Cisco Customer Response Solutions Getting Started with Scripts, Release 4.5(1)

Cisco CRS Scripting and Development Series: Volume 1

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Cisco Customer Response Solutions Developer Guide and CRS Editor Step Reference

Preface

This book is Volume 1 of the *Cisco CRS Scripting and Development Series*. This series provides information about how to use the Cisco Customer Response Solutions (CRS) Editor to develop a wide variety of interactive scripts.

The *Cisco CRS Scripting and Development Series* contains four volumes:

- *Volume 1, Getting Started with Scripts* (this book), provides an overview of the Cisco CRS and the CRS Editor web interface.
- *Volume 2, Editor Step Reference*, describes each individual step in the CRS Editor palettes.
- *Volume 3, Expression Language Reference,* provides details on working with the Cisco CRS Expression Editor

Volume 1, Getting Started with Scripts describes how to:

- Install the Cisco CRS Editor
- Navigate the Cisco CRS Editor interface
- Make use of key features of the CRS development environment
- Create scripts that perform a wide variety of tasks

Note For an overview of the Cisco Customer Response Solutions, refer to the Cisco *Customer Response Solutions Administration Guide*, which includes information about configuring Cisco CallManager, the Cisco CRS Server, and other subsystems of the CRS Engine.

Audience

The *Cisco CRS Scripting and Development Series: Volume 1, Getting Started with Scripts, Release 4.5(1)* is written for application developers who will use the Cisco CRS Editor to create and modify CRS 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 Customer Response Solutions.

Organization

This guide contains the following chapters.

Chapter	Title	Description
Chapter 1	Installing and Starting the Cisco CRS Editor	Describes how to install and start the CRS Editor on your computer.
Chapter 2	How to Use the Cisco CRS Editor	Provides a high-level overview of the CRS Editor and its components.
Chapter 3	Localizing CRS Scripts	Describes how to localize your CRS scripts to use prompts in the language your customers use.
Chapter 4	Advanced Scripting Techniques	Describes advanced features of the CRS development environment.
Chapter 5	Designing a Basic Script	Uses the sample script SNU.aef to demonstrate how to use CRS Editor steps to design a basic script.
Chapter 6	The Basic IPCC Express Script	Uses the sample script icd.aef to demonstrate how to use CRS Editor steps to provide an IPCC Express solution to queue calls and connect them to available resources.

Chapter	Title	Description
Chapter 7	Working with Multiple Contacts	Uses the sample script broadcast.aef to demonstrate how to use CRS 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.
Chapter 8	Designing a Web-Enabled Script	Demonstrates how to use CRS Editor steps to create scripts that take advantage of web server applications.
Chapter 9	Designing a Web-Enabled Client Script	Demonstrates how to use CRS Editor steps to create a web-enabled client script.
Chapter 10	Designing a Database Script	Demonstrates how to use CRS Editor steps to design a simple script that automatically provides callers with access to information in a database.
Chapter 11	Designing an IP IVR Script	Uses the sample script aa.aef to demonstrate how to use CRS 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.
Chapter 12	Designing Contact-Neutral Scripts	Demonstrates how to use CRS Editor steps to create a contact-neutral script that accepts either a phone call or an HTTP request as the triggering contact.

Chapter	Title	Description
Chapter 13	Designing a Script with Text-To-Speech (TTS)	Uses the sample script TTSsample.aef to demonstrate how to use CRS Editor steps to design a script that takes advantage of TTS capability.
Chapter 14	Designing CRS VoiceXML Applications	Contains information about Cisco CRS support for VoiceXML standards and other information useful in developing applications that take advantage of VoiceXML-enabled web pages.
Chapter 15	Designing Scripts for IP Queue Manager	Demonstrates how to use CRS Editor steps in the ICM palette to design VRU scripts for use with Cisco IP Queue Manager.
Chapter 16	Designing IPCC Express Scripts	Demonstrates how to use CRS Editor steps in the IPCC Express palette to design scripts for use with Cisco IPCC Express. This chapter also demonstrates how to use Session steps for session management and how to use a default script.
Chapter 17	Designing Remote Monitoring Scripts	Demonstrates how to use CRS Editor steps in the IPCC Express palette to design scripts that allow a supervisor to call into any site (where the supervisor has a Cisco CallManager user profile) and to monitor an agent's conversation at that site.
Chapter 18	Designing IPCC Gateway Scripts	Describes how to design CRS scripts to interact with ICM scripts in an IPCC Express system integrated with an ICM system through the IPCC Gateway.

Chapter	Title	Description
Appendix A	VoiceXML Implementation for Cisco Voice Browser	Provides VoiceXML information for implementing the Voice Browser feature of the CRS Engine.
Appendix B	A Sample VoiceXML Log File	A sample voiceXML log file with SS_VB debug turned on.

Related Documentation

Refer to the following documents for further information about Cisco CRS applications and products:

- *Cisco CRS Scripting and Development Series: Volume 2, Editor Step Reference*
- *Cisco CRS Scripting and Development Series: Volume 3, Expression Language Reference*
- *Cisco Customer Response Solutions Administration Guide*
- *Cisco Customer Response Solutions Installation Guide*
- *Cisco Customer Response Solutions Servicing and Troubleshooting Guide*
- *Cisco CallManager Administration Guide*
- *Cisco CallManager Extended Services Administrator Guide*
- *Cisco CallManager System Guide*
- *Cisco IP Telephony Network Design Guide*

Conventions

This document uses the following conventions.

Table 1 Documentation Conventions

Convention	Description
boldface font	Commands and keywords appear in **boldface** font.
italic font	Arguments for which you supply values appear in *italic* font.
[ ]	Optional elements appear in square brackets.
{ x | y | z }	Alternative keywords are grouped in braces and separated by vertical bars.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
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.
`screen` font	Terminal sessions and information the system displays appear in `screen` font.
`boldface screen` font	Information you must enter appears in **`boldface screen`** font.
^	The key labeled Control is represented in screen displays by the symbol ^. For example, the screen instruction to hold down the Control key while you press the D key appears as ^D.
< >	Nonprinting characters, such as passwords, appear in angle brackets.

Notes use the following convention.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in this guide.

Timesavers use the following convention.

Timesaver Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Tips use the following convention.

Tip Means *the following are useful tips.*

Cautions use the following convention.

Caution Means *reader be careful*. In this situation, you could do something that could result in equipment damage or loss of data.

Warnings use the following convention.

Warning **This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and familiar with standard practices for preventing accidents.**

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

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

http://www.cisco.com/techsupport

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

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

Product Documentation DVD

Cisco documentation and additional literature are available in the Product Documentation DVD package, which may have shipped with your product. The Product Documentation DVD is updated regularly and may be more current than printed documentation.

The Product Documentation DVD is a comprehensive library of technical product documentation on portable media. The DVD enables you to access multiple versions of hardware and software installation, configuration, and command guides for Cisco products and to view technical documentation in HTML. With the DVD, you have access to the same documentation that is found on the Cisco website without being connected to the Internet. Certain products also have .pdf versions of the documentation available.

The Product Documentation DVD is available as a single unit or as a subscription. Registered Cisco.com users (Cisco direct customers) can order a Product Documentation DVD (product number DOC-DOCDVD=) from the Ordering tool or Cisco Marketplace.

Cisco Ordering tool:

http://www.cisco.com/en/US/partner/ordering/

Cisco Marketplace:

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

Ordering Documentation

Beginning June 30, 2005, registered Cisco.com users may order Cisco documentation at the Product Documentation Store in the Cisco Marketplace at this URL:

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

Cisco will continue to support documentation orders using the Ordering tool:

- Registered Cisco.com users (Cisco direct customers) can order documentation from the Ordering tool:

  http://www.cisco.com/en/US/partner/ordering/

- Instructions for ordering documentation using the Ordering tool are at this URL:

  http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 1 800 553-NETS (6387).

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Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Cisco Product Security Overview

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

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

From this site, you can perform these tasks:

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

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

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

If you prefer to see advisories and notices as they are updated in real time, you can access a Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed from this URL:

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

Reporting Security Problems in Cisco Products

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

- Emergencies—security-alert@cisco.com

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

- Nonemergencies—psirt@cisco.com

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

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

Tip We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.*x* through 8.*x*.

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

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

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

Obtaining Technical Assistance

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

Cisco Technical Support & Documentation Website

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

http://www.cisco.com/techsupport

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

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

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

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

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

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

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

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

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

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

Definitions of Service Request Severity

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

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

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

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

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

Obtaining Additional Publications and Information

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

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

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

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

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and

Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

http://www.cisco.com/packet

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

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

  or view the digital edition at this URL:

  http://ciscoiq.texterity.com/ciscoiq/sample/

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

  http://www.cisco.com/ipj

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

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

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

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

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

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

Installing and Starting the Cisco CRS Editor

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

On installing the CRS Editor:

- When Cisco CRS is installed, the CRS Editor is automatically installed on every server in the Cisco CRS cluster.
- Using a web browser, you can also download and install the CRS Editor on any computer (not in the CRS cluster) that can access the CRS administration web page.

Note You should not download and install the CRS Editor on a server in the Cisco CRS cluster because the CRS Editor is already installed automatically, and if you try to do so you will receive an error message.

This section includes the following topics:

Starting the CRS Editor

To start the CRS Editor, do the following:

Procedure

Step 1 Select **Start > Programs > Cisco CRS Administration > Cisco CRS 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 CRS cluster and click **Logon**.

The Name and Password value for the CRS Editor must be the same as your CRS Administration Name and Password value.

Note

- Only users with Administrative rights to the machine that the CRS Editor is installed on are able to launch the CRS Editor. Non-administrator users are not able to launch the Editor. This is true for both Windows 2000 and Windows XP systems.
- After you download and launch the CRS Editor for the first time, you can select the **Log On Anonymously** button to run the CRS Editor without specifying a Name and Password. However, in Anonymous mode, you cannot save scripts to the Repository.

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

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

First, a window displays the logon progress; then the Cisco Customer Response Solutions Editor window appears.

Prerequisites for a Separate Installation

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

- Windows 2000 Professional with Service Pack 4
- Windows XP Professional

Note You must use Internet Explorer version 5.*x* or 6.0 as your web browser for the Cisco CRS family of products.

Downloading the CRS Editor for a Separate Installation

To download the CRS Editor from the Cisco Customer Response Solutions Administration web interface onto a computer not included in the CRS cluster, do the following:

Procedure

Step 1 From the CRS Administration menu bar, choose **Tools > Plug-ins**.

The Plug-ins web page appears.

Note For instructions on accessing the CRS Administration web interface, see the *Cisco CRS Administration Guide*.

Figure 1-1 Plug-ins Web Page

Step 2 Click the **Cisco CRS Editor** hyperlink.

The Download CRS Editor web page appears.

Figure 1-2 Download CRS Editor Web Page

Step 3 Click **Download and access the CRS Editor installer.**

Depending on your browser and its configuration, either a File Download dialog box or a Save As dialog box appears.

Step 4 Using either the File Download dialog box or the Save As dialog box, choose a directory in which to store the executable file that contains the CRS Editor.

Step 5 Click **Save**.

The CRS Editor executable file (CiscoCRSEditorv4.0exe) begins downloading.

When the file has completely downloaded, you are ready to install the CRS Editor.

Follow the procedure in the "Installing the CRS Editor Apart from the CRS Cluster" section on page 1-5.

Installing the CRS Editor Apart from the CRS Cluster

Note If you install the CRS Editor on a server in a CRS cluster that already has the CRS Editor installed, you will get an error condition. All servers in a CRS cluster automatically have the CRS Editor installed as a part of the CRS installation procedure.

To install the CRS Editor on your computer, do the following:

Procedure

Step 1 In the directory where you stored the downloaded CRS Editor executable file, double-click **CiscoCRSEditor.exe**.

The default directory is c:\Program Files\wfavvid.

The InstallShield 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 Take one of the following actions:

- Click **Next** to accept the default directory option, C:\program Files\wfavvid.

  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 CRS 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 InstallShield Wizard closes, and the CRS Editor is installed at the indicated destination.

Step 8 Start up Cisco CRS Editor by doing the following:

a. Select **Start > Programs > Cisco CRS Administration > Cisco CRS Editor**.

The Editor Login dialog box appears.

b. Enter a valid Name, Password, and CRS Server ID for a CRS cluster and click **Logon**.

The Name and Password value for the CRS Editor is the same your CRS Administration Name and Password value.

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

The Cisco CRS Editor is a visual programming environment for creating telephony and multimedia application scripts. You can use the CRS Editor on any computer that has access to the CRS server.

This introduction to the CRS Editor contains the following topics:

Within the CRS Editor, you can also use the CRS Expression Editor to enter or modify expressions in a CRS script. For how to use the CRS Expression Editor, see Using Expressions and the Expression Editor, page 3-1.

About the CRS Editor

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

The CRS 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, queueing calls, or performing complex database operations.

Although the steps are written in Java, you do not need to understand Java programming to build a CRS 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 CRS 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 CRS Editor.

Note Any script created prior to CRS 4.x will run under CRS 4.x. If, however, you want to modify a pre-existing script, the CRS Editor might prompt you to convert it.

An Example CRS Editor Window

This section includes the following topics:

- Cisco CRS Editor Window with a Sample Script, page 2-3
- About the CRS Editor Status Bar, page 2-4
- Menu Bar Function Descriptions, page 2-6
- Tool Bar Function Descriptions, page 2-12

See also:

- About the CRS Editor Step Palettes, page 2-14
- How to Create and Customize a CRS Editor Script, page 2-22
- Defining, Using, and Updating Script Variables, page 2-26
- Validating and Debugging Your Script, page 2-42

Figure 2-1 Cisco CRS Editor Window with a Sample Script

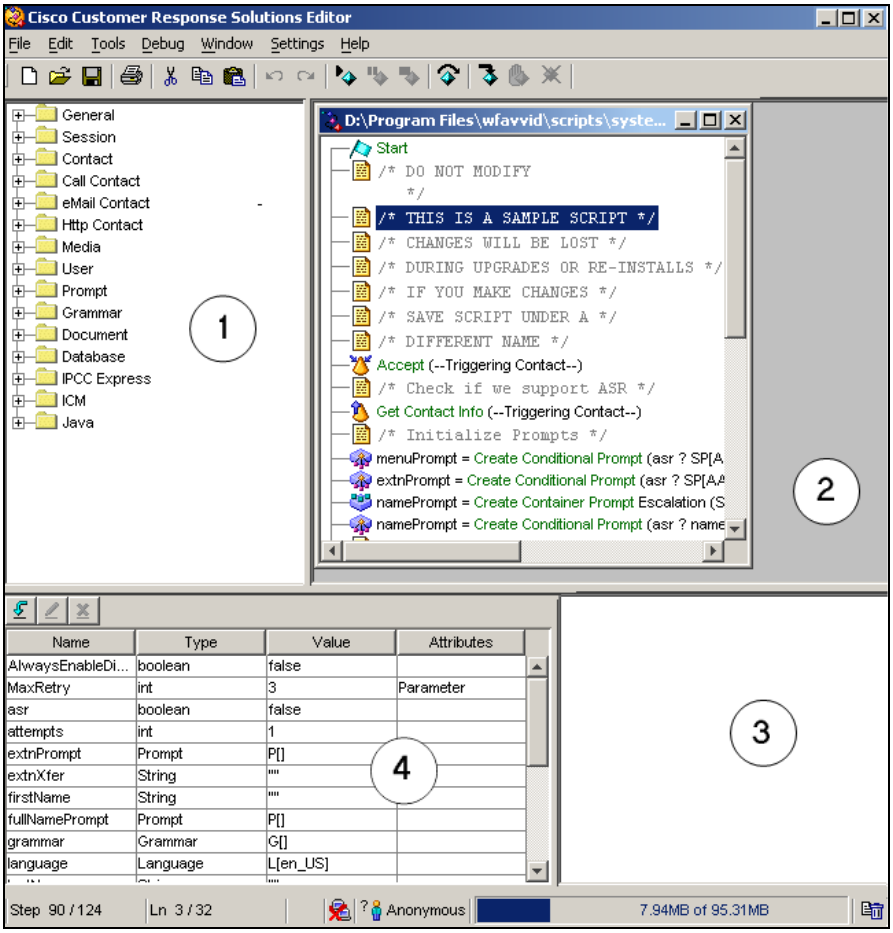


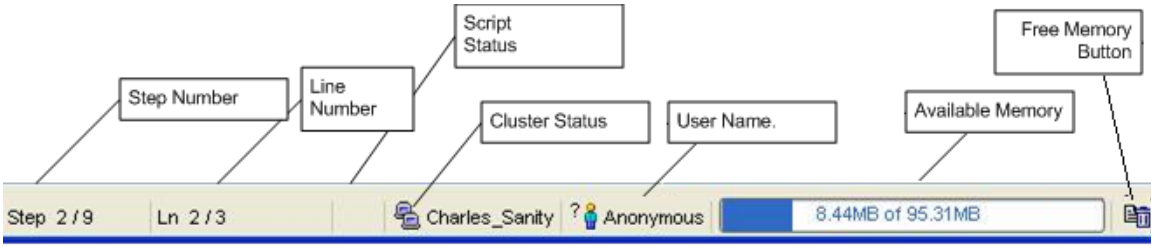
Figure 2-1 shows an example CRS Editor window with an example CRS script opened in it. The following table describes the four panes of the CRS Editor window.

1	Palette pane	Use the Palette pane to choose the steps you need to create your script.
2	Design pane	Use the Design pane to create your script.
3	Message pane	Use the Message pane to view messages when you are validating or debugging a script.
4	Variable pane	Use the Variable pane to create, modify, and view variables for your script.

About the CRS Editor Status Bar

The following is an example of the CRS Editor status bar.

