3 In the Application Name field, select the Application name as sayhello.

Step 4 Select Enable and click Add.
The trigger is saved as /greeting.

---

Testing the script

To test the script, do the following:

---

Step 1 In a web browser, type http://<ipaddress>:9080/welcome.html.

Step 2 In the What is your name field, enter your name and click Submit Query.
Then verify that the HTML page displays “Hello <your name>”.

---
Designing a Web-Enabled Client Script

A web-enabled script is a script that obtains information from web servers on the Internet or an intranet. A client script is a script that can retrieve information from a server.

After the client script receives and extracts the desired information, you can use steps from the other palettes to make this information available to users or other scripts. A web-enabled client script may be an Interactive Voice Response (IVR) script or any other user script that makes a web request.

You can use the Cisco Unified CCX Editor to design a sample web-enabled client script, getQuoteClient.aef, that gets an XML (eXtensible Markup Language) file containing stock quotes from a web server, extracts the stock quote, and outputs the price to the user.

This chapter contains the following topics:

- Example Web-Enabled Client Script Template, page 10-2
- Analyzing the Data Source, page 10-3
- Creating the getQuoteClient.aef Script, page 10-4
  - The Start Step (Creating a Script), page 10-5
  - Defining the Client Script Variables, page 10-5
  - The Accept Step, page 10-6
  - The Create URL Document Step, page 10-7
  - The Create XML Document Step, page 10-8
  - The Get XML Document Data Step, page 10-10
Example Web-Enabled Client Script Template

This sample script template uses a static XML page that you store on the local HTTP subsystem web server and a simple server script that sends the XML page in response to the client request.

---

**Note**

While this sample script uses a static XML file, you can apply the same steps to handle dynamic XML output directly from any web server.

---

Figure 10-1 shows the getQuoteClient.aef script template as it appears in the Design pane of the Cisco Unified CCX Editor window.

---

**Figure 10-1 Completed Client Script**

```
Start
  Accept (-- Triggering Contact --)
  doc = Create URL Document ("http://127.0.0.1:8080/getquote")
  doc = Create XML Document (doc)
  stockprice = Create Generated Prompt currency (result)
  outputPrompt = Create Container Prompt Concatenation (stockprice + resultPrompt)
  Play Prompt (-- Triggering Contact --, outputPrompt)
  Terminate (-- Triggering Contact --)
End
```
Analyzing the Data Source

Begin the process of building the getQuoteClient.aef script by first analyzing the structure of the data the server obtains. To do this, you need to identify the data you want to extract from the XML file. This is found in the XML data path in the file.

To determine the XML data path in the file, do the following.

Procedure

Step 1  Access the web server XML file that is to supply data for your client script by entering the following URL in your web browser:

http://127.0.0.1:8080/getQuote.xml

In this example, the getQuote.xml file is on the local web server included in the HTTP subsystem on the Cisco Unified CCX Engine.

The getQuote.xml file contains the following:

```xml
<?xml version="1.0" standalone="yes"?>
<STOCKLIST>
  <STOCK symbol="ABC" error="0">
    <HIGH>58.0625</HIGH>
    <PCT_CHANGE>0.67114094</PCT_CHANGE>
    <LOW>55.1875</LOW>
    <LAST>56.25</LAST>
    <CHANGE>0.375</CHANGE>
    <VOLUME>31,973,600</VOLUME>
    <REC_STATUS>0</REC_STATUS>
    <DATE>02/21/2001</DATE>
    <TIME>15:52</TIME>
  </STOCK>
</STOCKLIST>
```

Step 2  Identify the path in the XML file of the information you want to extract from the file.

In the preceding example, the XML path to the stock quote for the ABC Company is as follows:

```
/STOCKLIST/STOCK[symbol='ABC']/LAST
```
Creating the getQuoteClient.aef Script

This section demonstrates the process of writing the getQuoteClient.aef script, a Cisco Unified CCX Editor script that gets an XML file containing stock quotes from a web server, extracts the stock quote, and outputs the price to the user.

This section contains the following steps:

- The Start Step (Creating a Script), page 10-5
- Defining the Client Script Variables, page 10-5
- The Create URL Document Step, page 10-7
- The Create XML Document Step, page 10-8
- The Terminate Step, page 10-18
- The End Step, page 10-18
The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click **OK**.

A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar.

Our example script is called getQuoteClient.aef.

Defining the Client Script Variables

Begin the process of designing the getQuoteClient.aef script by defining script variables.

Use the Variable pane of the Cisco Unified CCX Editor to define five variables, as shown in Table 10-1:

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Type</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>doc</td>
<td>Document</td>
<td>DOC[]</td>
<td>Contains the URL for the client request to the local web server.</td>
</tr>
<tr>
<td>result</td>
<td>Float</td>
<td>0.0F</td>
<td>Contains the value obtained by the client script.</td>
</tr>
<tr>
<td>stockprice</td>
<td>Prompt</td>
<td>P[stockprice.wav]</td>
<td>Contains the StockPrice.wav file that plays back the sentence, “The stock price of the selected company is.”</td>
</tr>
<tr>
<td>resultPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td>Contains the information in the result variable.</td>
</tr>
<tr>
<td>outputPrompt</td>
<td>Prompt</td>
<td>P[stockprice.wav]</td>
<td>Contains the resultPrompt and stockprice prompts.</td>
</tr>
</tbody>
</table>
To define the five variables for the getQuoteClient.aef script, do the following:

**Procedure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>In the Cisco Unified CCX Editor window, click the New Variable icon in the Variable pane toolbar.</td>
</tr>
<tr>
<td>Step 2</td>
<td>In the Name field, enter doc. This variable will contain the URL for the client request to the local web server.</td>
</tr>
<tr>
<td>Step 3</td>
<td>From the Type drop-down menu, choose Document. DOC[] appears automatically in the value field. This field will contain the name of the document when the script is run.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Click OK. The New Variable dialog box closes, and the name of the variable appears in the Variable pane of the Cisco Unified CCX Editor.</td>
</tr>
<tr>
<td>Step 5</td>
<td>For each of the other four variables, repeat Steps 3 to 5, using the information shown in Table 10-1. You are now ready to create the getQuoteClient.aef script in the Design pane of the Cisco Unified CCX Editor.</td>
</tr>
</tbody>
</table>

**The Accept Step**

Add an Accept step to the getQuoteClient.aef script to accept the contact.

To add an Accept step, drag an Accept step from the Contact palette in the Palette pane to the Design pane, and then drop it over the Start step icon. The Accept step icon appears in the Design pane, just below, and on the same level as, the Start step icon. You do not need to configure this step because you can simply use the default contact as the triggering contact for the step.

You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the Cisco Unified CCX Editor.
The Create URL Document Step

Add a Create URL Document step to the getQuoteClient.aef script to enter the URL that contains the stock price information.

To configure the Create URL Document customizer window, do the following:

Procedure

Step 1 From the Document Palette in the Palette pane, drag a Create URL Document step to the Design pane, and then drop it over the Accept step icon.

The Create URL Document step icon appears in the Design pane, just below, and on the same level as, the Accept step icon.

Step 2 Right-click the new Create URL Document step icon.

A popup menu appears.

Step 3 Choose Properties.

The Create URL Document customizer window appears.

Figure 10-2 Create URL Document Customizer Window
Step 4 In the URL text field, enter the following URL:

```
"http://127.0.0.1:8080/getquote"
```

This URL is composed of the following three parts:

- The IP address of the web server—This example uses the special IP address assigned to the local host. When an HTTP request uses this address, the request is directed to the web server running on the same machine as the client that issued the request.
- The port number of the web server—This example uses the default port number used by the HTTP subsystem web server. If the web server uses the standard HTTP port (port 80), you can omit this part of the URL.
- The HTTP script—in this example, the string “getquote” invokes the server script described in the previous section.

Step 5 From the Document drop-down menu, choose doc.

This choice defines the document that contains the information found in the URL.

Step 6 Click OK.

The Create URL Document customizer window closes.

You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the Cisco Unified CCX Editor.

---

**The Create XML Document Step**

Add a Create XML Document step to the getQuoteClient.aef script to create an XML document out of the document created in the previous procedure (in order to make the information in the URL document available to the script).

To configure the Create XML Document customizer window, do the following:

**Procedure**

---

Step 1 From the Document Palette in the Palette pane, drag a Create XML Document step to the Design pane, and then drop it over the Create URL Document step icon.
Creating the getQuoteClient.aef Script

The Create XML Document step appears in the Design pane, just below, and on the same level as, the Create URL Document step icon.

**Step 2** Right-click the new **Create XML Document** step icon.

A popup menu appears.

**Step 3** Choose **Properties**.

The Create XML Document customizer window appears.

**Step 4** From the Source Document drop-down menu, choose **doc**.

You used the Create URL Document step in the last procedure to define this variable to store the URL for making the request.

**Step 5** From the Document drop-down menu, choose **doc**.

This variable stores the results of the HTTP request, issued when the Create XML Document step executes. You use the same variable as for the source document. If you want to reuse the URL in the source document in a subsequent step, use a separate document variable to store the results of that HTTP request.

**Figure 10-3 Create XML Document Customizer Window**

**Step 6** Click **OK**.

Creating the getQuoteClient.aef Script

Chapter 10      Designing a Web-Enabled Client Script

Figure 10-4 Create XML Document Step in the Design Pane

Step 7 You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the Cisco Unified CCX Editor.

The Get XML Document Data Step

Add an Get XML Document Data step to the getQuoteClient.aef script to extract the specified information from the XML document you created in the preceding procedure and store it in a variable.

To configure the Get XML Document Data customizer window, do the following:

Procedure

Step 1 From the Document Palette in the Palette pane, drag an Get XML Document Data step to the Design pane, and then drop it over the Create XML Document step icon.

The Get XML Document Data step icon appears in the Design pane, just below, and on the same level as, the Create XML Document step icon.

Step 2 Right-click the new Get XML Document Data step icon.

A popup menu appears.

Step 3 Choose Properties.

The Get XML Document Data customizer window appears.
Step 4  From the Document drop-down menu, choose doc.
This variable contains the XML document data stored by the Create XML Document step.

Step 5  In the XML Path text field, click the Expression Editor (…) button.
The Expression Editor dialog box appears.
Step 6 In the Expression Editor text field, enter the following expression:
```
"/descendant::STOCKLIST/child::STOCK[attribute::symbol='ABC']/child::LAST"
```
This means that the data to be extracted is from the XML element named LAST, contained in the XML element named STOCKLIST, identified by the symbol ABC.

Step 7 Click OK.

The Expression Editor dialog box closes, and the expression appears in the XML path text field of the Get XML Document Data customizer window.

Step 8 From the Result Data drop-down menu, choose result.

This variable stores the data extracted from the XML document when the Get XML Document step executes.

If you want to reuse the data in the source document to extract other values, use a separate document variable to store the extracted value.

Step 9 Click OK.


You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the Cisco Unified CCX Editor.

---

**The Create Generated Prompt Step**

Add a Create Generated Prompt step to the getQuoteClient.aef script to create the prompt that combines the audio file introducing the information and the information itself.

To configure the Create Generated Prompt customizer window, do the following:

**Procedure**

Step 1 From the Prompt Palette in the Palette pane, drag a Create Generated Prompt step to the Design pane, and then drop it over the Get XML Document Data step icon.
The Create Generated Prompt step icon appears in the Design pane, just below, and on the same level as, the Get XML Document Data step icon.

**Step 2** Right-click the new **Create Generated Prompt** step icon.

A popup menu appears.

**Step 3** Choose **Properties**.

The Create Generated Prompt customizer window appears.

**Step 4** From the Output Prompt drop-down menu, choose **stockprice**.

The **stockprice** variable contains the StockPrice.wav file that plays back the following phrase: “The stock price of the selected company is.” (See The Create URL Document Step, page 10-7).

**Step 5** From the Generator Type drop-down menu, choose **currency**.

The Constructor type text field automatically displays “(amount)”.

**Step 6** In the Argument Information text box, double-click **amount**.

The Set Amount dialog box appears.

**Figure 10-7 Set Amount Dialog Box**

![Set Amount Dialog Box](image)

**Step 7** From the variable drop-down menu, choose **result**.

The **result** variable contains the value obtained by the client script.

**Step 8** Click **OK**.

The Set Amount dialog box closes, and “result” appears under the Value column in the Argument text field.
Step 9  Click **OK**.

The Create Generated Prompt customizer window closes, and the generator type and the output prompt variable appear next to the Create Generated Prompt step icon in the Design pane of the Cisco Unified CCX Editor.

You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the Cisco Unified CCX Editor.
Create Container Prompt Step

Add a Create Container Prompt step to the getQuoteClient.aef script to create the concatenated prompt that combines the stockprice.wav file with the result variable.

To configure the Create Container Prompt customizer window, do the following:

Procedure

Step 1  From the Prompt Palette in the Palette pane, drag a Create Container Prompt step to the Design pane, and then drop it over the Create Generated Prompt step icon. The Create Container Prompt step icon appears in the Design pane, just below, and on the same level as, the Create Generated Prompt step icon.

Step 2  Right-click the new Create Container Prompt step icon. A popup menu appears.

Step 3  Choose Properties. The Create Container Prompt customizer window appears.

Figure 10-9  Configured Create Container Prompt Customizer Window
Step 4  From the Output Prompt drop-down menu, choose **outputPrompt**, as shown in Figure 10-9.

This variable stores the prompt that is played back to the caller.

Step 5  From the Prompt Container Type drop-down menu, choose Concatenation, as shown in Figure 10-9.

For more information on concatenated prompts, which are prompts that combine other prompts, see the *Cisco Unified Contact Center Express Editor Step Reference Guide*.

Step 6  To specify the prompts to be concatenated into **outputPrompt**, click the **Add** button.

The Add Prompt dialog box appears.

*Figure 10-10  Configured Add Prompt Dialog Box*

Step 7  From the Prompt drop-down menu, choose **stockprice**, and then click **OK**, as shown in Figure 10-10.

The Add Prompt dialog box closes, and **stockprice** appears in the Prompts text box, as shown in Figure 10-9.

Step 8  Repeat Steps 6 to 7 to add the **resultPrompt** variable to the Prompts text field, as shown in Figure 10-9.

Step 9  You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the Cisco Unified CCX Editor.
The Play Prompt Step

Add a Play Prompt step to the getQuoteClient.aef script to play back the prompt `outputPrompt` to the caller.

To configure the Play Prompt customizer window, do the following:

**Procedure**

**Step 1**
From the Media Palette in the Palette pane, drag a Play Prompt step to the Design pane, and then drop it over the Create Container Prompt step icon.

The Play Prompt step icon appears in the Design pane, just below, and on the same level as, the Create Container Prompt step icon.

**Step 2**
Right-click the new **Play Prompt** step icon.

A popup menu appears.

**Step 3**
Choose **Properties**.

The Play Prompt customizer window appears, displaying the General tab.

**Step 4**
Click the **Prompt** tab.

The Prompt tab of the Play Prompt customizer window appears.

*Figure 10-11  Play Prompt Customizer Window—Configured Prompt Tab*

**Step 5**
From the Prompt drop-down menu, choose `outputPrompt`, and then click OK.
Creating the getQuoteClient.aef Script

The Play Prompt customizer window closes, and the name of the prompt variable appears next to the Play Prompt step in the Design pane of the Cisco Unified CCX Editor.

You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the Cisco Unified CCX Editor.

---

The Terminate Step

Add the Terminate step to the getQuoteClient.aef script to terminate the connection.

To add a Terminate step, drag an Terminate step from the Contact palette in the Palette pane to the Design pane, and then drop it over the Play Prompt step icon. The Terminate step icon appears in the Design pane, just below, and on the same level as, the Play Prompt step icon. You do not need to configure this step because you do not need to change the default contact choice.

You are now ready to end the getQuoteClient.aef script in the Design pane of the Cisco Unified CCX Editor.

---

The End Step

Use the End step to complete each script you create with the Cisco Unified CCX Editor. The End step needs no configuration and has no customizer window.

To end the getQuoteClient.aef script, follow this procedure:

**Procedure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>From the General palette, drag the End step to the Design pane, and then drop it over the Terminate step icon in the Design pane. The End step icon appears in the Design pane, just below, and on the same level as, the Terminate step icon.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Save the client script as <strong>getQuoteClient.aef</strong>.</td>
</tr>
</tbody>
</table>
Creating the getQuoteClient.aef Script
Designing a Database Script

You can use the Cisco Unified CCX Editor to design scripts that can access information from a specified database.

This section describes the design of a script that can access information in a database. This simple script template, database.aef, uses steps from the Database palette to automatically provide callers with contact information for local physicians.

This chapter contains the following topics:

- An Example Database Script Template, page 11-2
- The Start Step (Creating a Script), page 11-3
- Database Script Variables, page 11-3
- The Accept Step, page 11-5
- The Play Prompt Step, page 11-5
- The DB Read Step, page 11-6
- The Label Step (Physician Loop), page 11-9
- The DB Get Step, page 11-9
- The End Step, page 11-17
An Example Database Script Template

In this sample script template, the script reads all the data from a database table named physician_locator and plays back output one row at a time, looping back and repeating this process until there is no more data.

Figure 11-1 shows the database.aef script template as it appears in the Design pane of the Cisco Unified CCX Editor window.

**Figure 11-1 database.aef Script**

![Diagram of database.aef Script]

Table 11-1 shows the physician_locator database table.

**Table 11-1 Physician_Locator Database Table**

<table>
<thead>
<tr>
<th>ZIP_CODE</th>
<th>CATEGORY</th>
<th>NAME</th>
<th>SPOKEN_NAME</th>
<th>ADDRESS</th>
<th>PHONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>11111</td>
<td>chiropractor</td>
<td>john doe</td>
<td>(audio document)</td>
<td>222 main st. bedrock ca</td>
<td>5551112222</td>
</tr>
<tr>
<td>22222</td>
<td>podiatrist</td>
<td>jane wong</td>
<td>(audio document)</td>
<td>333 oak st. bubble city ny</td>
<td>5552344343</td>
</tr>
</tbody>
</table>
The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click **OK**.

A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar.

Our example script is called database.aef.

Database Script Variables

Begin the database.aef script design process by using the Variable pane of the Cisco Unified CCX Editor to define script variables.

<table>
<thead>
<tr>
<th>ZIP_CODE</th>
<th>CATEGORY</th>
<th>NAME</th>
<th>SPOKEN_NAME</th>
<th>ADDRESS</th>
<th>PHONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>33333</td>
<td>dentist</td>
<td>jim smith</td>
<td>(audio document)</td>
<td>435 state st. oakwood tn</td>
<td>5556458978</td>
</tr>
<tr>
<td>99999</td>
<td>general</td>
<td>tia gomez</td>
<td>(audio document)</td>
<td>382 first st. river city ia</td>
<td>5557674444</td>
</tr>
</tbody>
</table>

Table 11-1  Physician_Locator Database Table (continued)
Figure 11-2 shows the variables of the database.aef script as they appear in the Variable pane of the Cisco Unified CCX Editor.

![Variable Pane of the database.aef Script](image)

Table 11-2 describes the variables used in the database.aef script.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the address of the physician. (See The DB Get Step, page 11-9.)</td>
</tr>
<tr>
<td>Category</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the category of the physician. (See The DB Get Step, page 11-9.)</td>
</tr>
<tr>
<td>Name</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the written name of the physician. (See The DB Get Step, page 11-9.)</td>
</tr>
<tr>
<td>Phone</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the phone number of the physician. (See The DB Get Step, page 11-9.)</td>
</tr>
<tr>
<td>Spoken_Name</td>
<td>Document</td>
<td>null</td>
<td>Stores the audio document of the spoken name of the physician. (See The DB Get Step, page 11-9.)</td>
</tr>
<tr>
<td>Zip_Code</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the Zip code of the physician. (See The DB Get Step, page 11-9)</td>
</tr>
</tbody>
</table>
The Accept Step

Continue the database.aef script by dragging an Accept step from the Contact palette (in the Palette pane of the Cisco Unified CCX Editor window) to the Design pane, and dropping it over the Start step, as shown in Figure 11-1.

**Note**

Since you intend to accept the default triggering contact, no further configuration is necessary for this step.

The Play Prompt Step

Continue the database.aef script by dragging a Play Prompt step from the Media palette into the Design pane.

Configure the Play Prompt step to play a welcome message to the caller, announcing that the script will play back a list of physicians and their addresses. Figure 11-3 shows the configured Prompt tab of the Play Prompt customizer window.

**Figure 11-3** Play Prompt Customizer Window—Configured Prompt Tab

Configure the Play Prompt step as follows:

- General tab
  - Contact—Triggering Contact
The DB Read Step

The step operates on the contact that triggers the execution of the script.

– Interruptible—Yes

External events can interrupt the playing of the prompt. (At this point the script has not yet queued the call, so this configuration has no effect.)

• Prompt tab
  – Prompt—WelcomePrompt

WelcomePrompt is the prompt that the Play Prompt step plays back to welcome the caller.

– Barge in—Yes

The caller can interrupt the prompt playback.

– Continue on Prompt Errors—Yes

In the event of a prompt error, the script continues to play back the next prompt in the sequence or waits for caller input.

• Input tab
  – Flush Input Buffer—No

The system does not erase previously entered input before capturing new caller input.

The DB Read Step

Continue the database.aef script by dragging a DB Read step from the Database palette into the Design pane.

Configure the DB Read step to use SQL (Structured Query Language) commands to read the physician_locator table in the specified database.
Figure 11-4 shows the configured General tab of the DB Read customizer window.

**Figure 11-4  DB Read Customizer Window—Configured General Tab**

Configure the General tab of the DB Read customizer window as follows:

- **DB Resource Name**—`getPhysicians`
  
  This choice names the query that is used by the subsequent DB Get step to read data from the database.

- **Data Source Name**—`ALPINE00`
  
  This choice specifies the database that contains the desired information.
Figure 11-5 shows the configured Field Selector tab of the DB Read customizer window.

Configure the Field Selector tab as follows:

- Enter the SQL command `select * from physician_locator`, which tells the DB Read step to read all the data that exists in the physician_locator table.

The DB Read step has three output branches, Successful, Connection Not Available, and SQL Error. The following sections describe these output branches:

- The Successful Output Branch, page 11-8
- The Connection Not Available Output Branch, page 11-9
- The SQL Error Output Branch, page 11-9

### The Successful Output Branch

If the DB Read step successfully reads the physician_locator table in the specified database, the script executes the Successful output branch.
Configure the Successful output branch of the DB Read step to concatenate all the information extracted from the database and play it back to the caller.

The Successful output branch is discussed in the following sections, beginning with The Label Step (Physician Loop), page 11-9.

The Connection Not Available Output Branch

If the DB Read step does not successfully read the physicianlocator table in the specified database, the script executes the Connection Not Available output branch, and the script goes to the End step.

The SQL Error Output Branch

If the DB Read step cannot execute because of an error in the SQL command, the script executes the SQL Error output branch, and the script goes to the End step.

The Label Step (Physician Loop)

Begin the Successful output branch of the DB Read step by dragging a Label step from the General palette into the Design pane, and dropping it over the Successful icon under the DB Read step icon.

Configure the Label step to provide a target for the beginning of a loop that will repeat until all the names in the database have been read back to the caller.

After the DB Read step, use a DB Get step within a Label step defined as Physician Loop. (See Figure 11-1.)

The DB Get Step

Continue the Successful output branch of the DB Read step by dragging a DB Get step from the Database palette to the Design pane, and dropping it over the Label step icon under the Successful icon under the DB Read step icon.

Then configure the DB Get step to retrieve the information in the physicians_locator database.
Figure 11-6 shows the configured General tab of the DB Get customizer window.

Figure 11-6  DB Get Customizer Window—Configured General Tab

In the DB Resource Name text field, specify “getPhysicians”, which is the query that retrieves one row of data at a time from the physician_locator table.
Figure 11-7 shows the configured Field Selection tab of the DB Get customizer window.

Figure 11-7  DB Get Customizer Window—Configured Field Selection Tab

Use the Field Selection tab to associate each field in the database table with a local variable.

The DB Get step has three output branches, Successful, No Data, and SQL Error. (See Figure 11-1.) These following sections describe these output branches:

- The Successful Output Branch, page 11-11
- The No Data Output Branch, page 11-13
- The SQL Error Output Branch, page 11-17

The Successful Output Branch

If the DB Get step successfully obtains data from the database table and stores the data in the defined variables, the script executes the Successful output branch.

Configure the Successful output branch of the DB Get step to concatenate all the information extracted from the database, play it back to the caller.
The Successful output branch contains two steps, discussed in the following sections:

- The Play Prompt Step, page 11-12
- The Goto Step (Physician Loop), page 11-13

The Play Prompt Step

Begin the Successful output branch of the DB Get step by dragging a Play Prompt step from the General palette to the Design pane, and dropping it over the Successful icon under the DB Get step icon.

Then configures the Play Prompt step to play back to the caller the information retrieved from the database table.

Figure 11-8 shows the configured Prompt tab of the Play Prompt customizer window.

Figure 11-8  Play Prompt Customizer Window—Configured Prompt Tab

Set the Prompt variable to the following expression:


This expression represents a prompt concatenation where the Play Prompt step plays back the Document variable Spoken_Name as a prompt.
DP[250] stands for 250 milliseconds of silence. All the $[xx]$ elements represent the \( xx \) String variables that the Play Prompt step converts to a prompt that spell out the contents of the variables.

**The Goto Step (Physician Loop)**

End the Successful output branch of the DB Get step by dragging a Goto step from the General palette to the Design pane, and dropping it over the Play Prompt step icon under the Successful icon under the DB Get step icon, as shown in Figure 11-1.

Then configure the Goto step to instruct the script to loop back to the DB Get step and continue to retrieve a row of data from the table each time this step executes.

When the script reads every row of data and no data is found, the script automatically drops down to the DB Get step No Data output branch. (See The No Data Output Branch, page 11-13.)

**The No Data Output Branch**

If the DB Get step does not find any data in the database table, or reaches the end of the table, the script executes the No Data output branch.

The No Data output branch contains four steps, discussed in the following sections:

- The DB Write Step, page 11-13
- The DB Release Step, page 11-16
- The Terminate Step, page 11-16
- The End Step, page 11-17

**The DB Write Step**

Begin the No Data output branch of the DB Get step by dragging a DB Write step from the Database palette to the Design pane, and dropping it over the No Data icon under the DB Get step icon, as shown in Figure 11-1.

Then configure the DB Write step to search the database table for entries for which the zip code is 99999 and delete them from the table.
Figure 11-9 shows the configured General tab of the DB Write customizer window.

Figure 11-9 DB Write Customizer Window—Configured General Tab

Configure the General tab of the DB Write customizer window as follows:

- **DB Resource Name**—**Next**
  
  You assign this name to identify this database query.

- **Data Source Name**—**ALPINE00**.
  
  This variable specifies the database that contains the desired information.
Figure 11-10 shows the configured SQL tab of the DB Write customizer window.

Configure the SQL tab as follows:

- Enter SQL Comments—`delete from physician_locator where zip_code = 99999`

  This SQL command tells the step what to write to the database table.

Using the data in Table 11-1, the DB Write step deleted the last row of the table.

The DB Write step has the following three output branches, (each of which fall through to the DB Release step):

- Successful—The DB Write step successfully deleted the specified information.
- Connection Not Available—The DB Write step was not successful because a connection was not found.
- SQL Error—The DB Write step was not successful because of a SQL command error.
The DB Release Step

Continue the No Data output branch of the DB Get step by dragging a DB Release step from the Database palette to the Design pane, and dropping it over the DB Write step icon under the No Data output branch of the DB Get step icon, as shown in Figure 11-1.

Then configure the DB Release step to close the SQL query and release the allocated resources.

The system returns the released DB connection to the connection pool, and no longer associates data with this connection.

Figure 11-11 shows the configured DB Release customizer window.

**Figure 11-11 Configured DB Release Customizer Window**

In the DB Resource Name text field, specify getPhysicians as the DB Resource to be released.

The Terminate Step

Continue the No Data output branch of the DB Get step by dragging a Terminate step from the Contact palette to the Design pane, and dropping it over the DB Release step icon under the No Data output branch of the DB Get step icon, as shown in Figure 11-1.

Then configure the Terminate step to terminate the outgoing call.
The End Step

End the No Data output branch of the DB Get step by dragging an End step from the General palette to the Design pane, and dropping it over the DB Terminate step icon under the No Data output branch of the DB Get step icon, as shown in Figure 11-1.

The End step ends the script and releases all system resources. The End step requires no configuration and has no customizer.

The SQL Error Output Branch

If the DB Get step does not execute because of a SQL command error, the script executes the SQL Error output branch, and the script falls through to the End step to end the script.

The End Step

Conclude the database.aef script by dragging an End step from the General palette into the Design pane, and dropping it over the DB Read step.

The End step ends the script and releases all system resources. The End step requires no configuration and has no customizer.
The End Step
Designing a Cisco Unified IP IVR Script

You can use the Cisco Unified CCX Editor to design scripts that take advantage of Cisco Unified IP IVR (Interactive Voice Response) capability. This section describes the design of an AutoAttendant (AA) script template, aa.aef, which is included with the Cisco Unified CCX Editor. This script can work in a Cisco Unified IP IVR system or a traditional ACD IVR system.

This chapter contains the following topics:

- The Sample AutoAttendant (aa.aef) Script Template, page 12-2
- The Start Step (Creating a Script), page 12-5
- The aa.aef Script Variables, page 12-6
- The Getting the Contact Information and Setting Up the Prompts, page 12-10
- Determining if the System is ASR Enabled, page 12-19
- Creating and Setting an Error Message Prompt, page 12-22
- Recognizing Input, page 12-24
- The DialByExtn Output Branch of the Simple Recognition Step, page 12-27
- The Successful Output Branch (of Get Digit String), page 12-30
- Confirming the Caller Input, page 12-35
- Localizing the Prompt Language, page 12-36
- Completing the Input Confirmation, page 12-38
- Transferring the Call, page 12-41
The Sample AutoAttendant (aa.aef) Script Template

This simple script template answers a call, asks for the name or extension of the person to whom the caller would like to be connected, and transfers the call.

Note
You can modify the aa.aef file to create your own Cisco Unified IP IVR script. Please make a backup copy of the aa.aef file before modifying it, so that you always have access to the original file.

The aa.aef script template is a good example of how you can use various steps: steps in the Media palette to receive caller input; the Switch step in the General palette to switch based on a language; steps in the Prompt palette to create a variety of prompts; and steps in the Media palette to specify grammars that recognize caller input.

The aa.aef script template is also a good example of a media-neutral script that accepts either speech or Dual Tone Multi-Frequency (DTMF) input from the caller.

The aa.aef script can handle the following two media types:

- Cisco Media Termination (CMT)—Simple media termination, either playing a prompt or receiving DTMF digits
- Automatic Speech Recognition (ASR)—Speech recognition media
Figure 12-1 shows the aa.aef script as it appears in the Design pane of the Cisco Unified CCX Editor window.

The aa.aef script performs the following tasks:

1. Accepts the call.

2. Plays a welcome prompt, asking the caller to perform one of three actions:
   - Press or say “1” to enter an extension number
   - Press or say “2” to enter the name of a person

If the caller chooses to spell a name, the script maps the letters entered against the available users defined in a specified directory and transfers the call to the primary extension of the user.
If more than one match occurs, the script prompts the caller to choose the correct extension. If too many matches occur, the script prompts the caller to enter more characters. If no match occurs, the script prompts the caller to enter another name.

- Press or say “0” to speak to an operator

Configure this welcome prompt as a parameter, which means that the administrator can configure this prompt when provisioning an application with this script. (For more information on provisioning applications, see the Cisco Unified Contact Center Express Administration Guide.)

3. When the script receives a valid extension, it transfers the call.

- If the destination is busy, the caller hears the system prompt, “The phone number you are trying to reach is currently busy.”
- If the destination is out of service, the caller hears the system prompt, “The phone number you are trying to reach is currently out of service.”

The aa.aef script uses audio prompts stored as .wav files in the wfaxvid_1001\prompts\system\en_Use\AA\ directory and installed automatically with the Cisco Unified CCX Engine.

These audio prompts include the following:

- AAMainMenu_ASR.wav—Provides a menu of choices: press 1 or say “one” to enter an extension, press 2 or say “two” to enter the first few characters of a user name, or press 0 or say “zero” to speak to an operator.
- AASorry.wav—States that the transfer was not successful.
- AABusyExtn.wav—States that the dialed extension is busy.
- AAInvalidExtn.wav—States that the entered extension is not a valid choice.
- AAExntOutofService.wav—States that the entered extension is no longer in service.
- AAWelcome.wav—Greets the caller.

In the AutoAttendant application, you configure the filename and pathname for the AAWelcome.wav prompt by running the AA configuration wizard from the main menu of the Cisco Unified CCX Administration web interface. You can choose to change the default welcome prompt to reference a customized prompt.
Chapter 12  Designing a Cisco Unified IP IVR Script

The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click **OK**.

A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

Begin to build the sample script by choosing **File > New** from the Cisco Unified CCX Editor menu bar. The Cisco Unified CCX Editor places a Start step in the Design pane of the Cisco Unified CCX Editor window.

The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar.

Our example script is called aa.aef.

---

Note  For custom scripts, you need to record your own prompts. To record a prompt, see the Recording step information in the *Cisco Unified Contact Center Express Editor Step Reference Guide* or the *Cisco Unified Contact Center Express Administration Guide*. 

---
The aa.aef Script Variables

Begin the aa.aef script design process by using the Variable pane of the Cisco Unified CCX Editor to define script variables.

Figure 12-2 shows the variables of the aa.aef script as they appear in the Variable pane of the Cisco Unified CCX Editor.

![Variables Pane of the aa.aef Script](image-url)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Value</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AlwaysEndDialogsByName</td>
<td>boolean</td>
<td>false</td>
<td></td>
</tr>
<tr>
<td>MaxTry</td>
<td>int</td>
<td>3</td>
<td>Parameter</td>
</tr>
<tr>
<td>aaSelected</td>
<td>boolean</td>
<td>false</td>
<td></td>
</tr>
<tr>
<td>attempts</td>
<td>int</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>extnPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>extnXfer</td>
<td>String</td>
<td>&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>firstName</td>
<td>String</td>
<td>&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>fullNamePrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>grammar</td>
<td>Grammar</td>
<td>{}</td>
<td></td>
</tr>
<tr>
<td>language</td>
<td>Language</td>
<td>[en_US]</td>
<td></td>
</tr>
<tr>
<td>lastName</td>
<td>String</td>
<td>&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>newPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>name</td>
<td>String</td>
<td>&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>namePrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>openExtn</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Parameter</td>
</tr>
<tr>
<td>prehPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>prompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>spokenName</td>
<td>Document</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>thisPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td></td>
</tr>
<tr>
<td>user</td>
<td>User</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>welcomePrompt</td>
<td>Prompt</td>
<td>[SPA/MJWelcome.wav]</td>
<td>Parameter</td>
</tr>
</tbody>
</table>
Table 12-1 describes the variables used in the aa.aef script.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>AlwaysEnable</td>
<td>Boolean</td>
<td>False</td>
<td>Stores the information that indicates whether Dial By Name is always enabled for the script (regardless of the language associated with the incoming call or the type of media). (See If ASR, page 12-19.)</td>
</tr>
<tr>
<td>MaxRetry</td>
<td>Integer</td>
<td>3</td>
<td>Stores the maximum retries a caller can make in this script before the script terminates the call. (See Localizing the Prompt Language, page 12-36.) Define this variable as a parameter so that the administrator can configure it when provisioning an application with this script.</td>
</tr>
<tr>
<td>asr</td>
<td>Boolean</td>
<td>False</td>
<td>Stores the information that indicates whether or not ASR is enabled for this call. (See Get Contact Info, page 12-11.)</td>
</tr>
<tr>
<td>attempts</td>
<td>Integer</td>
<td>1</td>
<td>Stores the number of times the script has attempted confirmation. (See Localizing the Prompt Language, page 12-36.)</td>
</tr>
<tr>
<td>extnPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td>Prompts the caller to either press or say the extension number. (See The DialByExtn Output Branch of the Simple Recognition Step, page 12-27.)</td>
</tr>
<tr>
<td>extnXfer</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the extension to which the caller is transferred. (See The Get Digit String Step, page 12-29.)</td>
</tr>
<tr>
<td>firstName</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the first name of the selected user.</td>
</tr>
</tbody>
</table>
### Table 12-1 Variables in the aa.aef Script (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>fullNamePrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td>Stores the full name of the user to be played back.</td>
</tr>
<tr>
<td>grammar</td>
<td>Grammar</td>
<td>G[]</td>
<td>Stores the value SG[AA/AAWantToCall] assigned to it by the Set step.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The Explicit Confirmation Step, page 12-62.)</td>
</tr>
<tr>
<td>language</td>
<td>Language</td>
<td>L[en_US]</td>
<td>Stores the current language associated with the call.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Default: English (United States)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See Get Contact Info, page 12-11.)</td>
</tr>
<tr>
<td>lastName</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the last name of the selected user.</td>
</tr>
<tr>
<td>menuPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td>Stores the result from the Create Conditional Prompt step. This prompt</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>presents the initial menu of options for calling by name or by extension.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The First Create Conditional Prompt Step, page 12-12.)</td>
</tr>
<tr>
<td>name</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the written name of the person the caller is trying to reach.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The Successfully Receiving Caller Input, page 12-51.)</td>
</tr>
<tr>
<td>namePrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td>Asks the caller to say the name of the person the caller wants to reach.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The First Create Container Prompt Step, page 12-14.)</td>
</tr>
</tbody>
</table>
The aa.aef Script Variables

Table 12-1    Variables in the aa.aef Script (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>operExtn</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the Operator extension the Call Redirect step uses to transfer the call to the operator. (See The Call Redirect Step, page 12-80.) Define this variable as a parameter so that the administrator can configure it when provisioning an application with this script.</td>
</tr>
<tr>
<td>prefixPrompt</td>
<td>Prompt</td>
<td>P[]</td>
<td>Informs the caller of the status of the call. This value is dependent on many steps. (See The DialByExtn Output Branch of the Simple Recognition Step, page 12-27.)</td>
</tr>
<tr>
<td>prompt</td>
<td>Prompt</td>
<td>P[]</td>
<td>Used for a variety of purposes throughout the script. (See The First Create Container Prompt Step, page 12-14.)</td>
</tr>
<tr>
<td>spokenName</td>
<td>Document</td>
<td>null</td>
<td>Stores the audio document of the spoken name of the person the caller is trying to reach. (See The Successfully Receiving Caller Input, page 12-51.)</td>
</tr>
</tbody>
</table>
| ttsPrompt     | Prompt        | P[]   | Contains the TTS prompt for the user selected. 

Note: When TTS is available, the system can use this prompt instead of spelling back the full user name.
Chapter 12  Designing a Cisco Unified IP IVR Script

The Getting the Contact Information and Setting Up the Prompts

This section contains the following:

- Accept, page 12-10
- Get Contact Info, page 12-11
- The First Create Conditional Prompt Step, page 12-12
- The Second Create Conditional Prompt Step, page 12-13
- The First Create Container Prompt Step, page 12-14
- The Third Create Conditional Prompt Step, page 12-16
- The Play Prompt Step, page 12-16
- The Label Step (MainMenu), page 12-18

Accept

Continue to build the aa.aef script by dragging an Accept step from the Contact palette (in the Palette pane of the Cisco Unified CCX Editor window) to the Design pane, and dropping it over the Start step.

Table 12-1  Variables in the aa.aef Script (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>user</td>
<td>User</td>
<td>null</td>
<td>Identifies the user that the caller chooses with the Name To User step.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The Name To User Step, page 12-48.)</td>
</tr>
<tr>
<td>welcomePrompt</td>
<td>Prompt</td>
<td>P[AA\Welcome.wav]</td>
<td>Greets the caller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The Play Prompt Step, page 12-16.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Define this variable as a parameter so that the administrator can configure it when provisioning an application with this script.</td>
</tr>
</tbody>
</table>
Because you intend to accept the default contact, no configuration is necessary for this step.

**Get Contact Info**

Continue the aa.aef script by dragging a Get Contact Info step from the Contact palette to the Design pane, and dropping it over the Accept step.

Then configure the Get Contact Info step to retrieve information about the contact that the script uses. This determines which prompts to use, based on whether or not Automatic Speech Recognition (ASR) is enabled, and, if so, what language the script uses.

*Figure 12-3* shows the configured customizer window of the Get Contact Info step.

*Figure 12-3 Configured Get Contact Info Customizer Window*
Configure the Get Contact Info customizer window as follows:

- **Contact**—**Triggering Contact**
  The contact that triggered the script remains the contact for this step.

- **Attribute/Variable**—**language** and **asr**
  The two variables for which the Get Contact Info step obtains values. Subsequent If steps use these values to determine the language context of the call and whether or not ASR is enabled for this call.

### The First Create Conditional Prompt Step

Continue to build the aa.aef script by dragging the first of three Create Conditional Prompt steps from the Prompt palette to the Design pane, and dropping it over the Get Contact Info step.

Configure the first Create Conditional Prompt step to play back one of two prompts, according to whether or not ASR is enabled for this call.

**Figure 12-4** shows the configured customizer window for the first Create Conditional Prompt step.

**Figure 12-4 Configured Create Conditional Prompt Customizer Window**

Configure the first Create Conditional Prompt step as follows:

- **Condition Expression**—**asr**
The Boolean variable for which the Create Conditional Prompt step evaluates the Boolean expression of the variable (as defined by you when defining variables).

- True Prompt—SP[AA\AAMainMenu\_ASR]
The script plays back this .wav file if the condition evaluates to true; that is, if ASR is enabled for this call.

- False Prompt—SP[AA\AAMainMenu]
The script plays back this .wav file if the condition evaluates to false; that is, if ASR is not enabled for this call.

- Output Prompt—menuPrompt
The variable that stores the prompt value resulting from this Create Conditional Prompt step.

The Second Create Conditional Prompt Step

Continue to build the aa.aef script by dragging the second of three Create Conditional Prompt steps from the Prompt palette to the Design pane, and dropping it over the first Create Conditional Prompt step.

Configure the second Create Conditional Prompt step to play back one of two prompts, according to whether or not ASR is enabled for this call. The first prompt offers the caller the option to either press or say an extension; the second prompt offers the caller only the choice of pressing the extension.

Configure the properties of the second Create Conditional Prompt step in the same manner as the first Create Conditional Prompt step (see The First Create Conditional Prompt Step, page 12-12), with the following two exceptions:

- True Prompt—SP[AA\AAEnterExtn\_ASR]
The script plays back this .wav file if the condition evaluates to true; that is, if ASR is enabled for this call.

- False Prompt—SP[AA\AAEnterExtn]
The script plays back this .wav file if the condition evaluates to false; that is, if ASR is not enabled for this call.
The Getting the Contact Information and Setting Up the Prompts

Note The third Create Conditional Prompt step appears just after the next step, the first Create Container Prompt step.

The First Create Container Prompt Step

Continue the aa.aef script by dragging a Create Container Prompt step from the Prompt palette to the Design pane, and dropping it over the second Create Conditional Prompt step.

Then configure the Create Container Prompt step to ask the caller to speak the name of the desired person.

This container prompt is an *escalating* container prompt, which consists of a series of prompts, each of which provides more information to the caller. If the first prompt attempt does not receive valid input, the step prompts the caller with the next prompt in the sequence. This progression continues until either the caller returns valid input or the step reaches the last prompt in the sequence.
Figure 12-5 shows the configured Create Container Prompt customizer window.

Configure the Create Container Prompt customizer window as follows:

- **Prompt Container Type**—*escalating*
  
  The prompt container type is escalating, a series of prompts that provides increasing amounts of information.

- **Prompts List Box**
  - SP[AA\AANameDial0_ASR]
  - SP[AA\AANameDial1_ASR]
  - SP[AA\AANameDial2_ASR]

  The three prompts that are played, one after the other, if the media steps must use all three (or more) attempts at eliciting a valid response.

- **Override Language (optional)**—(not chosen)
You can check this option in order to specify a different language than the original language context of the contact.

- Output Prompt—**namePrompt**
  This prompt results from the Create Container Prompt step.

### The Third Create Conditional Prompt Step

Continue to build the aa.aef script by dragging the third of three Create Conditional Prompt steps from the Prompt palette to the Design pane, and dropping it over the Create Container Prompt step.

Configure the third Create Conditional Prompt step to play back one of two prompts, according to whether or not ASR is enabled for this call.

Configure the properties of the third Create Conditional Prompt step in the same manner as the first Create Conditional Prompt step (see *The First Create Conditional Prompt Step, page 12-12*), with the following two exceptions:

- **True Prompt—** **namePrompt**
  The script plays back **namePrompt** (as configured by the previous Create Container Prompt step) if the condition evaluates to true; that is, if ASR is enabled for this call.

- **False Prompt—** **AA/AANNameDial**
  If ASR is not enabled, then the value of **namePrompt** becomes the system prompt **AA/AANNameDial** (one of the system prompts included with the aa.aef file), which prompts the caller to spell the name of the desired person by pressing digits.

### The Play Prompt Step

Continue the aa.aef script by dragging a Play Prompt step from the Prompt palette to the Design pane, and dropping it over the third Create Conditional Prompt step, as shown in *Figure 12-1*.

Then configure the Play Prompt step to plays the prompts that the other Prompt steps create.
Figure 12-6 shows the configured Prompt tab of the Play Prompt customizer window.

Figure 12-6  Play Prompt Customizer Window—Configured Prompt Tab

Configure the three tabs of the Play Prompt customizer window as follows:

- **General tab**
  - **Contact**—Triggering contact
    The contact that triggered the script remains the contact for this step.
  - **Interruptible**—No
    No external events can interrupt the playback of the prompt.

- **Prompt tab**
  - **Prompt**—welcomePrompt
    This prompt plays back to greet the caller.
  - **Barge In**—No
    The caller must listen to the whole prompt before responding.
  - **Continue on Prompt Errors**—Yes
    If a prompt error occurs, the script continues to play the next prompt, or, if this is the last prompt in the sequence, the script waits for caller input.

- **Input tab**
  - **Flush Input Buffer**—Yes
The step erases previous input.

**The Label Step (MainMenu)**

Continue the aa.aef script by dragging a Label step from the General palette to the Design pane, and dropping it over the Play Prompt step.

Then configure the Label step to create a target for the script. This target is used later in the script when an output branch reaches a timeout, unsuccessful, or otherwise dead-end position and the script returns the caller to the Label step to try again.

The Label step is named MainMenu.

**Note**  
For an example of configuring the Label step, see “The Label Step” section on page 6-10.
Determining if the System is ASR Enabled

This section contains the following:

- If ASR, page 12-19
- The True Output Branch, page 12-20
- The False Output Branch, page 12-20
- The Switch Step, page 12-21

If ASR

Continue the aa.aef script by dragging an If step from the General palette to the Design pane, and dropping it over the Label step.

Then configure the If step to determine which segment of the script handles the contact, depending on whether or not the system is ASR-enabled and Name To User capability is enabled or supported.

The If step evaluates the expression “asr || AlwaysEnableDialByName” (“either ASR is enabled, or the system allows the caller to enter the person’s name to which they would like to be connected”).

Note

For an example of configuring the If step, see “The If Step” section on page 7-17.
Figure 12-7 shows the If step’s two output branches, True and False.

Figure 12-7   If Step Scripting

The following sections describe the two output branches of the If step:

• The True Output Branch, page 12-20
• The False Output Branch, page 12-20

The True Output Branch

If the If step evaluates the expression “asr || AlwaysEnableDialByName” as true, the script executes the True output branch, which allows the script to fall through to the subsequent Create Container Prompt step in the script.

Note: Use an Annotate step to contain notes describing the function of the branch. (This step has no impact on script functionality.) For more information about using the Annotate step, see “The Annotate Step” section on page 8-6.

The False Output Branch

If the If step evaluates the expression “asr || AlwaysEnableDialByName” as false, the script executes the False output branch.
Configure the False output branch of the If step to use a Switch step to allow the script to automatically enable the Dial By Name feature based on the language associated with the call. If the language is either English or Canadian French, then the script prompts the caller for the option to Dial By Name.

The False output branch contains the Switch step, discussed below.

**The Switch Step**

Configure the False output branch of the If step by dragging a Switch step from the General palette to the Design pane, and dropping it over the False icon under the If step.

Then configure the Switch step to evaluate the value of the `language` variable (as retrieved by the previous Get Contact Info step) and to switch the language context of the call accordingly.

*Figure 12-8* shows the configured Switch customizer window.

*Figure 12-8  Configured Switch Customizer Window*
Configure the Switch customizer window as follows:

- **Switch Value**—`language`
  The variable that stores the current language of the call.
- **Case(s)**—`L[en]`, `L[fr_CA]`
  The language options available for the call.

The Switch step has three output branches, based on the `language` variable as specified in the Switch Expression text field: `L[en]`, `L[fr_CA]`, and Default. The following sections describe the three output branches of the Switch step:

- **The `L[en]` Output Branch**, page 12-22
- **The `L[fr_CA]` Output Branch**, page 12-22
- **The Default Output Branch**, page 12-22

**The `L[en]` Output Branch**
If the Switch step determines that English is the language context of the call, the script executes the `L[en]` output branch and the script uses English in subsequent steps.

**The `L[fr_CA]` Output Branch**
If the Switch step determines that Canadian French is the language context of the call, the script executes the `L[fr_CA]` output branch, and the script uses Canadian French in subsequent steps.

**The Default Output Branch**
If the Switch step determines that Dial By Name is not supported for this call, the script executes the Default output branch.

Configure the Default output branch of the Switch step to use the Goto step to send the caller to the DialByExtn Label step under the Simple Recognition step. (See **The Get Digit String Step**, page 12-29.)

---

**Creating and Setting an Error Message Prompt**

- **The Second Create Container Prompt Step**, page 12-23
- **The Set Step**, page 12-23
The Second Create Container Prompt Step

Continue the aa.aef script by dragging a second Create Container Prompt step from the Prompt palette to the Design pane, and dropping it over the If step.

Then configure the second Create Container Prompt step to create an escalating prompt called prompt, which combines menuPrompt (the first prompt created in the script; see the “The First Create Conditional Prompt Step” section on page 12-12) with a new prompt called prefixPrompt.

The prefixPrompt variable initializes with no value in the beginning, but as the caller loops through the application and fails to be connected to a destination, this variable holds an error message to be played back to the caller.

Use an escalating prompt so that the error message plays only on the first attempt of the subsequent Simple Recognition step, which uses the prompt created by this step.

Configure this Create Container Prompt step as follows:

- **Type**—escalating
  - This step creates an escalating prompt.
- **Prompts List Box**
  - prefixPrompt + menuPrompt
  - menuPrompt
  - This specifies the prompt phrases that are played if the Media step uses more than one attempt at eliciting a valid response from the caller.
- **Override Language (optional)—(not chosen)**
  - You can check this option in order to specify a different language than the original language context of the contact.
- **Output Prompt**—prompt
  - This prompt results from this (second) Create Container Prompt step.

The Set Step

Continue the aa.aef script by dragging a Set step from the General palette to the Design pane, and dropping it over the second Create Container Prompt step.
Then configure the Set step to set the value of `prefixPrompt` to `P[ ]`, which means it is empty.

This script uses this Set step to return callers to the MainMenu Label step to listen to menu options again, in order to clear this prompt of values that the script may have previously assigned.

**Recognizing Input**

Continue the aa.aef script by dragging a Simple Recognition step from the Media palette to the Design pane, and dropping it over the Set step.

Then configure the Simple Recognition step to receive either speech or digits in response to prompts. The script steps under the Simple Recognition step transfer the call to the proper extension if the script receives valid input from the caller.

---

**Note**

The Simple Recognition step is similar to the Menu step, with the added advantage that it allows you to utilize user-defined grammar for matching user input with options you provide.

Use this step to configure grammar variables that store the words or digits that the script must recognize in order to dial an extension number, a name, or the operator, depending on the input from the caller.
Figure 12-9 shows the configured Filter tab of the Simple Recognition customizer window.

**Figure 12-9  Simple Recognition Customizer Window—Configured Filter Tab**

Configure the Simple Recognition customizer window as follows:

- **General tab**
  - **Contact**—**Triggering Contact**
    The contact that triggered this script remains the contact for this step.
  - **Interruptible**—**Yes**
    External events can interrupt the execution of this step.

- **Prompt tab**
  - **Prompt**—**prompt**
    The step plays this prompt back to the caller.
  - **Barge In**—**Yes**
    The caller can respond without first having to listen to the playback of the entire prompt.
- **Continue on Prompt Errors**—Yes
  
  If a prompt error occurs, the script continues to play the next prompt, or, if this is the last prompt in the sequence, the script waits for caller input.

- **Input tab**
  - **Timeout (in sec)**—5
    
    After playing all prompts, the script waits 5 seconds for initial input from the caller before re-attempting with a timeout error, or, if this was the last attempt, the script executes the Timeout output branch.
  
  - **Maximum Retries**—5
    
    The script will retry to receive input 5 times before sending the script to the Unsuccessful output branch.
  
  - **Flush Input Buffer**—No
    
    The script saves previous input.

- **Filter tab**
  
  - **Grammar**—SG[AA\AAMainMenu]
    
    The system grammar that the step uses to recognize caller input.
  
  - **Options Tag/Connection list box**—DialByExtn, DialByName, Operator
    
    The list of options the menu offers to the caller. The tags map to the output points to determine the execution of branching output paths.

  **Note**
  
  The tag values must correspond to the tag values defined in the grammar.
The Simple Recognition step contains two built-in output branches: Timeout and Unsuccessful. Add three output branches, as shown in Figure 12-10, corresponding to the three choices menuPrompt gives the caller: to dial by extension, dial by name, or to dial the operator.

**Figure 12-10 Simple Recognition Step Output Branches**

The Timeout and Unsuccessful output branches need no scripting. If the script reaches either of these branches, it falls through to the next step on the same level as the Simple Recognition step, the second Play Prompt step (see The Play Prompt Step, page 12-79).

The following sections describe the three designer-specified output branches, each of which is described in its own section:

- The DialByExtn Output Branch of the Simple Recognition Step, page 12-27
- The DialByName Output Branch of the Simple Recognition Step, page 12-46
- The Operator Output Branch of the Simple Recognition Step, page 12-73

**The DialByExtn Output Branch of the Simple Recognition Step**

If the caller chooses menu option “1” (press or say an extension number) when given the option by the Simple Recognition step, the script executes the DialByExtn output branch.

Then configure the DialByExtn output branch of the Simple Recognition step to receive the extension number provided by the caller.
Figure 12-11 shows the scripting under the DialByExtn output branch of the Simple Recognition step.

The DialByExtn contains the following steps, the last of which is discussed in its own section:

- The Label Step, page 12-28
- The Create Container Prompt Step, page 12-28
- The Set Step, page 12-29
- The Get Digit String Step, page 12-29

The Label Step

Begin the DialByExtn output branch of the Simple Recognition step by dragging a Label step from the General palette to the Design pane, and dropping it over the DialByExtn icon under the Simple Recognition step.

Then configure the Label step to create a target for the Goto step under the default output branch of the If step above. (See If ASR, page 12-19.)

The Create Container Prompt Step

Continue the DialByExtn output branch of the Simple Recognition step by dragging a Create Container Prompt step from the General palette to the Design pane, and dropping it over the Label step (DialByExtn) icon under the DialByExtn icon.
Then configure the Create Container Prompt step to create a concatenated container prompt, consisting of `prefixPrompt` (see The Second Create Container Prompt Step, page 12-23) and `extnPrompt`, a preset prompt that prompts the caller to either press or say the extension number (with a possible error message when looping back if there is an error connecting to the destination).

### The Set Step

Continue the DialByExtn output branch of the Simple Recognition step by dragging a Set step from the General palette to the Design pane, and dropping it over the Create Container Prompt icon under the DialByExtn icon.

Then configure the Set step to set the value of `prefixPrompt` to P[], which clears `prefixPrompt` of any values that the script may have previously assigned.

### The Get Digit String Step

Conclude the DialByExtn output branch of the Simple Recognition step by dragging a Get Digit String step from the Media palette to the Design pane, and dropping it over the Set step icon under the DialByExtn icon.

Then configure the Get Digit String step to receive the digits entered by the caller in response to `prompt`, stores them in a result digit string variable named `extnXfer`, and then attempt to transfer the call.

---

**Note**

For more information on configuring the Get Digit String step, see “The Get Digit String Step” section on page 7-25.

The Get Digit String has three output branches: Successful, Timeout, and Unsuccessful.
Figure 12-12 shows the output branches of the Get Digit String step.

**Figure 12-12 Get Digit String Output Branches**

-Successful
-Timeout
-Unsuccessful

The following sections describe the three output branches of the Get Digit String step:
- The Timeout Output Branch, page 12-30
- The Unsuccessful Output Branch, page 12-30
- The Successful Output Branch (of Get Digit String), page 12-30

**The Timeout Output Branch**
If the Get Digit String step does not receive input before reaching the timeout limit, the script executes the Timeout output branch, and the script skips the rest of the output branches of the Simple Recognition step and falls through to the second Play Prompt step (see The Play Prompt Step, page 12-79).

**The Unsuccessful Output Branch**
If the Get Digit String step is unsuccessful in receiving valid input, the script executes the Unsuccessful output branch, and the script skips the rest of the output branches of the Simple Recognition step and falls through to the second Play Prompt step (see The Play Prompt Step, page 12-79).

**The Successful Output Branch (of Get Digit String)**
If the Get Digit String step successfully receives caller input, the script executes the Successful output branch.
Figure 12-13 shows the scripting of the Successful output branch of the Get Digit String step.

Figure 12-13  Get Digit String—Successful Branch Scripting

Figure 12-13

Configure the Successful output branch of the Get Digit String step to transfer the call.

The Successful output branch of the Get Digit String step contains an If step, discussed in the section that follows.
Transferring the Call if Recognition Is Successful

Continue the aa.aef script by dragging an If step from the General palette to the Design pane, and dropping it over the Get Digit String step. This section determines which part of the script handles the contact.

In the customizer window of the If step, set the condition `toextnXfer == ""`

The following sections describe the two output branches of the If step:

- The True Recognition Branch, page 12-32
- The False Recognition Branch, page 12-34

The True Recognition Branch

The True Output branch of the If step contains the following steps:

- Setting the Retry Message, page 12-32
- Configuring the Number of Retries, page 12-33

Setting the Retry Message

From the General palette, drag the Set step below the True label and set the value of the `prefixPrompt` variable.

Configure the Set Customzer window as follows:
The Successful Output Branch (of Get Digit String)

- Variable—prefixPrompt
  The prefixPrompt is used informing the caller of the status of the call.
- Value— SP[AA\AAInvalidExtn] + DP[500]

Configuring the Number of Retries

From the General palette, drag the If step below the Set step.

Configure the If step in the customizer window so that the condition reads Attempts < MaxRetry.

The Retry Branch

The True branch of the If step contains:

- Increment Step, page 12-33
- Goto MainMenu Step, page 12-34

Increment Step

From the General palette, drag the Increment step and place it under the True branch. In the Increment step customizer window set the value of the Increment variable to Attempts.
The Successful Output Branch (of Get Digit String)

Goto MainMenu Step
To finish the True branch of the If step, from the General palette, drag the Goto step under the Increment step and in the customizer window choose the MainMenu label.

The False Recognition Branch
The False Output branch of the If transfer step contains the following steps:

- Drag a Create Generated Prompt step from the Prompt palette to the Design pane and drop it on the False output of the Successful icon under the Get Digit String step., page 12-35
- Use the Create Language Prompt step to localize the prompt with a specific language., page 12-36
Confirming the Caller Input

Drag a Create Generated Prompt step from the Prompt palette to the Design pane and drop it on the False output of the Successful icon under the Get Digit String step.

Then configure the Create Generated Prompt step to create a prompt to play back to the caller the digits received, in order to confirm the caller input before transferring the call.

Figure 12-14 shows the configured Create Generated Prompt customizer window.

Figure 12-14  Configured Create Generated Prompt Customizer Window

Configure the Create Generated Prompt customizer window as follows:
Localizing the Prompt Language

Use the Create Language Prompt step to localize the prompt with a specific language.
Configure the Create Language Prompt customizer window as follows:

- **Options— Language and Prompt**
  
Enter all the languages you want and all the prompt expression names or prompt expressions.

- **Output Prompt— telephone.number**
  
Enter the script variable where the prompt that results from the Create Language Prompt step will be stored.

You can use the Create Language Prompt step to adapt concatenating prompts to the sentence structures of different languages. For example, a normal grammar sequence for an English sentence is Subject + Verb + Object. For a Japanese sentence, it is Subject + Object + Verb. The selection of the prompt is based on the standard search for a matching language. For example, assuming a language context of {L[fr_FR], L[en_GB]}, the search returns the first prompt defined for the following languages: L[fr_FR], L[fr], L[en_GB], L[en], and finally L[ ].

See Chapter 4, “Localizing Cisco Unified CCX Scripts” for more information on localizing scripts.
Completing the Input Confirmation

Continue the Successful output branch of the Get Digit String step by dragging an Implicit Confirmation step from the Media palette to the Design pane, and dropping it over the Create Generated Prompt step icon under the Successful icon under the Get Digit String step.

Then configure the Implicit Confirmation step to confirm the extension entered without requiring more input from the caller.

Figure 12-16 shows the prompt tab of the configured Implicit Confirmation customizer window.

Figure 12-16 Configured Implicit Confirmation Customizer Window

Configure the Implicit Confirmation customizer window as follows:

- **General tab**
  - **Contact**—Triggering Contact
    The contact that triggered this script remains the contact for this step.
  - **Interruptible**—Yes
    External events are allowed to interrupt the execution of this step.

- **Prompt tab**
  - **Prompt**—prompt
    The step plays this prompt back to the caller.
  - **Continue on Prompt errors**—Yes
In the event of a prompt error, the script will play the next prompt in the sequence, or if this is the last prompt, will wait for caller input.

- **Input tab**
  - **Timeout (in sec)** — 2

  The caller has 2 seconds to stop the transfer before the script accepts the confirmation and transfers the call.

The Implicit Confirmation step has two output branches: No and Yes.

The following sections describe these two output branches:

- **The Caller Does Not Give Confirmation, page 12-39**
- **The Extension is Confirmed as Correct, page 12-41**

### The Caller Does Not Give Confirmation

If the caller interrupts the Implicit Confirmation step and thereby does not give confirmation, the script executes the No output branch.

Configure the No output branch of the Implicit Confirmation step to Use an If step to try again, until the maximum number of retries is reached.

The No output branch contains the following step:

- **Configuring the Retries, page 12-39**

### Configuring the Retries

Configure the No output branch of the Implicit Confirmation step by dragging an If step from the General palette to the Design pane, and dropping it over the No icon under the Implicit Confirmation step.

Then configure the If step to allow the script to determine whether or not the maximum number of retries has been reached, by evaluating the expression “attempts < MaxRetry”, (“the number of attempts, as stored in the attempts variable, is less than the maximum number of retries, as stored in the MaxRetry variable”).

The If step has two output branches: True and False.

The following sections describe these two output branches:
The Caller With Retries Gives Confirmation

If the If step determines that the maximum number of retries has not been reached, the script executes the True output branch.

Configure the True output branch of the If step to increment the number of retries by one and to give the caller another try.

The True output branch of the If step contains three functional steps:

The Play Prompt Step

Continue the True output branch of the If step by dragging a Play Prompt step from the Prompt palette to the Design pane, and dropping it over the True icon under the If step.

Then configure the Play Prompt step to play an empty prompt, P[], in order to flush the DTMF buffer of any digits that the script may have accumulated as part of the previous Implicit Confirmation step.

Note

Configure the Play Prompt step with an empty prompt to enable the script to return immediately from this step after flushing out the buffer.

The Increment Step

Continue the True output branch of the If step by dragging an Increment step from the General palette to the Design pane, and dropping it over the Play Prompt step icon under the True icon under If step.

Then configure the Increment step to increase the number of attempts until the maximum number of retries is reached.
The Goto Step
Ends the True output branch of the If step by dragging a Goto step from the General palette to the Design pane, and dropping it over the Increment step icon under the True icon under the If step.

Then configure the Goto step to return the caller to the beginning of the DialByExtn Label step at the beginning of the DialByExtn output branch of the Get Digit String step, in order to give the caller more attempts to input the proper extension.

The Caller Does Not Give Confirmation
If the If step determines that the maximum number or retries has been reached, the script executes the False output branch.

Configure the False output branch of the If step to skip the rest of the steps under the Simple Recognition step and fall through to the second Play Prompt step (see The Play Prompt Step, page 12-79).

The Extension is Confirmed as Correct
If the Implicit Confirmation step successfully confirms the extension, the script executes the Yes output branch of the Implicit Confirmation step.

Configure the Yes output branch of the Implicit Confirmation step to transfer the call.

The Yes output branch contains the following steps:
- Transferring the Call, page 12-41
- The If Step, page 12-45

Transferring the Call
Begin the Yes output branch of the Implicit Confirmation step by dragging a Call Redirect step from the Call Contact palette to the Design pane and dropping it over the Yes icon under the Implicit Confirmation step.
As in the other two main output branches of the Simple Recognition step (DialByName and Operator), the DialByExtn output branch contains the Call Redirect step. This step attempts to transfer the call, which, in this case, is the desired extension number.

As shown in Figure 12-17, the Call Redirect step has four output branches.

**Figure 12-17 Call Redirect Output Branch Scripting**

The following sections describe these four output branches.

- Successfully Transferring the Call, page 12-42
- Receiving a Busy Signal, page 12-43
- Registering an Invalid Transfer Extension, page 12-44
- Unsuccessfully Transferring the Call, page 12-44

**Successfully Transferring the Call**

If the Call Redirect step successfully transfers the call, the script executes the Successful output branch.

Configure the Successful output branch of the Call Redirect step to mark the contact as Handled and to end the script.

The Successful output branch of the Call Redirect step contains two steps:
Transferring the Call

- The Set Contact Info Step, page 12-43
- The End Step, page 12-43

The Set Contact Info Step

Begin the Successful output branch of the Call Redirect step by dragging a Set Contact Info step from the Contact palette to the Design pane, and dropping it over the Successful icon under the Call Redirect step, as shown in Figure 12-17. Then configure the Set Contact Info step to mark the call as Handled.

Note

For reporting purposes, you should use the Set Contact Info step to mark the contact as Handled; otherwise, reports may not show that the script successfully handled the contact.

The End Step

Conclude the Successful output branch of the Call Redirect step by dragging an End step from the General palette to the Design pane, and dropping it over the Set Contact Info step icon under the Successful icon under the Call Redirect step, as shown in Figure 12-17. The End step ends this branch of the script.

Receiving a Busy Signal

If the Call Redirect step registers the destination extension as busy, the script executes the Busy output branch.

Configure the Busy output branch of the Call Redirect step to set the value of the prefixPrompt variable to inform the caller that the extension was busy.

The Busy output branch of the Call Redirect step contains the Set step.
Transferring the Call

The Set Step
Configure the Busy output branch of the Call Redirect step by dragging a Set step from the General palette to the Design pane, and dropping it over the Busy icon under the Call Redirect step, as shown in Figure 12-17.

Then configure the Set step to set the value of `prefixPrompt` to contain a system prompt that plays back a message to the caller that the extension is busy.

Registering an Invalid Transfer Extension

If the Call Redirect step registers the destination extension as invalid, the script executes the Invalid output branch.

Configure the Invalid output branch of the Call Redirect step to set the value of the `prefixPrompt` variable to inform the caller that the extension was invalid.

The Invalid output branch of the Call Redirect step contains the Set step.

The Set Step
Configure the Invalid output branch of the Call Redirect step by dragging a Set step from the General palette to the Design pane, and dropping it over the Invalid icon under the Call Redirect step, as shown in Figure 12-17.

Then configure the Set step to set the value of `prefixPrompt` to contain a system prompt that plays back a message to the caller that the extension is invalid.

Unsuccessfully Transferring the Call

If the Call Redirect step registers the destination extension as out of service, the script executes the Unsuccessful output branch.

Configure the Unsuccessful output branch of the Call Redirect step to set the value of the `prefixPrompt` variable to inform the caller that the extension was out of service.

The Unsuccessful output branch of the Call Redirect step contains the Set step.
The Set Step
Configure the Unsuccessful output branch of the Call Redirect step by dragging a Set step from the General palette to the Design pane, and dropping it over the Unsuccessful icon under the Call Redirect step, as shown in Figure 12-17.

Then configure the Set step to set the value of the prefixPrompt to play back a message to the caller that the extension is out of service.

The If Step
End the Yes output branch of the Implicit Confirmation step by dragging an If step from the General palette to the Design pane, and dropping it over the Call Redirect step icon under the Implicit Confirmation step, as shown in Figure 12-17.

Then configure the If step to allow the script to determine whether or not the maximum number of retries has been reached, by evaluating the expression “attempts < MaxRetry”, (“the number of attempts, as stored in the attempts variable, is less than the maximum number of retries, as stored in the MaxRetry variable”).

The If step has two output branches, True and False.
The following sections describe these two output branches.

• The True Output Branch, page 12-45
• The False Output Branch, page 12-46

The True Output Branch
If the If step determines that the maximum number of retries has not been reached, the script executes the True output branch.

Configure the True output branch of the If step to allow the caller to keep returning to the MainMenu Label until it reaches the maximum number of retries.

The True output branch contains two steps:

• The Increment Step, page 12-46
• The Goto Step, page 12-46
The Increment Step
Begin the True output branch of the If step by dragging an Increment step from the General palette to the Design pane, and dropping it over the True icon under the If step, as shown in Figure 12-17. Then configure the Increment step to increase the numbers or retries by 1.

The Goto Step
End the True output branch of the If step by dragging a Goto step from the General palette to the Design pane, and dropping it over the True step icon under the If step, as shown in Figure 12-17.
Then configure the Goto step to send the caller back to the Label step named MainMenu to provide the caller another opportunity to enter an extension.

The False Output Branch
If the If step determines that the maximum number of retries has been reached, the script executes the False output branch.
Configure the False output branch of the If step to fall through to the second Play Prompt step (see The Play Prompt Step, page 12-79).

The DialByName Output Branch of the Simple Recognition Step
If the caller chooses menu option “2” (press or say to enter the name of a person) when given the option by the Simple Recognition step, the script executes the DialByName output branch.
Configure the DialByName output branch of the Simple Recognition step to receive the name of the person the caller desires to reach.
The DialByName output branch contains four functional steps, the last of which is described in its own section:

- The Label Step, page 12-47
- The Create Container Prompt Step, page 12-48
- Continue the Successful output branch of the Get Digit String step by dragging an Implicit Confirmation step from the Media palette to the Design pane, and dropping it over the Create Generated Prompt step icon under the Successful icon under the Get Digit String step., page 12-38
- The Set Step, page 12-48
- The Name To User Step, page 12-48

The Label Step

Begin the DialByName output branch of the Simple Recognition step by dragging a Label step from the General palette to the Design pane, and dropping it over the DialByName icon under the Simple Recognition step icon, as shown in Figure 12-18.

Then name the Label step DialByName to provide a target for the script to provide the caller more opportunities if necessary to enter a name successfully.
The Create Container Prompt Step

Continue the DialByName output branch of the Simple Recognition step by dragging a Create Container Prompt step from the Prompt palette to the Design pane, and dropping it over the Label step icon under the DialByName icon under the Simple Recognition step icon, as shown in Figure 12-18.

Then configure the Create Container Prompt step to create a prompt that asks the caller to enter the name of the desired person.

The Set Step

Continue the DialByName output branch of the Simple Recognition step by dragging a Set step from the General palette to the Design pane, and dropping it over the Create Container Prompt step icon under the Simple Recognition step icon, as shown in Figure 12-18.

Then configure the Set step to clear the value of the prefixPrompt variable, so that it can be assigned by subsequent steps.

The Name To User Step

End the DialByName output branch of the Simple Recognition step by dragging a Name To User step from the Media palette to the Design pane, and dropping it over the Set step icon under the Simple Recognition step icon, as shown in Figure 12-18.

Then configure the Name To User step to allow the caller to find a user based on either DTMF digits or spoken input from the caller.

The Name To User customizer window has three tabs: General, Prompt, and Input.
Figure 12-19 shows the configured General tab of the Name To User customizer window.

**Figure 12-19 Name To User Customizer Window—Configured General Tab**

Configure the Name To User customizer window as follows:

- **General tab**
  - **Contact**—**Triggering Contact**
    The contact that triggered the script remains the contact for this step.
  - **Interruptible**—**Yes**
    External events can interrupt the playback of the prompt.
  - **Operator**—**Yes**
    The script gives the caller the option to connect to an operator by pressing “0” or saying “operator” in the appropriate language.
  - **Result User**—**user**
    The `user` variable stores the user object that maps to the selection of the caller.