Figure 2-2 CRS 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.

Script Status Image	Indicates
	The script has been modified and needs to be saved.
	The script is being debugged.
	Script debugging is temporarily paused.

- **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.

Cluster Status Image	Indicates
	The Editor is connected to a cluster allowing it to debug scripts.
	The Editor is not connected to a cluster because all its engines are down so no debugging is possible.
	The Editor was started without information about a cluster.

- **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.

User Status	Indicates
	The Editor user is logged in by name.

User Status	Indicates
	The Editor user is logged in anonymously.

- **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 2-6
- Tool Bar Function Descriptions, page 2-12

Menu Bar Function Descriptions

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

The File Menu

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

Table 2-1 File Menu Options

Option	Description
New	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.)
Open	Displays a standard Open window that allows you to choose and open an existing script (.aef) file. **Note** The default location of user scripts is: C:\ProgramFiles\wfavvid\Scripts\User \Default 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 > Open to load a CRS 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 CRS installer to get the original system script re-installed properly.
Close	Closes the current script file.
Save	Saves the current script file.

Table 2-1 File Menu Options (continued)

Option	Description
Save As	Opens a standard Save As window that you can use to save your current script by entering a filename with an .aef extension.
Print	Prints the current file.
Properties	Provides two tabs: • General—Describes the type, location, and size of the opened file. • Summary—Provides fields you can use to enter descriptive information about the opened file.

The Edit Menu

Use Edit menu options to perform various editing tasks.

Table 2-2 Edit Menu Options

Option	Description
Undo	Undoes last action
Redo	Redoes last action
Cut	Cuts selected items
Copy	Copies selected items
Paste	Pastes selected items
Delete	Deletes selected items
Find	Displays a window you can use to search for specific text
Find Label	Displays a window you can use to search for a specific label
Find Next	Searches for another occurrence of text entered in the Find window
Expand All	Displays all branches in the steps in the Design pane

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 CRS Engine requires.

The Debug Menu

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

Table 2-3 Debug Menu Options

Option	Description
Start/Continue	Runs the current script in debug mode.
Break	Stops the script to allow you to view or change the current values of variables and step properties before resuming execution.
End	Ends the current script.
Step Over	Executes one step.
Insert/Remove Breakpoint	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.
Enable/Disable Breakpoint	Toggles the selected breakpoint on or off.
Clear All Breakpoints	Removes all breakpoints from the script.
Reactive Script	Prompts for the name and timeout setting of the event-triggered script to be debugged.
Pending Response	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.)

The Window Menu

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

Table 2-4 Window Menu Options

Option	Description
Cascade	Displays files as stacked windows
Tile Horizontally	Displays files as equal windows tiled horizontally
Tile Vertically	Displays files as equal windows tiled vertically

The Settings Menu

Use the Settings menu options to define expanded call variables and customize the CRS Editor.

Table 2-5 Settings Menu Options

Option	Description
Options	Allows you to customize what steps appear in the CRS Editor palettes. The CRS *Editor* no longer enforces CRS licensing; instead, the 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 CRS Engine will reject the script at runtime with a license violation. This option can let you hide steps that you have not purchased. In addition, the Synchronize License button is available to communicate with the CRS cluster and automatically show/hide palette steps according to the currently installed licenses.

Table 2-5 Settings Menu Options (continued)

Option	Description
Expanded Call Variables	Enables you to define the expanded call variables used by the Get Enterprise Call Info and Set Enterprise Call Info steps. **Note** If you are using IP IVR or IP QM, 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 CRS Editor tool bar provides icons you click to choose some of the same Cisco CRS 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 CRS Editor Toolbar

Table 2-6 Editor Toolbar Tool Functions

Tool	Description
	Creates a new script.
	Opens a script.
	Saves a script.
	Prints selected file.
	Cuts selected item.
	Copies selected item.
	Pastes selected item.
	Undoes previous command.
	Redoes previous command.

Table 2-6 Editor Toolbar Tool Functions (continued)

Tool	Description
	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.)
	Pauses the debugging process.
	Stops debugging process.
	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.
	Inserts/removes a breakpoint at the currently selected step. This instructs the CRS 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.

Table 2-6 Editor Toolbar Tool Functions (continued)

Tool	Description
	Enables/disables a breakpoint on a step. Click the diamond icon to enable a breakpoint. Click the hand with the diamond icon to disable a breakpoint.
	Clears all breakpoints in debugging process

About the CRS Editor Step Palettes

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

Figure 2-4 Cisco CRS Editor Palette Pane

This section contains the following topics:

- The Editor Palettes Available in Each CRS Product, page 2-15
- The Steps in Each CRS Editor Palette

- How To Use the CRS Editor Palettes, page 2-20
- How To Add Custom Steps to the CRS Editor Palette Pane, page 2-21

The Editor Palettes Available in Each CRS Product

Table 2-7 lists the CRS Editor step palette availability for each CRS license option.

Note Effective with Cisco CRS Release 4.0(1), the CRS Editor is no longer responsible for enforcing step licensing. All the palettes listed in the table below will be displayed in the CRS Editor by default. However, the CRS Engine will enforce licensing at run time; if a script uses a step for which your system is not licensed, the CRS Engine prevents the script from being loaded.

Table 2-7 Step Palette Availability with CRS License Options

	IP QM	IP IVR	IP IPCC Express Standard	IP IPCC Express Enhanced	IP IPCC Express Premium
General[1]	X	X	X	X	X
Session	X	X	X	X	X
Contact	X	X	X	X	X
Call Contact[2]	X	X	X	X	X
Email Contact		X			X
HTTP Contact		X			X
Media[3, 4]	X	X	X	X	X
User		X	X	X	X
Prompt[5]	X	X	X	X	X
Grammar	X	X	X	X	X
Document	X	X	X	X	X
Database		X			X
IPCC Express			X[6]	X	X

Table 2-7 Step Palette Availability with CRS License Options (continued)

	IP QM	IP IVR	IP IPCC Express Standard	IP IPCC Express Enhanced	IP IPCC Express Premium
ICM	X	X			
Java[7]	X	X		X	X

1. The ‘Get Reporting Statistic’ step is only available with the IPCC Express packages.
2. The ‘Place Call’ step is not available with the IP QM package.
3. The ‘Name to User’ step is not available with the IP QM package.
4. The ‘Voice Browser’ step is only available with the IP IVR or IPCC Express Premium packages.
5. The ‘Create TTS Prompt’ step is only available with the IP IVR or IPCC Express Premium packages.
6. The ‘Stet Priority,’ ‘Start Monitor,’ ‘Stop Monitor,’ and ‘CreateCSQSpokenNamePromptStep’ stpes are not available with IPCC Express Standard
7. When the step in the Java palette is enabled, the Java functionality of the expression language is also enabled.

The Steps in Each CRS Editor Palette

Table 2-8 lists the steps in each CRS Editor palette.

Table 2-8 The CRS Editor Palettes

Palette	Steps
General	General Annotate Call Subflow Day of Week Decrement Delay End Get Trigger Info Goto If Increment Label On Exception Clear On Exception Goto Set Switch Time of Day
Session	Session Get Session Get Session Info Session Mapping Set Session Info
Contact	Contact Accept Get Contact Info Reject Set Contact Info Terminate

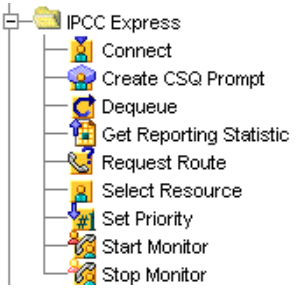
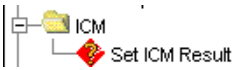
Table 2-8 The CRS Editor Palettes (continued)

Palette	Steps
Call Contact	Call Contact Call Consult Transfer Call Hold Call Redirect Call Unhold Get Call Contact Info Get Enterprise Call Info Place Call Set Enterprise Call Info
Email Contact	eMail Contact Attach To eMail Create eMail Send eMail
HTTP Contact	Http Contact Get Http Contact Info Http Forward Http Include Http Redirect Send Http Response Set Http Contact Info
Media	Media Explicit Confirmation Extended Get Digit String Extended Play Prompt Get Digit String Implicit Confirmation Menu Name To User Play Prompt Recording Send Digit String Simple Recognition Voice Browser

Table 2-8 The CRS Editor Palettes (continued)

Palette	Steps
User	User Authenticate User Get User Get User Info Set User Info
Prompt	Prompt Create Conditional Prompt Create Container Prompt Create Generated Prompt Create Language Prompt Create TTS Prompt Upload Prompt
Grammar	Grammar Create Language Grammar Create Menu Grammar Upload Grammar
Document	Document Cache Document Create File Document Create URL Document Create XML Document Get XML Document Data Keyword Transform Document Upload Document Write Document XSL Transform Document
Database	Database DB Get DB Read DB Release DB Write

Table 2-8 The CRS Editor Palettes (continued)

Palette	Steps
IPCC Express	
ICM	
Java	

Note For complete descriptions of the steps in every CRS Editor palette, see CRS Editor Palette Step Descriptions.

How To Use the CRS 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 will display the international *prohibited* sign until you move a step into a location that the CRS Editor allows. In addition, the step or branch under which the step would be inserted will also be 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 will 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 will not immediately expand. To expand a collapsed step, move the cursor over the collapsed step for two seconds; the step or connection then expands.

How To Add Custom Steps to the CRS Editor Palette Pane

You can add custom steps to the Palette pane to use in your scripts.

To add your-defined steps:

First use the CRS Administration window to upload the custom-defined classes or jar files and to configure the new step palettes and steps to be displayed in the CRS Editor.

Then make sure to restart the CRS Editor and connect to the cluster so it can properly download the new classes or jar files.

Note For more information on this process, see the *Cisco CRS Administration Guide*.

On startup of the CRS Editor, when a CRS Server IP address is specified, the CRS Editor contacts the CRS cluster and downloads—among other things—all the custom-defined classes that have been uploaded to the Document repository, as well as information about additional palettes and steps to be displayed in the Palette pane.

Note If the CRS Editor cannot connect to the CRS cluster at startup, then it uses the information it downloaded on the last successful startup.

How to Create and Customize a CRS Editor Script

This section contains the following topics:

Creating a Script

- To begin a new script, select the blank script button in the CRS 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 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.

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

Figure 2-5 Script Example in the Design Pane

```
Start
/* THIS IS A SAMPLE SCRIPT */
Accept (--Triggering Contact--)
/* Check if we support ASR */
Get Contact Info (--Triggering Contact--)
/* Initialize Prompts */
menuPrompt = Create Conditional Prompt (asr ? SP[AA\AAMainMenu_ASR] : SP[AA\AAMainMenu])
extnPrompt = Create Conditional Prompt (asr ? SP[AA\AAEnterExtn_ASR] : SP[AA\AAEnterExtn])
namePrompt = Create Container Prompt Escalation (SP[AA\AANameDial0_ASR] || SP[AA\AANameDial1_ASR] || ...)
namePrompt = Create Conditional Prompt (asr ? namePrompt : SP[AA\AANameDial])
/* Play Welcome Prompt without any interruptions or barge-in being enabled. */
Play Prompt (--Triggering Contact--, welcomePrompt)
MainMenu:
If (asr || AlwaysEnableDialByName ) Then
prompt = Create Container Prompt Escalation (prefixPrompt + menuPrompt || menuPrompt)
/* Clear Prefix */
Set prefixPrompt = P[]
Simple Recognition (--Triggering Contact--, prompt, SG[AA\AAMainMenu])
/* We could not recognize anything or transfer anywhere */
Play Prompt (--Triggering Contact--, prefixPrompt + SP[AA\AASorry])
Call Redirect (--Triggering Contact-- to operExtn)
If (attempts < MaxRetry ) Then
    True
    False
/* Were 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 + DP[1000])
Terminate (--Triggering Contact--)
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 CRS 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 CRS Editor step, do the following.

Step 1 In the tool bar, select the blank script button.

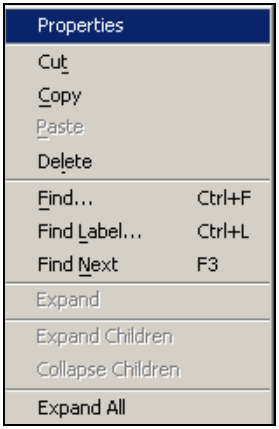
The Start icon and End icons appear in the Design pane.

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.

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 2-9 Step Editor Customizer Window Tabs

Tab	Icon	Description
Top Tab		The step's icon, allowing you to customize the specific properties of the selected step, if any. This icon always corresponds to the icon associated with the current step. The example step icon illustrated here is that of the Get Session step.
Middle Tab		The Label icon, allowing you to assign a label to the step.
Bottom Tab		The Annotate icon, allowing you to enter comments regarding the step.

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 CRS Editor window. A script variables stores 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

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

How To Define Local Script Variables in the CRS Editor

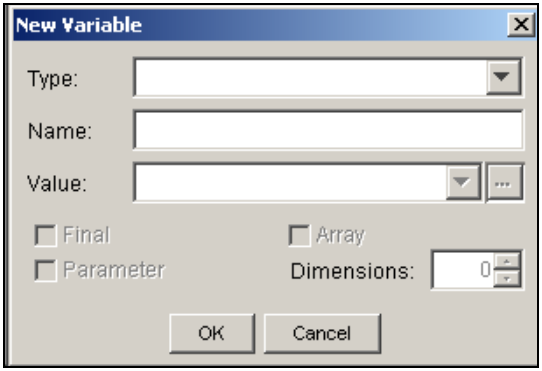
This section describes how to define a local script variable, a variable created in a script and specific only to that script.

Note In addition to defining local script variables, you can also define expanded call variables for use with the Enterprise Call Info steps. See XXX 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 CRS Editor window.

The New Variable dialog box appears.

Figure 2-8 New Variable Dialog Box



After you use the New Variable dialog box to define your variables, the variables appear in the CRS 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 2-10 New and Edit Variable Properties

Property	Description
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 CRS variable types, see Table 2-11
Name	Name of the variable you want to declare.

Table 2-10 New and Edit Variable Properties (continued)

Property	Description
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 CRS 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: `final int`
Parameter	(Checkbox.) If enabled, sets the value for this parameter in the CRS Administration web interface when you provision applications that use this script.
Array	(Checkbox.) If enabled, defines the variable as an array (seen by, or entered by, the ending [] on the variable type).
Dimensions	(Checkbox.) If enabled, allows you to use the drop-down list to define the dimensions of an array variable: • If set at 0, then the variable is not defined as an array. • If set to 1, it defines the variable as an array of dimension 1; if set to 2, an array of dimension 2, and so on. **Note** You can also simply type ending brackets ([]) to the variable type to indicate to the CRS Editor that an array is being created.

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. You can also map a local variable to a Web cookie, an environment variable, and HTTP header, a keyword, or a CRS 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 CRS application parameter.

Note For complete details on using variables in scripts, see *Expression Editor Tab Reference Descriptions.*

Note .

Using Enterprise Expanded Call Context (ECC) Variables

Enterprise Expanded Call Context (ECC) data fields are used by all applications in the CRS 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 ICM Enterprise Server, the Cisco CRS system, and the Cisco Agent Desktop can also pass ECC variables to each other.

CRS has some pre-defined ECC variables. For a list of the CRS system default ECC variables, see System Default Expanded Call Variables, page 5-53.

The CRS 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 CRS Editor

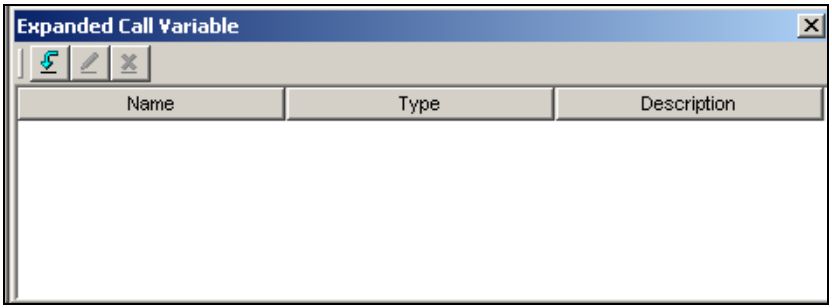
Note Every enterprise ECC variable must be separately defined on all parts of the system that sends and receives the variable data: the CRS Editor in IPCC Express, the Cisco Agent Desktop, and the ICM software. This procedure deals only with the CRS Editor. For further information, see Designing IPCC Gateway Scripts, page 19-1.

To define an ECC variable in the CRS Editor, do the following.

Step 1 From the CRS Editor menu bar, choose **Settings > Expanded Call Variables.**

The Expanded Call Variables window appears.

Figure 2-9 Expanded Call Variables Window



Step 2 In the tool bar, click the **Add New Variable** icon.

The Edit Expanded Call Variable dialog box appears.

Figure 2-10 Edit Expanded Call Variable Dialog Box

Step 3 In the Name text field, enter the ECC variable name as defined in the Cisco ICM configuration (or the Cisco Desktop Administrator using Cisco IPCC Express).

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 ICM Expanded Call Variables window (or the Cisco Desktop Administrator using Cisco IPCC Express).

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 CRS Editor

Table 2-11 describes the types of local variables available in the CRS Editor.

Note This table provide brief descriptions and examples of each of the built-in variable types available to CRS. For complete details on using each variable, see the *Expression Editor Tab Reference Descriptions* and the CRS Editor Palette Step Descriptions.

Table 2-11 Available CRS Variable Types

Variable Name	Description
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 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.

Table 2-11 Available CRS Variable Types (continued)

Variable Name	Description
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 2-11 Available CRS Variable Types (continued)

Variable Name	Description
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 CRS 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’, ‘\\’, ‘\’

Table 2-11 Available CRS Variable Types (continued)

Variable Name	Description
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://evbuweb/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 he same escape sequences or Unicode characters described for the Character type.

Table 2-11 Available CRS Variable Types (continued)

Variable Name	Description
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 2-11 Available CRS Variable Types (continued)

Variable Name	Description
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): • 234556789 L • 0 L • -23 L

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 CRS 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 CRS 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 CRS Editor supports all variable types as parameters.

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

When the Cisco CRS system receives variables from the Cisco ICM software or Enterprise Server, the variables do not have an associated type (such as Integer or Float). To use these variables in Cisco VRU or Cisco IPCC Express scripts, the Cisco CRS system first decodes them to one of the available types. When the script sends variables back to the Cisco ICM Enterprise Server, the Cisco CRS system then encodes them into a form that is a string that the Cisco ICM Enterprise Server can use, depending on the type of the local CRS 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

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

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 2-12 lists many of the encoding types that the Cisco CRS system supports.

Note The Input format is the data decoded from the Cisco ICM Enterprise Server variables to the CRS script local variables. The Output format is the data encoded from the CRS script local variables to the Cisco ICM Enterprise Server variables.

Table 2-12 Encoding Types That Cisco CRS Supports

Encoding Type	Input Format	Example Input	Output Format
Integer—32-bit signed integer	The CRS 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*Digits*, where *Digits* can range from 0 to 9, a to f, and A to F. • Octal—in the form 0*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	[-]*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

Table 2-12 Encoding Types That Cisco CRS Supports (continued)

Encoding Type	Input Format	Example Input	Output Format
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*:*MmTod* 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

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 Using the Parameter Separator, page 5-54.

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

To validate your script, once you have finished it and with the script open, in the CRS 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 CRS Editor message windows.

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

How to Debug Your Script

This section includes the following topics:

Using BreakPoints

When you debug a script, you can **insert**, **delete**, **enable**, and **disable** breakpoints in the script by selecting those functions from the CRS 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 CRS 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 Debugging

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

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 CRS 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 CRS Editor can save script information directly to the Script Repository. However, before the CRS Engine can use a script for call processing, you must refresh the application that uses the script through the CRS Administration web interface. In addition, every time you edit a script, you must refresh the version of the script on the CRS Engine.

To upload and refresh a script, you must use the CRS Administration Script Management web page. For more information, see the *Cisco CRS Administration Guide*.

To debug a reactive script, do the following.

Step 1 From the CRS 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 expression of the script you want to debug just as you entered in the CRS 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 CRS Editor script object in the dialog box.

Table 2-1 The Format for Specifying Script Objects in a Script

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

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 CRS Administration web interface.

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

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

Step 4 Click **OK**.

How the event is invoked depends on the type of event required. For example, for the Cisco 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 CRS 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 CRS Editor.

Using Non-Reactive Debugging

Use this 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 --”.

You can create, validate, and debug scripts that do not require connectivity to the CRS Engine directly from the CRS Editor.

Note If you are using subflows, the debug process does not enter and debug the subflows. The debug process executes the subflow without providing debug controls while executing it. (This process is exactly like stepping over the Call Subflow step.)

To debug a non-reactive script, do the following.

Step 1 With an existing or new script open in the CRS Editor Design pane, choose **Debug > Start** from the CRS Editor menu bar.

The CRS Editor debugs the script and flags any errors.

Step 2 In the CRS Editor, correct any errors flagged by system prompts.

Step 3 Continue to use the Debug command until you have cleared all error flags (messages).

How To Handle Basic Script Errors

The CRS 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 2-46
- Using Error Output Branches, page 2-48

Note For information about advanced error handling, see Advanced Error Handling, page 5-18.

Using the "Continue on Prompt Errors" Option

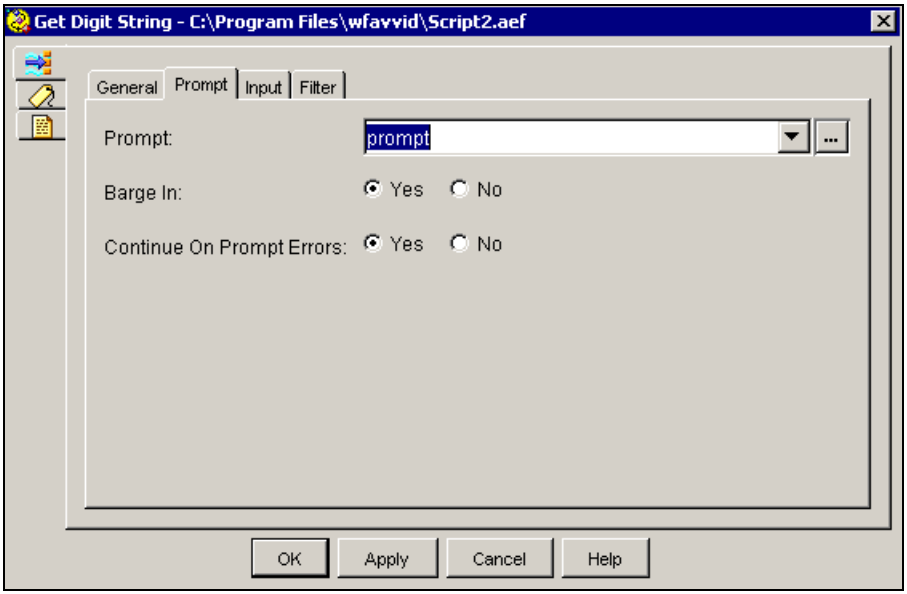
The Continue on Prompt Errors option allows the script to continue to execute when the script receives invalid input (for example, Invalid Audio Format or File Not Found).

This section covers the following topics:

Enabling the ”Continue On Prompt Errors“ Option

To enable this option, select “Continue on Prompt Errors” in the customizer windows of steps in the Media palette.

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:

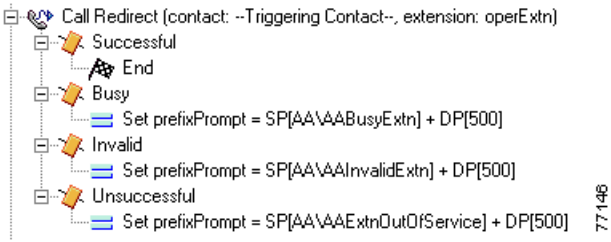
- PromptException
- UndefinedPromptGenerator
- TTSPromptProviderException
- UndefinedPrompt Exception
- InvalidPromptArgumentException
- UnsupportedPromptExpression

Using Error Output Branches

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

The following figure shows error output branches under a Call Redirect step in a script.

Figure 2-14 Error Output Branches—Call Redirect Step



In this example, the Call Redirect step includes logic for both an invalid extension and an out-of-service extension.

Note The script provides error branches only for expected error conditions, not for system errors.

How and Why To Use the CRTP Protocol

You can use CRS repositories to store and manage documents, prompts, grammars and scripts.

To fetch data in a CRS repository for a CRS script or a for VoiceXML document, you need to specify a URI using the CRTP (the Cisco Repository Transfer Protocol) protocol. This is a protocol used only by the CRS system and allows access to the resources in the various CRS 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 CRS 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 (Universal 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** (Universal Resource Locator) 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 CRS 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 CRS 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	Specifies
`<repository>`	The name of the CRS repository from which you want to get a resource. The current CRS repositories are of two types: • **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 CRS 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"

Command Argument	Specifies
`<path>`	Any valid path to a file within a CRS repository as defined in the CRS 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 CRS 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.

Command Argument	Specifies
	• **index** 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: &Index=x[,n] where: **&** 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: &index=0,2,1
<ref>	Optional. An anchor reference, beginning with the pound sign (#), linking to a section within a file.

Example CRTP URI Specifications

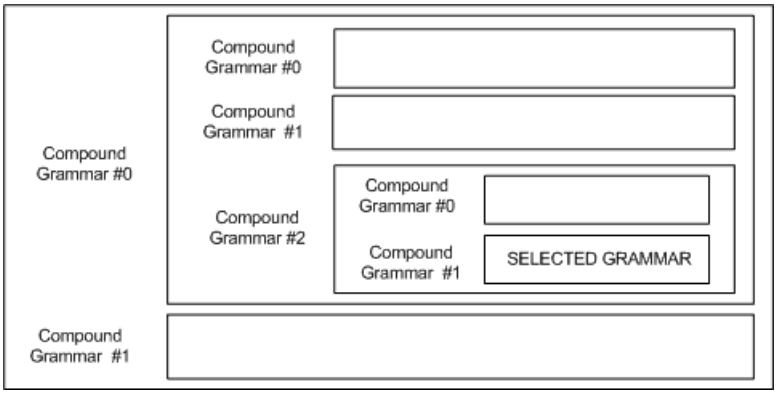
The following are example CRTP protocol URIs:

- 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 CRS Script Templates

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

The Script Templates Installed with the CRS Editor

Your Cisco CRS system includes script templates stored as .aef files. These scripts have been built using Cisco CRS 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 CRS system solely as samples, and are not supported by Cisco Systems.

This section includes the following topics:

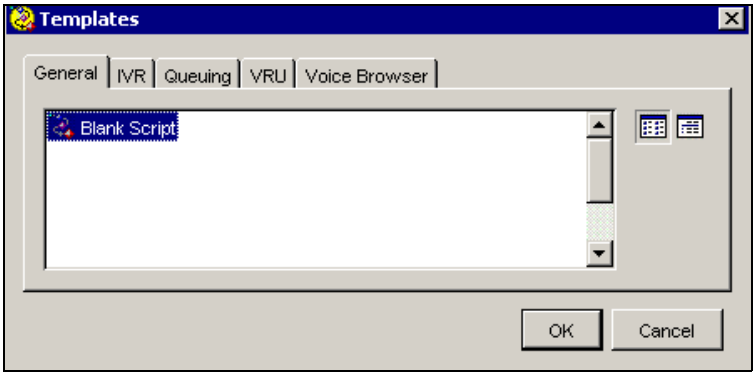
How do I find the script templates installed with the CRS Editor?

The script templates are listed in the CRS Templates window displayed when you select **File > New** from the CRS Editor.

To access the script templates on your system:

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

Step 2 In the CRS 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 CRS 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 CRS script templates automatically included with your Cisco CRS system.

Note Every CRS product includes every CRS Editor step and all the CRS script templates. However, you can only run those scripts for the product for which you are licensed.

Table 2-13 General Script Template

Script Template	Description
Blank Script	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.

Table 2-14 IVR Script Templates

Script Templates	Description
Auto Attendant	Allows a caller to call an agent by entering an extension number or the first few characters of an associated username. If ASR is enabled, the caller might simply speak the extension or the user name. Previously named ":aa.aef."
Spoken Name Upload	Enables Cisco CallManager users to call in, authenticate their identities, and replace their spoken names with newly recorded announcements on their telephones. Previously named "snu.aef."

Table 2-15 Queuing Script Templates

Sample Script Templates	Description
Remote Monitoring	allows a supervisor to call into any site (where the supervisor has a Cisco CallManager user profile) and to monitor an agent's conversation at that site. Previously named "rmon.aef."

Table 2-15 Queuing Script Templates (continued)

Sample Script Templates	Description
Simple Queuing	This basic Cisco IPCC Express script establishes a simple call queue and routes callers to a group of agents as the agents become available. Previously named "icd.aef."

Table 2-16 VRU Script Templates

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

Table 2-17 Sample Voice Browser Script Templates

Sample Script Template	Description
Outbound Voice Browser	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."
Voice Browser	Uses ASR functionality to allow a caller to access information from VoiceXML-enabled web sites. Previously named "VoiceBrowser.aef."

How to Create Your Own Script Template

To create you own script template, do the following.

Step 1 Open your script in the CRS Editor

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

Step 3 In the Save Script As dialog box, select **Script Repository** as the Save in location.

Step 4 In the directory selection box, select the **Templates** main directory and then the subdirectory where you want to save the file.

Step 5 Click **Save**.

The next time, you select **File > New**, the template dialog box will include the file you saved in the script repository template directory where you saved it. By selecting that file, you can create a new script using that file as a script template.

How to Create Your Own Script Template Directory

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

Step 1 Open in the CRS 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, select **File > Save As**.

Step 3 In the Save Script As dialog box, select **Script Repository** as the Save in location.

Step 4 In the directory selection box, select the **Templates** main directory.

Step 5 Next to the directory selection box, click the Create New Folder button .

Step 6 In the Save As dialog box, give the new folder a name.

To save your opened template file in that new folder, in the Save as dialog box, open the new folder, and click **Save**.

The next time, you select **File > New**, the template dialog box will include the file you saved in the script repository template directory where you saved it. By selecting that file, you can create a new script using that 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), these prompts are now installed in the prompt\system folders as System prompts.

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

The Cisco IPCC Express 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 IPCC Express users.

In addition to the scripts that are already provided as examples, CCBU 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 IPCC Express script repository. This repository is designed to be a dynamic resource for all IPCC Express 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:

- Where do I find the IPCC Express script Web repository?, page 2-62

- How do I add my favorite IPCC Express script to the Web repository?, page 2-62

Where do I find the IPCC Express script Web repository?

The IPCC Express script Web repository is located on Cisco.com in a .zip file at http://www.cisco.com/en/US/products/sw/custcosw/ps1846/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 IPCC Express 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 IPCC Express script repository is updated.

How do I add my favorite IPCC Express script to the Web repository?

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

Obtaining Technical Assistance

Technical assistance is not available for the sample scripts. They are intended to be a samples that can be easily modified to suit a particular need, as well as provide a visual "how to" for CRS 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 CRS support mailer alias, ask-icd-ivr-support@external.cisco.com.

If the issue is with your CRS system as a whole (that is: Subsystems out of service, CRS 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.

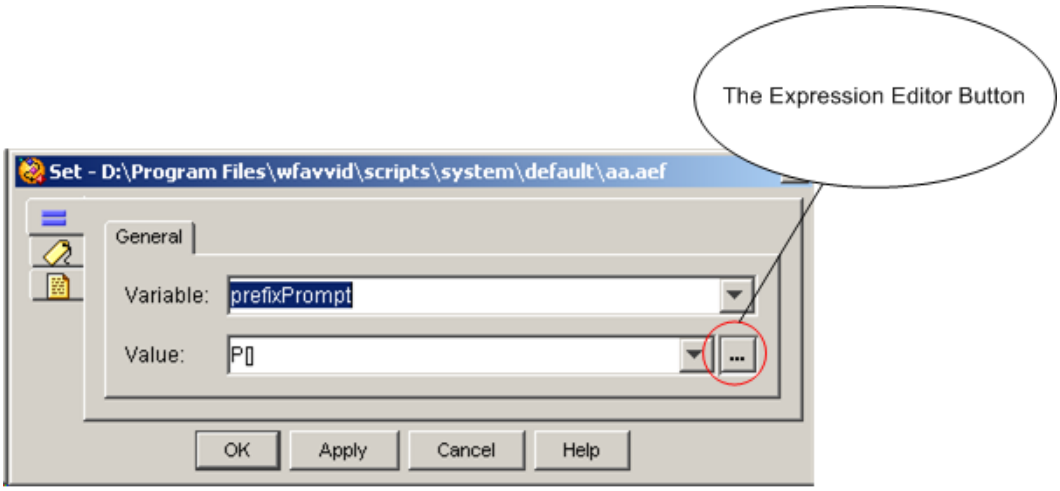
Using Expressions and the Expression Editor

This section covers the following topics:

For an explanation of each toolbar on each Expression Editor tab, see Expression Editor Tab Reference Descriptions, page 7-41.

How to Access the CRS Expression Editor

Whenever you see this 3-dot button ... in a CRS 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 CRS Expression Editor to enter or modify expressions in a CRS script.

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.

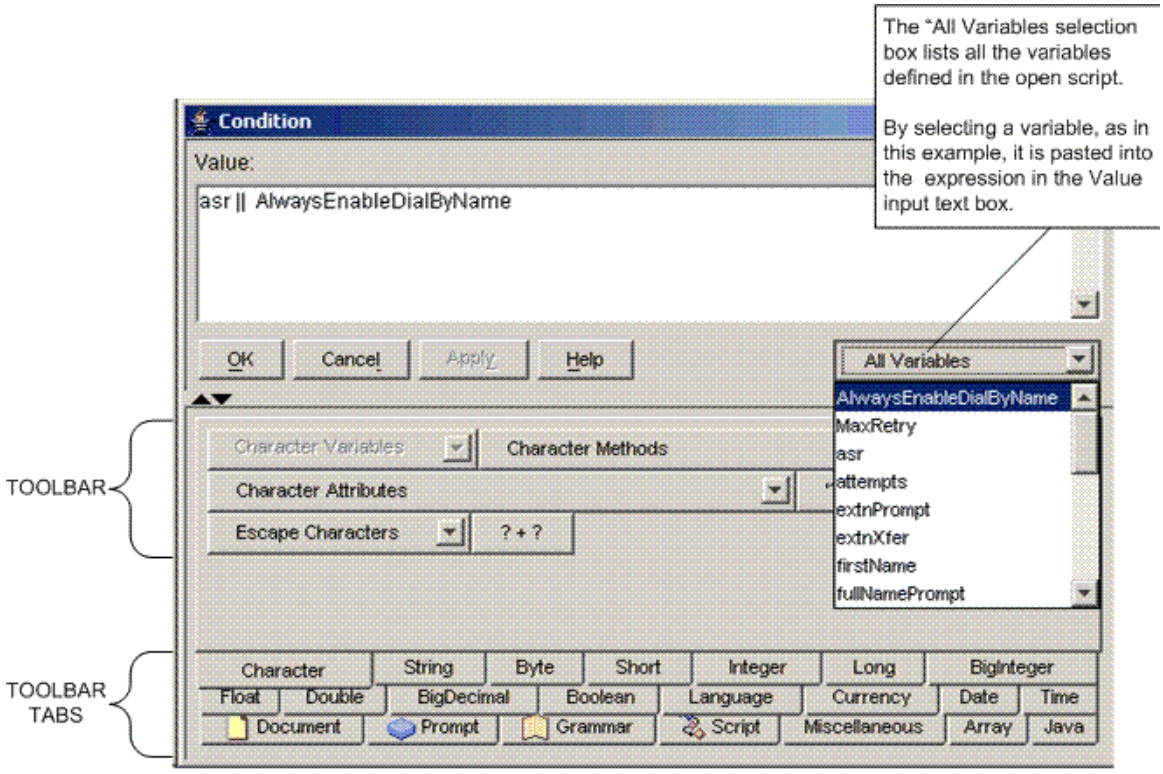
Note The resulting type of expression must match the expected input type or types (which you check at design time).

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.

Figure 3-1 Example Expression Editor Window with the "All Variables" Selection box Open



This section includes the following topics:

- About the Expression Editor Toolbar, page 3-3

About the Expression Editor Toolbar

Below the Expression Editor Value input text box and buttons is a very versatile toolbar, which 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

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.

For an explanation of each toolbar on each Expression Editor tab, see Expression Editor Tab Reference Descriptions, page 7-41.

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 CRS repository.

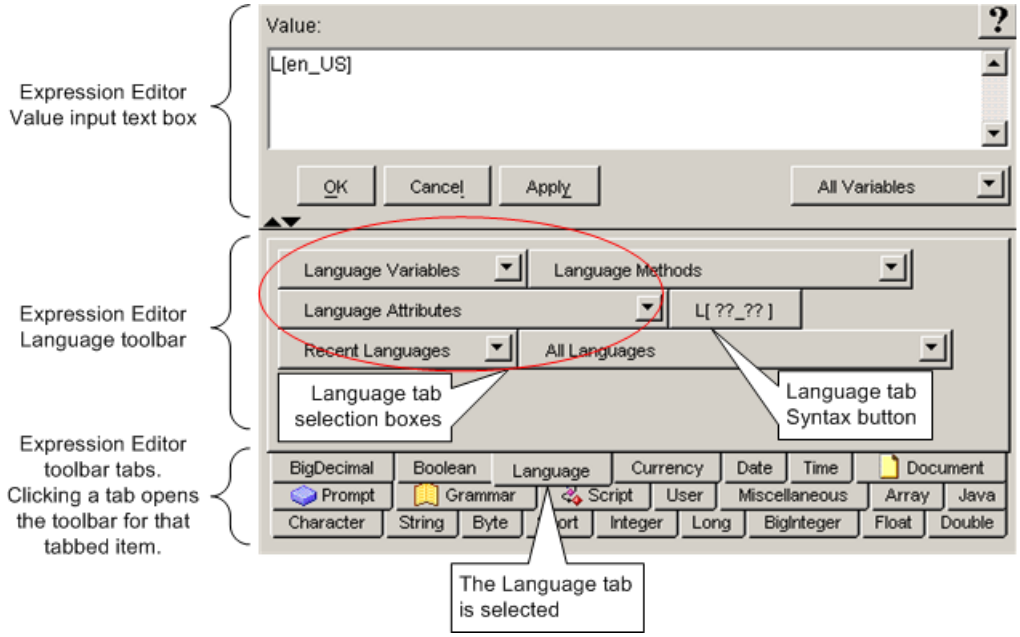
When you click a button or select an item from a list, the CRS Editor inserts the selected expression text at the cursor position in the text input field.

For example, if you are creating an expression that accesses the current time, on the Time tab, click the **now** button, and the CRS 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.

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



A Pop-Up Menu

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

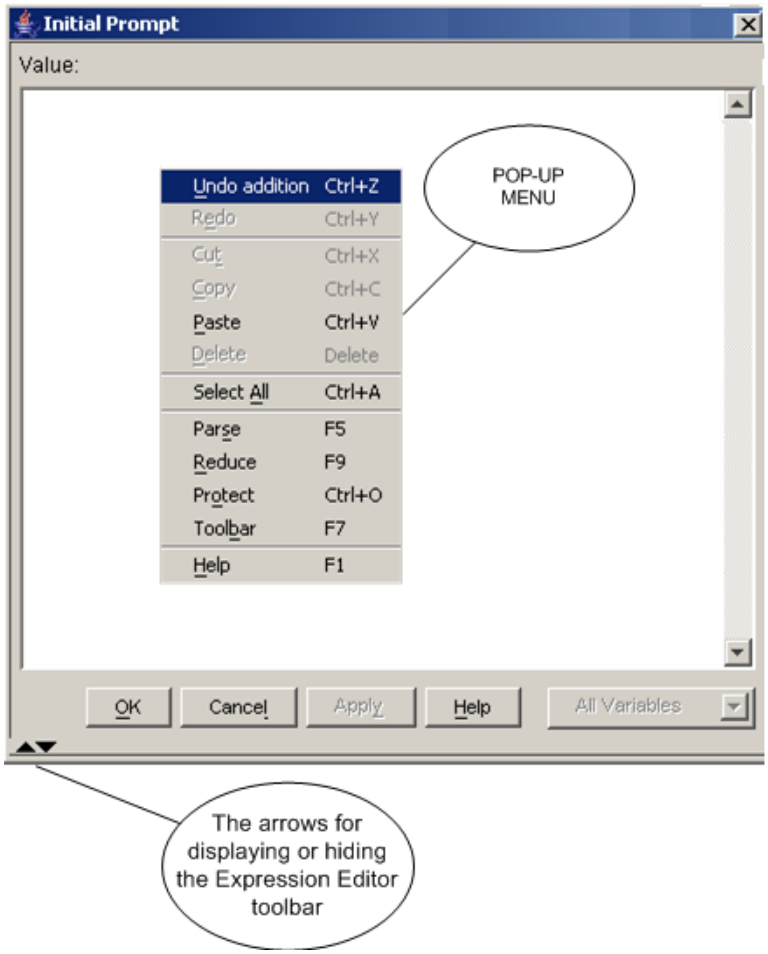
The popup menu also provides two special functions:

- 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**).

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.

See the individual Expression Language tab descriptions for the meanings of the syntax buttons displayed on each tab (Expression Editor Tab Reference Descriptions, page 7-41). See also Expression Language Operator Summary, page 6-7 and Operators Used with Prompts and Documents, page 6-10.

About Expression and Java Licensing

In 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 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 IP IVR, IP Queue Manager, IPCC Express Enhanced, and IPCC Express Premium license. However, in IPCC Express Standard, you can enter only simple expressions unless you also have a Java license. You automatically have a Java license with the other four CRS 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.

Localizing CRS Scripts

You can localize your CRS scripts to use prompts in the language your customers use.

This section covers the following topics:

Installing Language Groups

When you install a CRS 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 CRS 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 CRS 4.0. Prompts and rules are accessible to your CRS scripts either in the language that you install or in the language that you provide in your own prompts through the CRS 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 CRS 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 CRS 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.

  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 CRS 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 CRS Installed Language

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

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 CRS Appplications Administration window. But:

- If you are using ASR-enabled CRS scripts, you are restricted to the languages available and installed for the installed ASR vendor(s) and for which CRS 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 CRS

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 CRS (but within the set available from an MRCP vendor) using VXML, you must:

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 CRS 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. CRS does not completely implement the notion of platform-specific audio, as defined by W3C (World Wide Web Consortium, see http://www.w3.org/), since system prompts are played instead. A default script is provided with CRS 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 section describes advanced techniques you can use when designing custom scripts in the Cisco Customer Response Solutions (CRS) Editor.

This section contains the following topics:

Managing Contacts in Your Scripts

The key element in a Cisco CRS 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.

Contacts carry *attributes*, such as the type.

The script performs actions on contacts through one or more of the following types of channels:

- CTI (Computer Telephony Interface) port
- CMT (Cisco Media Termination) dialog channel
- HTTP control channel
- ICM (Intelligent Contact Management) channel
- MRCP dialog channel
- E-mail control channel
- IPCC Express 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 now design contact-neutral scripts that can contain small logic sections that can be independent of the type of contact.

Because you can now keep a handle to a contact inside the script, it is possible to 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" in *Cisco CRS Scripting and Development Series: Volume 1, Getting Started with Scripts*

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 CRS server only; for example, information entered on CRS Server #1 will not be available if the call arrives or is transferred to CRS Server #2.

Using Mapping Identifiers

The 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 CRS Applications Administration web interface.

Tip If you need to lessen session impact on the memory consumption of the CRS 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 an Interactive Voice Response (IVR) application, or redirects the call contact from one application to another application on the same CRS 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 IPCC Express Scripts," in the *Cisco CRS Scripting and Development Series: Volume 2, Getting Started with Scripts*

Using Grammars in Your Scripts

This section includes the following topics:

About Grammars

In an 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 run time.

The CRS 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 CRS Applications Administration web interface.

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

The CRS 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 CRS servers in the cluster.

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 CRS 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

Note For more information on grammars algorithms and files, see the *Cisco CRS 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 CRS 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 CRS supports the following two file grammar formats:

- The SRGS File Grammar Format, page 5-7
- The GSL File Grammar Format (deprecated), page 5-7
- The Digit File Grammar Format, page 5-8

The SRGS File Grammar Format

For an example of SRGS grammar format, see Using the SRGS Grammar Format, page 5-156.

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:

```
.Main [
       hi  {<tag hi>}
       dtmf-star {<tag bye>}
```

```
    dtmf-4 {<tag 4>}
    joy {<tag lg>}
  ]
```

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:

```
word=true
dtmf-star=bye
dtmf-4=4
```

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.
- 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

CRS 4.0 adds support for a new type of grammar file to the user and system grammars already available. This new 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, CRS 4.0 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. Since CRS 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. Starting with CRS 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 grammars 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]
```

represents a compound grammar that activates the grammars `G[G1]`, `G[G2]` and `GG[Hello|dtmf-2]` together with priority to `GG[Hello|dtmf-2]` over `G[G1]` and `G[G2]`, and priority to `G[G2]` over `G[G1]`.

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 5-1 Compound Grammar Indexing Examples

1	G[grammar.tgl][1]
2	(G[grammar1.digit] || G[grammar2.grxml])[0]
3	((DG[dtmf-1|word=true] || G[grammar.tgl) || GG[hello|dtmf-3])[0][1]

Using Prompts in Your Scripts

This topic covers the following topics:

About Prompts

The CRS 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 CRS Administration web interface.

Note For complete details on creating complex prompts in scripts, see the *Cisco CRS 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 CRS 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 CRS Administration web interface. (For more information on configuring the Prompt Management Configuration web page, see the *Cisco CRS Administration Guide*.)

Prompt Types You Can Create

You can use the steps in the Prompt palette of the CRS 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.

CRS 4.0 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, CRS 4.0 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 Prompt, page 7-146.

How To Create or Customize a Prompt

Through Cisco CRS 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

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 (mu-law) 8-kHz, 8-bit, mono format. You must have a microphone and speakers on your system to use the software.

Procedure

Step 1 Start the Sound Recorder software; for example, by choosing

Start>Programs>Accessories>Entertainment>Sound Recorder.

Step 2 Click the **Record** button and say your greeting into the microphone.

Step 3 When you finish the greeting, click the **Stop** button.

Step 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.

Step 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 CRS 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 CRS 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 CRS 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 theprompt should be uploaded.

Step 3 To add a new prompt

a. Click the **Add a new prompt** hyperlink.

The 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 CRS 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, Cisco CallManager 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 CallManager 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 CRS 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 CRS 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 CRS 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 5-18
- Using Default Scripts, page 5-19

Using the On Exception Goto Step

The On Exception Goto step of the General palette of the CRS 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.

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 CRS 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 CRS 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 CRS server has reached its limit for the number of simultaneous sessions for the application.
- When the CRS 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 ICM scripts, the default script executes if the ICM 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 an ICM 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 Automatic Call Distribution (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 CRS Editor to debug a script and the CRS 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 CRS 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.”

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 CRS Editor, the script is interrupted and aborts without the possibility of catching or handling this case.

- An IPCC Express agent becomes available.

  This event occurs only if the script has previously executed a Select Resource step from the IPCC Express 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.

- An ICM agent becomes available.

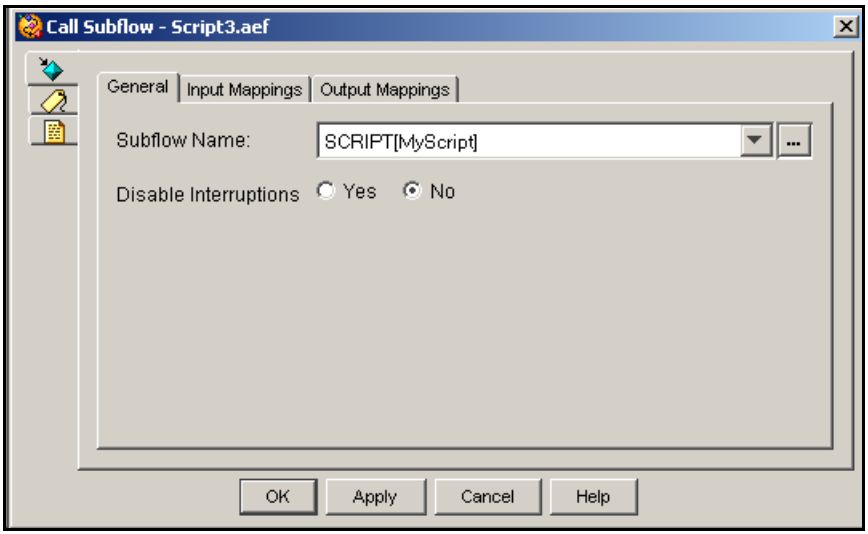
  The script is automatically interrupted without the possibility of catching or handling this case.

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).

The figure below 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)



Using Different Media in Your Scripts

This section covers the following topics:

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 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 CRS Engine. This type of call uses fewer CPU resources on the CRS server than other types of calls, which may allow you to increase the capacity of the CRS Engine.

Media Neutrality

All Media palette steps of the CRS 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 CRS Editor.

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 5-5 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 (Voice eXtensible Markup Language) language. Voice Browser currently supports VoiceXML 2.0 elements.

This section includes the following topics:

For more information on developing voice-enabled applications, see Chapter 13, “Developing VoiceXML Applications” in the *Cisco CRS Scripting and Development Series: Volume 1, Getting Started with Scripts*.

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Understanding VoiceXML

Voice eXtensible Markup Language (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

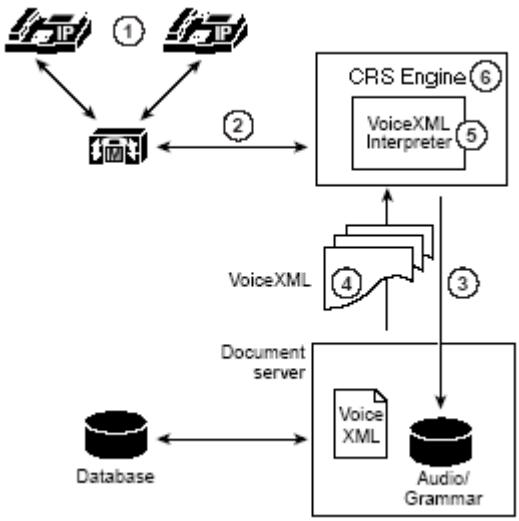
Voice Browser consists of the following three components:

- Document server—Processes requests from the VoiceXML interpreter. The server produces VoiceXML documents in reply.
- VoiceXML Interpreter—Processes the document. The VoiceXML interpreter executes the VoiceXML application, doing prompting and voice recognition via the CRS 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 CRS implementation platform.

The following figure 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 CRS 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 CRS 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 Voice XML 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 CRS Administration Guide*.

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 2-49, 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 IDE (Integrated Development Environment). 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.

Designing a Basic Script

You can use the Cisco CRS Editor to create a number of basic scripts.

This section describes the steps used to create a Spoken Name Upload (SNU) script, SNU.aef, which is included as a script template with the Cisco CRS Editor.

This section contains the following topics:

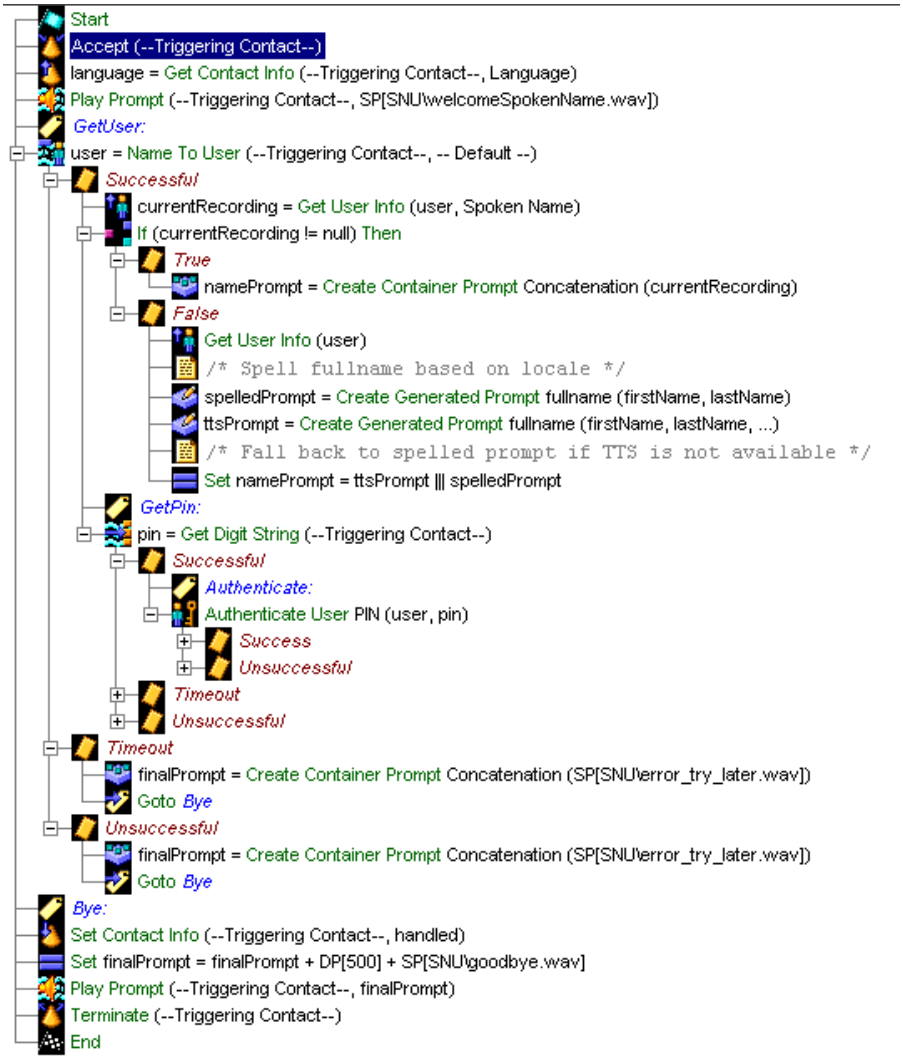
An Example Basic Script

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.