- **Prompt tab**
  - **Prompt**—**prompt**
    The `prompt` variable stores the custom prompt the script plays back to the caller.
The DialByName Output Branch of the Simple Recognition Step

- **Match Threshold**—4
  If the number of matches is less than 4, the script prompts the caller to choose the correct entry from the list of matches. If the number of matches is greater than or equal to 4, the script prompts the caller to enter additional letters to reduce the number of matches.

- **Barge In**—**Yes**
  The caller can respond without first having to listen to the playback of the entire prompt.

- **Continue On Prompt Errors**—**Yes**
  If a prompt error occurs, the script continues to play the next prompt, or, if this prompt is the last in the sequence, the script waits for caller input.

- **Input tab**
  - **Initial Timeout (in sec)**—5
    The step times out if the script receives no input within 5 seconds after playing back the prompt.
  - **Interdigit Timeout (in sec)**—3
    The step times out if the script receives no input between digits for 3 seconds.
  - **Maximum Retries**—5
    The maximum number of retries is 5.
  - **Flush Input Buffer**—**No**
    The script saves input previously entered by the caller.

- **Filter tab**
  - **Input Length**—30
    Specifies that the script automatically triggers a lookup when the caller enters 30 digits.
  - **Terminating Digit**—#
    The terminating digit is “#”.
  - **Cancel Digit**—*
    The cancel digit is “*”.

Cisco Unified Contact Center Express Getting Started with Scripts, Release 11.0(1)
The Name To User step has four output branches: Successful, Timeout
Unsuccessful and Operator.

The Timeout and Unsuccessful output branches need no scripting. If the step
times out, the script falls through to the second Play Prompt step (see The Play
Prompt Step, page 12-79). If an invalid entry is made, after 5 attempts the script
also falls through to the second Play Prompt step (see The Play Prompt Step,
page 12-79).

Two output branches require scripting, each of which is described in its own
section:

- The Successfully Receiving Caller Input, page 12-51
- The Operator Output Branch of the Simple Recognition Step, page 12-73

The Successfully Receiving Caller Input

If the Name to User step successfully receives caller input, the script executes the
Successful output branch.

Then configure the Successful output branch of the Name To User step to receive
confirmation of the name from the caller and to transfer the call.

The steps under this branch are similar to the steps under the Successful output
branch of the Get Digit String step above (See The Get Digit String Step,
page 12-29); the script requests confirmation, and redirects the call to the desired
extension.
Figure 12-20 shows the scripting under the Successful output branch of the Name To User step.

The Successful output branch of the Name To User step contains three main steps, the last of which is discussed in its own section:

- **The Get User Info Step**, page 12-53
- **The If Step**, page 12-54
- **The Implicit Confirmation Step**, page 12-54
The Get User Info Step

Begin the Successful output branch of the Name To User step by dragging a Get User Info step from the User palette to the Design pane, and dropping it over the Successful icon under the Name To User step icon, as shown in Figure 12-20.

Then configure the Get User Info step to make user attributes available to the script. Figure 12-21 shows the configured customizer window for the Get User Info step.

Figure 12-21 Configured Get User Info Customizer Window

Configure the Get User Info customizer window as follows:

- **User**—user
  Specifies user as the variable that holds a handle to the user information selected by the Name To User step.

- **Attribute/Variable text box**
  - Full Name—name
  - Extension—extnXfer
  - Spoken Name—spokenName
The If Step

Continue the Successful output branch of the Name To User step by dragging an If step from the General palette to the Design pane, and dropping it over the Get User Info step icon under the Name To User step icon, as shown in Figure 12-20.

Then configure the If step to create a prompt based on whether or not a recording of the spoken name of the person whose extension is being called is available.

The If step evaluates the Boolean expression spokenName==null; or, the value of the Document variable spokenName is equal to null.

The If step has two output branches: True and False. (See Figure 12-20.)

The following sections describe the two output branches of the If step:

• The True Output Branch, page 12-54
• The False Output Branch, page 12-54

The True Output Branch

If the If step determines that a recording of the spoken name of the person whose extension is being called is not available, the script executes the True output branch.

Configure the True output branch of the If step to instruct prompt to play the system prompt SP[AA/AACalling], which does not speak the name of the person being called.

The False Output Branch

If the If step determines that a recording of the spoken name of the person whose extension is being called is available, the script executes the False output branch.

Configure the False output branch of the If step to instruct prompt to play the system prompt SP[AA/AACallingName], which is then followed by the spoken name.

The Implicit Confirmation Step

End the Successful output branch of the Name To User step by dragging an Implicit Confirmation step from the Media palette to the Design pane, and dropping it over the If step icon under the Name To User step icon, as shown in Figure 12-20.
Then configure the Implicit Confirmation step to implicitly confirm the name entered without demanding more input from the caller.

The Implicit Confirmation step performs in a similar way to the DialByExtn section above. (See Localizing the Prompt Language, page 12-36).

The Implicit Confirmation Step has two output branches: No and Yes. (See Figure 12-20.)

The following sections describe the two output branches of the Implicit Confirmation step:

- The No Output Branch of the Simple Recognition Step, page 12-55
- The Yes Output Branch, page 12-66

### The No Output Branch of the Simple Recognition Step

If the Implicit Confirmation step does not successfully confirm the choice of the caller, the script executes the No output branch.

Configure the No output branch of the If step to create a prompt that will then provide the caller an opportunity to explicitly confirm the choice.
Figure 12-22 shows the scripting under the No output branch of the Implicit Confirmation step.

The No output branch of the Implicit Confirmation step contains nine functional steps:

- Get User Info Step, page 12-57
- The First Create Generated Prompt Step, page 12-57
- The Second Create Generated Prompt Step, page 12-58
- The First Create Conditional Prompt Step, page 12-59
- The If Step, page 12-60
• The Create Container Prompt Step, page 12-61
• The Set Step, page 12-62
• The Explicit Confirmation Step, page 12-62
• The If Step, page 12-65

Get User Info Step

The purpose of this step is to fall back to a spelling prompt if the name is not spoken or text to speech is not available. See The Get User Info Step, page 12-53 for an explanation of how to configure this step.

The First Create Generated Prompt Step

Drag a Create Generated Prompt step from the Prompt palette to the Design pane, and drop it on the False output of the Successful icon under the Get User Info step. Then configure the Create Generated Prompt step to create a prompt to play back to the caller the digits received, in order to confirm the caller input before transferring the call.
Figure 12-23 shows the configured Create Generated Prompt customizer window.

**Figure 12-23  Create Generated Prompt customizer window**

The Second Create Generated Prompt Step

Enter a second Create Generated Prompt step.
The First Create Conditional Prompt Step

Begin the No output branch of the Implicit Confirmation step by dragging a Create Conditional Prompt step from the Prompt palette to the Design pane, and dropping it over the No output branch icon under the Implicit Confirmation step icon, as shown in Figure 12-22.

Then configure the first Create Conditional Prompt step to create a prompt based on whether or not the variable spokenName is null. (The spokenName variable is not null if a spoken name exists for the selected user in the directory.)

If it is true that spokenName is null, the prompt plays the prompt S[name], which corresponds to the name of the user spelled back one letter at a time. If the expression is false, (which means there is a recording of the name of the person), the prompt plays P[] + spokenName.
The If Step

Continue the No output branch of the Implicit Confirmation step by dragging an If step from the General palette to the Design pane, and dropping it under the first Create Conditional Prompt step icon under the Implicit Confirmation step icon, as shown in Figure 12-22.

In the If customizer window, set the condition as ASR.

True Branch—Create Language Prompt

From the Prompt palette, drag a Create Language Prompt step to the Design pane and drop it in the True branch. In the customizer window of the Create Language Prompt step, enter the languages and prompts. For more information on configuring this step, see Localizing the Prompt Language, page 12-36.
False Branch—Set Prompt

From the General palette, drag a Set step to the Design pane and drop it in the False branch. In the customizer window of the Set step, select the variable Prompt, and enter `prompt + DP[250] + SP[AA\AWant2Call]` as its value.

Then configure the second Create Conditional Prompt step to create a prompt based on whether or not ASR is enabled for this call. If ASR is enabled, the script plays `SP[AA/AAWant2Call_ASR] + prompt` (for example, “Do you want to call John Doe?”). If ASR is not enabled for this call, then the script plays `prompt + DP[250] + SP[AA/AAWant2Call]` (for example, “John Doe, is this the name of the person you want to call?”).

The Create Container Prompt Step

Continue the No output branch of the Implicit Confirmation step by dragging a Create Container Prompt step from the Prompt palette to the Design pane, and dropping it on the If step icon under the Implicit Confirmation step icon.
The Set Step

Continue the No output branch of the Implicit Confirmation step by dragging a Set step from the Prompt palette to the Design pane, and dropping it over the second Create Conditional Prompt step icon under the Implicit Confirmation step icon, as shown in Figure 12-22.

Then configure the Set step to assign the system grammar SG[AA/AAWantToCall] to the grammar variable. This choice instructs the script how to interpret spoken input from the caller.

The Explicit Confirmation Step

Continue the No output branch of the Implicit Confirmation step by dragging an Explicit Confirmation step from the Media palette to the Design pane, and dropping it over the Set step icon under the Implicit Confirmation step icon, as shown in Figure 12-22.

Then configure the Explicit Confirmation step to make an explicit confirmation of the name of the desired person.
Figure 12-24 shows the configured Prompt tab of the Explicit Confirmation customizer window.

Figure 12-24 Explicit Confirmation Customizer Window—Configured Prompt Tab

Configure the Explicit Confirmation customizer window as follows:

- **General tab**
  - **Contact—Triggering Contact**
    The contact that triggered the script remains the contact for this step.
  - **Interruptible—Yes**
    External events can interrupt the playback of the prompt.

- **Prompt tab**
  - **Initial Prompt—prompt**
    The prompt variable stores the first prompt.
  - **Error Prompt—prompt**
    The prompt variable plays in the event of an input error.
  - **Timeout Prompt—prompt**
    The prompt variable plays if the timeout limit is reached.
  - **Barge In—Yes**
The No Output Branch of the Simple Recognition Step

The caller can respond without first having to listen to the playback of the entire prompt.

– Continue on Prompt Errors—Yes

If a prompt error occurs, the script continues to play the next prompt, or, if this is the last prompt in the sequence, the script waits for caller input.

• Input tab

  – Timeout (in sec)—5

  After playing all prompts, the script waits 5 seconds for initial input from the caller before re-attempting with a timeout error, or, if this was the last attempt, the script executes the Timeout output branch.

  – Maximum Retries—3

  The script will attempt a maximum of 3 retries to receive confirmation before executing the Unsuccessful output branch.

  – Flush Input Buffer—Yes

  The step erases previous input.

• Filter tab

  – Grammar—grammar

  This variable is assigned the value SG[AA/AWantToCall] by the Set step in the preceding section.

The Explicit Confirmation step has four output branches: Yes, No, Timeout, and Error.

The No, Timeout, and Error output branches do not require scripting. The script falls through to the If step (see The If Step, page 12-65) to allow the caller more attempts to confirm until the maximum retries limit is reached, after which the script falls through to the Play Prompt step at the same level as the Simple Recognition step. (See Figure 12-1.)

The following section describes the Yes output branch:

• The Yes Output Branch, page 12-64

The Yes Output Branch

If the Explicit Confirmation step successfully receives confirmation from the caller, the script executes the Yes output branch.
Configure the Yes output branch of the Explicit Confirmation step to direct the script to the Xfer Label step under the Yes output branch of the Implicit Confirmation step (see The Label Step, page 12-68), which contains the steps necessary to redirect the call to the desired extension.

The If Step

Finish the No output branch of the Implicit Confirmation step by dragging an If step from the General palette to the Design pane, and dropping it over the Explicit Confirmation step icon, as shown in Figure 12-22.

Configure the If step to determine whether or not the maximum number of retries has been reached, by evaluating the expression “attempts < MaxRetry”; or “the number of attempts (as stored by the attempts variable) is less than the maximum retries value stored in the MaxRetry variable.”

The If step has two output branches, True and False. (See Figure 12-22.)

The following sections describe the two output branches of the If step:

• The True Output Branch, page 12-65
• The False Output Branch, page 12-66

The True Output Branch

If the If step determines that the maximum number of retries has not been reached, the script executes the True output branch.

Configure the True output branch of the If step to provide the caller with another opportunity to enter the name of the desired person.

The following sections describe the two steps under the True output branch of the If step:

• The Increment Step, page 12-65
• The Goto Step (DialByName), page 12-66

The Increment Step

Begin the True output branch of the If step by dragging an Increment step from the General palette to the Design pane, and dropping it under the True icon under If step, as shown in Figure 12-22.
The No Output Branch of the Simple Recognition Step

Then configure the Increment step to increase the value of the attempts variable by 1.

The Goto Step (DialByName)

End the True output branch of the If step by dragging a Goto step from the General palette to the Design pane, and dropping it over the Increment step icon under the True icon under the If step, as shown in Figure 12-22.

Then configure the Goto step to return the caller to the beginning of the DialByName Label step at the beginning of the DialByName output branch of the Name to User step, in order to give the caller more attempts to input the proper name.

The False Output Branch

If the If step determines that the maximum number of retries has been reached, the script executes the False output branch, and the script also falls through to the second Play Prompt step (see The Play Prompt Step, page 12-79).

The Yes Output Branch

If the Implicit Confirmation step is successful, the script executes the Yes output branch.

Configure the Yes output branch of the If step to redirect the call to the desired extension.
Figure 12-25 shows the scripting under the Yes output branch of the Implicit Confirmation step.

**Figure 12-25 Name To User—Yes Output Branch of Implicit Confirmation Step**

The Yes output branch of the Implicit Confirmation step contains three functional steps directly underneath it:

- The Label Step, page 12-68
- The First If Step, page 12-68
- The Second If Step, page 12-72
The Label Step

Begin the Yes output branch of the Implicit Confirmation step by dragging a Label step from the General palette to the Design pane, and dropping it over the Yes icon under the Implicit Confirmation step icon, as shown in Figure 12-25.

Then configure the Label step to provide a target for the Yes output branch of the Explicit Confirmation step.

The First If Step

Continue the Yes output branch of the Implicit Confirmation step by dragging an If step from the General palette to the Design pane, and dropping it over the Label step icon under the Implicit Confirmation step icon, as shown in Figure 12-25.

Then configure the first If step to direct the script based on whether or not the desired extension exists, by evaluating the expression “extnXfer != null”; or, “the value of the extnXfer variable (which stores the extension number) is not null.”

The If step has two output branches, True and False. (See Figure 12-25.)

The following sections describe the two output branches of the If step:

- The False Output Branch, page 12-68
- The True Output Branch, page 12-68

The False Output Branch

If the If step finds no extension exists for the selected user, the script executes the False output branch.

Configure the Set step underneath the False output branch to set the value of a prompt that will be played back to inform the caller that the extension was invalid.

The True Output Branch

If the If step evaluates the desired extension as valid, the script executes the True output branch.

Configure the True output branch of the If step to transfer the call.

The If step contains one step, described in its own section:

- The Call Redirect Step, page 12-69
The Call Redirect Step

Begin the True output branch of the first If step by dragging a Call Redirect step from the Call Contact palette to the Design pane, and dropping it over the True icon under the first If step icon, as shown in Figure 12-25.

As in the other two main output branches of the Simple Recognition step (DialByExtn and Operator), the DialByName output branch contains the Call Redirect step, which attempts to transfer the call, in this case, the desired extension number.

The Call Redirect step has four output branches:

- The Successful Output Branch, page 12-69
- The Busy Output Branch, page 12-70
- The Invalid Output Branch, page 12-71
- The Unsuccessful Output Branch, page 12-71

Note

Adding a 2 second delay is a best practice when you have a script that performs a transfer or redirect to another script. Without the delay, there will be a timing issue. When a transfer or redirect occurs, a call leg is initiated. If the transfer or redirect completes and then another transfer or redirect occurs, the call leg from the second transfer or redirect can get stuck. In this case, the second transfer or redirect fails. Adding a delay ensures that the second transfer or redirect leg can complete before continuing through the script.

The Successful Output Branch

If the Call Redirect step successfully transfers the call, the script executes the Successful output branch.

Configure the Successful output branch of the Call Redirect step to mark the contact as Handled and to end the script.

The Successful output branch of the Call Redirect step contains two steps:

- The Set Contact Info Step, page 12-70
- The End Step, page 12-70
The Set Contact Info Step

Begin the Successful output branch of the Call Redirect step by dragging a Set Contact Info step from the Contact palette to the Design pane, and dropping it over the Successful icon under the Call Redirect step, as shown in Figure 12-25.

Then configure the Set Contact Info step to mark the call as Handled.

Note

For reporting purposes, you should use the Set Contact Info step to mark the contact as Handled; otherwise, reports may not show that the script successfully handled the contact.

The End Step

Conclude the Successful output branch of the Call Redirect step by dragging an End step from the General palette to the Design pane, and dropping it over the Set Contact Info step icon under the Successful icon under the Call Redirect step, as shown in Figure 12-25.

The End step ends the script and releases all system resources.

The Busy Output Branch

If the Call Redirect step registers the destination extension as busy, the script executes the Busy output branch.

Configure the Busy output branch of the Call Redirect step to set the value of the prefixPrompt variable to inform the caller that the extension was busy.

The Busy output branch of the Call Redirect step contains the Set step.

The Set Step

Configure the Busy output branch of the Call Redirect step by dragging a Set step from the General palette to the Design pane, and dropping it over the Busy icon under the Call Redirect step, as shown in Figure 12-25.

Then configure the Set step to set the value of prefixPrompt to contain a system prompt that will play back a message to the caller that the extension is busy when the script falls through to the final Play Prompt step (see The Call Redirect Step, page 12-80).
The Invalid Output Branch

If the Call Redirect step registers the destination extension as invalid, the script executes the Invalid output branch.

Configure the Invalid output branch of the Call Redirect step to set the value of the \texttt{prefixPrompt} variable to inform the caller that the extension was invalid.

The Invalid output branch of the Call Redirect step contains the Set step.

The Set Step

Configure the Invalid output branch of the Call Redirect step by dragging a Set step from the General palette to the Design pane, and dropping it over the Invalid icon under the Call Redirect step, as shown in Figure 12-25.

Then configure the Set step to set the value of \texttt{prefixPrompt} to contain a system prompt that plays back a message to the caller that the extension is invalid when the script falls through to the final Play Prompt step (see The Call Redirect Step, page 12-80).

The Unsuccessful Output Branch

If the Call Redirect step registers the destination extension as out of service, the script executes the Unsuccessful output branch.

Configure the Unsuccessful output branch of the Call Redirect step to set the value of the \texttt{prefixPrompt} variable to inform the caller that the extension was out of service.

The Unsuccessful output branch of the Call Redirect step contains the Set step.

The Set Step

Configure the Unsuccessful output branch of the Call Redirect step by dragging a Set step from the General palette to the Design pane, and dropping it over the Unsuccessful icon under the Call Redirect step, as shown in Figure 12-25.

Then configure the Set step to set the value of \texttt{prefixPrompt} contain a system prompt that plays back a message to the caller that the extension is out of service when the script falls through to the final Play Prompt step (see The Call Redirect Step, page 12-80).
Chapter 12  Designing a Cisco Unified IP IVR Script

The Second If Step

End the Yes output branch of the Implicit Confirmation step by dragging a second If step from the General palette to the Design pane, and dropping it over the first If step icon under the Implicit Confirmation step icon, as shown in Figure 12-25.

Then configure the second If step to direct the script based on whether or not the maximum number of retries has been reached, by evaluating the expression “attempts < MaxRetry”; or, “the number of attempts, as stored in the attempts variable, is less than the maximum number of retries allowed, as stored in the MaxRetry variable”).

The If step has two output branches, True and False. (See Figure 12-25.)

The following sections describe the two output branches of the If step:

• The False Output Branch, page 12-72
• The True Output Branch, page 12-72

The False Output Branch

If the second If step finds that the maximum number of retries has been reached, the script executes the False output branch, and the script falls through to the final Play Prompt step (see The Call Redirect Step, page 12-80).

The True Output Branch

If the If step finds that the maximum number of retries has not been reached, the script executes the True output branch.

Configure the True output branch of the If step to provide more opportunities for the caller to successfully enter a name.

The True output branch of the If step contains two functional steps:

• The Increment Step, page 12-72
• The Goto Step, page 12-73

The Increment Step

Begin the True output branch of the second If step by dragging an Increment step from the General palette to the Design pane, and dropping it over the True icon under the True icon under the If step, as shown in Figure 12-25.

Then configure the Increment step to increase the value of the attempts variable by 1.
The Goto Step

End the True output branch of the second If step by dragging a Goto step from the General palette to the Design pane, and dropping it over the Increment step icon under the True icon under the If step, as shown in Figure 12-25.

Then configure the Goto step to return the caller to the beginning of the DialByName Label step at the beginning of the DialByName output branch of the Get Digit String step, in order to give the caller more attempts to input the proper extension.

The Operator Output Branch of the Simple Recognition Step

If the caller chooses menu option “3” (press or say to speak to an operator) when given the option by the Simple Recognition step, the script executes the Operator output branch.

Then configure the Operator output branch of the Simple Recognition step to transfer the call to an operator.
Figure 12-26 shows the scripting under the Operator output branch of the Simple Recognition step.

The Operator output branch of the Simple Recognition step contains three steps, each of which is described in its own section:

- The Label Step (Xfer Operator), page 12-74
- The Call Redirect Step, page 12-75
- The If Step, page 12-77

The Label Step (Xfer Operator)

Begin the Operator output branch of the Simple Recognition step by dragging a Label step from the General palette to the Design pane, and dropping it over the Operator icon under the Simple Recognition step icon, as shown in Figure 12-26. Then configure the Label step to provide a target for the Goto step.
The Call Redirect Step

Continue the Operator output branch of the Simple Recognition step by dragging a Call Redirect step from the Call Contact palette to the Design pane, and dropping it over the Label step icon under the Simple Recognition step icon, as shown in Figure 12-26.

As in the other two main output branches of the Simple Recognition step (DialByExtn and DialByName), the Operator output branch contains the Call Redirect step, which attempts to transfer the call, in this case to the operator.

For examples using this step, see Chapter 18, “Designing Cisco Unified Gateway Scripts.”

The Call Redirect step has four output branches:

- The Successful Output Branch
- The Busy Output Branch
- The Invalid Output Branch
- The Unsuccessful Output Branch

The Successful Output Branch

If the Call Redirect step successfully transfers the call, the script executes the Successful output branch.

Configure the Successful output branch of the Call Redirect step to transfer the call.

The Successful output branch of the Call Redirect step contains two steps:

The Set Contact Info Step

Begin the Successful output branch of the Call Redirect step by dragging a Set Contact Info step from the Contact palette to the Design pane, and dropping it over the Successful icon under the Call Redirect step, as shown in Figure 12-26.

Then configure the Set Contact Info step to mark the call as Handled.

**Note**

For reporting purposes, you should use the Set Contact Info step to mark the contact as Handled; otherwise, reports may not show that the script successfully handled the contact.
The End Step
Conclude the Successful output branch of the Call Redirect step by dragging an End step from the General palette to the Design pane, and dropping it over the Set Contact Info step icon under the Successful icon under the Call Redirect step, as shown in Figure 12-26.

The End step ends the script and releases all system resources.

The Busy Output Branch

If the Call Redirect step registers the destination extension as busy, the script executes the Busy output branch.

Configure the Busy output branch of the Call Redirect step to set the value of the prefixPrompt variable to inform the caller that the extension was busy.

The Busy output branch of the Call Redirect step contains the Set step.

The Set Step
Configure the Busy output branch of the Call Redirect step by dragging a Set step from the General palette to the Design pane, and dropping it over the Busy icon under the Call Redirect step, as shown in Figure 12-26.

Then configure the Set step to set the value of prefixPrompt to contain a system prompt that plays back a message to the caller that the extension is busy.

The Invalid Output Branch

If the Call Redirect step registers the destination extension as invalid, the script executes the Invalid output branch.

Configure the Invalid output branch of the Call Redirect step to set the value of the prefixPrompt variable to inform the caller that the extension was invalid.

The Invalid output branch of the Call Redirect step contains the Set step.

The Set Step
Configure the Invalid output branch of the Call Redirect step by dragging a Set step from the General palette to the Design pane, and dropping it over the Invalid icon under the Call Redirect step, as shown in Figure 12-26.
Then configure the Set step to set the value of prefixPrompt to contain a system prompt that plays back a message to the caller that the extension is invalid.

The Unsuccessful Output Branch

If the Call Redirect step registers the destination extension as out of service, the script executes the Unsuccessful output branch.

Configure the Unsuccessful output branch of the Call Redirect step to set the value of the prefixPrompt variable to inform the caller that the extension was out of service.

The Unsuccessful output branch of the Call Redirect step contains the Set step.

The Set Step

Configure the Unsuccessful output branch of the Call Redirect step by dragging a Set step from the General palette to the Design pane, and dropping it over the Unsuccessful icon under the Call Redirect step, as shown in Figure 12-26.

Then configure the Set step to set the value of prefixPrompt contain a system prompt that plays back a message to the caller that the extension is out of service.

The If Step

End the Operator output branch of the Simple Recognition step by dragging an If step from the General palette to the Design pane, and dropping it over the Call Redirect icon under the Simple Recognition step, as shown in Figure 12-26.

Then configure the If step to allow the script to determine whether or not the maximum number of retries has been reached, by evaluating the expression “attempts < MaxRetry”, (“the number of attempts, as stored in the attempts variable, is less than the maximum number of retries, as stored in the MaxRetry variable”).

The If step has two output branches, True and False.

The following sections describe these two output branches.

- The True Output Branch, page 12-78
- The False Output Branch, page 12-78
The True Output Branch

If the If step determines that the maximum number of retries has not been reached, the script executes the True output branch.

Configure the True output branch of the If step to allow the caller to keep returning to the MainMenu Label until it reaches the maximum number of retries. The True output branch contains two steps:

- The Increment Step, page 12-78
- The Goto Step, page 12-78

The Increment Step

Begin the True output branch of the If step by dragging an Increment step from the General palette to the Design pane, and dropping it over the True icon under the If step, as shown in Figure 12-26.

Then configure the Increment step to increase the value of the attempts variable by 1.

The Goto Step

End the True output branch of the If step by dragging a Goto step from the General palette to the Design pane, and dropping it over the True step icon under the under the If step, as shown in Figure 12-26.

Then configure the Goto step to send the script back to the MainMenu label.

The False Output Branch

If the If step determines that the maximum number of retries has been reached, the script executes the False output branch.

Configure the False output branch of the If step to fall through to the next step at the same level in the script as the Simple Recognition step, which is the Play Prompt step. (See Figure 12-1.)

The Concluding Steps of the Script

This section contains the following:
The Play Prompt Step

In case none of the steps and branches under the Simple Recognition step succeed in transferring the call, continue the aa.aef script by dragging a Play Prompt step from the Prompt palette to the Design pane, and dropping it over the Simple Recognition step, as shown in Figure 12-1.

Configure the Play Prompt step to (as a last resort) play a prompt informing the caller of the inability to transfer the call.

The Play Prompt Step plays \texttt{prefixPrompt + SP[AA/AASorry]}, which informs the caller the reason the attempted transfer was unsuccessful.
Figure 12-27 shows the closing steps of the aa.aef script.

The Call Redirect Step

Continue the aa.aef script by dragging a Call Redirect step from the Call Contact palette to the Design pane, and dropping it over the Play Prompt step, as shown in Figure 12-27.

Configure the Call Redirect step to attempt to redirect the call to an operator, using the extension number stored in the `operExtn` variable. This step has four possible outputs:

- **Successful**: for the successful output, add the Terminate and End steps.
- **Busy**: for the busy output, add the Set step and set the `prefixPrompt` variable to `SP[AA\AAABusyExtn] + DP[500]`.
- **Invalid**: for the invalid output, add the Set Step and set the `prefixPrompt` variable to `SP[AA\AAInvalidExtn] + DP[500]`.
• Unsuccessful: for the unsuccessful output, add the Set step and set the prefixPrompt variable to SP[AA\:AAExtnOutOfService] + DP[500].

The If Step

Continue the aa.aef script by dragging an If step from the General palette to the Design pane, and dropping it over the Call Redirect step, as shown in Figure 12-27.

Configure the If step to determine whether or not the maximum number of retries has been reached. As in the previous examples, the If step and Increment step allow the caller the maximum number of retries.

If the transfer is successful, the script ends.

The Play Prompt Step

When the maximum number of retries is reached without successfully transferring the call to an operator, continue the aa.aef script by dragging a Play Prompt step from the Prompt palette to the Design pane, and dropping it over the If step, as shown in Figure 12-1.

Configure the Play Prompt step to play prefixPrompt, which explains why the transfer was unsuccessful.

The Terminate Step

Conclude the contact in the aa.aef script by dragging a Terminate step from the General palette to the Design pane and entering the triggering contact number into the customizer window.

The End Step

Conclude the aa.aef script by dragging a End step from the General palette to the Design pane.

The End step ends the script and releases all system resources. The End step requires no configuration and has no customizer.
The Concluding Steps of the Script
Designing Contact-Neutral Scripts

You can use the Cisco Unified CCX Editor to create a script that is contact neutral, that is, a script that accepts either a phone call or an HTTP request as the triggering contact.

This chapter describes the Cisco Unified CCX Editor steps used to create such a contact-neutral sample script, which executes one of two tasks, depending on the contact type:

- If the contact is a call, the script directs the contact to the beginning of a modified version of the Cisco Unified IP Interactive Voice Response (IVR) aa.aef script as described in Chapter 12, “Designing a Cisco Unified IP IVR Script.”
- If the contact is an HTTP request, the script expects an “Extension” parameter in the HTTP form to be defined with the extension to be called back.

This section contains the following topics:

- An Example Contact Neutral (Phone or HTTP) Script Template, page 13-2
- The Start Step (Creating a Script), page 13-3
- Contact-Neutral Script Variables, page 13-4
- The Accept Step, page 13-7
- The Get Contact Info Step, page 13-7
- The Switch Step, page 13-8
- The HttpContact Output Branch of the Switch Step, page 13-10
- The CallContact Branch of the Switch Step, page 13-19
- The Default Branch of the Switch Step, page 13-22
An Example Contact Neutral (Phone or HTTP) Script Template

The example template in Figure 13-1 shows a script that generates a web page containing a field that prompts the user for an extension, at which point the system posts this data to the script. Once the script starts, it extracts the extension and attempts to place a call to the given extension.

If the call fails, an error message is returned as a result to the HTTP request.

If the call succeeds, the script sends back a response to the HTTP request indicating that the call is connected, and then the call continues with the aa.aef script as if it was an inbound call.
Begin to build the sample script by choosing **File > New** from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click **OK**.
A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting File > Save from the menu bar.

Our example script is called hello.aef.

Contact-Neutral Script Variables

Begin the contact-neutral sample script design process by using the Variable pane of the Cisco Unified CCX Editor to define script variables.

Figure 13-2 shows the variables of the contact-neutral sample script as they appear in the Variable pane of the Cisco Unified CCX Editor window.

Figure 13-2 Variable Pane of the Contact-Neutral Sample Script

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Value</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CellControlGroupId</td>
<td>int</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>PrimaryDialogGroupId</td>
<td>int</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>SecondaryDialogGroupId</td>
<td>int</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>asr</td>
<td>boolean</td>
<td>true</td>
<td></td>
</tr>
<tr>
<td>call</td>
<td>Contact</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>callbackExtn</td>
<td>String</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>contactTime</td>
<td>String</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>language</td>
<td>Language</td>
<td>[en_US]</td>
<td></td>
</tr>
</tbody>
</table>
Table 13-1 describes the variables used in the contact-neutral sample script.

### Table 13-1 Variables in the Contact-Neutral Script

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CallControlGroupId</td>
<td>Integer</td>
<td>0</td>
<td>Call Control Group with which the outbound call is associated. (See The HttpContact Output Branch of the Switch Step, page 13-10.) Mark this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, see the Cisco Unified Contact Center Express Administrator Guide.</td>
</tr>
<tr>
<td>PrimaryControlGroupId</td>
<td>Integer</td>
<td>0</td>
<td>Stores the identifying number of the primary dialog group for handling the outbound call. (See The HttpContact Output Branch of the Switch Step, page 13-10.) Mark this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, see the Cisco Unified Contact Center Express Administrator Guide.</td>
</tr>
</tbody>
</table>
### Table 13-1 Variables in the Contact-Neutral Script (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>SecondaryControlGroupId</td>
<td>Integer</td>
<td>0</td>
<td>Stores the Identifying number of the fallback dialog control group for handling the outbound call. (See The HttpContact Output Branch of the Switch Step, page 13-10.) Mark this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, see the Cisco Unified Contact Center Express Administration Guide.</td>
</tr>
<tr>
<td>asr</td>
<td>boolean</td>
<td>true</td>
<td>Indicates whether or not the script is enabled for speech recognition. (See The Get Contact Info Step, page 13-7.)</td>
</tr>
<tr>
<td>call</td>
<td>Contact</td>
<td>0</td>
<td>Stores a handle to the call object to which the Cisco Unified IP IVR script will be applied. (See The HttpContact Output Branch of the Switch Step, page 13-10.)</td>
</tr>
<tr>
<td>callbackExtn</td>
<td>String</td>
<td>***</td>
<td>Stores the extension number input from the web page prompt. (See The HttpContact Output Branch of the Switch Step, page 13-10.)</td>
</tr>
<tr>
<td>contactType</td>
<td>String</td>
<td>***</td>
<td>Stores the information identifying the type of contact (telephone call or HTTP request). (See Variable Pane of the Contact-Neutral Sample Script, page 13-4.)</td>
</tr>
<tr>
<td>language</td>
<td>Language</td>
<td></td>
<td>Stores the default language used for prompts. (See The Get Contact Info Step, page 13-7.)</td>
</tr>
</tbody>
</table>
The Accept Step

Continue the script by dragging an Accept step from the Contact palette (in the Palette pane) to the Design pane of the Cisco Unified CCX Editor window, as shown in Figure 13-1. The script uses an Accept step to accept a contact, in this case either a telephone call or an HTTP request.

The Get Contact Info Step

Use the Get Contact Info step to make available to the script the type of contact received.

Figure 13-3 shows the configured Get Contact Info customizer window.

Figure 13-3 Configured Get Contact Info Customizer Window
Configure the Get Contact Info customizer window as follows:

- **Type**—`contactType`
  The `contactType` variable stores the information identifying the type of contact (call or HTTP).

- **Language**—`language`
  The `language` variable stores the language context of the contact.

- **ASR Supported**—`asr`
  The `asr` variable stores the information that tells the script whether or not Automatic Speech Recognition (ASR) is supported on the local system.

### The Switch Step

Next, use a Switch step to switch the contact to the appropriate section of the script, depending on whether the contact is a telephone call or an HTTP contact. **Figure 13-4** shows the configured Switch customizer window.

**Figure 13-4**  Configured Switch Customizer Window
Configure the Switch customizer window as follows:

- **Switch Expression**—`contactType`
  The Switch step evaluates the value of the `contactType` variable (as assigned by the Get Contact Info step).

- **Switch Cases**
  - **HttpContact**
    The script executes this case if the contact type is an HTTP request made through a web browser.

  **Note** The value in both switch cases is a string and requires quotes.

  - **CallContact**
    The script executes this case if the contact type is a telephone call.

As shown in Figure 13-5, the two cases appear as output branches underneath the Switch step in the script, along with the Default output branch that always appears under the Switch step.

**Figure 13-5 Switch Step Output Branches**

The following sections describe the three output branches of the Switch step:

- **The HttpContact Output Branch of the Switch Step**, page 13-10
- **The CallContact Branch of the Switch Step**, page 13-19
- **The Default Branch of the Switch Step**, page 13-22
The HttpContact Output Branch of the Switch Step

If the contact is an HTTP request, the scripting under the HttpContact output branch executes and the script attempts to place the outbound call.

Figure 13-6 shows the scripting under the HttpContact output branch of the Switch step.

This section contains the following steps:

- The Get Http Contact Info Step, page 13-11
- The Place Call Step, page 13-11
The Get Http Contact Info Step

Use the Get Http Contact Info step to map the Extension parameter to the `callbackExtn` variable, which stores the extension number that the person making the request provides via the web browser.

Figure 13-7 shows the configured Parameters tab of the Get Http Contact Info customizer window.

![Get Http Contact Info Customizer Window—Configured Parameters Tab](image)

The Place Call Step

After the Get Http Contact Info step, use the Place Call step to attempt to place the call back to the person who made the HTTP request.

(The Place Call step uses the extension number that the person entered through the web browser and that is stored in the `callbackExtn` variable.)

Configure the Place Call customizer window as follows:

- Destination Telephone No.—`callbackExtn`
  The `callbackExtn` variable stores the destination number of the outbound call.
- Timeout (sec)—5
The Place Call step waits 5 seconds before a Ring No Answer condition terminates the call.

- **CallControlGroupId**—\textit{CallControlGroupId}
  
  The \textit{CallControlGroupId} variable stores the call control group information with which the outbound call is associated.

- **Primary Dialog Group ID**—\textit{PrimaryDialogGroupId}
  
  The \textit{PrimaryDialogGroupId} variable stores the primary dialog group information with which the outbound call is associated.

- **Secondary Dialog Group ID**—\textit{SecondaryDialogGroupId}
  
  The \textit{SecondaryDialogGroupId} variable stores the secondary dialog group information with which the outbound call is associated.

- **Call Contact**—\textit{call}
  
  The \textit{call} variable name stores a handle to the call object that the subsequent Cisco Unified IP IVR script uses.

The Place Call step has the following six default output branches:

- **Successful**—Call was successful.
- **NoAnswer**—Call was made, but there was no answer.
- **Busy**—Call was made, but there was no answer.
- **Invalid**—Call was not made because the extension was invalid.
- **NoResource**—Call was not made because no Resource was available.
- **Unsuccessful**—Call was not made because of an internal system error.

The following sections describe these output branches:

- **The Successful Output Branch, page 13-13**
- **The Other Output Branches, page 13-17**
The Successful Output Branch

When the Place Call step successfully places the call, the script sends this information back to the web browser of the contacting person, marks the HTTP Contact as Handled, and sends the call to the beginning of the Cisco Unified IP IVR script.

Figure 13-8 shows the scripting under the Successful output branch of the Place Call step.

**Figure 13-8 Successful Output Branch Script**

This section contains the following steps:
- The Http Forward Step, page 13-13
- The Set Contact Info Steps, page 13-15
- The Get Contact Info Step, page 13-16
- The Goto Step, page 13-17

The Http Forward Step

Use the Http Forward step to send a (previously created) Java Server Page (JSP) template called CallConnected back to the originating web browser, to inform the web browser that the call has been connected.
Figure 13-9 shows the configured Http Forward customizer window.

Figure 13-9  Configured Http Forward Customizer Window

Configure the General tab of the Http Forward customizer window as follows:

- **Http Contact**—Triggering Contact
  The default **Triggering Contact** is the Http Contact that triggers the execution of the Http Forward step.

- **URI Path**—callbackExtn
  The **callbackExtn** variable stores the outbound call extension, which the Http Forward step includes in its message to the web browser.

Configure the “parameters” Map tab of the Http Forward customizer window as follows:

- **Keyword**—“Extension”
  The **Extension** keyword maps to the **callbackExtn** variable.

- **Value**—**callbackExtn**
The Set Contact Info Steps

After the Http Forward step, use the first Set Contact Info step to mark the HTTP Contact as Handled, which is useful for reporting purposes. Figure 13-10 shows the configured first Set Contact Info customizer window.

Figure 13-10     Configured First Set Contact Info Customizer Window

Next configure a second Set Contact Info step to assign the call variable (which is used by the subsequent Cisco Unified IP IVR script) the value of the language variable as the default language.

Figure 13-11     Configured Second Set Contact Info Customizer Window
The Get Contact Info Step

Use the Get Contact Info step to determine whether or not ASR is enabled on the system. Figure 13-3 shows the configured Get Contact Info customizer window.

Figure 13-12  Configured Get Contact Info Customizer Window

Configure the Get Contact Info customizer window as follows:

- **Contact**—*call*
  
  The *call* variable is the handle that identifies the contact throughout the rest of the Cisco Unified IP IVR script.

- **ASR Supported**—*asr*
  
  The Get Contact Info step retrieves the information stored in the *asr* variable to tell the script whether or not ASR is supported for this call.
The Goto Step

The last step under the Successful output branch of the Place Call step is a Goto step, which directs the script to the Label AAStart at the beginning of the Cisco Unified IP IVR script (see Figure 13-1.) From the AAStart label, the script is exactly the same as if the call had been an inbound call.

The Other Output Branches

For all the other output branches of the Place Call step, use a Send Http Response step to send an HTML file back to the originating web browser, with information on why the call was not able to be placed. An End step then ends the script.

Figure 13-13 shows the scripting under the other output branches of the Place Call step.

**Figure 13-13  Other Output Branches of the Place Call Step**
This section contains the following steps:

- The Send Http Response Step, page 13-18
- The End Step, page 13-18

The Send Http Response Step

Use the Send Http Response step to send the HTML file back to the originating browser.

Figure 13-14 shows the configured Send Http Response customizer window.

**Figure 13-14 Configured Send Http Response Customizer Window**

Configure the Send Http Response customizer window as follows:

- **HTTP Contact—Triggering Contact**
  
  The default Triggering Contact is the Http Contact that triggers the execution of the Send Http Response step.

- **Document**

  For each output branch of the Place Call step executes, the Document file that contains the appropriate message.

The End Step

The End step ends the script and releases all system resources. The End step requires no configuration and has no customizer.
The CallContact Branch of the Switch Step

If the contact is not an HTTP request, but is an incoming call, the Switch step (see The Switch Step, page 13-8) directs the script to the CallContact case. Figure 13-15 shows the scripting under the CallContact (and Default) case of the Switch step.

The CallContact output branch of the Switch step has one step:

- The Get Trigger Info Step, page 13-20
The Get Trigger Info Step

Use the Get Trigger Info step to retrieve a handle to the triggering contact, which in this case is a call, and to save it into a variable named call.

Figure 13-16 shows the configured Get Trigger Info customizer window.

Choose the call variable, instead of the default Triggering Contact variable used by the Accept and Get Contact Info steps at the beginning of the script (see Figure 13-1), so that the subsequent Cisco Unified IP IVR script treats the contact as a call rather than an HTTP request.
Figure 13-17 shows the top level of the full Cisco Unified IP IVR script.

**Figure 13-17 Full Cisco Unified IP IVR Scripting Example**

```plaintext
Start
   Accept [contact -Triggering Contact-]
   /* Contact type, ASR? Language ... */
   Set Contact Info [contact: -Triggering Contact-]
   Switch [string: contactType]
      AAStart:
         /* Initialize Prompts */
         Create Conditional Prompt [store: menuPrompt]
         Create Conditional Prompt [store: extraPrompt]
         Create Container Prompt [output: namePrompt]
         Create Conditional Prompt [store: namePrompt]
         /* Play Welcome Prompt without ... */
         Play Pprompt [contact: call, pprompt: welcomePrompt]
      MainMenu:
         If [ astrAlwaysEnableDiaByName ] Then
            Create Container Pprompt [output: prompt]
            /* Clear Prefix */
            Set prefixPrompt = P
         End
         Simple Recognition [contact: call]
            /* We could not recognize ... */
            Play Pprompt [contact: call, pprompt: prefixPrompt + SPF(\V\A\ASorry)]
         Call Redirect [contact: call, extension: openExt]
         If [ attempts < MaxRetry ] Then
            /* We were not able to transfer ... */
            Play Pprompt [contact: call, pprompt: prefixPrompt + DP(1000)]
         End
```

After the AA Label, the script is identical to the aa.aef script described in Chapter 12, “Designing a Cisco Unified IP IVR Script,” with the exception that the call variable is selected as the triggering variable for many steps; for example, see the Play Prompt step after the last Create Conditional Prompt step and the Simple Recognition step.
The Default Branch of the Switch Step

If the trigger is not recognized as either an HTTP contact or a phone contact, the Default case of the Switch step executes, as shown in Figure 13-15.

The Default output branch of the Switch step has one step:

- The End Step, page 13-22

The End Step

The End step ends the script and releases all system resources. The End step requires no configuration and has no customizer.
Designing a Script with Text-To-Speech (TTS)

You can use the steps of the Cisco Unified CCX Editor to design scripts that take advantage of Text-To-Speech (TTS) capability. This chapter describes the design of such a script, TTSsample.aef.

**Note**

Before using a TTS script as a Cisco Unified CCX application, you should first validate the script against the MCRP TTS vendor’s list of supported capabilities.

This chapter contains the following topics:

- An Example Text-To-Speech (TTS) Script, page 14-2
- The Start Step (Creating a Script), page 14-3
- TTS Script Variables, page 14-3
- The Accept Step, page 14-4
- The Set Contact Info Step, page 14-4
- The First Create TTS Prompt Step, page 14-5
- The Play Prompt Step, page 14-7
- The Create File Document Step, page 14-8
- The Second Create TTS Prompt Step, page 14-9
- The Annotate Step, page 14-10
- The Menu Step, page 14-11
An Example Text-To-Speech (TTS) Script

The TTSsample.aef script creates prompts based on text files that are played back as speech to callers, and provides a good example of how you can use the Set Contact Info step, the Create TTS Prompt step, the Create File Document step, and the Menu step to offer callers two menu choices, in this case based on whether the caller chooses English or Spanish.

Figure 14-1 shows the TTSsample.aef script as it appears in the Design pane of the Cisco Unified CCX Editor window.

Figure 14-1   Design Pane of the TTSsample.aef Script

---

The language in the second prompt is overridden to en-US (as part of the second “Create TTS Prompt” step.)

---

The first part of the prompt played back in the menu step uses the lan_08 which is set in the “Set Contact Info” step.
The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click **OK**.

A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar.

Our example script is called **TTSsample.aef**.

---

**Note**

Nuance TTS server needs to be configured with UTF-8 to enable correct playing of accented characters.

---

TTS Script Variables

Begin the TTSsample.aef script design process by using the Variable pane of the Cisco Unified CCX Editor to define script variables.

**Figure 14-2** shows the variables of the TTSsample.aef script as they appear in the Variable pane of the Cisco Unified CCX Editor window.

**Figure 14-2 Variable Pane of the TTSsample.aef Script**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Value</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>scannerPrompt</td>
<td>Prompt</td>
<td>F[]</td>
<td></td>
</tr>
<tr>
<td>scannerPromptDoc</td>
<td>Document</td>
<td>DOC[]</td>
<td></td>
</tr>
<tr>
<td>welcomePrompt</td>
<td>Prompt</td>
<td>F[]</td>
<td></td>
</tr>
</tbody>
</table>
Table 14-1 describes the variables used in the TTSsample.aef sample script.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>spanishPrompt</td>
<td>Prompt</td>
<td>—</td>
<td>Prompt created by the second Create TTS Prompt step, which is played by the subsequent Menu step. (See The Second Create TTS Prompt Step, page 14-9.)</td>
</tr>
<tr>
<td>spanishPromptDoc</td>
<td>Document</td>
<td>null</td>
<td>Variable created by the Create File Document step to store a reference to the text file in order to make it available for the subsequent Create TTS Prompt. (See The Create File Document Step, page 14-8.)</td>
</tr>
<tr>
<td>welcomePrompt</td>
<td>Prompt</td>
<td>—</td>
<td>Prompt created by the first Create TTS Prompt step, which is played back by the subsequent Play Prompt step. (See The First Create TTS Prompt Step, page 14-5.)</td>
</tr>
</tbody>
</table>

The Accept Step

Continue to build the TTSsample.aef script by dragging an Accept step (from the Contact palette in the Palette pane) to the Design pane of the Cisco Unified CCX Editor window, as shown in Figure 14-1. The script uses an Accept step to accept a contact.

The Set Contact Info Step

Continue to build the TTSsample.aef script by adding a Set Contact Info step (from the Contact palette), which modifies the context information associated with a contact. In this case, the script designer sets the language context of the call to L[en_US], which is American English.
Figure 14-3 shows the configured Set Contact Info customizer window.

The First Create TTS Prompt Step

Continue to build the TTSsample.aef script by adding a Create TTS Prompt step (from the Prompt palette) to create a prompt based on text that you enter into the customizer window of the Create TTS Prompt step.
Figure 14-4 shows the configured Create TTS Prompt Customizer window.

**Figure 14-4  Configured Create TTS Prompt Customizer Window**

Configure the Create TTS Prompt step as follows:

- **Text Input**—“Welcome to Company ABC”
  The step converts this sentence into speech.

- **Voice Gender**—Neutral
  The step uses the neutral voice gender.
  Voice gender can be male, female, or neutral, if supported by the TTS provider. If optional voice genders are not supported, the system automatically falls back to a supported voice gender.

- **Override provider (optional)**
  Variable or expression indicating a different TTS provider to be used when the prompt is played back instead of the provider defined for the contact.

- **Override Language (optional)—English (United States) (en_US)**
  The prompt will be played back in American English.
Note

Setting the Override Language option is particularly important for TTS prompts because the text entered is already in a specified language. For example, if the language associated with the call is Spanish, relying on the language of the call may result in the script trying to speak English text in Spanish.

- Output Prompt—welcomePrompt

  The name of the prompt that this step creates. The subsequent Play Prompt step will play this prompt. (You create the sentence using the Expression Editor.)

The Play Prompt Step

Continue to build the TTSsample.aef script by adding a Play Prompt step (from the Prompt palette) to play back the prompt created by the Create TTS Prompt step.

To do this, choose welcomePrompt from the Prompt drop-down menu in the Prompt tab of the Play Prompt customizer window.

Figure 14-5 shows the configured Prompt tab of the Play Prompt customizer window.

Figure 14-5  Play Prompt Customizer Window—Configured Prompt Tab
The Create File Document Step

Continue to build the TTSsample.aef script by adding a Create File Document step (from the Document palette) to create a document variable, `spanishPromptDoc`, from a text file.

The subsequent Create TTS Prompt step will then use this document variable to create a prompt in the Spanish language.

Figure 14-6 shows the configured Create File Document customizer window.

Figure 14-6    Configured Create File Document Customizer Window

Configure the Create File Document customizer window as follows:

- **Filename**—“`spanishPrompt.txt`”
  
  This filename represents the text file that holds the text that the subsequent Create TTS Prompt step will convert into speech.

- **Document**—`spanishPromptDoc`
  
  This document variable will be used by the subsequent Create TTS Prompt step to create a Spanish language prompt.
The Second Create TTS Prompt Step

Use a second Create TTS Prompt step (from the Prompt palette) to convert the text contained in the `spanishPromptDoc` variable into a prompt, `spanishPrompt`, that the subsequent Menu step will use to offer callers the choice of the Spanish language.

Figure 14-4 shows the configured second Create TTS Prompt customizer window.

**Figure 14-7** Configured Second Create TTS Prompt Customizer Window

Configure the second Create TTS Prompt customizer window as follows:

- **Text Input**—`spanishPromptDoc`
  The document that is the source of the text that is converted to speech.

- **Voice Gender**—`Neutral`
  The prompt playback uses the default voice gender.

- **Override Provider** (optional)
  Variable or expression indicating a different TTS provider to be used where the prompt is played back instead of the provider defined for the contact.

- **Override Language** (optional)—`Spanish (Colombia) (es_CO)`
  The prompt will be played back in Colombian (American) Spanish.
Chapter 14  Designing a Script with Text-To-Speech (TTS)

The Annotate Step

Note  Make sure to specify that the prompt converts the language of the text, and not the language of the call, to speech.

- Output Prompt—spanishPrompt
  The name of the prompt that this step creates and that the subsequent Menu step will play.

The Annotate Step

Add an Annotate step (from the General palette) after the second Create TTS Prompt step to insert a note describing the functionality of the subsequent Menu step.

Figure 14-8 shows the configured Annotate customizer window.

Figure 14-8  Annotate Customizer Window

Note  The Menu step itself also contains two instances of the Annotate step.
The Menu Step

Continue to build the TTSsample.aef script by adding a Menu step (from the Media palette) to offer the caller the choice between the English and Spanish languages.

Figure 14-9 shows the configured General tab of the Menu customizer window.

Figure 14-9 Menu Customizer Window—Configured General Tab

Configure the General tab of the Menu customizer window as follows:

- **Contact**—Triggering Contact
  The Menu step acts upon the contact that triggered the execution of the Menu step.

- **Interruptible**—Yes
  External events can interrupt the execution of this step.
Figure 14-10 shows the configured Prompt tab of the Menu customizer window.

**Figure 14-10  Menu Customizer Window—Configured Prompt Tab**

Configure the Prompt tab of the Menu customizer window as follows:

- **Prompt**—`TTS[“For English, press one”] + spanipshPrompt`
  
  The Menu step plays this prompt back to the caller. The specified prompt expression combines the TTS prompt, “For English, press one” with `spanipshPrompt`, which the second Create TTS Prompt step previously created. (See The Second Create TTS Prompt Step, page 14-9.)

  **Note**  The format `TTS[...]` is another way to create a TTS prompt that uses the default gender and the language of the call. The text passed in parameter must match the language of the call.

- **Barge In**—Yes
  
  The caller can respond without having to listen to the whole playback of the prompt.

- **Continue on Prompt Errors**—Yes
  
  In the event of a prompt error, instead of generating an exception, the step continues with the second prompt if the error occurs on the first prompt, or, if this is the last prompt in the sequence, the script waits for input from the caller.
Figure 14-11 shows the configured Input Tab of the Menu customizer window.

**Figure 14-11 Menu Customizer Window—Configured Input Tab**

Configure the Input tab of the Menu customizer window as follows:

- **Timeout (in sec)**—3
  
The system waits 3 seconds for input from the caller before sending the script to the Timeout output branch (after the script reaches the maximum number of attempts).

- **Maximum Retries**—3
  
The Menu step will play the prompt to the caller up to 3 times after a timeout or invalid input response.

  In this case, after 3 retries, the Menu step executes either the Timeout or Unsuccessful output branches, depending on whether the last try timed out or the caller entered an invalid input response.

- **Flush Input Buffer**—No
  
The caller can type ahead and the step will save the previous input.
Figure 14-12 shows the configured Filter Tab of the Menu customizer window.

**Figure 14-12 Menu Customizer Window—Configured Input Tab**

Configure the Filter tab of the Menu customizer window as follows:

- **Options—** English, Spanish
  
The Menu step offers these two menu choices to the caller. Use the Add button to enter these two options.

In this sample script (see Figure 14-1), the Menu step has the following four output branches:

- **English**—If this were a fully-functioning script, this output branch would contain steps providing business logic in an English language context.
- **Spanish**—If this were a fully-functioning script, this output branch would contain steps providing business logic in a Spanish language context.
- **Timeout**—If the script times out, the script will fall through to the closing steps of the script.
- **Unsuccessful**—If valid caller response is not received, the script will fall through to the closing steps of the script.
Chapter 14  Designing a Script with Text-To-Speech (TTS)

The Terminate Step

Close the sample script TTSsample.aef with a Terminate step (from the Contact palette), which ends the call.

The End Step

Conclude the TTSsample.aef script with an End step (from the General palette). The End step ends the script and releases all system resources.
Chapter 14  Designing a Script with Text-To-Speech (TTS)

The End Step
Designing Cisco Unified CCX VoiceXML Applications

This chapter describes how to use the capabilities of Cisco Unified CCX 4.0 and later to develop VoiceXML applications.

This section includes the following topics:

• Understanding the Terminology, page 15-2
• A Prerequisite and a Recommendation, page 15-3
• Updating CRS 3.x VoiceXML Applications, page 15-3
• Designing Cisco Unified CCX VoiceXML Applications, page 15-6
• Creating VoiceXML Documents, page 15-6
• Creating Cisco Unified CCX Scripts that Run VoiceXML Documents, page 15-20
• Designing International Cisco Unified CCX VoiceXML Applications, page 15-29
• Cisco Unified CCX VoiceXML Application Troubleshooting Tips, page 15-32

For further information in this guide on Cisco Unified CCX VoiceXML applications, see:

• Appendix B, “VoiceXML Implementation for Cisco Voice Browser”
• Appendix A, “A Sample VoiceXML Log File”
Understanding the Terminology

The following terms are used in this section:

- **VoiceXML.** Voice eXtensible Markup Language (VoiceXML) is a web-based standardized markup language for representing human-computer dialogs. VoiceXML:
  - Is designed for creating audio dialogs that feature synthesized speech, digitized audio, recognition of spoken input and DTMF (Dual Tone Multi-Frequency) key input, recording of spoken input, telephony, and mixed initiative conversations. Its major purpose is to bring the advantages of Web-based development and content delivery to interactive voice response applications.
  - Assumes a voice browser with:
    - audio output (prerecorded speech or text-to-speech
    - audio input (speech and/or DTMF digits)
  - Follows the conventions of HTML and XML document format with <elements> and attributes.
  - Is:
    - A non-real-time means of communications, allowing users to access data at any time.
    - Also called an XML application.
- **Cisco Unified CCX Script.** Cisco Unified CCX scripts can extend the functionality of a VoiceXML document. A Cisco Unified CCX script is a sequence of steps constructed in the Cisco Unified CCX Editor for controlling the flow of customer calls and multimedia contacts. You can use the steps of the Cisco Unified CCX Editor to design scripts that take advantage of the capabilities of VoiceXML. In a Cisco Unified CCX script you can link any number of times to one or more VoiceXML documents depending on what you need to accomplish.
- **Cisco Unified CCX VoiceXML application.** A Cisco Unified CCX VoiceXML application is a Cisco Unified CCX script (Cisco Unified CCX_Editor_file.aef) that links to a VoiceXML document (text_file.vxml).
A Prerequisite and a Recommendation

Before using a VoiceXML document with a Cisco Unified CCX script, you should first validate that document against the Media Resource Control Protocol (MCRP) ASR and TTS vendor’s list of supported capabilities.

Developing applications that include Automatic Speech Recognition (ASR) is generally more difficult than developing non-ASR applications or Cisco Unified IP IVR scripts. To ensure a good user experience, Cisco provides consultancy services in different forms, please contact your Cisco Account Team to obtain more details on Development support plans.

Updating CRS 3.x VoiceXML Applications

All VoiceXML documents (text_file_document.vxml) and CRS scripts (Cisco Unified CCX_script.aef) created with CRS Release 3.x will fail to load when you attempt to open them in Release 4.0(x). To fix this problem you need to change both the VoiceXML document and how it is referenced in the CRS script:

- Update the VoiceXML 1.0 document referenced in the CRS script to a VoiceXML 2.0 document. For how to do this, see Converting Documents from VoiceXML 1.0 to VoiceXML 2.0, page 15-3.

  The CRS Voice Browser currently supports VoiceXML 2.0 (including DTMF Browser and N-Best Recognition).

- Update the Voice Browser step in the CRS script so that it links properly to the VoiceXML document. For how to do this, see Converting Documents from VoiceXML 1.0 to VoiceXML 2.0, page 15-3.

Converting Documents from VoiceXML 1.0 to VoiceXML 2.0

Convert your VoiceXML 1.0 documents to be compliant with VoiceXML 2.0. If you can validate it with a VoiceXML 2.0 DTD, then it will be compliant.

For all the changes made to VoiceXML 1.0 in VoiceXML 2.0, see Appendix J of the Voice Extensible Markup Language (VoiceXML) Version 2.0 specification at http://www.w3.org/TR/voicexml20/.
Some example changes in Cisco’s implementation of VoiceXML 2.0. The bracketed references see the sections in the VoiceXML 2.0 specification containing the specified information:

- The `<VXML>` element now requires the xmlns attribute, and the version attribute for the `<VXML>` element must contain “2.0.” [VXML 1.1]
- There are some grammar definition and syntax changes. The Speech Recognition Grammar Specification (SRGS), the Speech Synthesis Markup Language Specification (SSML) MRCP grammars, and the Cisco DTMF RegEx specification replace the Nuance Grammar Specification Language (GSL).
- Time designations have changed. These are listed in the VoiceXML 2.0 specification. [VXML 6.5.2]
- Session variables have changed. These are listed in the VoiceXML 2.0 specification. [VXML 5.1.4]
- The `<emp>, <div>, pros>, <sayas>, and <dtmf>` elements are obsolete. [VXML Appendix J]
- Variables must be declared before being assigned [VXML 5.1.1].
- The wait/transition state model has been implemented [VXML 4.1.8]

See VoiceXML Implementation for Cisco Voice Browser, page B-1, for a list of all the features in the VoiceXML 2.0 specification that Cisco supports.

**Converting VoiceXML CRS 3.x Scripts to CRS 4.x Scripts**

To convert a VoiceXML CRS 3.x script to a CRS 4.x script, open the script in the CRS Editor and update the Voice Browser step and the Create URL document step so that the script correctly invokes the Voice Browser. These steps are described in the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Cisco Unified Contact Center Express Editor Reference Guide.

In CRS 4.x:

- The Voice Browser” step uses the URL Document parameter, rather than the URI.
- The Document variable can be initialized with the Create URL Document parameter (as used in voicebrowser.aef), or it can be manipulated dynamically at runtime.
• VXML input parameters are specified in the Create URL Document step.

Note: These parameters are not usable within the VXML document directly. Instead, they are passed to the server identified in the URL Document. They are only used by that server if it supports dynamic VOICEXML page generation (that is, by a JSP page).

• VXML output parameters are specified in the <exit> Attributes tab of the Voice Browser step.

Converting VoiceXML CRS 3.x or 4.x Scripts to CRS 5.x Scripts

To convert a VoiceXML CRS 3.x or 4.x script to a CRS 5.x script, open the script in the CRS Editor and update the Voice Browser step and the Create URL document step so that the script correctly invokes the Voice Browser. These steps are described in the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Cisco Unified Contact Center Express Editor Reference Guide.

In CRS 5.x:
• The Voice Browser step uses the URL Document parameter, rather than the URI.
• The Document variable can be initialized with the Create URL Document parameter (as used in voicebrowser.aef), or it can be manipulated dynamically at runtime.
• VXML input parameters are specified in the Create URL Document step.

Note: These parameters are not usable within the VXML document directly. Instead, they are passed to the server identified in the URL Document. They are only used by that server if it supports dynamic VOICEXML page generation (that is, by a JSP page).

• VXML output parameters are specified in the <exit> Attributes tab of the Voice Browser step.
Designing Cisco Unified CCX VoiceXML Applications

To develop a Cisco Unified CCX VoiceXML application, complete the following steps:

Step 1  Create a VoiceXML document (text_file.vxml) that can be validated with a VoiceXML 2.0 DTD.

Step 2  Create a Cisco Unified CCX Editor script (Cisco Unified CCX_editor_file.aef) that calls the VoiceXML document.

Note  Both VoiceXML documents and Cisco Unified CCX Editor scripts can use the CRTP protocol to fetch resources (documents, prompts and grammars) from the Cisco Unified CCX Repository. See How and Why To Use the CRTP Protocol, page 2-56.

Creating VoiceXML Documents

A VoiceXML document is an XML (eXtensible Markup Language) text file. VoiceXML 2.0 is the version of VoiceXML that Cisco Unified CCX 4.0 supports.

You can use numerous tools to write VoiceXML, including simple text editors, server scripting languages, and third-party VoiceXML editors.

This section covers:

- Related Documentation, page 15-7
- A Sample VoiceXML Document, page 15-8
- Using Document Type Definitions, page 15-9
- Using SRGS Grammar Expressions, page 15-10
- Using Speech Recognition Input, page 15-10
- Using DTMF Input, page 15-11
• Using Text to Speech Output, page 15-15
• Using the Voice Browser Cache, page 15-18

Related Documentation

See the following documents for further information on VoiceXML:


• The Speech Recognition Grammar Specification (SRGS) Version 1.0 at http://www.w3.org/TR/2003/TR-speech-grammar/ defines a standard syntax for representing grammars for use in speech recognition so that developers can specify the words and patterns of words to be listened for by a speech recognizer.

• The Cisco Regular Expression (Regex) Grammar Specification at http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/rel_docs/vxmlprg/refgde1.htm#1050172 defines the Cisco dual tone multiple frequency (DTMF) grammar that you can use with VoiceXML.

• The Speech Synthesis Markup Language (SSML) Version 1.0 specification at http://www.w3.org/TR/speech-synthesis, defines a standard way to control aspects of synthesized speech such as pronunciation, volume, pitch, rate, and so on across different synthesis-capable platforms.

• The Natural Language Semantics Markup Language (NLSML) for the Speech Interface Framework specification at http://www.w3.org/TR/nl-spec/ defines a standard way to enable access to the Web using spoken interaction.

• The Semantic Interpretation for Speech Recognition (SI) specification at http://www.w3.org/TR/semantic-interpretation/ defines the process of Semantic Interpretation for Speech Recognition and the syntax and semantics of interpretation tags that can be added to speech recognition grammars to compute information to return to an application on the basis of rules and tokens that were matched by the speech recognizer.

• The VoiceXML 2.0 Implementation Report at http://www.w3.org/Voice/2004/vxml-ir describes the requirements for a VoiceXML 2.0 Implementation Report and the process that the Voice Browser Working Group follows in preparing the report.
• The VoiceXML Forum at http://www.voicexml.org is an industry organization chartered with establishing and promoting the Voice Extensible Markup Language (VoiceXML) for accessing internet content and services through voice and telephone.

A Sample VoiceXML Document

```xml
<?xml version="1.0" encoding="UTF-8"?>
<vxml xmlns="http://www.w3.org/2001/vxml" version="2.0">
  <form id="get_address">
    <field name="citystate">
      <grammar type="application/srgs+xml" src="citystate.grxml"/>
      <prompt>Say a city and state.</prompt>
    </field>
    <field name="street">
      <grammar type="application/srgs+xml" src="citystate.grxml"/>
      <prompt>What street are you looking for?</prompt>
    </field>
    <filled>
      <prompt>You chose</prompt>
      <value expr="street"/>
      in
      <value expr="citystate"/>
      <exit/>
    </filled>
  </form>
</vxml>
```

In the preceding example:

• The first two lines (the <?xml> and the <vxml> elements) are required for the beginning of all VoiceXML 2.0 files.

• The <form> element, similar to an HTML form, controls the interaction or “dialog” with the user.

• Form <field> elements specify the contents of a VoiceXML dialog unit. Fields contain other elements, such as:
  – <prompt> elements that control the output of synthesized speech and prerecorded audio and prompt a user for input.
Creating VoiceXML Documents

- `<grammar>` elements that specify what user input is acceptable for a field. In this case, the grammar element references the file that specifies the grammar, the rules by which to recognize input. The user input is stored in the variable that is named by the field.

- `<filled>` elements that specify actions to take when a field is filled in; that is, when the user has provided a valid value for the field.

Using Document Type Definitions


The Cisco Unified CCX Voice Browser includes a custom version of voiceml.dtd with some minor enhancements. The simplest way to use voiceml.dtd is to reference it with the URI (Uniform Resource Identifier) “http://IPAdress:9080/SDocuments/voiceml.dtd” in the `<DOCTYPE>` element as in the following example:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE vxml SYSTEM
  "http://10.78.94.224:9080/SDocuments/voiceml.dtd">
<vxml xmlns="http://www.w3.org/2001/vxml" version="2.0"/>
```

Note Do not use file protocol to access voiceml.dtd.

You can also deploy a DTD with your documents on the document server, by providing the URI to access the file in the XML document type definition.

Using a DTD is optional. In the development phase, it can help you catch syntax errors in VoiceXML documents. After you test the code and find no syntax errors, you may choose not to use a DTD in the production phase to maximize efficient performance (by eliminating the need for parsing the DTD file itself and the validation process).
Using SRGS Grammar Expressions

When using SRGS grammar expressions, you should be aware of the following:

• Cisco Unified CCX 4.x VoiceXML documents use SRGS grammar specifications and syntax rather than Nuance SGL grammar syntax.
• If not supplied, a <grammar> element is filled in with appropriate default values for the required attributes: root, version, xml:lang, xmlns.
• The <rule> “id” attribute is generated automatically and referenced by the “root” attribute of the <grammar> element.
• If this is an SRGS DTMF grammar, the “mode” attribute of the <grammar> element must be supplied and it must be set to “dtmf.”

Using Speech Recognition Input

VoiceXML accepts speech or digit input, based on speech grammars and or DTMF grammars that specify the input that is acceptable to the VoiceXML Interpreter at a given time.

You define grammars using the <grammar> element. The example below shows how to create an application that asks for and recognizes four words: coffee, tea, milk, and nothing.

Example 15-1 Sample VoiceXML Script using Speech Recognition

```
<form>
  <field name="choice">
    <prompt>Would you like coffee, tea, milk, or nothing?</prompt>
    <grammar xml:lang="en-US" type="application/srgs+xml
version="1.0" mode="voice">
      <rule id='drinks' >
        <one-of>
          <item>coffee</item>
          <item>tea</item>
          <item>milk</item>
          <item>nothing</item>
        </one-of>
      </rule>
    </grammar>
  </field>
  <filled>
    Just a second.
    Your <value expr="choice"/> is ready.
  </filled>
```

In the preceding example, the <one-of> element defines a set of expressions (voice replies) that are valid. The Voice Recognition engine fills in the field choice when it recognizes a valid response according to the rules of the grammar. In this example, the exchange might sound like this:

System: "Would you like some coffee, tea, milk, or nothing?"
Caller: "Hot tea."
System: "Just a second. Your tea is ready."

The Cisco Unified CCX Voice Browser supports SRGS and Cisco RegEx grammars, which are powerful languages for specifying speech input.

**Using DTMF Input**

DTMF is a common form of caller input in IVR applications, and in many cases it is a good idea to design applications that give callers the choice to use either DTMF or speech input.

DTMF input is most commonly used for such purposes as menu navigation, getting a digit string (such as an account number) from the caller, and recognizing a digit pattern.

You can use one of the following methods to allow the script to determine when the DTMF input from the caller is complete:

- A caller enters a specific termination key; for example, the “#” key.
- A specified number of seconds have passed without the caller entering a tone.
- The caller enters a predefined number of tones.

You can use the following DTMF properties to specify when the sequence is complete:

- termchar—The terminating DTMF character for DTMF input recognition.
  The default value is “#”. The value of empty string means no terminating DTMF character is defined.
- termtimeout—The terminating timeout to use when recognizing DTMF input.
  The default value is “4s”.

"/form"
This section contains the following topics:

- Using DTMF for Menu Navigation, page 15-12
- Receiving Digit String Input, page 15-13
- Using DTMF Grammar, page 15-14

Using DTMF for Menu Navigation

One of the most common uses of DTMF is to allow users to navigate a menu of choices. You can use the `<menu>` element to accomplish this navigation, as follows:

1. Use the `<menu>` element for the main prompt. The menu prompt has two attributes: `exact` and `approximate`. `Exact` is the default and means the user must match every word of the grammar fragment in order for a recognition match to occur. Example 15-2 uses the default.

2. For each choice, insert a `<choice>` element.

3. Specify the DTMF key associated with the item and the next place to jump to when the item is chosen.

You may also insert a grammar in the `<choice>` element. This insertion allows the user to select the item either by pressing the DTMF key or by speaking the grammar item.

As an example of a banking application, the script gives the caller the following three choices, and then instructs the caller to press “*” when finished:

- For checking account balance, press 1.
- For savings account balance, press 2.
- For credit card balance, press 3.

In this example, the caller presses 3. The system informs the caller “Sorry, you don’t have a credit card account with us,” and again offers the caller the same three choices. The caller presses “*”. The system says “Thank you. Good-bye!” and ends the call.

Example 15-2 shows the scripting for the preceding banking application.

Example 15-2  Using DTMF

```
<menu id="main">
  <prompt>
    For checking account balance, press 1.
  </prompt>
</menu>
```
For savings account balance, press 2.
For credit card balance, press 3.
Press * when you are finished.
</prompt>
<!-- No termination character is necessary -->
<property name="termchar" value=""/>
<choice dtmf="1" next="CheckBalance.jsp">
    checking account
</choice>
<choice dtmf="2" next="SavingBalance.jsp">
    savings account
</choice>
<choice dtmf="3" next="#credit">
    credit card
</choice>
<choice dtmf="*" next="#exit">
    [finish goodbye bye]
</choice>
</menu>
<form id="credit">
    <block>
        Sorry, you don't have a credit card account with us.
        <goto next="#main"/>
    </block>
</form>
<form id="exit">
    <block>
        Thank you. Good-bye!
    </block>
</form>

The preceding example:
Accepts both DTMF input and speech input. For example, rather than entering 2, a caller can also say “savings account” to check the savings account balance.
In addition to the <menu> and <choice> elements, VoiceXML also provides the <option> element, which you can use in a form for a similar purpose.

**Receiving Digit String Input**

You can use built-in “digits” grammar to accept digit strings such as credit card account information. You use the type attribute in a <field> element to select the built-in grammar.
Example 15-3 shows how to receive DTMF input for a credit card account number.

Example 15-3  Receiving Digit String Input