The following figure shows how the SNU.aef script template appears in the Design pane of the CRS Editor window.

Figure 6-1 SNU.aef Script Overview in the Design Pane



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 DTMF (Dual Tone Multi-Frequency) 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 CRS 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 CRS 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 CRS Editor to define script variables.

Note For more information about defining variables, see the "Defining, Using, and Updating Script Variables" section on page 2-26.

The following figure shows the variables of the SNU.aef script template as they appear in the Variable pane of the CRS Editor window.

Figure 6-2 Variables Listed in the Variable Pane

Name	Type	Value	Attributes
currentRecording	Document	null	
finalPrompt	Prompt	P[]	
firstName	String	""	
fullName	String	""	
instructPrompt	Prompt	P[]	
language	Language	L[en_US]	
lastName	String	""	
namePrompt	Prompt	P[]	
pin	String	""	
pound	Prompt	P[]	
recording	Document	null	
spelledPrompt	Prompt	P[]	
triesAuthentication	int	0	
triesGetDigit	int	0	
triesMaxAuthentic...	int	3	
triesMaxGetDigit	int	3	
triesMaxRecord	int	3	
triesRecord	int	0	
ttsPrompt	Prompt	P[]	
user	User	null	

The table below describes the variables used in the SNU.aef script template.

Table 6-1 Variable Descriptions

Variable Name	Variable Type	Value	Function
currentRecording	Document	null	Stores a recorded name. (See The Get User Info Step, page 6-16.)
finalPrompt	Prompt	—	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 6-24, and The Unsuccessful Output Branch, page 6-31.)
fullName	String	""	Stores the full name of the user. Used by the Create Generated Prompt step. (See The If Step, page 6-17.)
pin	String	""	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 6-25 and The Authenticate User Step, page 6-32.)
recording	Document	null	Stores the audio file recorded by the caller. (See The Recording Step, page 6-36.)
spelledPrompt	Prompt	—	Stores the name of the user, as created by the Create Container Prompt step. (See The If Step, page 6-17 and The Get Digit String Step, page 6-25.)
triesAuthentication	Integer	0	Stores the number of times authentication has been attempted. (See The Unsuccessful Output Branch, page 6-34.)

Table 6-1 Variable Descriptions (continued)

Variable Name	Variable Type	Value	Function
triesGetDigit	Integer	0	Stores the number of times the script has attempted to get PIN digits. (See The True Output Branch, page 6-30.)
triesMaxAuthentication	Integer	3	Stores the maximum number of attempts the script will make to authenticate the caller. (See The Unsuccessful Output Branch, page 6-34.)
triesMaxGetDigit	Integer	3	Stores the maximum number of retries the script attempts to get PIN digits. (See The True Output Branch, page 6-30.)
triesMaxRecord	Integer	3	Stores the maximum number of attempts the script will make to record the name of the caller. (See The Key 2 Output Branch, page 6-44.)
triesRecord	Integer	0	Stores the number of times that recording has been attempted. (See The Key 2 Output Branch, page 6-44.)
user	User	null	Stores the values associated with this particular user. First assigned a value by the Name To User step, and used by various other steps. (See The Name To User Step, page 6-11, and The Authenticate User Step, page 6-32.)

The Accept Step

Continue the SNU.aef script by dragging an Accept step from the Contact palette into the Design pane of the CRS 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.)

The following figure shows the customizer window for the Accept step.

Figure 6-3 Accept Customizer Window

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 CRS 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.

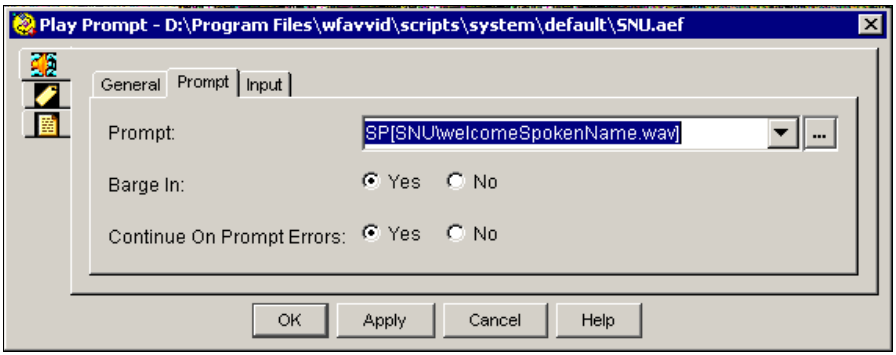
The Play Prompt Step

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 6-4 shows the configured Prompt tab of the Play Prompt customizer window.

Figure 6-4 Play Prompt Customizer Window—Configured Prompt Tab



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).

Configure the Play Prompt step as follows:

- General tab
  - Contact—Triggering Contact

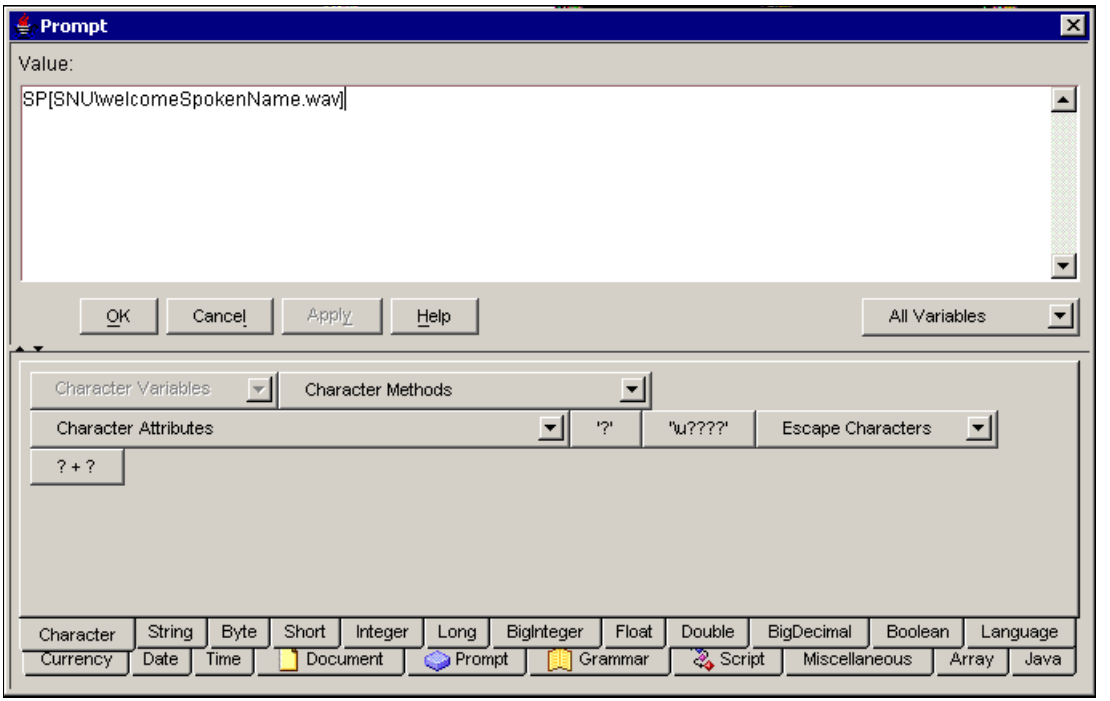
    The step operates on the contact that triggers the execution of the script.
  - Interruptible—**No**

    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 6-5 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 CRS 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 Customer Response Solutions 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 Customer Response Solutions 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
  - 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 ASR (Automatic Speech Recognition) 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.

- 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.

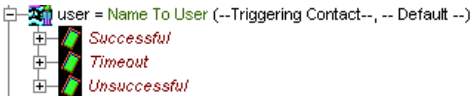
Note For more details on configuring the Name To User step, see the *Cisco Customer Response Solutions Editor Step Reference Guide*.

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.
- 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 6-6 Name To User Step Output Branches



The following sections describe the three output branches of the Name To User step:

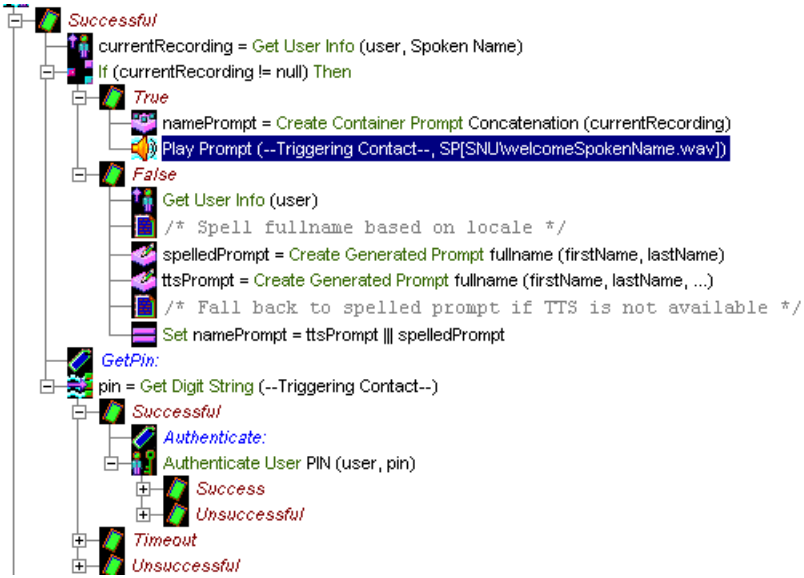
- The Successful Output Branch, page 6-14
- The Timeout Output Branch, page 6-24
- The Unsuccessful Output Branch, page 6-25

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.

The following figure shows the Successful output branch of the Name to User step.

Figure 6-7 Name To User Step—Successful Output Branch



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.

This section that follows contains the following topics:

- The Get User Info Step, page 6-16
- The If Step, page 6-17
- The Label Step (GetPin), page 6-23

Note Because of its multiple output branches, the Get Digit String step is discussed in a separate section, The Get Digit String Step, page 6-25.

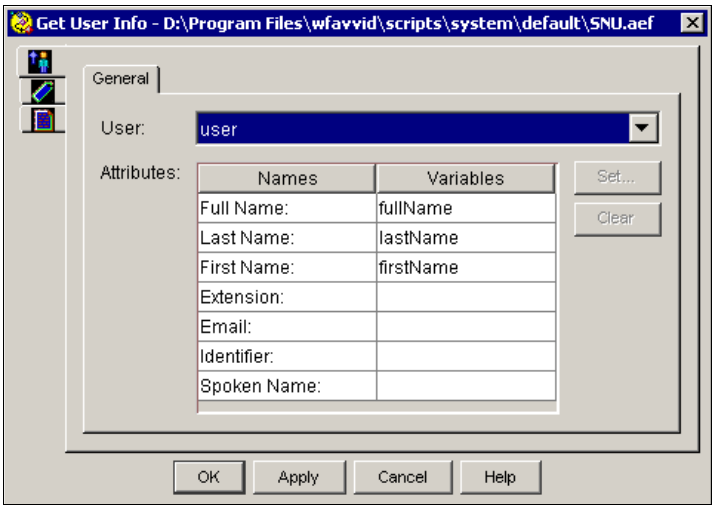
The Get User Info Step

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.

The following figure shows the configured Get User Info customizer window.

Figure 6-8 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 clicks **Set**. Then, in the Get User dialog box that appears, choose the **currentRecording** variable from the drop-down menu and clicks **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 Customer Response Solutions Editor Step Reference Guide*.

The If Step

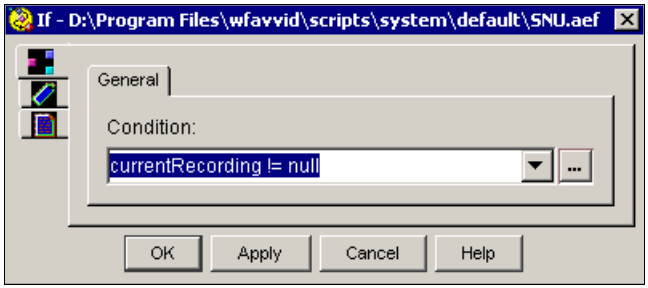
Because you cannot know in advance whether a recording of the spoken name of any particular caller exists at the time of any particular call, use the If step to provide script logic for each of the two possibilities: that a recording of the spoken name exists, and that a recording of the spoken name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

The following figure shows the configured If customizer window.

Figure 6-9 Configured If Customizer Window



Note For more information about configuring the If step, see the *Cisco Customer Response Solutions Editor Step Reference Guide*.

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

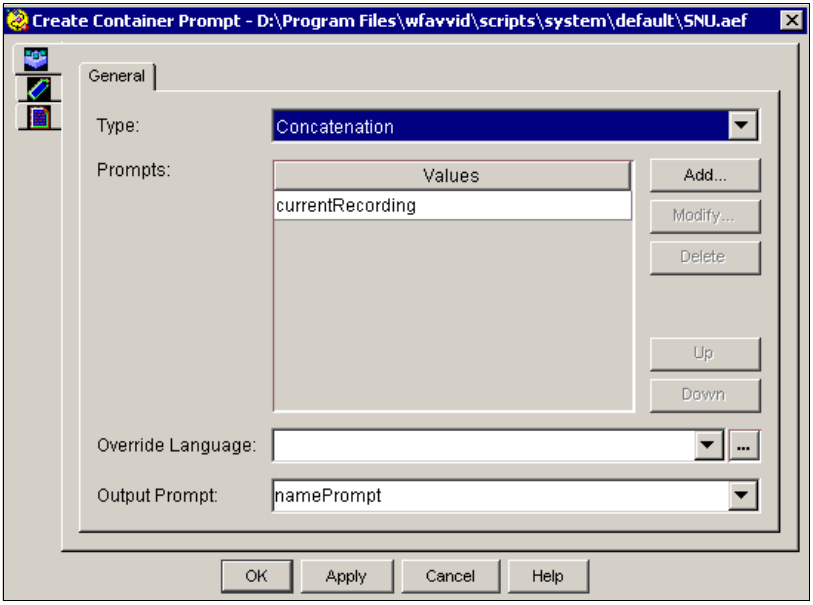
If the If step locates a spoken recording of the name of the caller, the script executes the True output branch.

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.

The following figure shows the configured Create Container Prompt customizer window.

Figure 6-10 First 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 int he 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

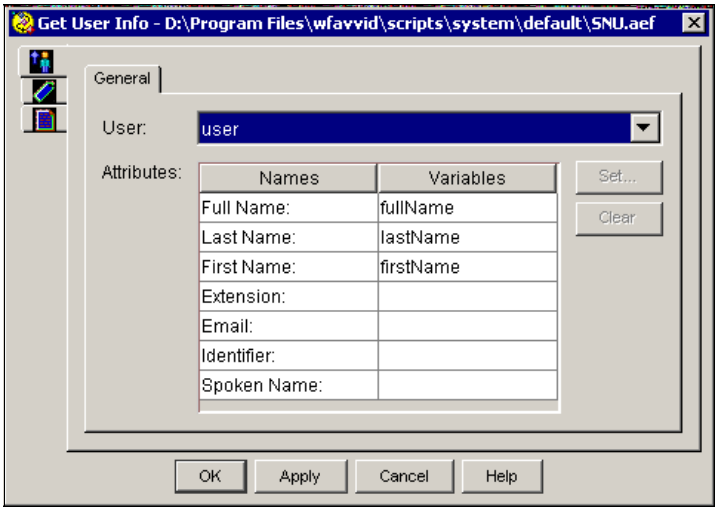
If the If step cannot locate a spoken recording of the name of the caller, the script executes the False output branch.

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.