```xml
<form>
  <field name="creditNumber" type="digits">
    Please enter your credit card number.
    Press the pound key when finished.
  </field>
  <filled>
    Your credit card number is
    <value expr="creditNumber" class="digits" mode="recorded"/>
    <exit namelist="creditNumber"/>
  </filled>
</form>
```

Using DTMF Grammar

The most flexible way to accept DTMF input is to use DTMF grammars that define how tones are interpreted.

To include DTMF tones in your grammar, use the format “dtmf-0” for each of the tones 0 through 9. You can also use “dtmf-star” for the star (“*”) key, “dtmf-pound” for the pound (“#”) key, and “dtmf-?” to indicate an unknown key.

However, if you specify mode = DTMF in the grammar element and then use an item list as in Example 15-4, you can use only numbers for the DTMF tones.

Example 15-4 shows a sample grammar that allows the caller to enter digits from the touch-tone pad. This example requests the user to use DTMF digits to enter PIN (Personal Identification Number) information. The grammar can be generated from the server from a user information database. It recognizes the key sequence 4-3-2-1.

Example 15-4  Using DTMF Grammar

```xml
<form>
  <field name="getPin">
    <grammar xml:lang="en-US" root = "pin" mode="dtmf">
      <rule id="pin" scope='public">
        <one-of lang-list="en-US">
          <dtmf-0 />
          <dtmf-1 />
          <dtmf-2 />
          <dtmf-3 />
        </one-of>
      </rule>
    </grammar>
  </field>
</form>
```
<item> 4321 </item>
</one-of>
</rule>
</grammar>

"Please enter your pin followed by the pound sign."

<!-- The pin is 4321 -->

<nomatch>
   Your input is incorrect. Please enter again.
</nomatch>

<nomatch count="3">
   Sorry access is denied.
   <exit/>
</nomatch>

</field>

<block>
   Thank you. Please wait while we access your account.
</block>
</form>

Using Text to Speech Output

This section covers the following topics:

- Understanding Provider Fallback for TTS, page 15-15
- Understanding Where TTS Prompts are Played, page 15-16
- Understanding Gender Fallback for MRCP TTS, page 15-17

Understanding Provider Fallback for TTS

The TTS prompt requests can originate from VXML documents. VXML documents can use a property to specify a particular TTS provider. However, users have the option of not using this property.
In response to a TTS prompt request, the Provider Fallback goes through the following possible steps:

1. With a VXML document, the system first tries the provider explicitly chosen (from the Cisco Unified CCX application or the VXML property). A provider can satisfy the request if (a) it is in service AND (b) the language-gender attributes requested by the prompt are supported by the provider.

   Each provider has a fallback mechanism to match the language-gender attributes. If the language specified is country specific such as en_US and the provider does not support it, it then checks if the base language, for example, 'en' is supported. For a detailed description of how gender attributed is matched please see Understanding Gender Fallback for MRCP TTS, page 15-17.

2. If the explicitly specified provider fails to match the request, OR if no provider is specified explicitly, the system uses the “Default TTS Provider” configured on the system parameters Cisco Unified CCX Application Administration web page.

3. If the System default provider fails to match the request, the system tries out all the providers configured through the TTS Cisco Unified CCX Application Administration web page. These providers are tried out in an indeterministic order.

4. If all the configured TTS providers fail, the system falls back on the CiscoSSMLlite provider. This provider however is only capable of playing out wav file prompts specified through the “audio” element in SSML and VXML. If the prompt request contains any text, an application exception is thrown and the caller gets a system error.

Understanding Where TTS Prompts are Played

Which server plays a TTS prompt depends on (a) the configuration of TTS providers and (b) the desired gender/locale/provider for a TTS prompt.

The following is the sequence used to determine which TTS provider plays a TTS prompt:

1. An Overwritten provider in the TTS prompt.
2. A System default provider (as configured in the System Parameters through the Cisco Unified CCX Administration web page).
3. All configured providers, one at a time, in an indeterministic order.
For a detailed description of how the provider selection and fallback works, see Understanding Provider Fallback for TTS, page 15-15

If any one of these providers can serve the desired locale and gender of the TTS prompt, then that provider plays the prompt. In most cases, the provider is the MRCP TTS server.

There is also a lightweight TTS provider called Cisco LiteSSMLProcessor. This provider can handle only TTS prompts with SSML text that contains only audio elements referring to audio files. In this case, the TTS prompt is played by the Cisco Unified CCX server.

The Cisco LiteSSMLProcessor gets used only under the following two circumstances:

- The text in the TTS prompt is SSML enabled with only audio elements referring to audio files.
- None of the providers in the preceding list can serve the TTS prompt request or the overridden/system default provider has been set to Cisco LiteSSMLProcessor.

**Understanding Gender Fallback for MRCP TTS**

Whenever a locale for an MRCP TTS server is configured in Cisco Unified CCX, the genders available for that locale on that server are also specified. In addition, for every TTS provider, a default gender is specified for each locale. This default should correspond to a gender that is configured for that locale by the servers for that TTS Provider.

When using a TTS prompt, a user has the option to either use the com.cisco.tts.gender property or not specify any property, which causes the default gender to be used.

The fallback mechanism that Cisco Unified CCX uses is as follows:

1. If a gender property has been specified, Cisco Unified CCX uses that gender. If no TTS server is found for that gender, Cisco Unified CCX tries the default gender if its value is different from the overridden gender. If no TTS server is found for the default gender, then Cisco Unified CCX fails the request.
2. If a gender property has not been specified, Cisco Unified CCX uses the default gender for the locale specified in the TTS prompt. If no TTS server is found for the default gender, then Cisco Unified CCX tries Female, Male and Neutral gender in that sequence until a TTS server is found. If none is found, Cisco Unified CCX fails the request.

Using The CRTP Protocol

In a VoiceXML document on a Cisco Unified CCX system, you can fetch resources from the Cisco Unified CCX Repository. The repository can be used to manage documents, prompts, and grammars. To allow access to the resources in the repository, you need to use a URL protocol provided by the Cisco Unified CCX system, The Cisco Repository Transfer Protocol (CRTP). It is similar to HTTP. However, in place of the Hostname and port number, the CRTP protocol contains a repository identifier and a language specifier.

Example 15-5 Using CRTP Protocol

```
<field name="aNumber">
  <prompt>Press a number.</prompt>
  <grammar type="application/srgs+xml" mode="dtmf"
    src="crtp:/Grammars/number.grxml" />
</field>
```

This is a proprietary protocol, so no “non-Cisco” use agents are expected to recognize it. Whenever a CRTP URL must be passed to a non-Cisco user agent, it must first be converted to its HTTP protocol equivalent. This is done by the Cisco Unified CCX system. This conversion should only be done right before the resource is needed to be fetched, as the conversion depends on the context at the time of the fetch. See How and Why To Use the CRTP Protocol, page 2-56 for more information on this protocol.

Using the Voice Browser Cache

Any document retrieved through a HTTP GET in a VoiceXML document may be cached; for example, other VoiceXML documents, grammars, and audio files. The voicexml.dtd file will not be cached because the XML parser loads DTDs on every fetch.
When the cache is enabled, all HTTP responses with a code of 200 are stored in the cache unless they exceed the size limit.

HTTP Cache keys are based on the URL. If the URL is a HTTP GET with values, the values will be part of the cache key as well.

When a request is made for the same URL, the cache response is checked for expiration. If it has not expired (based on the expires HTTP response header), a conditional HTTP request is made using the last-modified and/or etag values from the cached response.

Cache is controlled by the Web sender and by the set of vxml attributes containing the maxage and maxstale strings in the VoiceXML document.

If none of these headers were present in the cached response, it is assumed that the response is not cacheable.

The value of expires is subject to clock differences between computers. Last-modified is unaffected as it is sent back to the server as is.

Cache replacement policy is LRU.

Dynamic web pages (JSP, ASP, PHP, cgi-bin, and so on) are cacheable provided they are accessed via HTTP GET and they return the listed response header.

Contents cached based on HTTP headers use the following HTTP response headers:
- etag
- last-modified
- expires

Contents cached based on HTTP headers send the following HTTP request headers:
- if-none-match
- if-last-modified
Creating Cisco Unified CCX Scripts that Run VoiceXML Documents

The Cisco Unified CCX Voice Browser is fully integrated with the Cisco Unified CCX Engine. You can use scripts designed in the Cisco Unified CCX Editor to extend VoiceXML applications (documents) by providing Cisco Unified CCX call control and resource management.

For example, you can use VoiceXML to build a speech dialog as a front end to collect information from the caller. You can then pass this information to a Cisco Unified CCX script, and when the agent receives the call, the information collected by VoiceXML will be available.

This section covers:

- Related Documentation, page 15-20
- A Sample Voicebrowser.aef Script, page 15-20
- Creating a Script that Runs a VoiceXML Document, page 15-22
- Specifying TTS Providers in a Cisco Unified CCX Script, page 15-28

Related Documentation

For complete descriptions of the Cisco Unified CCX steps used in creating Cisco Unified CCX Editor scripts, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Cisco Unified Contact Center Express Editor Reference Guide.

A Sample Voicebrowser.aef Script

You can use the bundled voicebrowser.aef script as an example for creating scripts that invoke a VoiceXML document. Figure 15-1 shows that script as it appears in the Design pane of the Cisco Unified CCX Editor.
The Cisco Unified CCX Voicebrowser.aef sample script does the following:

1. Accepts a call.
2. Creates a URL document.
3. Starts the Voice Browser.
4. Terminates the call.
5. Ends the script and releases system resources.

Use the Voice Browser step in the Media palette of the Cisco Unified CCX Editor to invoke a VoiceXML application. This step can be used as many times in a script as is necessary.
When creating a Cisco Unified CCX VoiceXML script, you can also execute other steps in addition to VoiceXML. The purpose of this sample script is only to illustrate how to create a Cisco Unified CCX script that runs a VoiceXML document.

**Creating a Script that Runs a VoiceXML Document**

This section uses the sample voicebrowser.aef script described in the preceding section to show how to create a Cisco Unified CCX script that runs a VoiceXML document.

This section covers:

- **Step 1: The Start Step (Creating a Script), page 15-22**
- **Step 2: Create Two Voicebrowser Script Variables, page 15-23**
- **Step 3: Enter the Accept Step, page 15-24**
- **Step 4: Enter the Create URL Document Step, page 15-24**
- **Step 5: Enter the Voice Browser Step, page 15-25**
- **Step 6: Enter the Terminate Step, page 15-28**
- **Step 7: Enter The End Step, page 15-28**

**Step 1: The Start Step (Creating a Script)**

Begin to build the sample script by choosing **File > New** from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click OK.

A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

Begin to build the sample script by choosing **File > New** from the Cisco Unified CCX Editor menu bar. The Cisco Unified CCX Editor places a Start step in the Design pane of the Cisco Unified CCX Editor window.

The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar.

Our example script is called voicebrowser.aef.
Step 2: Create Two Voicebrowser Script Variables

Begin the Voicebrowser.aef script design process by using the Variable pane of the Cisco Unified CCX Editor to define two script variables.

Figure 15-1 shows the variables of the Voicebrowser.aef script as they appear in the Variable pane of the Cisco Unified CCX Editor window. Table 15-1 describes them.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFAULT_DOC_VER3 (the name is arbitrary)</td>
<td>Document</td>
<td>DOC[]</td>
<td>Specifies the VoiceXML Document that will be used as a parameter in the Voice Browser step. This variable is required.</td>
</tr>
<tr>
<td>uri (the name is arbitrary)</td>
<td>String</td>
<td>&quot;&quot; (You need to enter the voiceXML document http address between the quotes)</td>
<td>Specifies the URI address of the VoiceXML document. The example in the previous figure uses: “<a href="http://www.mycompany.com/VoiceXmlDocument.vxml%E2%80%9D">http://www.mycompany.com/VoiceXmlDocument.vxml”</a> This variable is optional but if you do not use it, then each time in a script that you need to reference the uri of the VoiceXML document, you will need to specify it with the Create URL Document step rather than just use the Document variable. This variable is used as a parameter in the Create URL Document step where you assign it to the document variable.</td>
</tr>
</tbody>
</table>

Step 2: Enter the Start Step

Begin to build your Voicebrowser.aef script by choosing File > New from the Cisco Unified CCX Editor menu bar. The Cisco Unified CCX Editor places a Start step in the Design pane of the Cisco Unified CCX Editor window. The Start Step needs no configuration and has no customizer window.
Step 3: Enter the Accept Step

Continue to build the Voicebrowser.aef script by dragging an Accept step (from the Contact palette in the Palette pane) to the Design pane of the Cisco Unified CCX Editor. The script uses an Accept step to accept a contact.

Step 4: Enter the Create URL Document Step

In the Create URL Document step customizer window, in the separate selection boxes, select the string variable \texttt{uri} and the document variable \texttt{DEFAULT\_DOC\_VER3} that you created and click \textbf{OK}. This assigns the URL address in the string variable to the document variable.

This step defines the XML document variable, \texttt{uri}, to be used in your script for specifying the VoiceXML document that you will run in the script.

The Create URL Document step does not issue a HTTP request. The request occurs when the document variable is used by another step, such as the Send Response step or the Send JSP step, or, as in our example script, the VoiceBrowser step.
In this example, parameters are not used. If you use parameters, they are passed to the web server where the VXML document is located for use by the web server.

**Step 5: Enter the Voice Browser Step**

In the VoiceBrowser step, in the Contact selection box, select the triggering contact that will run the VoiceXML document. Then, in the VXML Document selection box, select the VXML document and click **OK**.

The VoiceBrowser step assigns the trigger to run the VoiceXML document at the URL specified by the VXML Document variable. When a caller phones that trigger number, the caller accesses the VoiceXML programming in the VoiceXML document.
Figure 15-3 shows the General tab of the Voice Browser customizer window configured with the example VXML document variable. You can use the Expression Editor button next to the VXML Document select list to include the VXML document in an expression in the Cisco Unified CCX VoiceXML script.

**Figure 15-3 Voice Browser Customizer Window—General Tab**

Figure 15-4 shows the `<exit>` Attributes tab of the Voice Browser customizer window.

The sample script voicebrowser.aef does not use this tab.

Use the `<exit>` Attributes tab to return information from the Voice Browser step. For example, the script in Example 15-3 on page 15-14 returns the credit card number collected. Using the data in that example, you could pass the credit card information to a script variable. To do that, you would first have to create a script...
variable in the Cisco Unified CCX Editor and then, in the <exit> Attributes <namelist> tab of the Voice Browser step customizer window, you would add the mapping of the VoiceXML “creditNumber” to the “creditNumber” variable.

Figure 15-4 Voice Browser Customizer Window—<exit> Attributes Tab

Figure 15-5 shows Prompt tab of the Voice Browser customizer window. The sample script voicebrowser.aef does not use this tab. Use this tab if you do not want the Cisco Unified CCX script to continue if there are errors when the VoiceXML document is run. The default is for the script to continue.
Step 6: Enter the Terminate Step

Close the sample script Voicebrowser.aef with a Terminate step (from the Contact palette), which ends the call.

Step 7: Enter The End Step

Conclude the Voicebrowser.aef script with an End step (from the General palette). The End step ends the script and releases all system resources.

Specifying TTS Providers in a Cisco Unified CCX Script

In addition to the supported TTS providers, the Cisco Unified CCX Administration interface also allows the creation of new providers. Anytime a new provider is added, Cisco Unified CCX updates the editor machines with the new TTS provider information. This is done by synchronizing a file between the Cisco Unified CCX server and the editor machines.
Designing International Cisco Unified CCX VoiceXML Applications

The Cisco Unified CCX Voice Browser can generate TTS prompts and recognize speech in selected languages. In addition, the Voice Browser localizes built-in grammars such as date and time. The script automatically activates the grammar for specific languages based on the language context of the call.

For a list of built-in grammar support, see Built-in Type Implementation, page B-12 of Appendix B, “VoiceXML Implementation for Cisco Voice Browser.”

You can select a language for an application in one of several ways:

- Configure the language of the application in the Cisco Unified CCX Administration web interface. This method is the most convenient for applications that use a single language. (For more information on language configuration, see the Cisco Unified Contact Center Express Administration Guide.)

- Use the Set Contact Info in the Cisco Unified CCX script before invoking the Voice Browser step, in order to make language information available to the script.

- Use the xml:lang attribute on the <vxml>, <grammar>, or <prompt> element. With this method, scripts can use multiple languages.
  - To specify the language for a VoiceXML document, use the xml:lang attribute in the <vxml> element.
  - To specify the language for individual prompt or grammar, set the xml:lang attribute in the <prompt> or <grammar> element.

The following examples illustrate the use of the xml:lang attribute.
Example 15-6 is a main menu that requests users to select the language, prompting users in both English and Spanish. The xml:lang attributes in the <prompt> elements specify the language to use for each prompt.

Example 15-6 mainmenu.vxml

```xml
<?xml version="1.0" encoding="UTF-8"?>
<vxml xmlns="http://www.w3.org/2001/vxml" version="2.0">
<form>
  <field name="language">
    <!-- read in English -->
    <prompt xml:lang="en">
      For English, press 1.
    </prompt>
    <!-- read in Spanish -->
    <prompt xml:lang="es-MX">
      Para Español, oprima 2.
    </prompt>
    <grammar xml:lang="en-US" type="application/srgs+xml version="1.0" mode="dtmf">
      <rule id="choice" ">
        <one-of>
          <item>1</item>
          <item>2</item>
        </one-of>
      </rule>
    </grammar>
    <filled>
      <if cond="language=='1'">
        <goto next="info_en.vxml"/>
      </if>
      <elseif cond="language=='2'">
        <goto next="info_es.vxml"/>
      </elseif>
    </filled>
  </field>
</form>
</vxml>
```

In Example 15-7, if the user selects Spanish, the script executes the document info_es.vxml. The xml:lang attribute of the <vxml> element specifies the Spanish language for the entire document.
**Example 15-7 info_es.vxml**

```xml
<?xml version="1.0" encoding="ISO-8859-1"?>
<vxml xmlns="http://www.w3.org/2001/vxml" version="2.0" xml:lang="es-MI">
  <form>
    <field name="q">
      <prompt>
        ¿Desea escuchar las noticias o el tiempo?
      </prompt>
      <grammar xml type="application/srgs+xml" version="1.0" mode="voice">
        <rule id="choice">
          <one-of>
            <item>las noticias</item>
            <item>el tiempo</item>
          </one-of>
        </rule>
      </grammar>
    </field>
    <submit next="getInfo.jsp"/>
  </form>
</vxml>
```

**Note**
When you create non-English XML files, you must accurately set the character encoding. XML uses Unicode (UTF-8) by default, but you can use other encoding methods. For example, many Western European language text editors use ISO-8859-1 (latin-1) encoding by default. In this case, you must set the encoding attribute of the XML declaration correctly, as shown in the example above.

Although you may specify xml:lang in `<grammar>`, note that Cisco Unified CCX does not support recognition of multiple languages at the same time. If the `<grammar>` elements specify conflicting languages, the last one specified will take precedence.

See Using VXML to Implement a Language Not Available in Cisco Unified CCX, page 4-5 for further information.
Cisco Unified CCX VoiceXML Application Troubleshooting Tips

The following are helpful tips when troubleshooting your voiceXML application:

- Check the Cisco Unified CCX subsystems in service: CMT, JTAPI, MRCP ASR&TTS, Voice Browser.
- Test the URI in the Web browser.
- Check the Provider selection.
- Validate files: VXML, grammar, audio.
- Check file fetching locations.
- Use a DTD to check for the correct syntax.
- Do performance tuning: exclude the DTD and use caching facilities (VXML, HTTP)
- In the Cisco Unified CCX system, trace the contact flow:
  - The SS_VB subsystem is used to control tracing for the Voicebrowser, and the “Debugging” level provides debug output.
  - Other related subsystems to check:
    - SS_MRCP_TTS
    - SS_MRCP_ASR
    - SS_CMT
- Check the log file
You can use the steps of the Cisco Unified CCX Editor to design scripts that take advantage of the Cisco Unified Contact Center Enterprise (CCE) solution.

This chapter describes the steps used to create scripts that interact with the Cisco Unified Intelligent Call Management Enterprise (ICME) subsystem of the Cisco Unified CCX system.

This section contains the following topics:

- The Service Control Interface, page 16-1
- Call Variables, page 16-3
- ICM Script Types, page 16-7
- Sample VRU Script Templates, page 16-10

The Service Control Interface

The Service Control interface allows the Cisco Unified ICME software to provide call-processing instructions to the Cisco Unified CCX system. It also provides the Cisco Unified ICME software with event reports indicating changes in call state.
The Service Control interface supports the following four label types:

- **Normal**—The Normal label is a character string that encodes instructions for routing the call. It contains either a directory number to which the Cisco Unified CCX system routes the call or the name of a user prompt that represents an announcement.

- **Busy**—The Busy label indicates that the caller receives a busy treatment.

- **Ring No Answer**—The Ring No Answer (RNA) label indicates that the caller receives an RNA treatment.

- **Default Label**—The Default label indicates that the Cisco Unified CCX system runs the default script or runs the system default treatment if no default script is configured.

In addition to these label types, the Cisco Unified IP IVR product supports the following special extensions as part of the Normal label:

- **Extensions starting with “#” or “*”**
  These extensions trigger a network take back and transfer. For the redirect to be successful, the script out-pulses the specified string as is and then monitors the call for a hang-up event, for a maximum of 5 seconds.
  You can use the “,;” character to insert a 1 second pause.

- **Extensions ending with “.wav”**
  These extensions trigger a network announcement type of redirect, in which the script simulates a ring-back tone and then plays back the specified .wav file 4 times, and then finally simulates a fast busy tone. The transfer is successful if at any time the caller hangs up or if the script reaches the end of the fast busy tone and disconnects the call.

- **Extensions equal to “PROBLEMS”**
  These extensions trigger a network announcement type of transfer (see above) with a system problem announcement.

- **Extensions equal to “BUSY”, “RNA”, “FASTBUSY”, or “DIALTONE”**
  These extensions cause the script to generate the specified audio treatment before terminating the call. The transfer is successful if at any time the caller hangs up or if the script reaches the end of the audio treatment. The script then reports the call as disconnected rather than as redirected.
Call Variables

This section contains the following topics:

- Using Call Variables, page 16-3
- Using Expanded Call Variables, page 16-3
- Using Error Variables, page 16-4
- Using the Parameter Separator, page 16-4
- Configuring Encoding and Decoding Types, page 16-5

Using Call Variables

The Cisco Unified ICME software supports several Call Variables. The Cisco Unified ICME System, the Enterprise Server, and the Cisco Unified CCX system use these strings to pass values to each other. You can use the following variables in your scripts:

- VRU Script Name
- ConfigParam
- Call.CallingLineID
- Call.CallerEnteredDigits
- CallPeripheralVariable1 to Call.PeripheralVariable10
- Call.AccountNumber

Using Expanded Call Variables

The Cisco Unified ICME, the Enterprise Server, and the Cisco Unified CCX system also pass expanded call variables to each other, but you must use the Cisco Unified CCX Editor to define or enable these variables individually.
Note
If you are using Cisco Unified CCX, your variables must also be defined through the Cisco Finesse Administration.

See the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide and the Cisco Contact Center Express Administration Guide for more information about Call variables and ICME-related topics.

See Get Enterprise Call Info Step for more information about Call variables and ICME-related topics.

Using Error Variables

If a VRU (Voice Response Unit) script runs without any errors, the system sets the ResultCode field of the run_script_result message to true. You can change the result using the Set ICM Result step (from the ICM palette).

Note
For more information, see “Call Contact Step Descriptions” in the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.

Using the Parameter Separator

You can send multiple values—or tokens—within one variable, so you can avoid using many variables at the same time.

The parameter separator is a character that defines the boundary between the different tokens in one variable. The token numbering begins with 0.

Note
You specify this separator on the Cisco Unified CCX Administrator’s System Parameters web page.
For example, if the parameter separator is “|”, you can send an expanded call variable as

```
true | 4 | 4/3/2000
```

where the value of token number 0 is “true”, token number 1 is “4”, and token number 2 is “4/3/2000”.

The following variables can have multiple tokens separated by the parameter separator:

- Peripheral (1-10)
- Expanded Call (ECC)
- ConfigParam
- VRU Script Name

**Note**
The VRU Script Name variable holds the name of a VRU script to run when the Cisco Unified CCX system receives a Run Script request from the Cisco ICME software. The Cisco Unified CCX system reads only the first token (token number 0) as VRU Script Name; the rest of the tokens are passed on (with the script name - token #0) to be used as regular variable tokens.

The Get/Set Enterprise Call Info steps of the Call Contact palette in the Cisco Unified CCX Editor allow you to set and read different tokens in the variables passed between the Cisco Unified CCX system and the Cisco Unified ICME Server.

**Note**
For more information, see “Call Contact Step Descriptions” in the *Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.*

### Configuring Encoding and Decoding Types

When the Cisco Unified CCX system receives variables from the Cisco Unified ICME software or Enterprise Server, the variables do not have an associated type (such as Integer or Float). To use these variables in Cisco Unified ICME VRU or Cisco Unified CCX scripts, the Cisco Unified CCX system first
decodes them to one of the available types. When the script sends variables back to the Cisco Unified ICME Server, the Cisco Unified CCX system then encodes them into a form the Cisco Unified ICME Server can use, depending on the type of the local Cisco Unified CCX script variable.

Table 16-1 lists the encoding types that the Cisco Unified CCX system supports.

Note
The Input format is the data decoded from the Cisco Unified ICME Server variables to the Cisco Unified CCX script local variables. The Output format is the data encoded from the Cisco Unified CCX script local variables to the Cisco Unified ICME Server variables.

<table>
<thead>
<tr>
<th>Encoding Type</th>
<th>Input Format</th>
<th>Example Input</th>
<th>Output Format</th>
</tr>
</thead>
</table>
| Integer—32-bit signed integer | The Cisco Unified CCX Editor supports three formats:  
  • Decimal—a sequence of digits without a leading 0. Digits can range from 0 to 9.  
  • Hexadecimal—in the form 0xDigits, where Digits can range from 0 to 9, a to f, and A to F.  
  • Octal—in the form 0Digits, where Digits can range from 0 to 7.  
| Decimal:  
  • 25  
  • -34  
  • 900  
  Hexadecimal:  
  • 0x1e  
  • 0x8A5  
  • 0x33b  
  Octal:  
  • 033  
  • 0177 | Decimal digits from 0 to 9 with no leading 0 |
ICM Script Types

The Cisco Unified CCX system runs three different types of ICM scripts:

- Initial Scripts, page 16-8
- Default Scripts, page 16-8
- VRU Scripts, page 16-9

### Table 16-1 Encoding Types That Cisco Unified CCX Supports (continued)

<table>
<thead>
<tr>
<th>Encoding Type</th>
<th>Input Format</th>
<th>Example Input</th>
<th>Output Format</th>
</tr>
</thead>
</table>
| Float—32-bit floating number | [-]Digits.DigitsExponentTrailer where:
  - Digits are digits from 0 to 9.
  - Exponent is an optional exponent with a leading e or E.
  - Trailer is one of f, F, d, or D to specify a float or a double. The trailer is optional. | 3.1415927f
6.02e23F
25
-4.2323E5f | Same as input |
| Double—64-bit floating number | 0.843
1.871E3d
.23e-123
-3.4e34 | Same as input |
| Boolean | To designate this non-case-sensitive type:
  - True—Use 1, t, y, true, or yes.
  - False—Use 0, f, n, false, or no. | Yes
F
0
n | Either true or false |
| String | Type requires no conversion. | Hello world | Same as input |
| Date | Use the format mm/dd/yyyy where mm is the month, dd is the day, and yyyy is the year. | 10/22/1999
3/30/2000 | Same as input |
| Time | Use the format Hh:Mm:Tod where Hh is the hour, Mm is the minute, and Tod is am or pm. This type is not case-sensitive. | 12:20am
09:05PM | Same as input |
Initial Scripts

The Cisco Unified CCX system runs initial scripts when it receives a call on a JTAPI (Java Telephony Application Programming Interface) trigger associated with a post-route application. You set the initial script when you configure a Cisco Unified ICME post-route application. (For more information, see the *Cisco Unified Contact Center Express Application Administration Guide*.)

If you leave the Initial Script field empty, no initial script runs.

*Note* Because initial scripts are run on the Cisco Unified CCX system before the system notifies the Cisco Unified ICME about the call, you can use the Get Enterprise Call Info step or the Set Enterprise Call Info step, but not the Set ICM Result step.

Default Scripts

The Cisco Unified CCX system runs the default script whenever the Cisco Unified ICME software sends a default label, when the Cisco Unified CCX system times out waiting for the Cisco Unified ICME to provide instructions, or when communication with the Cisco Unified ICME software is lost.

*Note* Because default scripts can run without access to the Cisco Unified ICME software, you should never use any ICM step in a default script.

You set the default script when you configure the Cisco Unified ICME translation route or post-route applications. (For more information, see the *Cisco Contact Center Express Administrator Guide*.)

If you leave the Default Scripts field blank, the Cisco Unified CCX system runs the system default message, which announces that the system is experiencing technical difficulties.
Chapter 16  Designing Scripts for Cisco Unified IP IVR

ICM Script Types

VRU Scripts

Cisco VRU script design does not handle complete calls, but provides different call-handling instructions to be executed sequentially by the Cisco Unified CCX server. For example, the VRU scripts may play a prompt or acquire dual tone multi-frequency (DTMF) values.

The VRU scripts run when the Cisco Unified ICME software sends a Run VRU Script request to the Cisco Unified CCX system using a Run VRU Script node in an ICM script. Before the Cisco Unified ICME software can call a VRU script, you must configure and upload the script to the Repository. (For details, see the Script Management information in the Cisco Unified Contact Center Express Administration Guide.)

Because the VRU scripts run only when the Cisco Unified CCX system is in communication with the Cisco Unified ICME, you can use any ICM step in a VRU script.

PreConnect scripts and VRU scripts that run when Cisco Unified ICME software sends a connect request to the Cisco Unified CCX system before the Cisco Unified CCX system routes the call. When the Cisco Unified CCX system receives the connect request, it checks the Expanded Call Context variable. If the variable is empty, the Cisco Unified CCX system routes the call to the label sent by the Cisco Unified ICME. If the VRU Script Name variable is not blank, the Cisco Unified CCX system simulates a Run VRU Script request, using the first token of the variable as the file name of the VRU script to run. In addition, the Cisco Unified CCX system sends the ConfigParam variable and other tokens in the VRU Script Name variable to the PreConnect script.

If the PreConnect script returns a result of false, the Cisco Unified CCX system handles it as a failure-to-connect error, and does not attempt to route to the requested destination.

You must enable the VRU Script Name expanded call variable to use this feature. If you want to send values using the ConfigParam variable, you must enable the ConfigParam expanded call variable. For more information, see the “Using Expanded Call Variables” section on page 16-3.
Sample VRU Script Templates

The Cisco Unified CCX system ships with the following three VRU sample script templates:

- Basic Queuing (BasicQ.aef), page 16-10
- Visible Queuing (VisibleQ.aef), page 16-11
- Collect Digits (CollectDigits.aef), page 16-12

Basic Queuing (BasicQ.aef)

The BasicQ script template (BasicQ.aef) does not use any ICM steps. It simply plays several prompts (and puts the call on hold), looping through them until an agent phone becomes free and the Cisco Unified ICME can route the call to the agent.

This script has no variables defined.

The Cisco 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 connect request is sent to connect the call to an available agent.
Figure 16-1 shows BasicQ.aef as it appears in the Design pane of the Cisco Unified CCX Editor.

**Visible Queuing (VisibleQ.aef)**

The VisibleQ script template (VisibleQ.aef) uses the GetEnterpriseCallInfo step to retrieve the expected wait time from the Cisco Unified ICME and to relay that information to the caller.

Before accepting the call, the GetEnterpriseCallInfo step retrieves information for Cisco Unified ICME. The script copies the value of the expanded call variable user.expected.wait.time to the local variable **WaitTime** as an Integer.

Then, the Accept step accepts the call. The script plays several messages. It starts by playing ICMVisibleQAnn1.wav. It then plays the variable WaitTime, the ICMSecond.wav file, and ICMVisibleQAnn2.wav file.

The script then puts the call on hold for 30 seconds, takes the call off hold, plays the ICMWait4NextAvail.wav prompt, and puts the call back on hold for another 60 seconds. This sequence loops until an agent is free to take the call, as in the BasicQ script.
Figure 16-2 shows VisibleQ script as it appears in the Design pane of the Cisco Unified CCX Editor.

Figure 16-2 VisibleQ.aef Script in the Cisco Unified CCX Editor Design Pane

Collect Digits (CollectDigits.aef)

The CollectDigits script template, CollectDigits.aef, uses the Set ICM Data step to collect the caller account numbers, and send them back to the Cisco Unified ICME system.
Figure 16-3 shows the CollectDigits script as it appears in the Design pane of the Cisco Unified CCX Editor.

First the Accept step accepts the call, and then the script uses the Get Digit String step to ask the caller to enter an account number, which is assigned to Result Digit String acctno.

The Set Enterprise Call Info step stores the result in Field Name Call.CallerEnteredDigits field so that it can be returned back to the Cisco Unified ICME system for further processing.
Cisco Unified Contact Center Express (CCX) is an automatic call distributor (ACD) for enterprise organizations.

You can use the Cisco Unified CCX Editor to design scripts that take advantage of Cisco Unified CCX capability.

This chapter describes the design of such a script, SessionEnabled.aef, and also serves as a good demonstration of the use of the steps from the Session palette for session management and the use of a default script that executes if an error occurs in the main script.

This section contains the following topics:

- A Sample Cisco Unified CCX Script Template, page 17-2
- The Start Step (Creating a Script), page 17-2
- Cisco Unified CCX Script Variables, page 17-3
- The Accept Step, page 17-6
- The Get Contact Info Step, page 17-6
- The Get Session Info Step, page 17-6
- The If Steps, page 17-7
- Recording a Name, page 17-24
- The Select Resource Step, page 17-26
- Using Default Scripts, page 17-32
A Sample Cisco Unified CCX Script Template

The sample Cisco Unified CCX script template performs the following functions:

1. Accepts a call.
2. Asks the caller to enter an account number.
3. Records the caller’s name.
4. Does one of the following:
   - Connects the caller to an agent
   - Queues the call and sets a priority, based on whether or not the caller has already entered an account number on a previous attempt to connect during the same session, and/or if the main script has already failed and the caller has been re-routed back to the main script.

Figure 17-1 shows the top-level view of the sample Cisco Unified CCX script in the Design pane of the Cisco Unified CCX Editor.

The Start Step (Creating a Script)

Begin to build the sample script by choosing File > New from the Cisco Unified CCX Editor menu bar. The Templates folder displays. Select the blank script and click OK.
A blank script containing a Start and End step opens in the Design pane of the Cisco Unified CCX Editor window.

The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar.

Our example script is called SessionEnabled.aef.

## Cisco Unified CCX Script Variables

The designer begins the script design process by using the Variable pane of the Cisco Unified CCX Editor to define script variables.

**Figure 17-2** shows the variables of the sample Cisco Unified CCX script as they appear in the Variable pane of the Cisco Unified CCX Editor.

**Figure 17-2  Cisco Unified CCX Sample Script Variable Pane**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Value</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSG</td>
<td>String</td>
<td>**</td>
<td>Parameter</td>
</tr>
<tr>
<td>Delay/InQueued</td>
<td>rt</td>
<td>0</td>
<td>Parameter</td>
</tr>
<tr>
<td>WelcomePrompt</td>
<td>Prompt</td>
<td><code>CiscoWelcome.wav</code></td>
<td>Parameter</td>
</tr>
<tr>
<td>accountNum</td>
<td>String</td>
<td>**</td>
<td>Parameter</td>
</tr>
<tr>
<td>failureCount</td>
<td>rt</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>language</td>
<td>Language</td>
<td>[en_US]</td>
<td></td>
</tr>
<tr>
<td>name</td>
<td>Document</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>prompted</td>
<td>boolean</td>
<td>false</td>
<td></td>
</tr>
<tr>
<td>queued</td>
<td>boolean</td>
<td>false</td>
<td></td>
</tr>
<tr>
<td>resourceID</td>
<td>String</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>session</td>
<td>Session</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>session2</td>
<td>Session</td>
<td>null</td>
<td></td>
</tr>
</tbody>
</table>

**Table 17-1** describes the variables used in the Cisco Unified CCX sample script.
Table 17-1 Variable Descriptions for the Sample Cisco Unified CCX Script

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSQ</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores Contact Service Queue information from which to find a resource.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See The Select Resource Step, page 17-26.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The designer marks this variable as a parameter to allow the administrator</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the option to change the value of this variable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For more information, see the Cisco Unified Contact Center Express</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Administration Guide.</td>
</tr>
<tr>
<td>DelayWhileQueued</td>
<td>Integer</td>
<td>30</td>
<td>Length of time the script will delay before sending the call back</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>through the queue loop. (See The Queued Output Branch, page 17-30.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The designer marks this variable as a parameter to allow the administrator</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the option to change the value of this variable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For more information, see the Cisco Unified Contact Center Express</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Administration Guide.</td>
</tr>
<tr>
<td>WelcomePrompt</td>
<td>Prompt</td>
<td>P[CDWelcome.wav</td>
<td>Welcomes the caller. (See The Play Prompt Step, page 17-11.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The designer marks this variable as a parameter to allow the administrator</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the option to change the value of this variable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For more information, see the Cisco Unified Contact Center Express</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Administration Guide.</td>
</tr>
</tbody>
</table>
### Table 17-1  Variable Descriptions for the Sample Cisco Unified CCX Script (continued)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>accountNum</td>
<td>String</td>
<td>&quot;***&quot;</td>
<td>Stores the account number entered by the caller. (See The Play Prompt Step, page 17-11.)</td>
</tr>
<tr>
<td>failureCount</td>
<td>Integer</td>
<td>0</td>
<td>Stores the number of times a call has failed. (See The Session Steps, page 17-14.)</td>
</tr>
<tr>
<td>language</td>
<td>Language</td>
<td>English (United States) (en_US)</td>
<td>Stores the language selection made by the caller. (See The Third If Step, page 17-9.)</td>
</tr>
<tr>
<td>name</td>
<td>Document</td>
<td>null</td>
<td>Stores the spoken name of the caller. (See Recording a Name, page 17-24)</td>
</tr>
<tr>
<td>prompted</td>
<td>Boolean</td>
<td>false</td>
<td>Stores information to determine whether or not the caller has heard WelcomePrompt. (See The First If Step, page 17-9.)</td>
</tr>
<tr>
<td>queued</td>
<td>Boolean</td>
<td>false</td>
<td>Stores the information used to determine whether or not the call has been queued. This information will be useful in the default script to determine whether or not the main script failed while in or outside of queue. (See The Connected Output Branch, page 17-28 and The Queued Output Branch, page 17-30.)</td>
</tr>
<tr>
<td>resourceID</td>
<td>String</td>
<td>&quot;***&quot;</td>
<td>Stores the Resource ID of the chosen agent. (See The Select Resource Step, page 17-26.)</td>
</tr>
<tr>
<td>session</td>
<td>Session</td>
<td>null</td>
<td>Stores session information for the call. (See The Get Contact Info Step, page 17-6.)</td>
</tr>
<tr>
<td>session2</td>
<td>Session</td>
<td>null</td>
<td>Stores previous session information based on the accountNum variable. (See The Session Steps, page 17-14.)</td>
</tr>
</tbody>
</table>
The Accept Step

The designer continues to build the sample script by dragging an Accept step (from the Contact palette in the Palette pane) to the Design pane of the Cisco Unified CCX Editor window, as shown in Figure 17-1. The script uses an Accept step to accept a contact, in this case a telephone call.

The Get Contact Info Step

The designer continues to build the sample script by adding a Get Contact Info step, which determines whether or not contact information already exists for this caller (based on a previous call).

The Get Contact Info step extracts information from the Session object and stores it in a Session variable named session.

The Get Session Info Step

The designer continues to build the sample script by adding a Get Session Info step, which evaluates the value of session, attempting to retrieve previous information collected from the caller, who may have been disconnected during a previous call or transferred back into the Cisco Unified CCX queue by an agent.

A caller can be transferred back into the queue if the script fails, in which case the Cisco Unified CCX system falls back to the default script (see Using Default Scripts, page 17-32), or if an agent routes the call back to the route point.
Figure 17-3 shows the configured Context tab of the Get Session Info customizer window.

This chapter describes the variables listed in the Context tab of the Get Session Info customizer window as they are populated by subsequent steps in the script. If this call is the first time the caller has called, the session variable is empty and the prompted variable is null.

The If Steps

The designer continues the sample script by adding a series of If steps to test to find out if a caller has already entered information.

If the caller has made a previous call within the configured session timeout, which is typically 30 minutes, and has already entered information, then the script can retrieve this information, saving the caller from the inconvenience of re-entering it. In this case, the script collects the account number of the caller and then attempts to retrieve the session that corresponded with that previous call.
If an agent transferred the call back into the queue managed by this script, then the session that stores all the collected information is still associated with the call. The series of If steps at the beginning of the script verifies this fact, after having retrieved this information from the session using the Get Session Info step.

Figure 17-4 shows the scripting under the first three If steps in the beginning of the sample Cisco Unified CCX script.

This section contains the following steps:

- The First If Step, page 17-9
- The Second If Step, page 17-9
- The Third If Step, page 17-9
- The Fourth If Step, page 17-10
- The Play Prompt Step, page 17-11
- The Get Digit String Step, page 17-11
- The Session Steps, page 17-14
- Choosing a Language, page 17-21
The First If Step

The designer adds the first If step to evaluate the expression, prompted==null; or, the value of the **prompted** variable (which was obtained from the session) is equal to null.

The script uses the Boolean **prompted** variable to determine whether or not the caller has heard the **WelcomePrompt** prompt (which plays later in the script).

If the expression is true, then the Set step under the True output branch has not executed yet, because when it does execute, it sets the value of **prompted** to false. (See Figure 17-4.)

**Note**

A false value, when tested by a subsequent If step, tells the script that the caller has already entered an account number, and the script falls through to a Select Resource step to attempt to connect to an agent.

The Second If Step

The designer adds a second If step to evaluate the expression, failureCount==null; or, the value of the **failureCount** variable (which was obtained from the session) is equal to null.

The script uses the **failureCount** Integer variable to determine how many times the call has failed. If the expression is true, this tells the script that this is the first time for this call, and the Set step initializes the value of **failureCount** to 0. (See Figure 17-4.) This information will be useful later in the script to determine priority of queueing and in the associated default script to determine if the call has failed more than once in the main script.

If this expression is false, then the value of **failureCount** is not changed.

The Third If Step

The designer adds a third If step to evaluate the expression, language!=null; or, the value of the **language** variable (which was obtained from the session) is not equal to null.
Later in the script, the script gives the caller the choice to set the value of the `language` variable to either American English or North American Spanish. If the expression is true, the language variable has been set (and therefore, this is not the first pass for this caller), and the Set Contact Info step under the True output branch updates the language context of the call to the language selected by the caller in a previous attempt.

If the expression is false, the language preference has not been determined yet, and its value remains unchanged.

### The Fourth If Step

The designer adds a fourth If step to evaluate the expression, `prompted==false;` or, the value of the `prompted` variable is false.

As mentioned above (see The First If Step, page 17-9), if this expression is true, this is the first pass of the caller, and the script continues to the subsequent steps that prompt the caller to enter an account number, choose a language for the call, and record a name.

Figure 17-5 shows the scripting under the True output branch of this If step.

**Figure 17-5** Steps Under the True Output Branch of the Fourth If Step
If this expression is false, the steps under the True output branch of this If step have already been executed on a previous attempt, and the script can send the caller directly to the Select Resource step to be connected to an agent or placed in queue.

The True output branch of the fourth If step contains the following steps:

- The Play Prompt Step, page 17-11
- The Get Digit String Step, page 17-11
- The Session Steps, page 17-14
- Choosing a Language, page 17-21
- Recording a Name, page 17-24

The Play Prompt Step

The Play Prompt step under the True output branch of If step plays back the prompt WelcomePrompt, which welcomes the caller.

The Get Digit String Step

After this Play Prompt step executes, the Get Digit String step prompts the caller to enter an account number and then receives caller input.

The designer configures the Get Digit String customizer window as follows:

- General tab
  - Contact—Triggering Contact
    The contact that triggered the script remains the contact for this step.
  - Interruptible—Yes
    External events can interrupt the execution of this step.
  - Result Digit String—accountNum
    The accountNum variable stores the digits entered by the caller (and is used by the subsequent Session steps).
The If Steps

- **Prompt tab**
  - **Prompt**—P[EnterAccountNum]
    This prompt asks the caller to enter an account number.
  - **Barge In**—Yes
    The caller can enter an account number without first having to listen to
    the playback of the entire prompt.
  - **Continue on Prompt Errors**—Yes
    In the event of a prompt error, the script continues to play back the next
    prompt in the sequence, or waits for caller input if the last prompt has
    been played.

- **Input tab**
  - **Initial Timeout (in sec)**—5
    The system waits 5 seconds for initial input from the caller before
    executing the Timeout output branch (after the maximum number of
    retries has been reached).
  - **Interdigit Timeout (in sec)**—3
    The system waits 3 seconds for the caller to enter the next digit, after
    receiving initial input from the caller, before executing the Timeout
    output branch (after the maximum number of retries has been reached).
    (Does not apply for ASR channels.)
  - **Maximum Retries**—3
    The step makes 3 retries to receive valid input before executing the
    Unsuccessful output branch.
  - **Flush Input Buffer**—No
    The system saves previously entered input while the caller types ahead.
  - **Clear Input Buffer on Retry**—Yes
    The script clears the input buffer, erasing previously-entered digits
    whenever the step makes a new attempt at collecting caller input.
• Filter tab
  – Input Length—10
    The minimum number of digits required before the step returns
    automatically is 10. (This minimum number applies only to non-ASR
    channels; however, with ASR channels no more digits than specified will
    be returned.)
  – Digits Filter
    All the numeric options are checked. The alphabetical options and “*”
    and “#” and not selected.
    The step treats the numbers from 0 to 9 as valid entries, and treats the
    keys “*” and “#” and the letters A through D as invalid characters to
    collect.
  – Terminating Digit—#
    The key the caller can use to indicate completion of input.
  – Cancel Digit—*
    The key the caller can use to start over. (The cancel key works only until
    the script reaches the maximum number of retries.)

As shown in Figure 17-6, The Get Digit String step has three output branches.

• Successful—If the Successful output branch executes, the script uses a series
  of Session steps as described in the next section.

• Timeout—If the Timeout output branch executes, a Set step sets the
  accountNum to null, meaning that the account number was not received, and
  so the script treats the call as new.

• Unsuccessful—If the Unsuccessful output branch executes, a Set step sets the
  accountNum to null, meaning that the account number was not received, and
  so the script treats the call as new.
The Session Steps

This section describes the session management tasks accomplished by the scripting under the Successful output branch of the Get Digit String step.

The script determines whether or not the caller has made a recent call and previously entered all the necessary information, in which case a session may already exist. The script uses the account number to map the current call to any previous session information. The subsequent steps attempt to retrieve the previous session and if found, associate this new call contact with the original session.
Figure 17-7 shows the scripting under the Successful output branch of the Get Digit String step.

Figure 17-7  
Get Digit String Step—Successful Output Branch