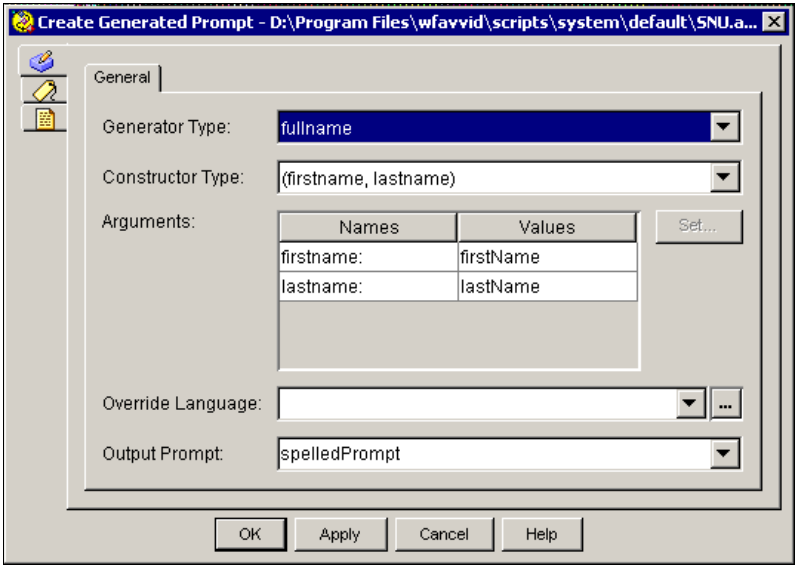
The following figure shows the configured Get User Info customizer window.

Figure 6-11 Configured Get User Info Customizer Window



The following figure shows the first configured Create Generated Prompt customizer window in the False branch.

Figure 6-12 Configured Create Generated Prompt Customizer Window—spelled Prompt



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)

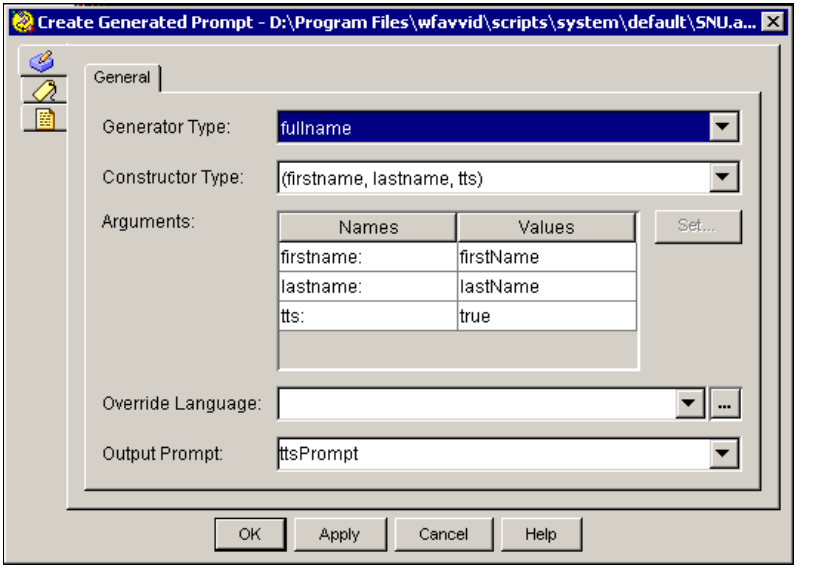
  Do not choose to override the language context of the call.

- 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.

The following figure shows the second configured Create Generated Prompt customizer window in the False branch.

Figure 6-13 Configured Create Generated Prompt Customizer Window—tts Prompt

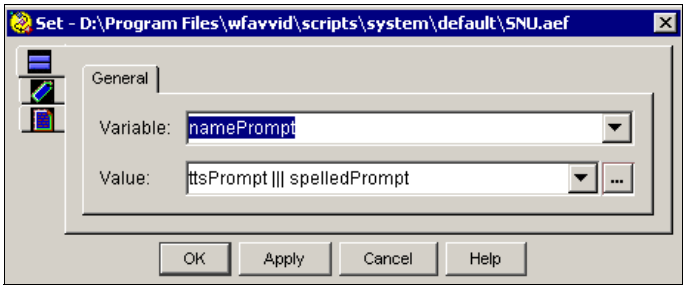


Configure the Create Generated Prompt customizer window for the TTS prompt in a similar way to Figure 6-13.

Finally, insert a Set step to revert to the spelled prompt if TTS is not available.

The following figure shows the Set step customizer window in the False branch.

Figure 6-14 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—then 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**.

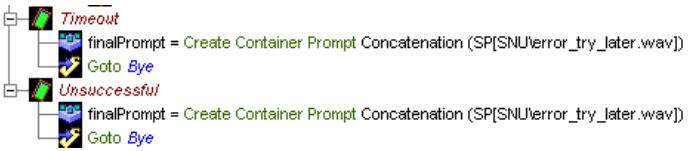
Note For more information about configuring the Label step, see the *Cisco Customer Response Solutions Editor Step Reference Guide*.

If the script reaches this Label step, the Get Digit String executes. (See The Get Digit String Step, page 6-25.)

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 below.

Figure 6-15 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 6-1, 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 6-18), 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 6-47.)

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 6-15.

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 6-18), 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 6-47.)

The Get Digit String Step

Finish building the Successful output branch of the Name To User step by dragging an 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.

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 CRS 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** the 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
  - 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.)

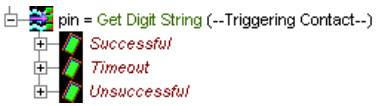
- Filter tab
  - All options are checked except "*" and "#"

    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.

Note For more information about configuring the Get Digit String step, see the *Cisco Customer Response Solutions Editor Step Reference Guide*.

The following figure shows the three output branches under the Get Digit String step.

Figure 6-16 Get Digit String Step—Output Branches



This section contains the following topics:

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 6-32.

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 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.

The following figure shows the scripting under the Timeout output branch of the Get Digit String step.

Figure 6-17 Get Digit String Step—Timeout Output Branch

Use the first If step to evaluate the expression pin==“ ”.

Note For details on configuring the If step, see “The If Step” section on page 6-17.

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 contains 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 6-17.

Tip 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 6-30
- The False Output Branch, page 6-31

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 6-17):

- 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 6-17), in order to give the caller more attempts at entering a PIN number. (See The Label Step (GetPin), page 6-23.)

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 6-47 below), where use a Play Prompt step to play **finalPrompt** before the script terminates the contact.

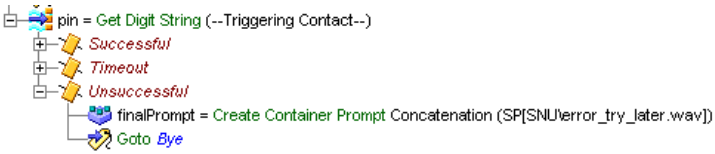
The Unsuccessful Output Branch

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.

The following figure shows the scripting under the Unsuccessful output branch of the Get Digit String step.

Figure 6-18 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 6-47 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 6-31.)

The Authenticate User Step

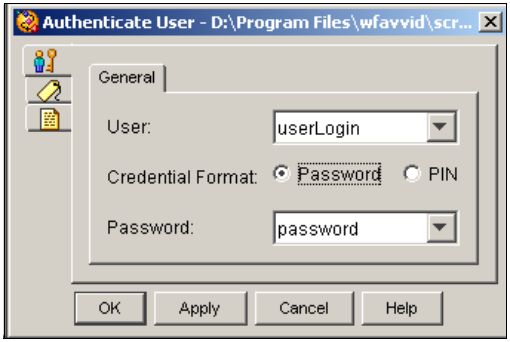
Place a Label step under the Successful output branch of the Get Digit String step. This Label step, named Authenticate, will serve as a target for the subsequent Goto step under the Timeout output branch of the Get Digit String step. (See The Timeout Output Branch, page 6-28.), and provides callers 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.

The following figure shows the configured Authenticate User customizer window.

Figure 6-19 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 CRS Administration web interface).

Note For more information about configuring the Authenticate User step, see the *Cisco Customer Response Solutions 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 6-33
- The Unsuccessful Output Branch, page 6-34

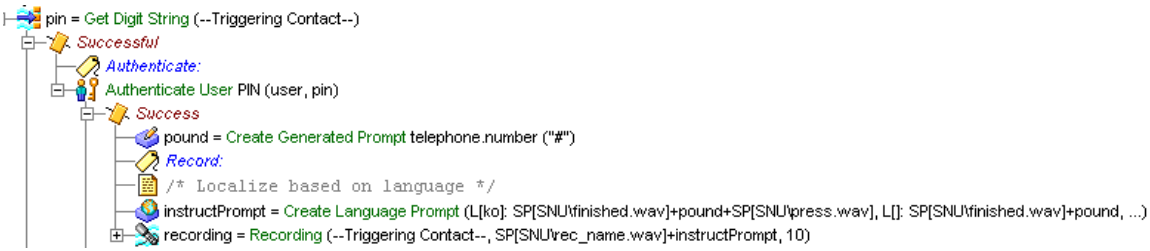
The Success Output Branch

If the Authenticate User step successfully authenticates the user, the script executes the Success output branch.

Configure the Success output branch of the Authenticate Use step to offer the caller the opportunity to record a name.

The following figure shows the scripting under the Success output branch of the Authenticate User step.

Figure 6-20 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 contructor type. (A constructor list 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 6-36.

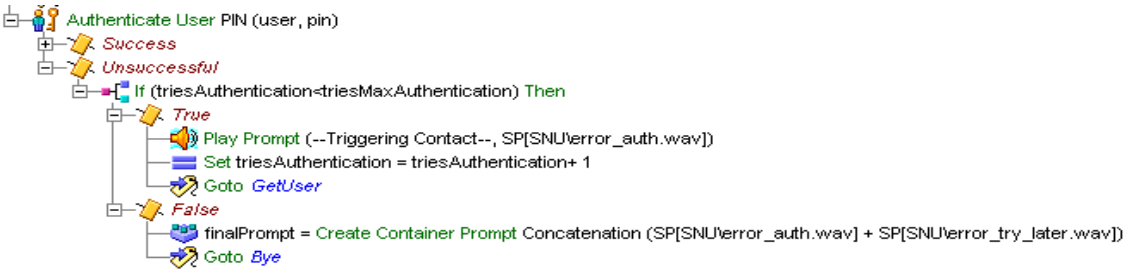
The Unsuccessful Output Branch

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 Use step to allow the caller to retry entering a valid PIN number until the script reaches the maximum number of retries.

The following figure shows the scripting under the Unsuccessful output branch of the Authenticate User step.

Figure 6-21 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 6-28), 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 6-35
- The False Output Branch, page 6-36

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 6-21):

- 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 6-17), in order to give the caller another chance to enter a name. (See The Label Step (GetUser), page 6-11.)

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 6-21):

- 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 6-47 below), 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 CRS 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 6-40) 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 CRS 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
  - 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 Customer Response Solutions Editor Step Reference Guide*.

The Recording step has two output branches, Successful and Unsuccessful, described in the following sections:

- The Successful Output Branch, page 6-39
- The Unsuccessful Output Branch, page 6-39

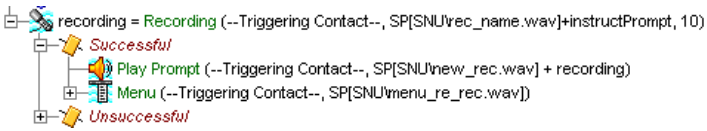
The Successful Output Branch

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.

The following figure shows the scripting under the Successful output branch of the Recording step.

Figure 6-22 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 6-40.)

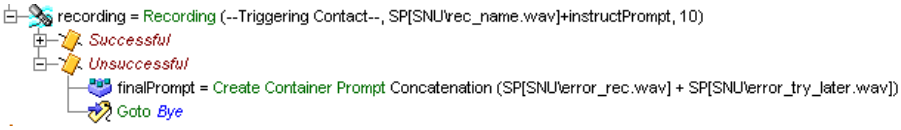
The Unsuccessful Output Branch

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.

The following figure shows the scripting under the Unsuccessful output branch of the Recording step.

Figure 6-23 Recording Step—Unsuccessful Output Branch



As in previous Unsuccessful output branches (see, for example, The Unsuccessful Output Branch, page 6-31), 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 6-47 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**

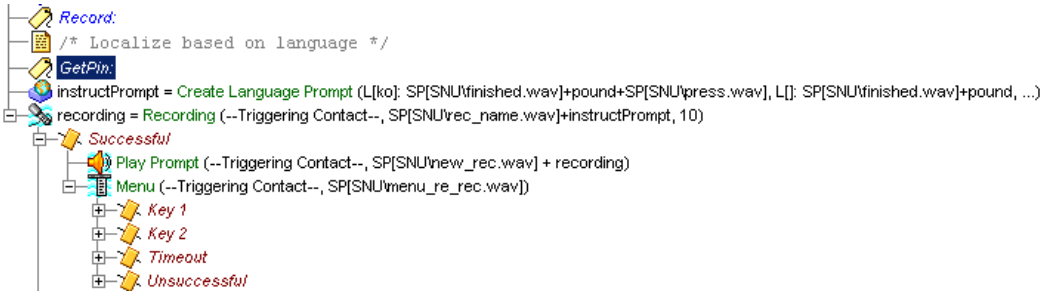
    The script erases previously entered input before capturing new user input.

Note For more information about configuring the Menu step, see the *Cisco Customer Response Solutions Editor Step Reference Guide*.

The Menu step in this script has the following output branches (see Figure 6-24):

- 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.
- Unsuccessful—Executes if the step receives invalid input

Figure 6-24 Menu Step—Output Branches



The following sections describe the scripting under each of these output branches:

- The Key 1 Output Branch, page 6-42
- The Key 2 Output Branch, page 6-44
- The Timeout and Unsuccessful Output Branches, page 6-46

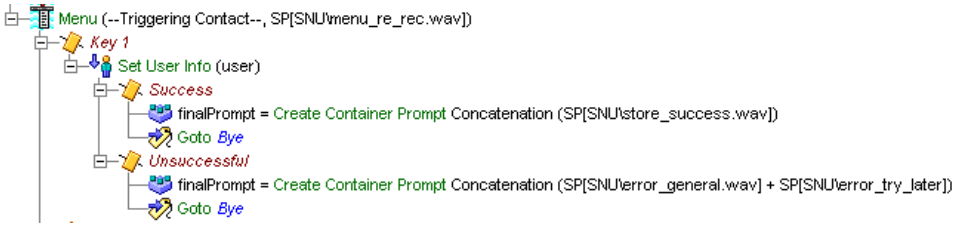
The Key 1 Output Branch

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.

The following figure shows the scripting under the Key 1 output branch of the Menu step.

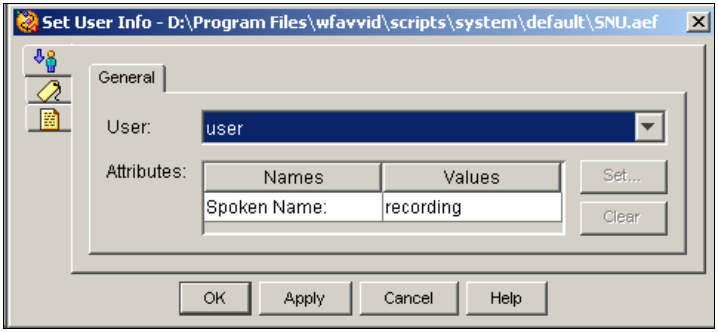
Figure 6-25 Menu Step—Key 1 Branch



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.

The following figure shows the configured Set User Info customizer window.

Figure 6-26 Configured Set User Info Customizer Window



The Set User Info step has the following two output branches (see Figure 6-25):

- 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.

- Unsuccessful—If the Set User Step fails, a Create Container Prompt step creates a prompt **finalPrompt,** which plays two system prompts SP[SNU\error_general.wav] + SP[SNU\error_try_later], 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.

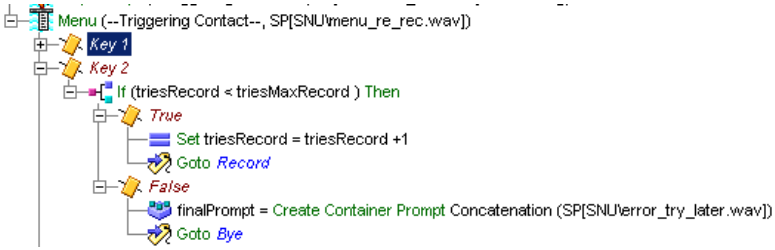
The Key 2 Output Branch

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.

The following figure shows the scripting under the Key 2 output branch of the Menu step.

Figure 6-27 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 6-28 and The Unsuccessful Output Branch, page 6-34.)

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 6-45
- The False Output Branch, page 6-45

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 6-27):

- 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 6-22), in order to give the caller further chances to record. (See The Recording Step, page 6-36.)

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 6-27):

- 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.

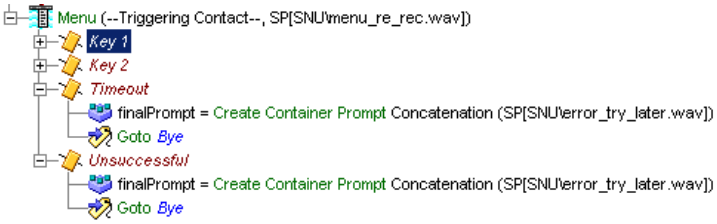
The Timeout and Unsuccessful Output Branches

The scripting under both the Timeout and Unsuccessful output branches of the Menu step (see Figure 6-28) is the same as that under the False output branch of the If step in the previous section (see The False Output Branch, page 6-45).

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 6-28 Menu Step—Timeout and Unsuccessful Output Branches

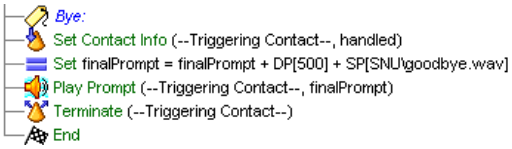


The Closing Steps of the SNU.aef Script

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.

The following figure shows the steps used to close the script.