```plaintext
accountNum = Get Digit String (--Triggering Contact--)  
Successful

/* Try to get session based */  
session2 = Get Session Info (session, "AccountNum")

If (session2 != null) Then
  True
    /* We have already have a session */
    Set session = session2
    Set Contact Info (--Triggering Contact--)  
    session = Get Session Info (session, "session")
  
  If (failureCount == 0) Then
    True
      Fail  
      Fail
    False

  /* Add new mapping to current mapping */
  Session Mapping (session, add session)
```

The Get Session step under the Annotate step attempts to get previous session information based on the `accountNum` variable, and to store it in the `session2` variable. (This information is useful to the subsequent If step, which tests to determine whether or not session information existed for the previous call.)

Figure 17-8 shows the context tab of the configured Get Session customizer window.
The If step under the Get Session step evaluates the expression session2!=null; or, the session2 variable is not null.

If this expression is true, session information does exist for the previous call, and the script uses the following steps under the True output branch of the If step (see Figure 17-8) in order to re-associate the current call to this older session:

- **Set step**—Sets the value of the session variable to equal the session2 variable.
  The session variable is used by subsequent steps in the script so that from this step on, the script uses only the previous session information.
- **Set Contact Info step**—Associates the new call to the old session and deletes the temporary blank session that the script automatically associated with the new call.
- **Get Session Info step**—Uses the session variable to retrieve values for the failureCount and language variables (used by subsequent If steps).
- **If step**—Evaluates the expression failureCount==null; or, the value of the failureCount variable is equal to null.
  - If the True output branch executes and failureCount is empty, the call has not failed before this step, and a Set step initializes the value to 0.
  - If the False output branch executes and failureCount has already been assigned a value, then this value is left unchanged and is subsequently used to determine the queuing priority to assign to this call.
If the expression session2!=null is false, then session information no longer exists, and the Session Mapping step adds new mapping for this session.

The script then continues with the temporary session object that the script originally associated with this call, and then re-populates the information by collecting it from the caller. The script maps the new session using the account number so that the script can retrieve it later for another call from the same customer.

Figure 17-9 shows the configured Session Mapping customizer window.

As shown in Figure 17-10, after the steps under the Get Digit String step execute, a Set step sets the value of the prompted variable to true.
Under the Set step, a Set Session Info step adds context information for this session, in order to record the account number, the current failure count and the fact that the caller has already been prompted.

The special context attributes “_ccdVar1” and “_ccdVar2” store the account number and the failure count to make these values available to historical reports for this particular call.
Figure 17-11 shows the configured Context tab of the Set Session Info customizer window.

Figure 17-11  Set Session Info Customizer Window—Configured Context Tab

The Set Session Info step adds the context information described in Table 17-2.

Table 17-2  Set Session Info Properties

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prompted</td>
<td>prompted</td>
<td>Stores the value that indicates whether or not the caller has previously heard the welcoming prompt.</td>
</tr>
<tr>
<td>AccountNum</td>
<td>accountNum</td>
<td>Caller account number</td>
</tr>
<tr>
<td>_ccdrVar1</td>
<td>accountNum</td>
<td>Places the specified variable values in the Contact Call Detail Record (CCDR) for this call. (You can write a custom report to display these values.)</td>
</tr>
</tbody>
</table>
### Table 17-2  
*Set Session Info Properties (continued)*

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>_ccdrVar2</td>
<td>failureCount</td>
<td>Places the specified variable values in the Contact Call Detail Record (CCDR) for this call. (You can write a custom report to display these values.)</td>
</tr>
<tr>
<td>FailureCount</td>
<td>failureCount</td>
<td>Stores the value that indicates how many times the call has failed, in order to set queueing priority (or in the default script, to decide if the script attempts to queue the caller again by re-routing the call back to the main script or announces that “we are experiencing problems” and requests the caller to call back later.</td>
</tr>
</tbody>
</table>
Choosing a Language

The next steps in the Cisco Unified CCX sample script determine whether or not a language has been previously set, and if not, to give the caller the chance to choose a language.

Figure 17-12 shows the scripting under the If steps that allow the caller to choose between two languages for the context of the call.

The first If step evaluates the expression language==null; or, the value of the variable language is equal to null.

If this expression is true, no language has been set (and this is the first pass through these steps). The Menu step then offers the caller a choice of two languages.

The designer configures the Menu step as follows:

- General tab
  - Contact—Triggering Contact
    The contact that triggered the script remains the contact for this step.
  - Interruptible—Yes
    External events can interrupt the execution of this step.
The If Steps

- **Prompt tab**
  - **Prompt—P[SelectLanguage]**
    This system prompt asks the caller to choose a language.
  - **Barge In—Yes**
    The caller can choose a language without first having to listen to the playback of the entire prompt.
  - **Continue on Prompt Errors—Yes**
    In the event of a prompt error, the script continues to play back the next prompt in the sequence, or waits for caller input if the last prompt has been played.

- **Input tab**
  - **Timeout (in sec)—3**
    The script executes the Timeout output branch if no input is received within 3 seconds and the script has reached the maximum number of retries.
  - **Maximum Retries—3**
    The step makes 3 attempts to receive valid input before executing the Unsuccessful output branch.
  - **Flush Input Buffer—No**
    The system does not erase previously entered input before capturing new caller input.

- **Filter tab**
  - **Add as connection options: American English and North American Spanish.**

The Menu step in this script has the following output branches (see Figure 17-12):

- **American English**—If the caller chooses this choice, a Set step sets the language variable to en_US, or American English.
- **North American Spanish**—If the caller chooses this choice, a Set step sets the language variable to es_US, or North American Spanish.
• Timeout—If this output branch executes, the script falls through to the next If step in the script without setting a value for the language variable. The script then continues with the language the designer configured for this application.

• Unsuccessful—If this output branch executes, the script falls through to the next If step in the script without setting a value for the language variable. The script then continues with the language the designer configured for this application.

After the Menu step executes, a Set Session Info step adds information to the session variable, as shown in Figure 17-11.

Figure 17-13 Set Session Info Customizer Window-Context Tab

The designer configures the Attribute list in the Context tab of the Set Session Info customizer window as follows:

• _ccdrVar3—language
• Language—language

The next If step (see Figure 17-12) updates the language of the call based on caller preference. This step is useful in the event subsequent prompting or session information from a previous call changed the language.

This If step evaluates the expression language!=null; or, the value of the variable language is not equal to null.
The If Steps

If this expression is true, the caller has chosen a language. In this case, the Set Contact Info step then makes the information in the `language` variable available to the rest of the script.

**Note**
The script could also modify the value of the CSQ variable to account for the language chosen by the caller. For example, the system may contain one CSQ for English-speaking callers and another CSQ for Spanish speakers.

### Recording a Name

Another If step evaluates the expression, `name==null`; or, the value of the `name` variable obtained from the session is equal to null.

As shown in Figure 17-14, if this expression is true, the caller has not previously recorded a name, and so the Recording step prompts the caller to do so.

**Figure 17-14   Recording Step Scripting**

```
if (name == null) then
    /* Prompt caller for spoken language */
    name = Recording (--Triggering Contact-, name, 10)
    Set Session Info (session)
    Success01
else
    False
```

If the Recording step is successful, the Set Session Info step adds this value of the `name` variable to the session so that it may be used again later; for example, to provide a more personal service.
Figure 17-15 shows the configured Context tab of the Set Session Info customizer window.

**Figure 17-15 Configured Set Session Info Customizer Window—Context Tab**
The Select Resource Step

The designer continues to build the sample script by adding a Select Resource step, which queues a call to a specific set of agents, based on the configuration in the Cisco Unified CCX Administration web interface.

Figure 17-16 shows the configured Select Resource customizer window.

Figure 17-16 Configured Select Resource Customizer Window

The designer configures the Select Resource customizer window as follows:

- **Call Contact**—**Triggering Contact**
  
  The step connects the call that triggered the script to the available resource.

- **Routing Target Type**—**Contact Service Queue**
  
  Variable indicating the routing method. The call will be routed to an available agent in the specified CSQ.
The Select Resource Step

Note If you set this field to Resource, the CSQ Target field is renamed to Resource Target. Resource Routing Target Type is only available for Cisco Unified CCX Enhanced Edition. If you use Resource Routing Target Type with Cisco Unified CCX Standard edition, Cisco Unified CCX Engine will be unable to load the script.

- **CSQ Target—CSQ**
  The CSQ String variable stores Contact Service Queue information from which to find a resource.

- **Connect—Yes**
  The call automatically connects the call to the available resource the instant the resource becomes available.

Note If No is selected, the step chooses the resource, if available, but does not yet connect it. In this situation, the designer can add additional script steps to the Selected output branch before connecting the call to the resource. If the resource is unavailable, the step queues the call.

- **Timeout—12**
  The step waits 12 seconds before the script retrieves the contact back into the queue.

- **Resource Selected**
  This is an optional user string variable identifying the chosen agent. This is left blank in the example application.

For more information about the Select Resource step, see the “ACD Step Descriptions,” in the *Cisco Unified Contact Center Express Scripting and Development Series: Volume 1, Script Reference Guide.*

Note For more information on configuring agents, see the *Cisco Unified Contact Center Express Administration Guide.*

The Select Resource step has two output branches, Connected and Queued, which are described in the following sections.
The Connected Output Branch

When the script connects the call to an agent, the steps under the Connected output branch of the Select Resource step modify variable values and session information in order to help set priorities should the call later need to be queued.

Figure 17-17 shows the scripting under the Connected output branch of the Select Resource step.

The following steps execute under the Connected output branch:

- Set step—Sets the value of the **queued** variable to false.
  This value indicates that the call has not been queued.
- Set step—Sets the value of the variable **failureCount** to 0.
  The **failureCount** variable stores the information on how many times the call has failed.
- Set Session Info step—Updates the **session** variable to include the new value for the **failureCount** variable.
Figure 17-18 shows the configured Set Session Info customizer window.

**Figure 17-18  Set Session Info Customizer Window—Context Tab**
The Queued Output Branch

As shown in Figure 17-19, if the script has queued the call, a series of steps under the Queued output branch of the Select Resource step modify priority settings, depending on how many times the call has looped through these queue steps.

Figure 17-19 Select Resource Step Scripting—Queued Output Branch

The Set step under the Queued output branch sets the value of the queued variable to true.

After the Set step, a series of If steps and Set Priority steps modify call priority based on the following variables:

- **accountNum**
  - If the expression accountNum!=null is true, the caller has already entered an account number, and so a Set Priority step increases the priority of the call by 1.
This allows the script to give more priority to a customer who has previously entered an account number.

- If the expression accountNum! =null is false, the caller has not entered an account number, and so a Set Priority step decreases the priority of the call by 1.

- **failureCount**
  - If the expression failureCount > 0 is true, this is means that the call has already failed, and so a Set Priority step increases the priority of the call by 1.

  By increasing the priority of this caller, the script attempts to reduce the time in queue that the caller will have to spend the second time in queue.

  - If the expression failureCount > 0 is false, this is means that the call has not already failed, and the script does not modify the priority.

After these If steps, the designer establishes a loop by using a Label step named queueLoop, followed by a Play Prompt step, a Call Hold step, a Delay step, and finally a Goto step, which directs the script back to the queueLoop Label.

The Play Prompt step informs the caller that the call has been placed on hold, the Call Hold step places the call on hold, and the Delay step delays the call based on the length of time stored in the **DelayWhileQueued** variable (which in this script is 30 seconds).

The designer configures the Delay step to be interruptible in the event of an agent becoming available, at which point the script connects the call based on the information in the Select Resource step.
Using Default Scripts

A default script provides a final feedback to the contact regarding a system problem (and does not continue a service or restart a service).

The Cisco Unified CCX system automatically invokes a default script if the main script:

- Cannot be loaded.
- Terminates abnormally because of a system or script error.

All script variables from the main script can initialize the default script variables, if the designer defines them using the same name and type.

This section contains the following sections:

- Variables for a Default Cisco Unified CCX Script, page 17-32
- Writing a Default Script, page 17-34

Variables for a Default Cisco Unified CCX Script

Figure 17-20 shows the Variable pane of a default Cisco Unified CCX script.

![Figure 17-20 Variable Pane of the Default Cisco Unified CCX Script]

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Value</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>DiS</td>
<td>String</td>
<td></td>
<td></td>
</tr>
<tr>
<td>session</td>
<td>Session</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>failureCount</td>
<td>Integer</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>accountNum</td>
<td>String</td>
<td></td>
<td></td>
</tr>
<tr>
<td>name</td>
<td>Document</td>
<td>null</td>
<td></td>
</tr>
<tr>
<td>active</td>
<td>Boolean</td>
<td>true</td>
<td></td>
</tr>
<tr>
<td>queued</td>
<td>Boolean</td>
<td>false</td>
<td></td>
</tr>
<tr>
<td>extn</td>
<td>String</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 17-3 describes the variables used in the example default Cisco Unified CCX script.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Value</th>
<th>Function</th>
<th>Correspondence</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSQ</td>
<td>String</td>
<td>—</td>
<td>Stores Contact Service Queue information from which to find a resource. (See The Select Resource Step, page 17-26.)</td>
<td>This variable is populated with the corresponding value of the variable with the same name from the main Cisco Unified CCX script.</td>
</tr>
<tr>
<td>session</td>
<td>Session</td>
<td>null</td>
<td>Stores session information for the call. (See The Get Contact Info Step, page 17-6.)</td>
<td>This variable is populated with the corresponding value of the variable with the same name from the main Cisco Unified CCX script.</td>
</tr>
<tr>
<td>failureCount</td>
<td>Integer</td>
<td>0</td>
<td>Stores the number of times a call has failed. (See The Session Steps, page 17-14)</td>
<td>This variable is populated with the corresponding value of the variable with the same name from the main Cisco Unified CCX script.</td>
</tr>
<tr>
<td>accountNum</td>
<td>String</td>
<td>—</td>
<td>Stores the account number entered by the caller. (See The Play Prompt Step, page 17-11.)</td>
<td>This variable is populated with the corresponding value of the variable with the same name from the main Cisco Unified CCX script.</td>
</tr>
<tr>
<td>name</td>
<td>Document</td>
<td>null</td>
<td>Stores the spoken name of the caller. (See Recording a Name, page 17-24)</td>
<td>This variable is populated with the corresponding value of the variable with the same name from the main Cisco Unified CCX script.</td>
</tr>
</tbody>
</table>
Writing a Default Script

The following example describes a sample Cisco Unified CCX default script using the variables described in the previous section.

The default script performs the following function:

- If it is the first time the call has failed, the script prompts the caller (with their name, if available), and asks the caller to stay on the line while the script makes another attempt to connect to an agent by transferring the caller back to the route point originally configured for the application.
  
  In this case, the session remains associated with the new incoming call received by the main Cisco Unified CCX script.

- If this is the second time the call has failed, the script redirects the caller to an announcement indicating that the call cannot be connected, and then asks the caller to call back later.
Figure 17-21 shows the top level of the example Cisco Unified CCX default script as it appears in the Design pane.

The Get Contact Info step determines whether or not the call is active (if the call is no longer active, then it means that the caller has hung up).

As shown in Figure 17-22, the If step underneath the Get Contact Info step evaluates this information, and if the call is not active, an End step underneath the True output branch of this If step ends the call.

If the call is active, then the next If step determines whether or not the call is in queue. If the call is in queue, a Dequeue step dequeues the call, and a Call Unhold step takes the call off hold.

Note
It is important to remember that the script defines the queued variable with the same type and name as in the main Cisco Unified CCX script, so that its value is populated with the last value of the corresponding variable in the Cisco Unified CCX script.
If the call is active, then an Accept step accepts the call.

This is done to make sure that the call is accepted. If the Cisco Unified CCX script had failed before the Accept step, the call would still be ringing and the script would not be able to provide any feedback to the caller as to the error that was encountered.

*Figure 17-23* shows the scripting of these steps.

*Figure 17-23  Cisco Unified CCX Default Script—Queued Status*

![Scripting Steps](image)

As shown in *Figure 17-24*, since one of the main functions of this script is to determine the number of times the call has failed, the designer uses an Increment step to increase the value of the failureCount variable by 1.

*Figure 17-24  Cisco Unified CCX Default Script—Session and Name Status*

![Scripting Steps](image)

The If step under the Increment step tests the value of the session variable. If the value of this variable is not null, there is session information associated with the call that needs to be updated by the Set Session Info step, which updates value of the failureCount variable.

The next If step tests for the value of the name variable. If the caller has recorded a name into this variable in the main Cisco Unified CCX script, then a Play Prompt step plays this name, followed by a short silence.
As shown in Figure 17-25, the next steps determine which of two prompts the caller hears after the short silence, depending on whether the call has failed once or twice.

**Figure 17-25  Cisco Unified CCX Default Script—Prompts**

If the value of `failureCount` is 1, then the Play Prompt plays a prompt explaining that there were problems in connecting, and asking the caller to stay on the line while another attempt is made to connect to an agent. The Call Redirect step then attempts to connect the caller to the extension the caller entered, using the `extn` variable. If this is successful, an End step ends the script.

If the value of `failureCount` is not 1, it must be 2, in which case the Set step sets the value of the `extn` variable to a user prompt that the script uses to announce that the call could not be connected and asking the caller to call back later. The Call Redirect step redirects the caller to this announcement, and an End step ends the script.
CHAPTER 18

Designing Cisco Unified Gateway Scripts

You can design Cisco Unified CCX scripts to interact with Cisco Unified ICM Enterprise (ICME) scripts in a Cisco Unified Contact Center Express (CCX) system integrated with a Cisco Unified ICME system through the Cisco Unified Gateway.

In such an integrated system, the Cisco Unified CCX software is linked as an ACD to the Cisco Unified ICME software.

This chapter contains the following topics:

- Scripting on a Cisco Unified Gateway System, page 18-2
- Using Variables, page 18-3
  - Using Cisco Pre-Defined Enterprise Call Variables, page 18-4
  - Using Enterprise Expanded Call Context (ECC) Variables, page 18-5
  - Using Variables Multiple Times, page 18-8
- Example Cisco Unified Gateway Post-Routing Scripts, page 18-9
  - A Sample Cisco Unified CCX Script that Selects a CSQ, page 18-11
  - A Sample Cisco Unified CCX Script that Selects an Agent, page 18-17
  - A Sample Cisco Unified CCX Script that Selects a Route Point, page 18-24
- A Summary Process for Defining Enterprise Variables, page 18-31

For further information on designing Cisco Unified Gateway scripts, see the following:
Scripting on a Cisco Unified Gateway System

The Cisco Unified CCX Editor contains three steps that specifically interface with the Cisco Unified Gateway:

- **Get Enterprise Call Info / Set Enterprise Call Info (Call Contact palette).**
  
  Use these steps to retrieve or send data from one part of your system to another. In a Cisco Unified Gateway deployment, this enables getting/setting data from Cisco Unified CCX to the Cisco Finesse Desktop.

  **Note** This step should be placed in a CRS 4.0 script before the call gets connected to an agent. This means the step in the script should be placed before the Request Route or Select Resource Step.

- **Request Route (ACD palette).**
  
  Use the Request Route step to request a call routing location from Cisco Unified ICME software. A Cisco Unified CCX script can then use that location to redirect a call. The Request Route step has two output branches:

  – Selected. The Request Route step successfully returned a routing destination from Cisco Unified ICME software.
  
  – Failed. The Request Route step failed to return a routing destination from Cisco Unified ICME software.

See the [Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide](#) for descriptions of the preceding steps.
Using Variables

In Cisco Unified CCX scripts that interact with Cisco Unified ICME scripts through the Cisco Unified Gateway, you can use three types of variables:

- Local variables that you define in the Cisco Unified CCX script in the Variable pane of the Cisco Unified CCX Editor.
- Cisco predefined enterprise call variables that you can select in the General tab of the customization window of the Set and Get Enterprise Call Info steps.
- Enterprise ECC variables that you can define in the Expanded Call Variable tab of the Set and Get Enterprise Call Info steps when you need more variables than are available in the predefined call variable list.

Cisco Unified CCX uses Enterprise Call Variables and Enterprise Expanded Call Context Variables when passing data between the integrated systems that make up a Cisco Unified Gateway system: the Cisco Unified CCX system. This means that you must use the Set Enterprise Call Info and Get Enterprise Call Info steps to take data stored in a local Cisco Unified CCX script variable or for use in a Cisco Unified ICME script.

Defining Local Cisco Unified CCX Script Variables

Begin the Cisco Unified Gateway script design process first by using the Variable pane of the Cisco Unified CCX Editor to define your local variables for your Cisco Unified CCX script.

For information about defining variables in Cisco Unified CCX scripts, see Defining, Using, and Updating Script Variables, page 2-31. For example Cisco Unified CCX script variables used in a Cisco Unified CCX Cisco Unified Gateway script, see Script Variables Used in the PostRouteSimple.aef Script, page 18-25.
Using Cisco Pre-Defined Enterprise Call Variables

In addition to the script variables that you can define in the Variable pane of the Cisco Unified CCX Editor window, you can use the following Cisco predefined strings as enterprise call variables in Cisco Unified CCX in the Set Enterprise Call Info and Get Enterprise Call Info steps to pass information between the Cisco Unified ICME system and the Cisco Unified CCX system:

- VRU Script Name
- ConfigParam
- Call.CallingLineID
- Call.CallerEnteredDigits
- Call.PeripheralVariable1 to Call.PeripheralVariable10
  This populates the fields "customCallVar1" through "customCallVar10" in the ContactCallDetail records of the db_cra database.
- Call.AccountNumber
  The Add button opens the Add Field window and permits you to apply the value (Values) of a local variable to the pre-defined Cisco call variable (Names). Tokens permit multiple values to be assigned and are only used in a Cisco Unified ICME environment.

These enterprise call variables are all written to the db_cra database.

---

Note

These enterprise call variables are available from a list in the General tab of the Customization window only in the Set Enterprise Call Info and Get Enterprise Call Info steps. In the Set Enterprise Call Info and Get Enterprise Call Info steps, you assign the values of local script variables to the enterprise script variables.

The Cisco Unified ICME Server, the Cisco Unified CCX system, and the Cisco Finesse Desktop support these call variables for passing data among themselves.

If you need more call variables than those predefined in the General tab, use ECC variables.

---

Note

While the Cisco pre-defined enterprise call variables are all written to the db_cra database and thus can be used in reporting, the ECC call variables are not written to the db_cra database and cannot be used in Cisco Unified CCX reporting.
**Using Enterprise Expanded Call Context (ECC) Variables**

The Cisco ICME Server, the Cisco Unified CCX system, and the Cisco Finesse Desktop can also pass ECC variables to each other.

Enterprise ECC data fields are used by all applications in the Cisco Unified CCX Cluster. There can be as many as 200 user-defined fields defined in the Field List (index numbers 0-199) of expanded call variables. These field values do not appear in the ContactCallDetail records as there are no fields reserved for them.

Cisco Unified CCX has some pre-defined ECC variables. For a list of the Cisco Unified CCX system default ECC variables, see Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide.

---

**Note**

Every enterprise ECC variable must be separately defined on all parts of the system that sends and receives the variable data: the Cisco Unified CCX Editor in Cisco Unified CCX and the Cisco Finesse Desktop.

---

**Defining ECC Variables in the Cisco Finesse Administration**

To define an ECC variable in the Cisco Finesse Administration, select Enterprise Data > Field List.

When creating a new Field, a unique Index number (Index) between 0-199 is assigned. The Field Name (Field Name) is the name of the field called by the layout list and is case sensitive. The Display Name (Display Name) is the name (Field) that will show on the agent desktop with the value of the field.

See the Cisco Finesse Administration Guide for more information on defining ECC variables in the Cisco Finesse Administration.

---

**Defining ECC Variables in the Cisco Unified CCX Editor**

To define an ECC variable in the Cisco Unified CCX Editor, do the following.
Procedure

**Step 1**  From the Cisco Unified CCX Editor menu bar, choose **Settings > Expanded Call Variables**.

The Expanded Call Variables window appears.

*Figure 18-1  Expanded Call Variables Window*

**Step 2**  In the toolbar, click the **Add New Variable** icon.

The Edit Expanded Call Variable dialog box appears.

*Figure 18-2  Edit Expanded Call Variable Dialog Box*

**Step 3**  In the Name text field, enter the ECC variable name as defined in the Cisco Unified ICME configuration (or the Cisco Finesse Administration using Cisco Unified CCX).

**Step 4**  In the Type drop-down menu, choose the type of expanded call variable (scalar or array).

**Step 5**  In the Description text field, enter a description of the variable.
Step 6  Click OK.
The Edit Expanded Call Variable dialog box closes, and the variable name, type,
and description appear under their respective columns in the Cisco Unified ICME
Expanded Call Variables window (or the Cisco Finesse Administration using
Cisco Unified CCX).

Step 7  Click the dialog box’s Close (X) button.
The Expanded Call Variables window closes, and the ECC variable is now
available to your script. It will be listed in the Enterprise Call Info step’s
drop-down list as ---name--, where name is the value you entered in the Variable
Name field.

Configuring ECC Variables in a Cisco Unified CCX Script

Use the Expanded Call Variables tab of the Set and Get Enterprise Call Info step
property windows to configure ECC variables in Cisco Unified CCX scripts. The
Add button in the customization window opens the Add ECC Variable window so
you can apply the value (Values) of a local variable to a user-defined Expanded
Call Variable (Names).

Note  See the “Cisco Contact Center Express Administration Guide” and the Cisco
Unified ICME Software IPCC Installation and Configuration Guide for
information on configuring Cisco Unified ICME software for Cisco Unified CCX
and for defining and configuring ECC variables in Cisco Unified ICME software.

Defining ECC Variables for a Post Call Treatment Script

Customize a Cisco Unified CCX Script for the post call treatment to be played for
the customer after the agent ends the call. Follow the procedure to define an ECC
Variable to achieve the post call treatment.

Step 1  From the Cisco Unified CCX Editor application, open an existing icd.aef script.
Step 2  From the Call Contact palette, select Set Enterprise Call Info.
Step 3  Drag and drop the selected step in the script before the Select Resource step.
Using Variables

Step 4 Define a variable for the post call treatment by name PostCallTreatment and of type Scalar as per the steps provided in the section, Defining ECC Variables in the Cisco Unified CCX Editor, page 18-5.

Note The name of the variable must be PostCallTreatment. It is case-sensitive.

Step 5 For the new variable PostCallTreatment set the type as int from the drop down list available and enter a number value in the Value field.

Step 6 Select the Final checkbox.

Step 7 Add the new ECC Variable created to the Set Enterprise Call Info step.
   a. Right click on the Set Enterprise Call Info step and then click Properties.
   b. In the Expanded Call Variables tab, Click Add.
   c. Select the field values of the ECC Variable PostCallTreatment as defined earlier.
   d. Click OK >Apply > OK.

Step 8 Ensure the ECC variable name defined for the post call treatment is listed against the selected step.

Using Variables Multiple Times

Note When an enterprise call variable or an enterprise ECC variable is used multiple times in the step, the result will be indeterminate in the following cases:
   • If an enterprise call variable is set multiple times with the same token.
   • If an enterprise ECC variable of type scalar is set multiple times with the same token.
   • If an array element of an enterprise ECC variable of type array is set multiple times with the same token.
Example Cisco Unified Gateway Post-Routing Scripts

In Cisco Unified Gateway deployments where the Cisco Unified CCX system is connected to a Cisco Unified ICME system as the child system, the Cisco Unified CCX system can use the Cisco Unified ICME system for *post routing*. Post routing is typically used to enable the Cisco Unified ICME system to determine the best routing solution based on the current situation at the contact center.

The following are three sample post-routing scripts that illustrate three different ways of post routing through the Cisco Unified Gateway. In each of these examples, the script accepts the call from the Cisco Unified CallManager in the Cisco Unified CCX system and then queries the Cisco Unified ICME system through the Request Route step. The Cisco Unified CCX system then routes the call based on the return value of the Request Route step supplied by the Cisco Unified ICME system.

In the first sample script, the call is routed to a CSQ. In the second sample script, the call is routed to an agent. And in the third sample script, the call is routed to a route point.

These are the sample scripts:

- **PostRouteSelectCSQ.aef**: The Request Route step returns a label corresponding to a CSQ which is used in the Select Resource step.

- **PostRouteSelectAgent.aef**: The Request Route step returns a label corresponding to an agent extension which is used in the Select Resource step.

- **PostRouteSelectSimple.aef**: The Request Route step returns a label corresponding to a route point which is used in the Call Redirect step.

Each of three sample Cisco Unified CCX scripts presume a Cisco Unified ICME script designed to interact with the Cisco Unified CCX script, depending on what Cisco Unified CCX resource is wanted: a CSQ, an agent, or a route point.

*Note:* An important point from these examples is that the Cisco Unified ICME and Cisco Unified CCX script writers need to work together during both design and implementation to ensure that the correct type of information is returned by the
Cisco Unified ICME script through the Cisco Unified CCX Request Route step and is used properly by the Cisco Unified CCX script to route the call appropriately.
A Sample Cisco Unified CCX Script that Selects a CSQ

Figure 18-3 displays the sample PostRouteSelectCSQ script as it appears in the Cisco Unified CCX Editor window.

**Figure 18-3** PostRouteSelectCSQ. aef Script—Select CSQ
### Script Variables Used in the PostRouteSelectCSQ.aef Script

Table 18-1 describes the variables used in the PostRouteSelectCSQ.aef sample script.

**Table 18-1 PostRouteSelectCSQ.aef Variable Descriptions**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Initialized Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>DelayWhileQueued</td>
<td>int</td>
<td>30</td>
<td>Stores the number of seconds to delay in the queue before prompting the call again. Used in the Queued section of the script.</td>
</tr>
<tr>
<td>QueuePrompt</td>
<td>Prompt</td>
<td>SP[ICD\ICDQueue.wav]</td>
<td>Gives the caller a message while the caller is in the queue waiting for the call to be answered. Used in the Queued branch of the Select Resource step.</td>
</tr>
<tr>
<td>WelcomePrompt</td>
<td>Prompt</td>
<td>SP[ICD\ICDWelcome.wav]</td>
<td>Stores the message the caller hears when the system answers the call. Used in the opening prompt of the script.</td>
</tr>
<tr>
<td>routeSelect</td>
<td>String</td>
<td>***</td>
<td>Stores the CSQ name to be used in the script. Returned by the Request Route step and passed into the Select Resource step.</td>
</tr>
</tbody>
</table>
Script Flow for the PostRouteSelectCSQ.aef Script

1. The script receives the call from the Cisco Unified CallManager.

   Figure 18-4  Configured General tab of the Accept Step

2. The script plays a welcome message to the caller.

   Figure 18-5  Configured Prompt tab of the Play Prompt Step
3. In the Request Route step, the script requests a route label from the Cisco Unified ICME system for a CSQ in the Cisco Unified CCX system.

   **Figure 18-6** Configured General tab of the Request Route Step

4. The Set Enterprise Call Info step puts the label contained in the routeSelect variable into the enterprise call variable, callPeripheralVariable2. In this case, the label is a CSQ identifier. This variable can be displayed on the Cisco Finesse Desktop.

   **Figure 18-7** Configured General tab of the Set Enterprise Call Info Step

No enterprise Extended Call Variables are used in this script.
5. If the route request fails, the script selects a default CSQ.

**Figure 18-8** Configured General tab of the Set Step

**Figure 18-9** Configured General tab of the Select Resource Step
6. If the call is not answered before the time limit, a prompt is played, and the call is put in the queue to repeat the process until the call is answered or dropped by the caller.

Figure 18-10 Configured Prompt tab of the Play Prompt Step

In the General tab of the Play Prompt Step:
- Triggering Contact is selected as the contact
- Interruptible option is Yes. This means that as soon as the call is answered, this queue prompt will be interrupted.

In the Input tab of the Play Prompt Step:
- Flush Input Buffer option is No

Figure 18-11 Configured General tab of the Delay Step
A Sample Cisco Unified CCX Script that Selects an Agent

Figure 18-12 PostRouteSelectAgent.aef Script—Select Agent
Script Variables Used in the PostRouteSelectAgent.aef Script

Table 18-2 describes the variables used in the PostRouteSelectAgent.aef sample script displayed in Figure 18-12.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Initialized Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSQ</td>
<td>String</td>
<td>&quot;Should be initialized to a default CSQ name&quot;</td>
<td>Used to route to a catch-all CSQ in case of failure within the script. Used in the Set Enterprise Call Info step and in the Select Resource step.</td>
</tr>
<tr>
<td>DelayWhileQueued</td>
<td>int</td>
<td>30</td>
<td>Stores the number of seconds to delay in the queue before prompting the call again. Used in the Queued section of the script.</td>
</tr>
<tr>
<td>PromptOne</td>
<td>Prompt</td>
<td>P[gen\number\One.wav]</td>
<td>Stores the message the caller hears when the call is answered. Used in the opening Play Prompt step.</td>
</tr>
<tr>
<td>QueuePrompt</td>
<td>Prompt</td>
<td>SP[ICD\ICDQueue.wav]</td>
<td>Stores a message for the caller to be played when the call is in queue waiting to be answered. Used in the Queued branch of the Select Resource step.</td>
</tr>
</tbody>
</table>
### Script Flow for the PostRouteSelectAgent.aef Script

1. The script accepts the call from the Cisco Unified CallManager.

   ![Figure 18-13 Configured General tab of the Accept Step](image)

2. The caller is welcomed.

### Table 18-2  
**PostRouteSelectAgent.aef Variable Descriptions (continued)**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Initialized Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>RouteSelectAgent</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>Stores the agent identifier that is received from the Cisco Unified ICME system. Returned by the Request Route step and passed to the Get User step.</td>
</tr>
<tr>
<td>SelectedAgent</td>
<td>User</td>
<td>null</td>
<td>Stores the Agent User information corresponding to the routeSelectAgent string selected by the Cisco Unified ICME system. A user object returned from the Get User step and passed into the Select Resource step.</td>
</tr>
</tbody>
</table>
In the General tab of the Play Prompt Step:
- Triggering Contact is selected as the contact
- Interruptible option is Yes

In the Input tab of the Play Prompt Step:
- Flush Input Buffer option is Yes

3. In the Request Route step, the script requests a route label for an agent from the Cisco Unified ICME system.

The agent identifier returned by the Cisco Unified ICME software is put in the local routeSelectAgent Cisco Unified CCX script variable.
Note

In this script, if the Cisco Unified ICME script returns a CSQ or a route point, rather than a string identifying the agent, the script will fail.

4. In the Get User step, the Cisco Unified CCX script returns a user object corresponding to the input agent identifier named in the RouteSelectAgent variable, which is stored in the SelectedAgent variable.

Figure 18-16  Configured General tab of the Get User Step

5. In the Select Resource step, the script rings the phone number identified by the agent ID in the SelectedAgent variable.
For agent based routing to succeed, the state of the selected agent must be **ready**. The Select Resource step will fail if the selected agent is in any state other than ready. The Cisco Unified ICME system can determine the current state of an agent, although there is no guarantee that the agent state will not change between when the Cisco Unified ICME system returns information and the Cisco Unified CCX script routes the call based on that information. Despite that, depending on the design of the script, the time between the two should be extremely small, making it unlikely that this will occur.
6. If the call is not answered, then the script plays a prompt.

   **Figure 18-18  Configured Prompt tab of the Second Play Prompt Step**

   ![Prompt tab configuration](Image)

   In the General tab of the Play Prompt Step:
   - Triggering Contact is selected as the contact
   - Interruptible option is Yes

   In the Input tab of the Play Prompt Step:
   - Flush Input Buffer option is No

7. The script will ring for the time set in the DelayWhileQueued variable, play a prompt to tell the caller to please wait, and then ring again.

   **Figure 18-19  Configured General tab of the Delay Step**

   ![Delay tab configuration](Image)
A Sample Cisco Unified CCX Script that Selects a Route Point

Figure 18-20  PostRouteSimple.aef Script — Select Route Redirect
Script Variables Used in the PostRouteSimple.aef Script

Table 18-3 describes the variables used in the PostRouteSimple.aef sample script as displayed in Figure 18-20.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Initialized Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSQ</td>
<td>String</td>
<td>&quot;Should be initialized to a default CSQ name&quot;</td>
<td>Used to route a catch-all CSQ in case of failure within the script. Used in the Set Enterprise Call Info step and in the Select Resource step.</td>
</tr>
<tr>
<td>DelayWhileQueued</td>
<td>int</td>
<td>30</td>
<td>Stores the number of seconds to delay in the queue before playing the prompt message again. Used in the Queued section of the script.</td>
</tr>
<tr>
<td>QueuePrompt</td>
<td>Prompt</td>
<td>SP[ICD\ICDQueue.wav]</td>
<td>Stores a message to be played while the call is in the queue waiting to be answered. Used in the Queued branch of the Select Resource step.</td>
</tr>
<tr>
<td>WelcomePrompt</td>
<td>Prompt</td>
<td>SP[ICD\ICDWelcome.wav]</td>
<td>Stores the message the caller hears when the system first answers the call. Used in the opening prompt of the script.</td>
</tr>
<tr>
<td>RouteSelect</td>
<td>String</td>
<td>#10</td>
<td>Stores the route identifier received from the Cisco Unified ICME system. Returned by the Request Route step and passed into the Call Redirect step.</td>
</tr>
</tbody>
</table>
Script Flow for the PostRouteSimple.aef Script

1. The Cisco Unified CCX script accepts the call from the Cisco Unified CallManager.

2. The Set Enterprise Call Info step put the value contained in the local CSQ variable into the Enterprise call.PeripheralVariable5. This means that value can then be used in the Cisco Finesse Desktop software or in a Cisco Unified ICME script. This might be used, for example, to display the current CSQ on the Agent Desktop.

Figure 18-21 Configured General tab of the Set Enterprise Call Info Step

Expanded Call Variables are not used in this sample script.
3. The Request Route step requests a label from the Cisco Unified ICME system which the Cisco Unified ICME system sends back and which is stored in the RouteSelect variable. In this example, the returned value is a route point rather than an agent or CSQ identifier. For example: extension 13526.

Figure 18-22  Configured General tab of the Request Route Step

4. The Set Enterprise Call Info step puts the route point contained in the routeSelect variable into the enterprise call variable, call.PeripheralVariable2. This variable can be used to display the phone number on the Cisco Finesse Desktop.

Figure 18-23  Configured General tab of the Second Set Enterprise Call Info Step

Expanded Call Variables are not used in this script.
5. The Cisco Unified CCX script, in the Call Redirect step, redirects the call to the selected route point and is stored in the string variable routeSelect.

**Figure 18-24 Configured General tab of the Call Redirect Step**

![Configured General tab of the Call Redirect Step](image)

**Note** The Redirect step essentially places a new call—terminating the original call. This results in a double-counting for statistics regarding the Connected state.
6. In the case of failure from the Request Route step or the Call Redirect step, the script is designed to route the call through the Select Resource step to the default CSQ specified in the CSQ variable.

Figure 18-25  Configured General tab of the Select Resource Step

If no resource is available in the default CSQ, then the call stays queued until a resource becomes available or the call is dropped by the caller.

Figure 18-26  Configured Prompt tab of the Play Prompt Step

In the General tab of the Play Prompt Step:
- Triggering Contact is selected as the contact
- Interruptible option is Yes. This means that as soon as the call is answered, this queue prompt will be interrupted.

In the Input tab of the Play Prompt Step:
- Flush Input Buffer option is No

Figure 18-27 Configured General tab of the Delay Step
A Summary Process for Defining Enterprise Variables

The following steps summarize the process for defining enterprise variables in the Cisco Unified CCX system. See the Cisco Unified ICME documentation for how to define ECC variables in Cisco Unified ICME software.

**Step 1** Create an ECC variable in the Cisco Finesse Administration (Enterprise Data Configuration > Enterprise Data > Field List).
Step 2  Create a new layout using the Cisco Finesse Administration and add fields to the layout (Enterprise Data Configuration > Enterprise Data).

Step 3  Configure the Set Enterprise Call Info (Expanded Call Variables tab) step in your Cisco Unified CCX script to set values for the ECC Variables.
Step 4 Configure the Set Enterprise Call Info (Expanded Call Variables tab) step in your Cisco Unified CCX script to use a custom layout that was created in Step 2.

Step 5 Configure the Set Enterprise Call Info (General tab) step using in your Cisco Unified CCX script to set values for the Cisco predefined Call Peripheral Variables.
Step 6  Check your list of Call Peripheral Variables in the Set Enterprise Call Info step.

Step 7  Check your list of ECC Variables in the Set Enterprise Call Info step.
Step 8  Check the values set in the Set Enterprise Call Info step displayed on the Cisco Finesse Desktop.
A Summary Process for Defining Enterprise Variables
Designing a Generic Recognition Script

This chapter contains the following:

- About the Generic Recognition Steps, page 19-1
- N-Best Recognition and Multiple Interpretations, page 19-2
- The Script Flow for a Generic Recognition Script, page 19-3
- An Example Script, GenericRecoExample.aef, page 19-7

About the Generic Recognition Steps

The Generic Recognition step is used when something more complex than a selection menu is needed in a speech dialog. The Generic Recognition step allows the application designer to use an arbitrarily complex Speech Recognition Grammar. These grammars can be used to build mixed initiative dialogs. They can be ambiguous. They can assign meaning to the results returned using semantic interpretation. They can allow multiple results to be returned.

The result returned by a recognition using this step is stored in an opaque data object that is associated with a name that is assigned in this step. The information in this result object can be extracted using two other steps: Get Recognition Result Info Step and Get Recognition Interpretation Step. These two steps along with the Generic Recognition Step are designed to work together.

The Generic Recognition steps are available from the Cisco Unified CCX Step Editor Media palette.
N-Best Recognition and Multiple Interpretations

The Generic Recognition set of steps improve speech recognition by providing multiple recognition results enabled by N-Best Recognition and multiple interpretations. It also can assign meaning to the utterance through the use of semantic interpretation:

- N-Best Recognition, page 19-2
- Multiple Interpretations, page 19-3

N-Best Recognition

N-Best Recognition allows the Speech Recognizer to return more than one result if there are several branches in the grammar that sound like the utterance. This allows the application to choose the best result based on additional criteria.
In some advanced voice applications, a single result may not be sufficient. For example, an airline reservation application might ask the user for destination and departure cities. The speech-recognition engine might not be able to distinguish between the two possible utterances that can sound the same or similar like "Austin" and "Boston." Ideally, the application would obtain both these possible results so that it could prompt for clarification, "Did you mean Austin, Texas; or Boston, Massachusetts?"

Using N-best recognition, the speech-recognition engine returns a list of different possible utterances whose confidence levels are high enough for consideration.

Multiple Interpretations

In some applications, a single recognized utterance may have multiple interpretations. The same utterance can appear in more than one place in the grammar. For example, Austin could be interpreted as Austin, Texas or Austin, California.

The Generic Recognition set of steps uses these two recognition features (N-Best Recognition and Multiple Interpretations) together to provide better speech recognition flexibility when needed.

When these preceding two features are combined, if the user says something that sounds like either "Austin" or "Boston," the speech-recognition engine would find two possible results, "Austin" and "Boston." The first of these results would have two possible interpretations: "Austin, Texas" and "Austin, California." A sophisticated application could then prompt the user, "Did you mean Austin, Texas; Austin, California; or Boston, Massachusetts?"

The Script Flow for a Generic Recognition Script

The following is an example of how N-best recognition and multiple interpretations can be done using a grammar and a script:

- An Example Grammar Used With Generic Recognition, page 19-4
- An Example Script Algorithm Used With Generic Recognition, page 19-5
An Example Grammar Used With Generic Recognition

The example grammar is an SRGS grammar. Note that there are three items that sound very similar - "cisco", "tisco" and "misco". Also note that there are two items with the same word, "cisco", but different values for the security tag, "cisco1" and "cisco2".