Figure 6-29 Closing Steps of the SNU.aef Script



Use the following steps to close the script:

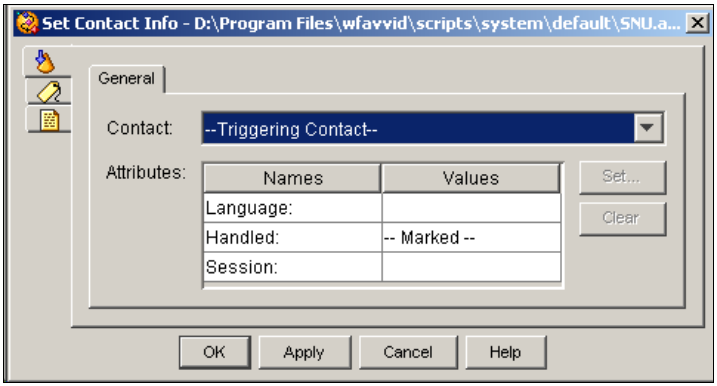
- The Set Contact Info Step, page 6-48
- The Set Step, page 6-49
- The Play Prompt Step, page 6-49
- The Terminate Step, page 6-49
- The End Step, page 6-49

The Set Contact Info Step

Use the Set Contact Info step to mark the contact as Handled, which is important for reporting purposes.

The following figure shows the configured Set Contact Info customizer window.

Figure 6-30 Configured Set Contact Info Customizer Window



To configure the Set Contact Info step, highlight the Handled attribute and clicks **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 Customer Response Solutions 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 Customer Response Solutions 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 6-8.

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 Customer Response Solutions 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 Basic IPCC Express Script

Cisco Customer Response Solutions (CRS) IPCC Express provides contact center solutions for automatic call distribution (ACD) and other call center requirements.

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

This section describes the design of such an IPCC Express script, icd.aef, which is included as a script template with the Cisco CRS Editor.

This section contains the following topics:

The Example IPCC Express 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.

The figure below shows the icd.aef script as it appears in the Design pane of the CRS Editor window.

Figure 7-1 icd.aef Script

The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS Editor window.

The Start step needs no configuration and has a customizer window that allows you to add an annotation. 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 sample script is called icd.aef.

Script Variables for icd.aef

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

Note For more information about defining variables, see the "Defining, Using, and Updating Script Variables" section on page 2-26.

The figure below shows the variables of the icd.aef script as they appear in the Variable pane of the CRS Editor window.

Figure 7-2 Variable Pane of the icd.aef Script

Name	Type	Value	Attributes
CSQ	String	""	Parameter
DelayWhileQueued	int	30	Parameter
QueuePrompt	Prompt	SP[ICD\ICDQueue.wav]	Parameter
SRS_TempResourceSelectedVar2	User	null	
WelcomePrompt	Prompt	SP[ICD\ICDWelcome.wav]	Parameter
resourceID	String	""	

The table below describes the variables used in the icd.aef script.

Table 7-1 Variables in the icd.aef Script

Variable Name	Variable Type	Value	Parmeter?	Function
Note Select the Parameter checkbox for variables whose value the administrator will have the option to change. For more information, see the *Cisco CRS Administration Guide*.				
CSQ	String	""	Yes	Stores Contact Service Queue information from which to find a resource. (For more information, see The Select Resource Step, page 7-7.)

Table 7-1 Variables in the icd.aef Script (continued)

Variable Name	Variable Type	Value	Parmeter?	Function
DelayWhileQueued	Integer	30	Yes	Stores the length of time for the delay. (For more information, see The Delay Step, page 7-11.)
QueuePrompt	Prompt	SP[ICD\ICDQueue.wav]	Yes	Stores the user prompt that informs the caller that the call is still in queue. (For more information, see The Play Prompt Step, page 7-10.)
SRS_TempResource SelectedVar2	User	null	No	Identifies the selected agent or resource
WelcomePrompt	Prompt	SP[ICD\ICDWelcome.wav]	Yes	Stores the user prompt that welcomes the caller. (For more information, see The Play Prompt Step, page 7-5.)
resourceID	String	""	No	Stores the Resource ID of the chosen agent. (For more information, see The Select Resource Step, page 7-7.)

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 CRS 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 "The Accept Step" section on page 6-7, or see the *Cisco Customer Response Solutions Editor Step Reference Guide*.

The Play Prompt Step

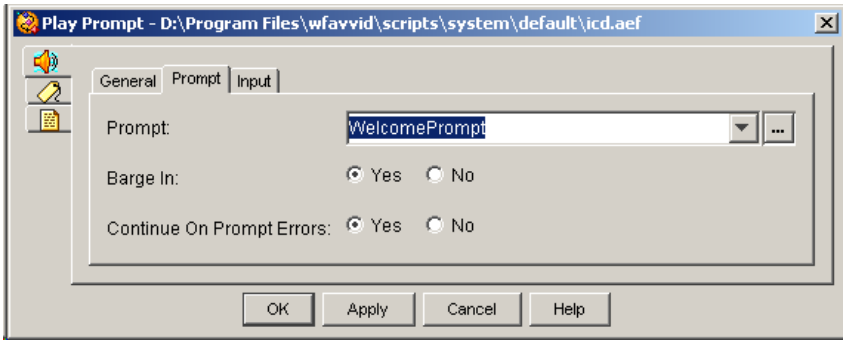
Continue the icd.aef script by dragging a Play Prompt step from the Media palette to the Design pane.

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).

The figure below hows the configured Prompt tab of the Play Prompt customizer window.

Figure 7-3 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.)
- 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 Select Resource Step

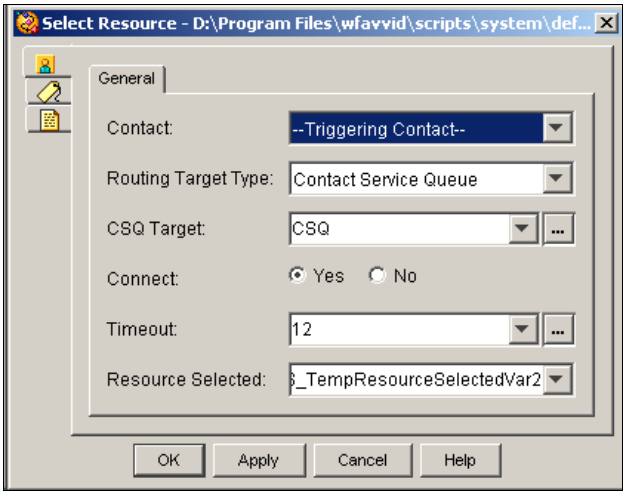
Continue the icd.aef script by dragging a Select Resource step from the IPCC Express palette to the Design pane.

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

Note For more information on configuring agents, see the *Cisco CRS Administration Guide*.

The figure below shows the configured Select Resource customizer window.

Figure 7-4 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 IPCC Express Enhanced Edition. If you use Resource Routing Target Type with IPCC Express Standard edition, CRS Engine will be unable to load the script.

- 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 CRS 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 7-9
- The Queued Output Branch, page 7-9

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 7-10
- The Play Prompt Step, page 7-10
- The Delay Step, page 7-11
- The Goto Step, page 7-13

The Label Step

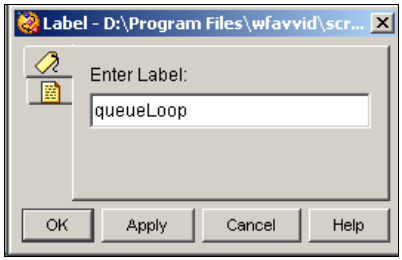
Begin to build the Queued output branch of the Select Resource step by dragging a Label step from the General palette into the Design pane and dropping it into the Queued icon under the Select Resource step.

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 CRS Editor Step Reference Guide*.

The figure below shows the configured Label customizer window.

Figure 7-5 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.

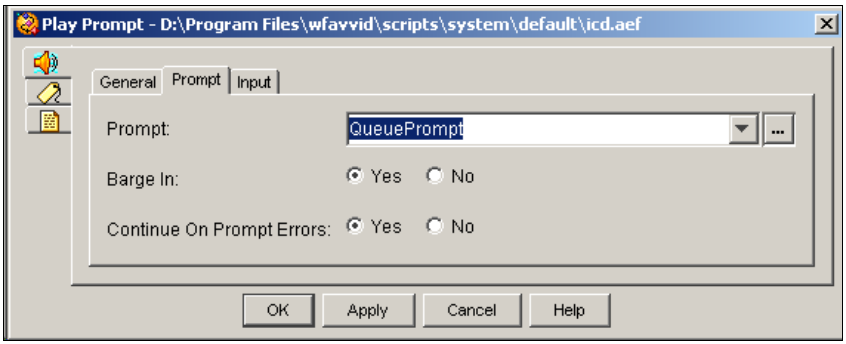
The Play Prompt Step

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.

The figure below shows the configured Prompt tab of the Play Prompt customizer window.

Figure 7-6 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 7-5), 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.

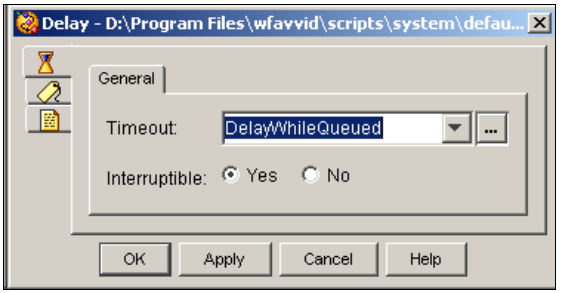
The Delay Step

Continue building the Queued output branch of the Select Resource step by dragging a Delay step from the General palette into the Design paneand 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.

The figure below shows the configured Delay customizer window.

Figure 7-7 Configured Delay Customizer Window



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 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 CRS server, because the music streaming is performed by the Music On Hold server and not by the CRS 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 CRS server streams this recorded music prompt to all callers in queue.

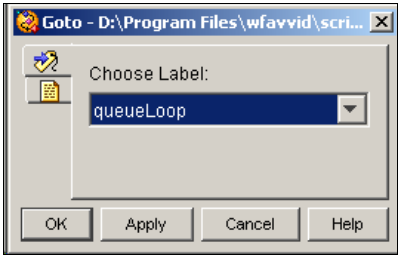
The Goto Step

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.

The figure below shows the configured Goto customizer window.

Figure 7-8 Configured Goto Customizer Window



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.

Working with Multiple Contacts

The key element in a Cisco CRS 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 Customer Response Solutions (CRS) Editor to design scripts that handle multiple contacts within the same script.

This section describes the design of such a script, the broadcast.aef script template.

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.

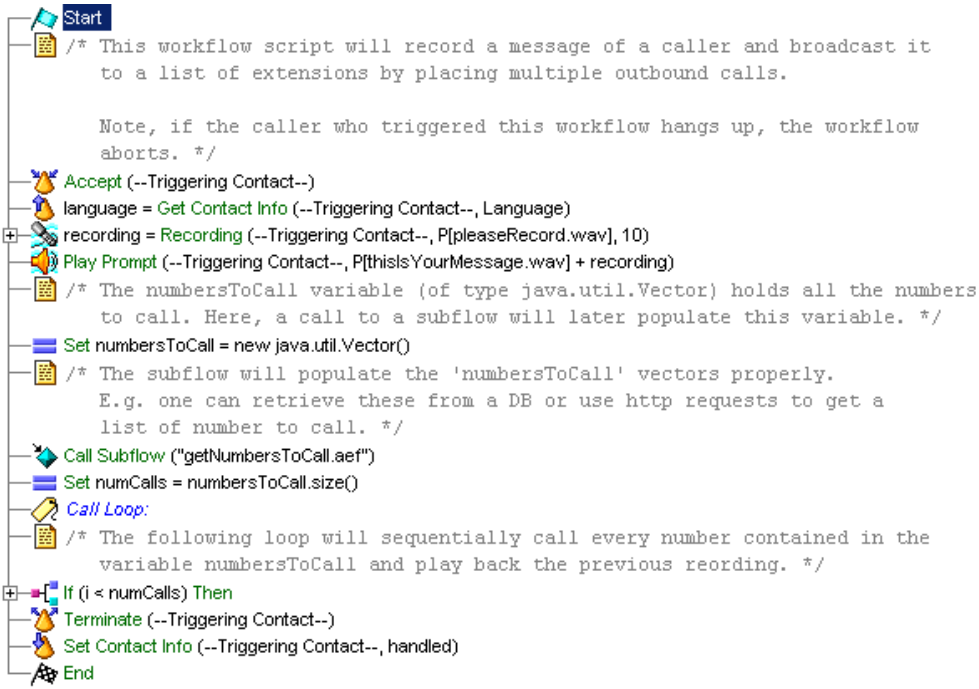
This section contains the following topics:

An Example Script Template with Multiple Contacts

The broadcast.aef script template 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 following figure shows the top level of the broadcast.aef script in the Design pane of the CRS Editor window.

Figure 8-1 broadcast.aef Script—Top Level



The Start Step (Creating a Script)

Once the Start step is entered (your script is created), you can enter variables into your script.

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 sample script is called b roadcast.aef.

Script Variables for broadcast.aef

Begin the broadcast.aef script design process by using the Variable pane of the CRS Editor to define script variables.

Note For more information about defining variables, see the "Defining, Using, and Updating Script Variables" section on page 2-26.

The following figure shows the variables of the broadcast.aef script as they appear in the Variable pane of the CRS Editor window.

Figure 8-2 Variable Pane of the broadcast.aef Script

Name	Type	Value	Attributes
dest	String	""	
groupCallControl	int	0	Parameter
groupDialog	int	0	Parameter
i	int	0	
language	Language	L[en_US]	
numCalls	int	0	
numbersToCall	java.util.Vector	null	
obj	Object	null	
outCall	Contact	null	
recording	Document	null	

The table below describes the variables used in the broadcast.aef script.

Table 8-1 Variables in the broadcast.aef Script

Variable Name	Variable Type	Value	Function
dest	String	""	Stores the current destination number to call as the script loops. (See The Call Subflow Step, page 8-12.)
groupCallControl	Integer	0	ID of the Call Control Group with which the outbound call is associated. (See The Place Call Step, page 8-21.) Mark this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, refer to the *Cisco Customer Response Solutions Administrator Guide*.
groupDialog	Integer	0	Identifies the ID of the primary dialog group for handling the outbound call. (See The Place Call Step, page 8-21.) Mark this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, refer to the *Cisco Customer Response Solutions Administrator Guide*.
i	Integer	0	Stores the current index of the number to call. (See The If Step, page 8-15.)
Language	language	L[en_US]	Sores the value of the local language used for prompts.
numCalls	Integer	0	Stores the number of calls to be made. (See The Set numCalls Step, page 8-15.)

Table 8-1 Variables in the broadcast.aef Script (continued)

Variable Name	Variable Type	Value	Function
numbersToCall	Java Type	null	Stores all the numbers to call. (See The Set numbersToCall Step, page 8-11.)
obj	Java Type	null	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)
outCall	Contact	null	Stores the contact information returned when the Place Call step succeeds. (See The Place Call Step, page 8-21.)
recording	Document	null	Stores the audio document that the caller records. (See The Recording Step, page 8-8.)

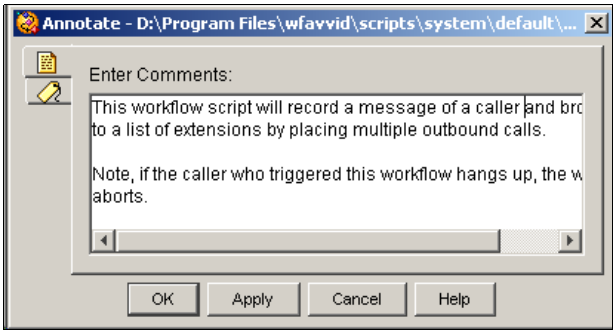
The Annotate Step

Continue to build the broadcast.aef script by dragging an Annotate step from the General palette (in the Palette pane of the CRS 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.)

The following figure shows the configured Annotate step customizer window.

Figure 8-3 Configured Annotate Customizer Window—Notes for the broadcast.aef Script



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 CRS Editor window) to the Design pane.

Because you intend to accept the default contact, no configuration is necessary.

Note For more information about using the Accept step, see "The Accept Step" section on page 6-7.

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.

Note For another example of configuration of the Recording step, see "The Recording Step" section on page 6-36.

Configure the Recording step as follows:

- General tab
  - Contact—**Triggering 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—*****

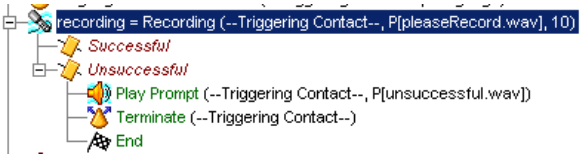
    The caller can use the "*" key to start over.

    (The cancel key works only until the script reaches the maximum number of retries.)

Note For another example of the use of the Recording step, see The Recording Step, page 6-36 of Chapter 6, "Designing a Basic Script."

The Recording step has two output branches, Successful and Unsuccessful. (See the following figure.)

Figure 8-4 Recording Step Output Branches



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.

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 6-8.

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 8-11.)

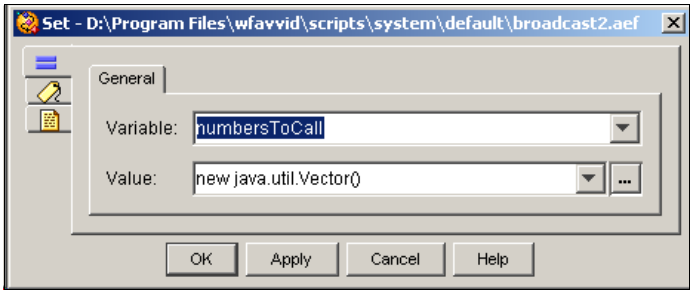
The Set numbersToCall Step

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.

The following figure shows the configured General tab of the Set customizer window.