```xml
<?xml version="1.0" encoding="ISO-8859-1"?>
<grammar xml:lang="en-US" version="1.0"
 xmlns="http://www.w3.org/2001/06/grammar"
 root="Securities">
 <rule id="Securities" scope="public">
   <ruleref uri="#Names"/>
 </rule>
 <rule id="Names">
   <one-of>
     <item>
       <item> cisco </item>
       <tag>security="cisco1"</tag>
     </item>
     <item>
       <item> cisco </item>
       <tag>security="cisco2"</tag>
     </item>
     <item>
       <item> tisco </item>
       <tag>security="tisco"</tag>
     </item>
     <item>
       <item> misco </item>
       <tag>security="misco"</tag>
     </item>
     <item>
       <item> microsoft </item>
       <tag>security="microsoft"</tag>
     </item>
   </one-of>
 </rule>
</grammar>
```
An Example Script Algorithm Used With Generic Recognition

This algorithm does not describe all the input and output parameters, only the ones relevant to demonstrate n-best recognition.

Step 1 Use the Generic Recognition step.
Input:
UserGrammar (for example, An Example Grammar Used With Generic Recognition, page 19-4)
Output:
resultData (a private variable that contains the recognition result)
resultCount (the number of results in the resultData)

Step 2 Set integer i = 0. This variable is used to index into the resultData and varies from 0 to one less than the number of results obtained in step 1.

Step 3 While (i < resultCount)
   a. Use Get Recognition Result Info step
      Input:
      ResultData (data from step 1)
i (used to index into the ResultData)
   b. Output:
      Utterance (text representing what was spoken),
      ConfLevel (indicates how closely this recognition matches the spoken word)
      interpCount (indicates number of interpretations in the result)
   c. Set integer j = 0. This variable is used to index into the result to retrieve the interpretations
   d. while (j < interpCount)
      (1) Use Get Recognition Interpretation Step
      (2) Input:
         resultData (data from step 1)
i (used to index into resultData)
j (interpretation index)
      (3) Output:
If slots are defined in the grammar, their values get stored in the specified variables.

(4) Set j = j + 1

f. Set i = i + 1

Step 4  End

With the example grammar and example script logic as described in this section and the preceding one, if a customer says "cisco", the customer may get back a recognition result containing three results: "cisco", "tisco" and "misco" respectively. Each of these results represents a different utterance and can have a different confidence level.

Note  The output can vary depending on how the utterance (the word) was spoken and the value of the confidence level configured in the Generic Recognition step.
An Example Script, GenericRecoExample.aef

Figure 19-2 displays an example script, GenericRecoExample.aef, as it appears in the Cisco Unified CCX Editor window. This script uses the generic recognition steps and the preceding algorithm. The example is displayed with unexpanded code branches so you can see the layout of the whole on one page. The code is expanded in later examples so you can see all the steps.

Figure 19-2   Example Generic Recognition Script

```
Start
Accept (--Triggering Contact--) start:
Generic Recognition (contact: (--Triggering Contact--): TTS["Please say a security name or enter some D T N P digits.", gRule,...]
resultCountPrompt = Create Generated Prompt number (resultCount)
prompt1 = Create Container Prompt Concatenation (TTS["The rule name or context used was, " + Rule_Name_or_Context + ","] + ...)
Play Prompt (--Triggering Contact--, prompt)
Set resultIndex = 0
NextResult:
  If (resultIndex ++ resultCount) Then
  Get Recognition Result info : (resultName: result, resultIndex, resultIndex)
  resultOrdPrompt = Create Generated Prompt ordinal (resultIndex++)
  numbirtordPrompt = Create Generated Prompt number (numbirtord)
  contLevelPrompt = Create Generated Prompt number (contLevel)
  resultInfoPrompt = Create Container Prompt Concatenation (TTS["The" ] + resultOrdPrompt + ...)
  Play Prompt (--Triggering Contact--, resultInfoPrompt)
  Set interpIndex = 0
  NextInterpretation;
  Get Recognition Interpretation : (resultName: result, resultIndex, interpIndex, interpIndex, interpIndex)
  InterpOrdPrompt = Create Generated Prompt ordinal (interpIndex++)
  resultInfoPrompt = Create Container Prompt Concatenation (TTS["The" ] + interpOrdPrompt + ...)
  Play Prompt (--Triggering Contact--, resultInfoPrompt)
  If (securityStkValue == null) Then
  If (disk2Value == null) Then
  If (disk1blong == null) Then
  Set interpIndex = interpIndex + 1
  If interpIndex == num interp) Then
    End
    Goto start
  Terminate (--Triggering Contact--)
End
```

Script Variables Used in the Example Generic Recognition Script

Table 19-1 lists the variables, with the exception of the prompt variables, that are specific to the generic recognition steps.

Table 19-1  GenericRecoExample.aef Generic Recognition Variable Descriptions

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Initialized Value</th>
<th>Function/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rule_Name_or_Context</td>
<td>String</td>
<td>&quot;Securities\securities&quot;</td>
<td>The name of the grammar file to be used in the recognition.</td>
</tr>
<tr>
<td>confLevel</td>
<td>int</td>
<td></td>
<td>The confidence threshold. This determines how closely a result must match the utterance before it is returned by the recognizer.</td>
</tr>
<tr>
<td>interpIndex</td>
<td>int</td>
<td>0</td>
<td>The index used to select the interpretation in the currently selected result.</td>
</tr>
<tr>
<td>maxResult</td>
<td>int</td>
<td>5</td>
<td>Contains the maximum number of results that can be returned by the recognition.</td>
</tr>
<tr>
<td>numinterp</td>
<td>int</td>
<td>0</td>
<td>Contains the number of interpretations in the currently selected result.</td>
</tr>
<tr>
<td>resultCount</td>
<td>int</td>
<td>number of results</td>
<td>The number of results in the result collection returned by the recognition.</td>
</tr>
<tr>
<td>resultIndex</td>
<td>int</td>
<td>0</td>
<td>Used to select the specific result from the result collection.</td>
</tr>
<tr>
<td>securitySlotValue</td>
<td>String</td>
<td>&quot; &quot;</td>
<td>A string variable to receive the value from the slot named &quot;security&quot;. This is the name of a stock.</td>
</tr>
<tr>
<td>utterance</td>
<td>String</td>
<td>&quot; &quot;</td>
<td>A string variable to receive the utterance for each result.</td>
</tr>
</tbody>
</table>
Getting a Collection of Results

Figure 19-3 shows the opening set of steps in the example script. These steps get the utterance "results." This is where the user's input is first returned.

This part of the script illustrates Step 1 and Step 2 of the preceding algorithm (An Example Script Algorithm Used With Generic Recognition, page 19-5).

Note: For descriptions of each step used in the example script, see the Cisco Unified Contact Center Express Scripting and Development Series: Volume 2, Editor Step Reference Guide. The purpose of this chapter is just to highlight some of these steps and to illustrate how they are used rather than to explain each step in detail.

Figure 19-3 The Opening Set of Steps in the Example Generic Recognition Script

```
    # If (resultNumber = resultCount) Then
      # True
      #   # GoTo End
      # False
```
Figure 19-4  Generic Recognition Step, Example General Tab Customization Window

Figure 19-5  Generic Recognition Step, Example Prompt Tab Customization Window
Figure 19-6  Generic Recognition Step, Example Input Tab Customization Window

![Generic Recognition Step, Example Input Tab Customization Window](image1)

Figure 19-7  Generic Recognition Step, Example Filter Tab Customization Window

![Generic Recognition Step, Example Filter Tab Customization Window](image2)
Getting All the Information for All the Results

The next series of steps in the example script is Step 3 of the algorithm (An Example Script Algorithm Used With Generic Recognition, page 19-5).

Use the Get Recognition Result Info step to:

- Extract the Results from the recognition performed in the Generic Recognition step. There may be more than one result. The Result Index is used to select the desired result. The range is 0 (zero) to one less than the number of results. Each result will contain one or more interpretations.
- Extract the number of interpretations for a result.
- Extract the confidence level for each result.
- Extract the string which represents the actual utterance that was recognized for each result.

Figure 19-8    Getting All the Recognition Information

```plaintext
NextResult:
  If (resultIndex >= resultCount) Then
    True
      Goto End
    False
  Get Recognition Result Info (resultName: result, resultIndex: resultIndex)
    Successful
    Unsuccessful
      resultOrdPrompt = Create Generated Prompt ordinal (resultIndex+1)
      numInterpPrompt = Create Generated Prompt number (numInterp)
      confLevelPrompt = Create Generated Prompt number (confLevel)
      resultInfoPrompt = Create Container Prompt Concatenation (TTS["The"] + resultOrdPrompt + ...)
      Play Prompt (~Triggering Contact-, resultInfoPrompt)
    Set interpIndex = 0
  NextInterpretation:
```
Getting Interpretations for Each Result and Prompting with Each

The final set of steps in this example uses the Get Recognition Interpretation step to get each interpretation for each result and to play the prompt for each interpretation. This represents the inner loop in Step 3 of the algorithm (An Example Script Algorithm Used With Generic Recognition, page 19-5).
The script needs to be aware of the grammar being used. The sample script described here reads only values for slots named `security`, `symbol` and `digitstring`. If the grammar does not contain these slot names, empty values are returned. If the grammar contains additional slot names that the script wants to retrieve, the script will need to be modified.
Uninstallation of Unified CCX Editor

Note

The Unified CCX Editor uninstallation should not be done through the Add Remove programs window.

To uninstall the Cisco Unified CCX Editor program, run the UninstallCiscoUnifiedCCXEditor.exe and do the following:

Step 1 In the maintenance window, select the "remove" radio button and click next

Step 2 In the "remove program" dialog-box, click the "remove" button. This will begin the uninstallation procedure of the Cisco Unified CCX Editor application.
A Sample VoiceXML Log File

This appendix includes the following topics:

• A Brief Description of a VoiceXML Log File, page A-1
• Excerpts from the Sample VoiceXML Log File, page A-2
• Sample VoiceXML Log File Selection, page A-3

Note
This is a sample voice XML log file with SS_VB debug turned on. Your log file contents may vary depending on your system configuration, scripts, and caller interactions.

A Brief Description of a VoiceXML Log File

Each line in a Voice XML log file contains a system message. Each log line is numbered sequentially and consists of:

• Line number
• Date and Time of event
• Task Message abbreviation and ID number
• Brief description of the event
For easier reference, the lines in the sample log file that are listed in Table A-1 are displayed in **BLUE** in the log file.

Clicking on the number in the table brings you to that line in the log file.

Clicking on the number beginning that line in the log file brings you to its explanation in this table.

### Excerpts from the Sample VoiceXML Log File

<table>
<thead>
<tr>
<th>Line Number</th>
<th>Message</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>615109</strong></td>
<td>Instantiating new WFMRCPDialogServicesAdapterImpl</td>
<td>The start of the MRCP(ASR) Voice Browser</td>
</tr>
<tr>
<td><strong>615120</strong></td>
<td>Invoke: <a href="http://mediaserver/vxml/docs/AA.vxml">http://mediaserver/vxml/docs/AA.vxml</a></td>
<td>The URL for the Voice Browser</td>
</tr>
<tr>
<td><strong>615126</strong></td>
<td>WFCallControlImpl.getOriginator() = 2011</td>
<td>The caller ID</td>
</tr>
<tr>
<td><strong>615127</strong></td>
<td>WFCallControlImpl.getLocalUri() = 1002</td>
<td>The dialed number</td>
</tr>
<tr>
<td><strong>615186</strong></td>
<td>handlMenuElement(): adding dtmf choice grammar string = one</td>
<td>Managing a VXML menu</td>
</tr>
<tr>
<td><strong>615233</strong></td>
<td>&lt;speak version=&quot;1.0&quot; xmlns=&quot;http://www.w3.org/2001/10/synthesis&quot; &gt; Welcome to the automated attendant. To enter the phone number of the person you are trying to reach, say or press 1. To enter the name of the person you are trying to reach, say or press 2. To transfer to the operator, say or press 0. &lt;/speak&gt;</td>
<td>The first prompt to the caller</td>
</tr>
</tbody>
</table>
### Table A-1: Some Items to Notice in the Sample Log File

<table>
<thead>
<tr>
<th>Line Number</th>
<th>Message</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>615243</td>
<td>Heard: ‘one’</td>
<td>The first heard caller response = “one”</td>
</tr>
</tbody>
</table>

### Sample VoiceXML Log File Selection

```

615110: Jun 01 08:25:22.131 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Here is the DefaultCompilationConfig set in the JVM en_US

615111: Jun 01 08:25:22.131 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 DefaultCompilationConfig will be set to en_US

615112: Jun 01 08:25:22.131 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 DefaultCompilationConfig is now set to JVM en_US

615113: Jun 01 08:25:22.178 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBContext: Constructing

615114: Jun 01 08:25:22.350 EDT %MIVR-SS_VB-7-UNK:HttpCache trace disabled (from voicebrowser.properties)

615115: Jun 01 08:25:22.381 EDT %MIVR-SS_VB-7-UNK:HttpCache enabled size: 25000000

615116: Jun 01 08:25:22.381 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBProperties::Constructing

615117: Jun 01 08:25:22.381 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBProperties.initDefaultProperties()

615118: Jun 01 08:25:22.397 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBProperties::Initializing

615119: Jun 01 08:25:22.397 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Here creating currentPathURI=file:C:/Program Files/wfavvid_1001/

615120: Jun 01 08:25:22.397 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Invoke: http://mediaserver/vxmldocs/AA.vxml

615121: Jun 01 08:25:22.412 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 JsScript - optimization
```
A Sample VoiceXML Log File

level: -1
615122: Jun 01 08:25:22.506 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterLevel: SESSION_LEVEL

615123: Jun 01 08:25:22.506 EDT %MIVR-SS_VB-7-UNK:WFCallControlImpl.getAai() = null
615124: Jun 01 08:25:22.506 EDT %MIVR-SS_VB-7-UNK:WFCallControlImpl.getLocalUri() = 1002
615125: Jun 01 08:25:22.506 EDT %MIVR-SS_VB-7-UNK:WFCallControlImpl.getRemoteUri() = 2011
615126: Jun 01 08:25:22.506 EDT %MIVR-SS_VB-7-UNK:WFCallControlImpl.getOriginator() = 2011
615127: Jun 01 08:25:22.506 EDT %MIVR-SS_VB-7-UNK:WFCallControlImpl.getLocalUri() = 1002
615128: Jun 01 08:25:22.506 EDT %MIVR-SS_VB-7-UNK:WFCallControlImpl.getProtocolName() = QBE
615129: Jun 01 08:25:22.506 EDT %MIVR-SS_VB-7-UNK:WFCallControlImpl.getProtocolVersion() = Cisco Jtapi version 2.1(3.3) Release
615130: Jun 01 08:25:22.584 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615131: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBContext::pushLang language = en_US

615132: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBContext::pushLang
Adding new language : en_US
615133: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615134: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: name='bargein' value='true'
615135: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615136: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: resulting value is 'true'
615137: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615138: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: name='timeout' value='5000'
615139: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615140: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: resulting value is '5000'
615141: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615142: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property:
name='com.cisco.tts.gender' value='female'
615143: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615144: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: resulting value is 'female'
615145: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615146: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: name='termchar' value='#'
615147: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615148: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: resulting value is '#'
615149: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615150: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: name='termtimeout' value='4000'
615151: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615152: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: resulting value is '4000'
615153: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615155: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615156: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property: resulting value is '32'
615157: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VoiceBrowser.invokeApplication(level:0): [URI=http://mediaserver/vxmldocs/AA.vxml fragment=null]
615158: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterScope: application
615159: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterLevel: APPLICATION_LEVEL
615160: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VXMLDocument.loadAndParse() start = 1117628722631
615161: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VXMLDocument.loadAndParse(), req.getMethod() =
615162: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VXMLDocument.loadAndParse(), add thread (TimeoutThread_1117628722631_1) to Map
Appendix A  A Sample VoiceXML Log File

Sample VoiceXML Log File Selection

615163: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocument.loadAndParse(): the total number of fetching threads = 0

615164: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocument.loadAndParse(): calling aThread (TimeoutThread_1117628722631_1) start().

615165: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocument.loadAndParse(): fetching (http://mediaserver/vxmldocs/AA.vxml) timeout attribute=0

615166: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocument.loadAndParse().aThread.run() thread (TimeoutThread_1117628722631_1) start = 1117628722631 state=STARTED

615167: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocument.loadAndParse().aThread.run() thread (TimeoutThread_1117628722631_1) set VxmlDocument’s state to DONE, state=DONE

615168: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocument.loadAndParse().aThread.run() (done) thread (TimeoutThread_1117628722631_1) end=1117628722631, time=0

615169: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocument.loadAndParse(): after join(), state=DONE time=1117628722631 fetching took=0

615171: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocument.loadAndParse(), now parse a Document from req.getDocObj()

615172: Jun 01 08:25:22.740 EDT %MIVR-SS_VB-7-UNK:xmlParser statistics: created=1 discarded=0 maxsize=-1


615175: Jun 01 08:25:22.818 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 XML DocumentType: name=null public id=null system id=null

615176: Jun 01 08:25:22.818 EDT %MIVR-SS_VB-7-UNK:xmlParser statistics: created=1 discarded=0 maxsize=50

615177: Jun 01 08:25:22.818 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VXMLDocument.loadAndParse() end = 111762872818 time = 187
615178: Jun 01 08:25:22.818 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 exitLevel:
APPLICATION_LEVEL
615179: Jun 01 08:25:22.818 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->0
615180: Jun 01 08:25:22.818 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 exitScope: application
615181: Jun 01 08:25:22.818 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterScope: application
615182: Jun 01 08:25:22.818 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterLevel:
APPLICATION_LEVEL
615183: Jun 01 08:25:22.818 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterScope: document
615184: Jun 01 08:25:22.834 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterLevel:
DOCUMENT_LEVEL
615185: Jun 01 08:25:22.834 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 traverseDocument:

615186: Jun 01 08:25:22.834 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): adding dtmf choice grammar string = one

615187: Jun 01 08:25:22.834 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): choice grammar string = one
615188: Jun 01 08:25:22.834 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 0->2
615189: Jun 01 08:25:22.834 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615190: Jun 01 08:25:22.834 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615191: Jun 01 08:25:22.834 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VBGrammaraHandler::addInLineGrammar() grammar =  [grammar: null] Type = 1
615192: Jun 01 08:25:22.850 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 handleGrammarElement : value of grammar string = null
615193: Jun 01 08:25:22.850 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615194: Jun 01 08:25:22.850 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615195: Jun 01 08:25:22.850 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615196: Jun 01 08:25:22.850 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VBGrammaraHandler::addInLineGrammar() grammar =  [grammar: null] Type = 1
615197: Jun 01 08:25:22.850 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 handleGrammarElement : value of grammar string = null
615198: Jun 01 08:25:22.850 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): adding dtmf choice grammar string = 2
615199: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351FormItemTraverser:handlMenuElement(): choice grammar string = 2
615200: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615201: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615202: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615203: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBGrammaraHandler::addInLineGrammar() grammar = [grammar: null] Type = 1
615204: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 handleGrammarElement: value of grammar string = null
615205: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615206: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615207: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615208: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBGrammaraHandler::addInLineGrammar() grammar = [grammar: null] Type = 1
615209: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 handleGrammarElement: value of grammar string = null
615210: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351FormItemTraverser:handlMenuElement(): adding dtmf choice grammar string = 0
615211: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615212: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615213: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615214: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615215: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBGrammaraHandler::addInLineGrammar() grammar = [grammar: null] Type = 1
615216: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 handleGrammarElement: value of grammar string = null
615217: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615218: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615219: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615220: Jun 01 08:25:22.685 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBGrammaraHandler::addInLineGrammar() grammar = [grammar: null] Type = 1
Appendix A  A Sample VoiceXML Log File

Sample VoiceXML Log File Selection

615221: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 handleGrammarElement: value of grammar string = null
615222: Jun 01 08:25:22.881 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615223: Jun 01 08:25:22.912 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterLevel:

DIALOG_LEVEL
615224: Jun 01 08:25:22.912 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 traverseDialog: id=aa
615225: Jun 01 08:25:22.912 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterScope: dialog
615226: Jun 01 08:25:22.928 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 enterLevel: FIELD_LEVEL
615227: Jun 01 08:25:22.928 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 DialogTraverser:

traverseDialog(): -- Beginning Select Phase
615228: Jun 01 08:25:22.928 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 DialogTraverser:

traverseDialog(): Selected element = menu name =
615229: Jun 01 08:25:22.928 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 DialogTraverser:

traverseDialog(): -- Beginning Collect Phase
615230: Jun 01 08:25:22.928 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->4
615231: Jun 01 08:25:22.928 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 4->4
615232: Jun 01 08:25:22.928 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 4->4
615233: Jun 01 08:25:22.943 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Setting gender as female for prompt = TTS:Dom[

Welcome to the automated attendant.
To enter the phone number of the person you are trying to reach, say or press 1.
To enter the name of the person you are trying to reach, say or press 2.
To transfer to the operator, say or press 0.

</speak>
]
615234: Jun 01 08:25:22.975 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Play: TTS:Dom[

Welcome to the automated attendant.
To enter the phone number of the person you are trying to reach, say or press 1.
To enter the name of the person you are trying to reach, say or press 2.
To transfer to the operator, say or press 0.

</speak>
]
615235: Jun 01 08:25:22.975 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 FormItemTraverser:handleMenuElement(): adding dtmf choice grammar string = one
615236: Jun 01 08:25:22.990 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): choice grammar string = one
615237: Jun 01 08:25:22.990 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): adding dtmf choice grammar string = 2
615238: Jun 01 08:25:22.990 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): choice grammar string = 2
615239: Jun 01 08:25:22.990 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): adding dtmf choice grammar string = 0
615240: Jun 01 08:25:22.990 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): choice grammar string = 0
615241: Jun 01 08:25:22.990 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Listen:
615242: Jun 01 08:25:39.288 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 4->4
615243: Jun 01 08:25:39.288 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Heard: 'one'
615244: Jun 01 08:25:39.288 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 playAndRecognize
returns: one
615247: Jun 01 08:25:39.288 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VBResultProcessor.processNlsmlResult(): gmParentName=choice, id=, name=, type=, slot=, result=<?xml version='1.0'?><result><interpretation grammar="session:choice1@document.grammar" confidence="94"><input mode="speech">one</input><instance><SWI_literal>one</SWI_literal><SWI_grammarName>session:choice1@document.grammar</SWI_grammarName><SWI_meaning>{SWI_literal:one}</SWI_meaning></instance></interpretation></result>
This appendix includes the following topics:

- VoiceXML 2.0 Element Implementation, page B-2
- VoiceXML Properties Implementation, page B-10
- Standard Session Variables Implementation, page B-11
- Built-in Type Implementation, page B-12
- The <value> Data Format, page B-14
VoiceXML 2.0 Element Implementation

Table B-1 describes the Cisco Unified CCX implementation of VoiceXML 2.0 elements. It contains:

- The list of all the elements defined in the W3C Voice Extensible Markup Language (VoiceXML) Version 2.0.
- The elements in the Speech Synthesis Markup Language Version 1.0 specification that Cisco Unified CCX supports. SML elements are available in VoiceXML 2.0.
- The elements in the Speech Recognition Grammar Specification (SRGS) Version 1.0 that Cisco Unified CCX supports. SRGS elements are available in VoiceXML 2.0.

Note: At run time, the system ignores unsupported or unimplemented attributes.

<table>
<thead>
<tr>
<th>Element</th>
<th>Attributes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;assign&gt;</td>
<td>name expr</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
</tbody>
</table>
| <audio> | src fetchtimeout fetchint maxage maxstale expr | The following attributes are not supported:  
  - fetchint  
  - The <audio expr> tag when nested in a <prompt> tag.  
The following audio file formats are supported:  
  - audio/wav  
The following codec is supported for each file format:  
  - G.711 ULAW |
| <block> | name expr cond | Fully supported by the Cisco Unified CCX implementation. |
| <break> | strength time | Fully supported by the Cisco Unified CCX implementation. |
### Table B-1  VoiceXML 2.0 Element Implementation (continued)

<table>
<thead>
<tr>
<th>Element</th>
<th>Attributes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;catch&gt;</code></td>
<td>event count cond</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
</tbody>
</table>
| `<choice>` | dtmf accept next expr event eventexpr message messageexpr fetchaudio fetchint fetchtimeout maxage maxstale | The following attributes are not supported:  
  - fetchint  
  **Note** The `<choice>` element’s dtmf attribute can be set only to dtmf='*', dtmf='#', or dtmf='0' if it is being used in conjunction with a `<menu>` element and the dtmf attribute is set to dtmf='true'. |
| `<clear>` | namelist | Fully supported by the Cisco Unified CCX implementation. |
| `<desc>` | xml:lang | Not supported by the Cisco Unified CCX implementation. |
| `<disconnect>` | no attributes | Fully supported by the Cisco Unified CCX implementation. |
| `<else>` | no attributes | Fully supported by the Cisco Unified CCX implementation. |
| `<elseif>` | cond | Fully supported by the Cisco Unified CCX implementation. |
| `<emphasis>` | level | Fully supported by the Cisco Unified CCX implementation. |
| `<enumerate>` | no attributes | Fully supported by the Cisco Unified CCX implementation. |
| `<error>` | count cond | Fully supported by the Cisco Unified CCX implementation. |
| `<example>` | no attributes | Fully supported by the Cisco Unified CCX implementation. |
| `<exit>` | expr namelist | Fully supported by the Cisco Unified CCX implementation. Parameters are returned to variables configured in the Voice Browser step. |
Table B-1  VoiceXML 2.0 Element Implementation (continued)

<table>
<thead>
<tr>
<th>Element</th>
<th>Attributes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;field&gt;</td>
<td>name expr cond type slot modal</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;filled&gt;</td>
<td>mode namelist</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;form&gt;</td>
<td>id scope</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| <goto> | next expr nextitem expritem fetchaudio fetchint fetchtimeout maxage maxstale | The following attributes are not supported:  
  • fetchint |
|         |            |       |
| <grammar> | xml:lang src scope type fetchint fetchtimeout maxsize maxstate mode root tag-format version weight xml:base | The following attributes are not supported:  
  • fetchint |
|         |            |       |
| <help> | count cond | Fully supported by the Cisco Unified CCX implementation. |
|         |            |       |
### VoiceXML 2.0 Element Implementation (continued)

<table>
<thead>
<tr>
<th>Element</th>
<th>Attributes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;if&gt;</td>
<td>cond</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;initial&gt;</td>
<td>name expr</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td></td>
<td>cond</td>
<td></td>
</tr>
<tr>
<td>&lt;item&gt;</td>
<td>tag weight</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;lexicon&gt;</td>
<td>type uri</td>
<td>Not supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;link&gt;</td>
<td>next dtmf</td>
<td>The following attributes are not supported:</td>
</tr>
<tr>
<td></td>
<td>expr</td>
<td>• fetchint</td>
</tr>
<tr>
<td></td>
<td>event</td>
<td></td>
</tr>
<tr>
<td></td>
<td>eventexpr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>fetchaudio</td>
<td></td>
</tr>
<tr>
<td></td>
<td>fetchint</td>
<td></td>
</tr>
<tr>
<td></td>
<td>fetchtimeout</td>
<td></td>
</tr>
<tr>
<td></td>
<td>maxsize</td>
<td></td>
</tr>
<tr>
<td></td>
<td>maxstate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>message</td>
<td></td>
</tr>
<tr>
<td></td>
<td>messageexpr</td>
<td></td>
</tr>
<tr>
<td>&lt;log&gt;</td>
<td>label expr</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;mark&gt;</td>
<td>name</td>
<td>Not supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;menu&gt;</td>
<td>id scope dtmf accept</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td></td>
<td>Note</td>
<td>If the &lt;menu&gt; element dtmf attribute is set to duemf=&quot;true&quot;, then the &lt;choice&gt; element dtmf attribute can be set to only one of the following: duemf=&quot;*&quot;, duemf=&quot;#&quot;, and duemf=&quot;0&quot;.</td>
</tr>
<tr>
<td>&lt;meta&gt;</td>
<td>name content http-equiv</td>
<td>Fully supported by the Cisco Unified CCX implementation. http-equiv may contain Date and Expires properties</td>
</tr>
<tr>
<td>Element</td>
<td>Attributes</td>
<td>Notes</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>&lt;metadata&gt;</td>
<td>creator, rights, subject</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;noinput&gt;</td>
<td>count, cond</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;nomatch&gt;</td>
<td>count, cond</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;object&gt;</td>
<td>name, expr, cond, classid, codebase, codetype, data, type, archive, fetchint, fetchtimeout, maxage, maxstale</td>
<td>No platform object is supported in the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;one-of&gt;</td>
<td>tag</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;option&gt;</td>
<td>dtmf, accept, value</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;p&gt;</td>
<td>XML:lang</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;param&gt;</td>
<td>name, expr, value, valuetype, type</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;phoneme&gt;</td>
<td>alphabet, ph</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
</tbody>
</table>
### Table B-1  VoiceXML 2.0 Element Implementation (continued)

<table>
<thead>
<tr>
<th>Element</th>
<th>Attributes</th>
<th>Notes</th>
</tr>
</thead>
</table>
| <prompt>    | bargein  
|             | bargeintype  
|             | cond  
|             | count  
|             | timeout  
|             | xml:lang  
|             | xml:base  | For bargein, only “speech” is supported. |
| <property>  | name  
|             | value  | Supported in the Cisco Unified CCX implementation. See VoiceXML Properties Implementation, page B-10 for the list of properties supported. |
| <prosody>   | pitch  
|             | contour  
|             | range  
|             | rate  
|             | duration  
|             | volume  | Not supported by the Cisco Unified CCX implementation. |
| <record>    | name  
|             | expr  
|             | cond  
|             | modal  
|             | beep  
|             | maxtime  
|             | finalsilence  
|             | dtmfterm  
|             | type  | The following attributes are not supported:  
|             |       | • finalsilence  
|             |       | • type (accepts only the default format)  
|             |       | Voice recording supports the following codec:  
|             |       | • G711_ULAW format  
|             |       | Simultaneous recognition and recording is not supported.  
|             |       | Note  
|             |       | Note that the record variable should be used only for submitting the audio using the <submit> element. Use of the variable in other ECMAScript expression is not supported. |
| <reprompt>  | no attributes  | Fully supported by the Cisco Unified CCX implementation. |
| <return>    | event  
|             | eventexpr  
|             | message  
|             | messageexpr  
|             | namelist  | Fully supported by the Cisco Unified CCX implementation. |
### Table B-1 VoiceXML 2.0 Element Implementation (continued)

<table>
<thead>
<tr>
<th>Element</th>
<th>Attributes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;rule&gt;</td>
<td>ID scope</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;ruleref&gt;</td>
<td>tag uri</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;s&gt;</td>
<td>no attributes</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
<tr>
<td>&lt;say-as&gt;</td>
<td>phon sub class</td>
<td>Fully supported by the Cisco Unified CCX implementation.</td>
</tr>
</tbody>
</table>
| &lt;script&gt; | src charset fetchint fetchtimeout maxage maxstale | The following attributes are not supported:  
  • fetchint |
| &lt;sub&gt;    | alias                 | Not supported by the Cisco Unified CCX implementation.                 |
| &lt;subdialog&gt; | name expr cond namelist src srcexp method enctype fetchaudio fetchtimeout fetchint maxage maxstale | The following attributes are not supported:  
  • fetchint |
### Table B-1 VoiceXML 2.0 Element Implementation (continued)

<table>
<thead>
<tr>
<th>Element</th>
<th>Attributes</th>
<th>Notes</th>
</tr>
</thead>
</table>
| <submit> | next, expr, namelist, method, enctype, fetchaudio, fetchint, fetchtimeout, maxage, maxstale | The following attributes are not supported:  
  - fetchint |
| <tag>    | no attributes                  | Contains a TAG-CONTENT string for semantic interpretation by MRCP.  
  Support varies by MRCP provider. |
| <throw>  | even, eventexpr, message, messageexpr | Fully supported by the Cisco Unified CCX implementation. |
| <token>  | xml:lang                       | Fully supported by the Cisco Unified CCX implementation. |
| <transfer> | aai, aaiexpr, bridge, cond, connecttimeout, dest, destexpr, expr, maxtime, name, transferaudio | The following attributes are not supported:  
  - bridge (only blind transfer is supported)  
  - connecttimeout  
  - transferaudio, aai, aaiexpr  
  The dest attribute supports both the phone: URL syntax used in VoiceXML 1.0 and the tel: URL syntax required by VoiceXML 2.0. The tel: URL syntax is described in [RFC2806]. |
| <value>  | expr                           | Fully supported by the Cisco Unified CCX implementation. |
| <var>    | expr, name                     | Fully supported by the Cisco Unified CCX implementation. |
The table below lists standard VoiceXML 2.0 properties supported in Cisco Unified CCX implementation.

Table B-2  
**Supported Standard VoiceXML 2.0 Properties**

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bargein</td>
<td>Specifies whether or not barge-in to voice prompts is allowed. Allowed values are &quot;true&quot; and &quot;false&quot;. Default value is &quot;true&quot;.</td>
</tr>
<tr>
<td>fetchtimeout</td>
<td>Sets the timeout for fetching the content from the web. The default value is &quot;4s&quot;.</td>
</tr>
<tr>
<td>timeout</td>
<td>The time after which a noinput event is thrown by the platform. The default value is &quot;5s&quot;.</td>
</tr>
<tr>
<td>termchar</td>
<td>Specifies the termination keys to be used in a particular DTMF recognition. More than one key can be specified. The default value is “#”. Use blank “ ” to represent no termination key. (Recognition ends with timeout.)</td>
</tr>
<tr>
<td>termtimeout</td>
<td>Specifies the timeout in seconds for DTMF recognition. The default value is &quot;4s&quot;.</td>
</tr>
</tbody>
</table>
Table B-3 lists other proprietary properties supported.

Table B-3  Supported Cisco Proprietary Properties

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>com.cisco.tts.gender</td>
<td>Select male or female voice for Text-to-Speech prompts. The allowed values are &quot;male&quot; and &quot;female&quot; (default).</td>
</tr>
<tr>
<td>com.cisco.tts.provider</td>
<td>Override the default TTS provider, default = “name”</td>
</tr>
</tbody>
</table>

### Standard Session Variables Implementation

The table below lists supported standard session variables.

Table B-4  Supported Standard VoiceXML 2.0 Session Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>session.connection.ani</td>
<td>Automatic Number Identification (ANI). This variable provides the calling party number.</td>
</tr>
<tr>
<td>session.connection.dnis</td>
<td>Dialed Number Identification Service (DNIS). This variable provides the number that the caller dialed.</td>
</tr>
<tr>
<td>session.connection.iidigits</td>
<td>Not supported.</td>
</tr>
</tbody>
</table>
| session.connection.rdnis| Redirect Dialed Number Information Service (RDNIS). This variable provides the number from which a call diversion or transfer was invoked. (This variable is undefined if the number is unavailable.) 
Example: Suppose person A subscribes to a voice messaging service, and forwards all calls to a voice server. Person B then calls A and gets routed to the voice server. A VoiceXML application on the voice server sees RDNIS as A’s number, DNIS as the number of the voice server, and ANI as B’s number. |
| session.connection.local.uri | A URI which addresses the local interpreter context device. |
| session.connection.remote.uri | A URI which addresses the remote caller device. |
### Built-in Type Implementation

Supported built-in types are listed below:

- Boolean
- date
- digits
- currency
- number
- phone

### Table B-4 Supported Standard VoiceVML 2.0 Session Variables (continued)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>session.connection.protocol.name</td>
<td>The connection protocol. The name also represents the subobject name for protocol specific information. For instance, if <code>session.connection.protocol.name</code> is 'q931', <code>session.connection.protocol.q931.uui</code> might specify the user-to-user information property of the connection.</td>
</tr>
<tr>
<td>session.connection.protocol.version</td>
<td>The version of the connection protocol.</td>
</tr>
<tr>
<td>session.connection.redirect</td>
<td>An array representing the connection redirection paths. The first element is the original called number, the last element is the last redirected number. Each element of the array contains a uri, pi (presentation information), si (screening information), and reason property. The reason property can be either &quot;unknown&quot;, &quot;user busy&quot;, &quot;no reply&quot;, &quot;deflection during alerting&quot;, &quot;deflection immediate response&quot;, &quot;mobile subscriber not reachable&quot;.</td>
</tr>
<tr>
<td>session.connection.originator</td>
<td>Directly references either the local or remote property (For instance, the following ECMAScript would return true if the remote party initiated the connection: <code>var caller_initiate = connection.originator == connection.remote</code>).</td>
</tr>
<tr>
<td>session.cisco.asravailable</td>
<td>Cisco Proprietary. Read Only. Indicates whether or not the ASR server is available.</td>
</tr>
</tbody>
</table>
• time (Time designations for properties and attributes is “s” or “ms,” except
maxage, maxstale, (and audio/document/grammar/script variants).

Some deviations are listed as follows:
• Number built-in grammar does not support decimal numbers. It accepts
number from 0 to 999,999.
• Phone built-in grammar does not support extension recognition.
• Parameterization of built-in types is not implemented.

Built-in grammar files are in the directory <install_directory>\grammars\system\.

See your MRCP vendor for the maximum number of digits that your Digit
grammar accepts.

Grammars of the languages are filed in the respective directories designated by
the locales.

---

**Note** Any modification to these files demands a through knowledge of SRGS and
SSML MRCP grammar syntax and is done at the customer’s risk.

---

### Table B-5 TTS/SSML/Audio Built-In Type Summary

<table>
<thead>
<tr>
<th>VXML <code>&lt;prompt&gt;</code> (VXML 2.0 Appendix P)</th>
<th>SSML <code>&lt;say-as&gt;</code> element (SSML S 2.1.4)</th>
<th>Mapping from VXML to SSML</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>interpret-as</td>
<td>Format (optional field)</td>
</tr>
<tr>
<td>Number</td>
<td>Number</td>
<td>ordinal</td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td>cardinal</td>
</tr>
<tr>
<td>Phone</td>
<td>Number</td>
<td>telephone</td>
</tr>
<tr>
<td>Date</td>
<td>Date</td>
<td>mdy</td>
</tr>
<tr>
<td>Digits</td>
<td>Digits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ordinal, Cardinal,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Letters, Words</td>
<td></td>
</tr>
<tr>
<td>Boolean, currency,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The <value> Data Format

The <value> data format can be used to format text, such as dates and times, into spoken form. The expr attribute can specify an ECMAScript Date object or a string. If it is a string, the Cisco Unified CCX Voice Browser attempts to parse it into a machine format.

The table below lists the formats used to parse the string. The format is language dependent. If the string cannot be parsed, the <value> data format is ignored.

<table>
<thead>
<tr>
<th>Language code</th>
<th>Date format</th>
<th>Time format</th>
</tr>
</thead>
<tbody>
<tr>
<td>de-DE</td>
<td>EEEE, d. MMMM yyy</td>
<td>H:mm' Uhr 'z</td>
</tr>
<tr>
<td></td>
<td>d. MMMM yyy</td>
<td>HH:mm:ss z</td>
</tr>
<tr>
<td></td>
<td>dd.MM.yyy</td>
<td>HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>dd.MM.yy</td>
<td>HH:mm</td>
</tr>
<tr>
<td>en-CA</td>
<td>EEEE, MMMM d, yyyy</td>
<td>h:mm:ss 'o'clock' a z</td>
</tr>
<tr>
<td></td>
<td>MMMM d, yyyy</td>
<td>h:mm:ss z a</td>
</tr>
<tr>
<td></td>
<td>d-MMM-yy</td>
<td>h:mm:ss a</td>
</tr>
<tr>
<td></td>
<td>dd/MM/yy</td>
<td>h:mm a</td>
</tr>
<tr>
<td>en-GB</td>
<td>dd MMMM yyyy</td>
<td>HH:mm:ss 'o'clock' z</td>
</tr>
<tr>
<td></td>
<td>dd MMMM yyyy</td>
<td>HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>dd-MM-MM-yy</td>
<td>HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>dd/MM/yy</td>
<td>HH:mm</td>
</tr>
<tr>
<td>en-US</td>
<td>EEEE, MMMM d, yyyy</td>
<td>h:mm:ss a z</td>
</tr>
<tr>
<td></td>
<td>MMMM d, yyyy</td>
<td>h:mm:ss a z</td>
</tr>
<tr>
<td></td>
<td>MMM d, yyyy</td>
<td>h:mm:ss a</td>
</tr>
<tr>
<td></td>
<td>M/d/yy</td>
<td>h:mm a</td>
</tr>
</tbody>
</table>
The table below lists the legend of the format. The information is based on Sun JDK’s java.text.SimpleDateFormat documentation.

**Table B-7 Format Legend**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Presentation</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>era designator</td>
<td>(Text)</td>
<td>AD</td>
</tr>
<tr>
<td>y</td>
<td>year</td>
<td>(Number)</td>
<td>2005</td>
</tr>
<tr>
<td>M</td>
<td>month in year</td>
<td>(Text &amp; Number)</td>
<td>July &amp; 07</td>
</tr>
<tr>
<td>d</td>
<td>day in month</td>
<td>(Number)</td>
<td>10</td>
</tr>
<tr>
<td>h</td>
<td>hour in am/pm (1~12)</td>
<td>(Number)</td>
<td>12</td>
</tr>
</tbody>
</table>
The count of pattern letters determines the format:

- Text
  - 4 or more pattern letters—Use full form.
  - Fewer than 4 pattern letters—Use short or abbreviated form if one exists.
- Number
  - The minimum number of digits.

Shorter numbers are zero-padded to this amount. Year is handled specially; that is, if the count of 'y' is 2, the Year will be truncated to 2 digits.

### Table B-7 Format Legend (continued)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Presentation</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>hour in day (0–23)</td>
<td>(Number)</td>
<td>0</td>
</tr>
<tr>
<td>m</td>
<td>minute in hour</td>
<td>(Number)</td>
<td>30</td>
</tr>
<tr>
<td>s</td>
<td>second in minute</td>
<td>(Number)</td>
<td>55</td>
</tr>
<tr>
<td>S</td>
<td>millisecond</td>
<td>(Number)</td>
<td>978</td>
</tr>
<tr>
<td>E</td>
<td>day in week</td>
<td>(Text)</td>
<td>Tuesday</td>
</tr>
<tr>
<td>D</td>
<td>day in year</td>
<td>(Number)</td>
<td>189</td>
</tr>
<tr>
<td>F</td>
<td>day of week in month</td>
<td>(Number)</td>
<td>2 (2nd Wed in July)</td>
</tr>
<tr>
<td>w</td>
<td>week in year</td>
<td>(Number)</td>
<td>27</td>
</tr>
<tr>
<td>W</td>
<td>week in month</td>
<td>(Number)</td>
<td>2</td>
</tr>
<tr>
<td>a</td>
<td>am/pm marker</td>
<td>(Text)</td>
<td>PM</td>
</tr>
<tr>
<td>k</td>
<td>hour in day (1–24)</td>
<td>(Number)</td>
<td>24</td>
</tr>
<tr>
<td>K</td>
<td>hour in am/pm (0–11)</td>
<td>(Number)</td>
<td>0</td>
</tr>
<tr>
<td>z</td>
<td>time zone</td>
<td>(Text)</td>
<td>Pacific Standard Time</td>
</tr>
<tr>
<td>‘</td>
<td>escape for text</td>
<td>(Delimiter)</td>
<td></td>
</tr>
<tr>
<td>&quot;</td>
<td>single quote</td>
<td>(Literal)</td>
<td>‘</td>
</tr>
</tbody>
</table>
• Text & Number
  – 3 or over—Use text.
  – Fewer than 3—Use number.

Any characters in the pattern that are not in the ranges of ['a'...'z'] and ['A'...'Z'] will be treated as quoted text. For instance, characters like '"', ',', '.', '#' and '@' will appear in the resulting time text even they are not enclosed within single quotes.
IN-1
Cisco Unified Contact Center Express Getting Started with Scripts, Release 11.0(1)

INDEX

A
Accept step
   using in a basic Unified CCX script  6-5
Annotate step
   using  14-10
ASR
   enabled scripts  4-4
   supported media  5-8
Authenticate User step
   using in a basic script  7-32

B
BasicQ script (BasicQ.aef)  16-10
BigDecimal
   variables  2-42
BigInteger
   variables  2-42
Boolean
   variables  2-40
Break option, in debug menu  2-10
breakpoints, inserting  2-11
broadcast.aef  8-2
built-in variable data types
   basic  2-37
   Byte
      variables  2-38

C
Call Hold step
   using in a Unified CCX script  17-31
Call Redirect step
   and error output branches  2-55
   using in a Unified IP IVR script  12-41,
                                 12-69, 12-75
Call Subflow step
   using  8-13
call variables  16-3, 18-4
changing the order of steps  2-26
Character
   variables  2-40
Cisco IP Auto-Attendant  12-3
Cisco Unified CCX Editor
   creating a script  2-25
   Design pane  2-27
   File menu  2-8
how to start  1-1
overview  2-1
Clear All Breakpoints option, in Debug menu  2-11
Close option, in File menu  2-8
CollectDigits script (CollectDigits.aef)  16-12
compound grammar about  5-10
indexing  5-10
Contact management, overview  5-1
Contact variable  2-38
Continue On Prompt Errors option  2-53
Copy option, in Edit menu  2-9
Create Conditional Prompt step using in a Unified IP IVR script  12-12
Create Container Prompt step using in a Unified IP IVR script  12-14
Create File Document step using  14-8
using in a web-enabled script  9-10
Create Generated Prompt step using in a Unified IP IVR script  12-35,
12-57
Create TTS Prompt step using  14-5, 14-9
Create XML Document step using in a web-enabled client script  10-9
creating a script  2-25
Currency variables  2-40
customizers, defined  2-28
Cut option, in Edit menu  2-9

D

Database steps using in scripts  11-1
Date variables  2-42
DB Get step in a database script  11-9
DB Read step in a database script  11-6
DB Release step in a database script  11-16
DB Write step in a database script  11-13
debugging non-reactive  2-52
reactive  2-49
Debug menu  2-10
Debug menu options Break  2-10
Clear All Breakpoints  2-11
Disable Breakpoint  2-11
Enable Breakpoint  2-11
End  2-10
Insert Breakpoint  2-11
Pending Response 2-11
Reactive Application 2-11
Start 2-10
Step Over 2-10
Validate 2-10
decoding ICME variables 16-5
decoding ICM variables 2-44
default scripts, overview 5-19
defining variables 2-32
Delay step
using in a basic Unified CCX script 6-12
using in a Unified CCX script 17-31
Delete option, in Edit menu 2-9
Design pane 2-27
Disable Breakpoint, in Debug menu 2-11
displaying step properties 2-28
Document
to variables 2-41
double
to variables 2-43
DTMF
suported media 5-8
using DTMF grammar 15-14
using DTMF input 15-11
dynamic web pages
creating 9-4

E

Edit menu options
Copy 2-9
Cut 2-9
Delete 2-9
Expand All 2-9
Find 2-9
Find Label 2-9
Find Next 2-9
Paste 2-9
Redo 2-9
Undo 2-9
Edit Variable
to properties 2-33
Enable Breakpoint option, in Debug menu 2-11
encoding ICME variables 16-5
encoding ICM variables 2-44
End option, in Debug menu 2-10
error output branches 2-55
error variables 16-4
Expand All option, in Edit menu 2-9
Expanded Call Variables 2-35, 18-5
in Settings menu 2-15
Explicit Confirmation step
using in a Unified IP IVR script 12-62
exporting variables 2-43
Expression Editor
All Variables selection box 3-3
pop-up menu 3-7
tabbed toolbar 3-7
using 3-2
expressions
expression panel 2-45
licensing 3-9
Extract XML Document step
using in a web-enabled client script 10-10

F
File menu options
Close 2-8
New 2-8
Open 2-8
Print 2-9
Properties 2-9
Save 2-9
Save As 2-9
Find Label option, in Edit menu 2-9
Find Next option, in Edit menu 2-9
Find option, in Edit menu 2-9
float
variables 2-41

G
Generic Recognition
about 19-1
script algorithm 19-5
Generic Recognition step
using 19-7
Get Contact Info step, using 17-6
Get Digit String step
using in a basic script 7-25
using in a Unified IP IVR script 12-29
Get Digit String step, using 17-11
Get HTTP Contact Info step
using in a web-enabled script 9-8
Get Recognition Result Info step
using 19-12
Get Session Info step, using 17-6, 17-16
Get Session step, using 17-15
Get User Info step
using in a Unified IP IVR script 12-53
Goto step
using in a basic Unified CCX script 6-14
using in a Unified CCX script 17-31
grammar
templates 5-9
variables 2-39
grammars
automatic conversion 5-8
file grammar formats 5-7
overview 5-4
passing grammars to steps 5-9
search algorithm 5-6
system 5-5
user 5-5
Http Forward Step
  in a contact neutral script 13-13

I
icd.aef
  overview 6-2
ICME
  call variables 16-3, 18-4
  default scripts 16-8
  error variables 16-4
  Expanded Call Variables 2-35, 18-5
  predefined call variables 2-36, 18-6
  VRU scripts 16-9
ICM variables
  decoding/encoding 2-44
If step
  using in a multiple contact script 8-15
Implicit Confirmation step
  using in a Unified IP IVR script 12-38, 12-54
Increment step
  using in a Unified IP IVR script 12-40, 12-66, 12-72
Insert Breakpoint option, in Debug menu 2-11
Integer (int)
  variables 2-41
Iterator variables 2-40

J
Java
  licensing 3-9

K
Keyword Transform Document step
  using in a web-enabled script 9-11

L
Label step
  using in a basic script 7-11
  using in a basic Unified CCX script 6-10
  using in a Unified IP IVR script 12-18
language
  variables 2-40
  licensing, expressions 3-9
locallizing scripts 4-1
long
  variables 2-43

M
mapping identifiers
  using 5-3
media
  media-less calls 5-25
  media neutrality 5-26
Index

overview 5-24
Menu step
  using 14-11
  using in a basic script 7-40
MRCP
  language packs 4-5

N
Name to User step
  using in a basic script 7-11
  using in a Unified IP IVR script 12-48
N-Best Recognition 19-2
New option, in File menu 2-8
New Variable
  dialog box 2-32
  non-reactive debugging 2-52

O
Open option, in File menu 2-8
outbound calls, placing 8-21

P
Palette pane
  definition 2-18
  tips for using 2-24
  passing grammars to steps 5-9
  Paste option, in Edit menu 2-9
  Pending Response option, in Debug menu 2-11
  peripheral variables 16-3, 18-4
  Place Call step
    using 8-21
  Play Prompt step
    using in a multiple contact script 8-19
    using in a Unified IP IVR script 12-16
  predefined call variables 2-36, 18-6
  Print option, in File menu 2-9
  Prompt
    variables 2-39
  prompts
    how to configure 5-16
    how to create or customize 5-15
    how to record 5-15
    overview 5-11
    search algorithm 5-13
    user 5-12
  properties, displaying step 2-28
  Properties option, in File menu 2-9

R
Reactive Application option, in Debug menu 2-11
reactive debugging 2-49
Recording step
  using in a basic script 7-37
  using in a multiple contact script 8-8
Recording step, using 17-24
Redo option, in Edit menu 2-9
remote method invocation 2-10
removing or showing
   Expression Editor toolbar 3-8
Request Route step 18-14

Sample Scripts
   BasicQ.aef 16-10
   CollectDigits.aef 16-12
   Unified Gateway scripts 18-3
   VisibleQ.aef 16-11
   voicebrowser.aef 15-20
Sample scripts
   broadcast.aef (for multiple contacts) 8-2
   hello.aef (web-enabled script) 9-1
   SNU.aef (basic script) 7-2
Save As option, in File menu 2-9
Save option, in File menu 2-9
script interruption, overview 5-22
Script Variables 18-3
Select Resource step
   using in a basic Unified CCX script 6-7
Select Resource step, using 17-26
Send Http Response step
   using in a web-enabled script 9-14
Service Control interface, Unified ICME 16-1
Session
   variables 2-39
   session management, overview 5-3
   session management steps, using 17-14
   Session Mapping step, using 17-17
   session objects, using 5-4
   Set Contact Info step, using 17-16
   Set Enterprise Call Info step 18-14
   Set Priority step, using 17-30
   Set Session Info step, using 17-24
   Set step
      using in a multiple contact script 8-12, 8-15
      using in a Unified IP IVR script 12-23
Settings menu 2-11
Settings menu options
   Expanded Call Variables 2-15
Short
   variables 2-38
Simple Recognition step
   using in a Unified IP IVR script 12-24
   speech recognition, using 15-10
spoken name
   how to upload 5-18
Start option, in Debug menu 2-10
Start step
   using in a basic script 6-2
static web pages
   creating 9-3
   Step Over option, in Debug menu 2-10
<table>
<thead>
<tr>
<th>Index</th>
</tr>
</thead>
</table>

String
  - variables 2-41

subflows, calling 8-13

Switch step
  - using in a Unified IP IVR script 12-22

Synchronize License 2-14

T

The Set step
  - using in a Unified IP IVR script 12-48

Time
  - variables 2-42

toolbar 2-16

TTS
  - enabled scripts 4-4
  - language packs 4-5

U

Undo option, in Edit menu 2-9

Unified CCX Editor
  - Overview 1-1

Unified CCX script
  - example 6-2

User variables 2-38

<table>
<thead>
<tr>
<th>V</th>
</tr>
</thead>
</table>

Validate option, in Debug menu 2-10

variables
  - BigDecimal 2-42
  - BigInteger 2-42
  - Boolean 2-40
  - built-in data types
    - basic 2-37
    - byte 2-38
    - call 16-3, 18-4
    - char 2-40
    - Contact 2-38
    - Currency 2-40
    - Date 2-42
    - defining 2-32
    - Document 2-41
    - double 2-43
    - error 16-4
    - exporting 2-43
    - float 2-41
    - for Unified gateway scripts 18-3
    - Grammar 2-39
    - ICME call 2-36, 18-6
    - ICME Expanded Call Variables 2-35, 18-5
    - in broadcast.aef 8-4
    - in icd.aef script 6-3
    - in SNU script 7-4
    - int 2-41
    - Iterator 2-40 |
language 2-40  web server script
long 2-43  creating 9-1
Prompt 2-39
properties 2-33
Session 2-39
Short 2-38
String 2-41
Time 2-42
user 2-38
VisibleQ script (VisibleQ.aef) 16-11
Voice Browser
   architecture 5-30
   development tools 5-32
   overview 5-28
VoiceXML
   built-in type implementation B-12
   element implementation B-2
   international applications 15-29
   overview 5-29
   passing parameters 15-26
   properties implementation B-10
   standard session variables
   implementation B-11
VoiceXML Sample Document 15-8
VRU scripts 16-9, 16-10, 16-11, 16-12

W

web-enabled client application, creating 10-1
web-enabled scripts 9-1