***Figure 8-5 Set* numbersToCall=java.util.Vector()**



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.

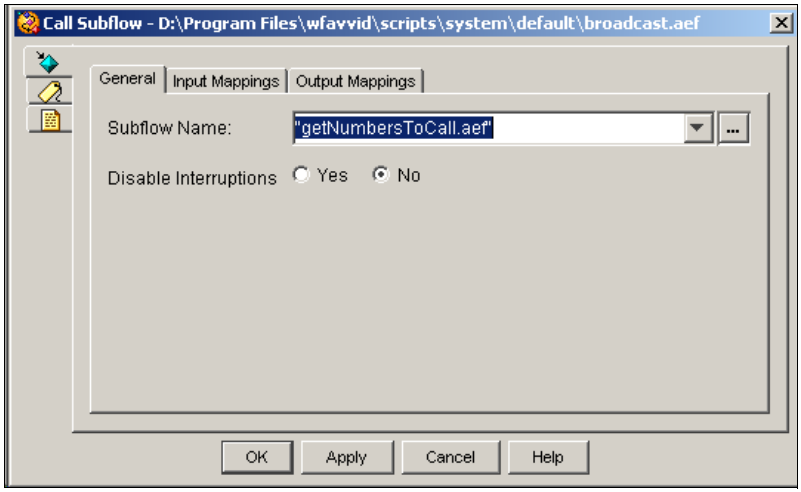
The Call Subflow Step

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 8-11).

The following figure shows the configured General tab of the Call Subflow customizer window.

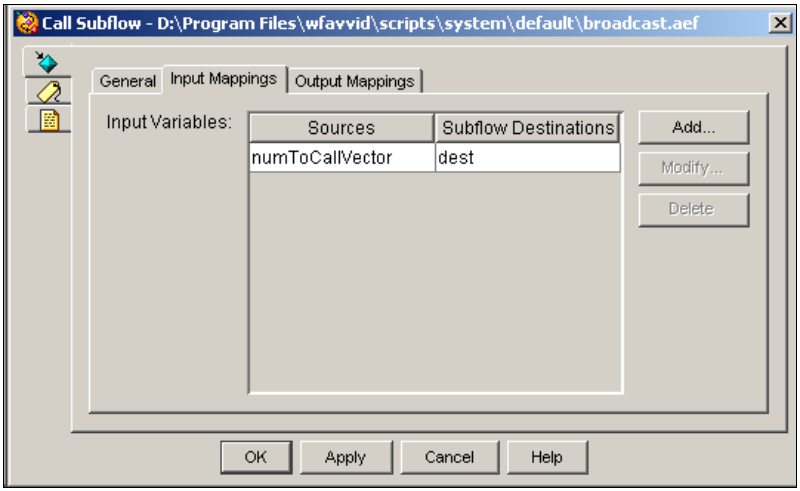
Figure 8-6 Call Subflow Customizer Window—Configured General Tab



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.

The following figure 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.

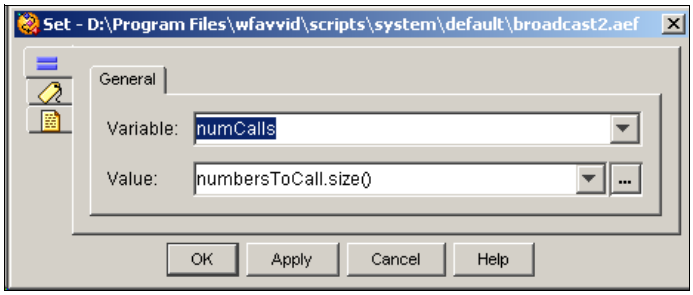
The Set numCalls Step

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.

The following figure shows the configured General tab of the Set customizer window.

Figure 8-8 Set Customizer Window—Set numCalls



The Label Step (Call Loop)

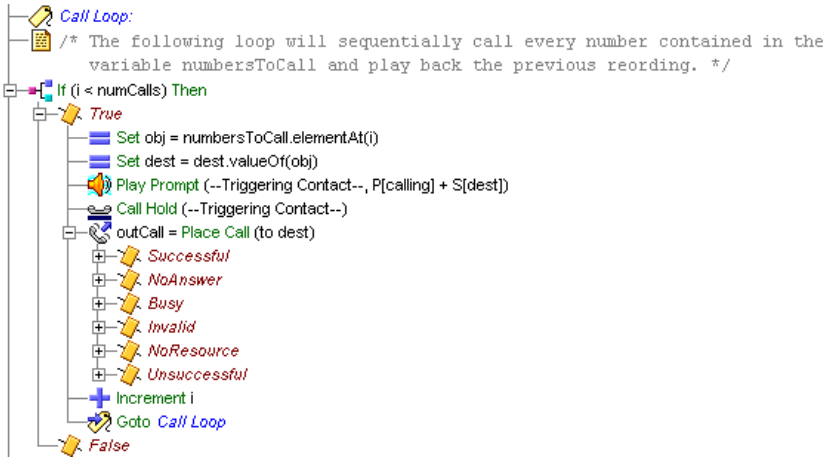
Continue to build the broadcast.aef script by dragging a Label step from the General palette to the Design pane. Then configure the Label step (named Call Loop), to provide a target for the beginning of the loop. The loop repeats until all the destination numbers have been called.

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 **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 the following figure.)

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

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.

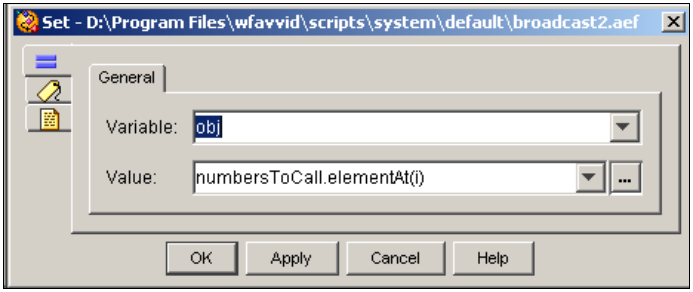
This section contains the following steps:

The First Set Step

Configure the General tab of the first Step customizer window to specify that the method executes on the **numbersToCall** variable.

The following figure 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

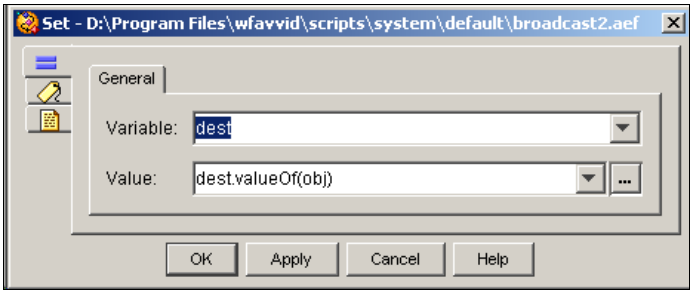
  The expression **numbersToCall.elementAt(i)** which gets the next number to call from the vector of numbers.

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.

The following figure 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.

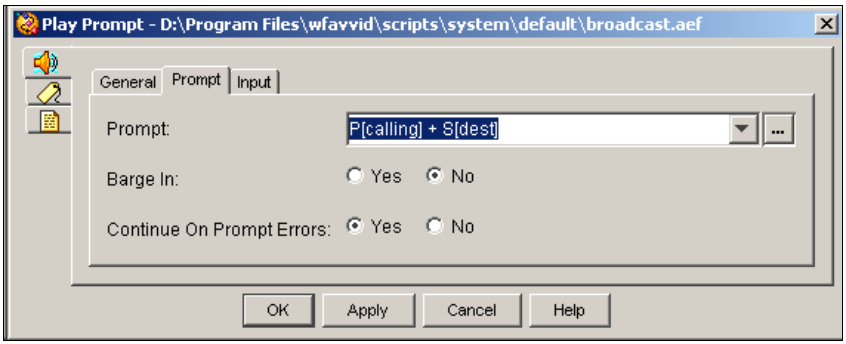
The Play Prompt Step

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.

The following figure shows the configured Prompt tab of the Play Prompt customizer window.

Figure 8-12 Play Prompt Customizer Window—Configured Prompt Tab



- In the General tab:
  - Set the contact to the triggering contact
  - Set Interruptible to No
- In the Prompt tab:
  - Set the prompt to P[calling] + S[dest]
  - Set Barge In to No
  - Set Continue on Prompt Errors to Yes
- In the Input tab:
  - Set Flush Input Buffer to Yes

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.

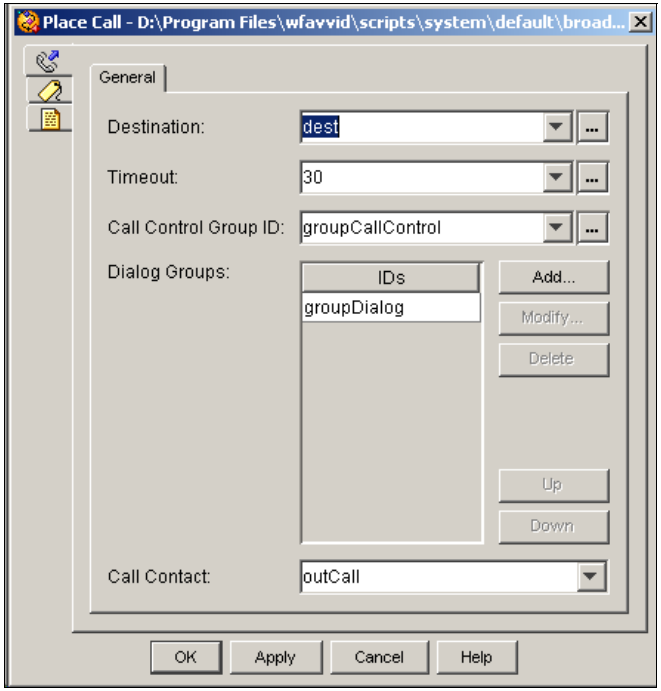
The Place Call Step

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.

The following figure 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—**groupCallControl**

  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—**groupDialog**

  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—**outCall**

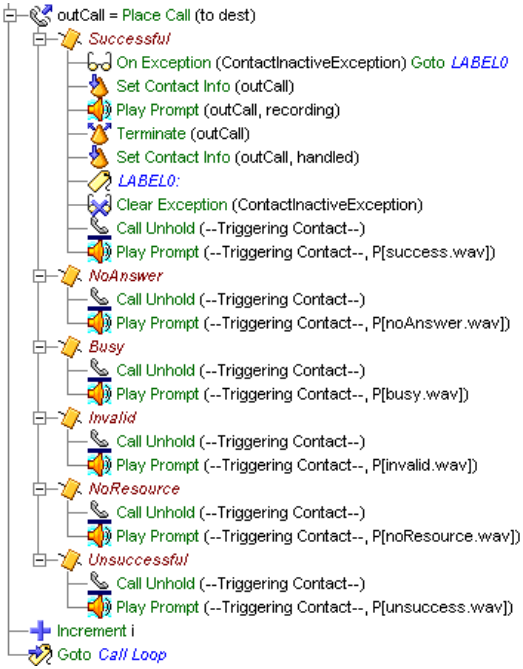
  The variable **outCall is** where the script returns a handle to the created call when the step succeeds.

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.

The following figure shows the scripting under the six output branches of the Place Call step.

Figure 8-14 Place Call Customizer Window—Output Branches



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

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 Call Unhold 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 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 **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 **i** variable is equal to the value of the **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 **i** variable is equal to the value of the **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

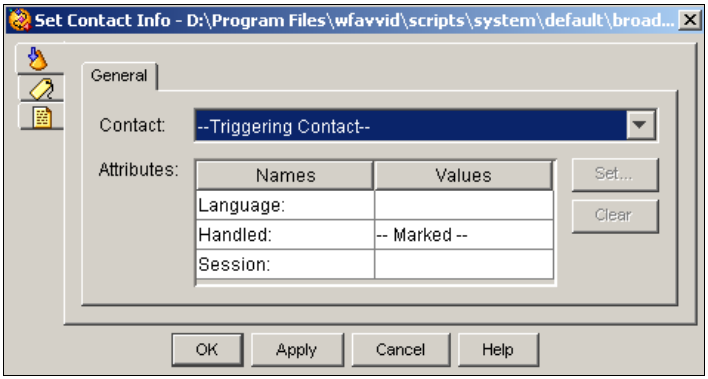
Drag a Terminate step from the Contact palette to the Design pane and place it on the Goto step.

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.

Figure 8-15 Set Contact Info Customizer Window



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 Customer Response Solutions (CRS) Editor to design web-enabled scripts that interact with application servers.

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.

This section contains the following topics:

A Sample 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 CRS 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 CRS Engine:

```
<form action="/greeting" method=GET>
```

This trigger (/greeting) runs the hello.aef script, which performs the following actions:

1. A Create File Document step references the response template document.
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 CRS 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

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>
<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 to the following location in the default web server document tree:

installationdirectory\Tomcat\webapps\ROOT\

Note In this example, *installationdirectory* is the drive location where you installed the CRS Engine. Typically, this location is C:\Program Files\wfavvid.

Step 3 Test the HTML page by opening it with 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 CRS 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.

Step 4 After you complete the template file, create a folder called template in your *installationdirectory* folder, then call the file sayhello.html and save it to the template folder.

You are now ready to write the hello.aef script.

Creating the hello.aef Script

This section demonstrates the process of writing the hello.aef script, a CRS Editor script that responds to an HTTP request from a web browser.

This section contains the following topics:

The Start Step

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS 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 CRS Editor to define two variables for the hello.aef script, as shown in the following table:

Table 9-1 Variables in the hello.aef Script

Variable Name	Variable Type	Function
name	String	Contains the value entered by the user. See The Get Http Contact Info Step, page 9-8.
doc	Document	Contains the document to be sent in response to the user. See The Create File Document Step, page 9-10.

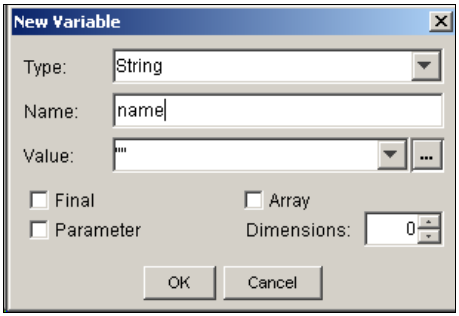
To define the two variables for the hello.aef script, do the following:

Procedure

Step 5 With the Hello.aef file open in the CRS Editor window, click the **New Variable** icon in the Variable pane toolbar.

The New Variable dialog box appears.

Figure 9-3 New Variable Dialog Box



Step 6 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 7 In the Name field, enter **name**.

This will be the variable that will hold the name entered by the user.

Step 8 Click **OK**.

The New Variable dialog box closes, and the name of the first variable appears in the Variable pane of the CRS Editor.

Step 9 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 10 From the Type drop-down menu, choose Document.

DOC[] appears automatically in the value field.

Step 11 In the Name field, enter **doc**.

This variable will contain the document to be sent in response to the user.

Step 12 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 CRS 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.

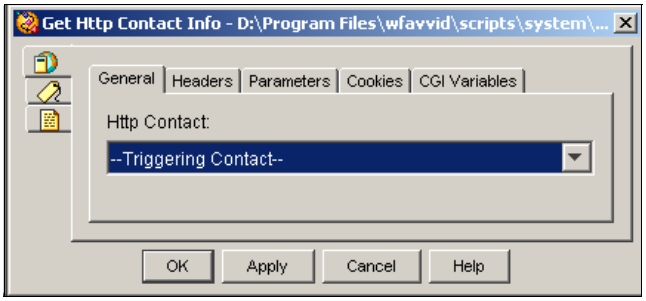
The Get Http Contact Info step icon appears in the Design pane, just below, and on the same level as, the Start step icon.

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.

Step 6 In the Name text field, enter "**name**".

Note You need quotation marks around your text since this is a string variable.

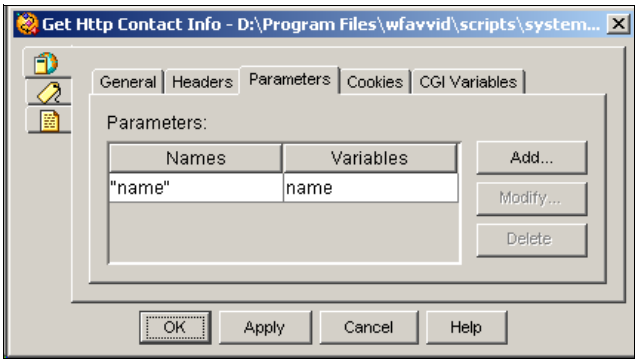
Step 7 In the Variable drop-down menu, choose **name**.

Step 8 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.

The following figure shows the configured Parameters tab of the Get Http Contact Info customizer window.

Figure 9-4 Get Http Contact Info Customizer Window—Parameters Tab



Step 9 Click **OK**.

The Get Http Contact Info customizer window closes.

You are now ready to add the next step to the hello.aef script in the Design pane of the CRS 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.

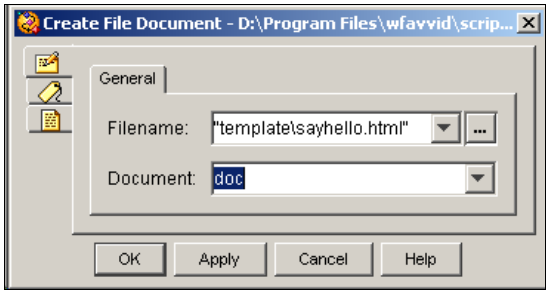
Step 2 Right-click the new **Create File Document** step icon.

A popup menu appears.

Step 3 Choose **Properties**.

The Create File Document customizer window appears.

Figure 9-5 Configured Create File Document Customizer Window



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 CRS Editor.

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.

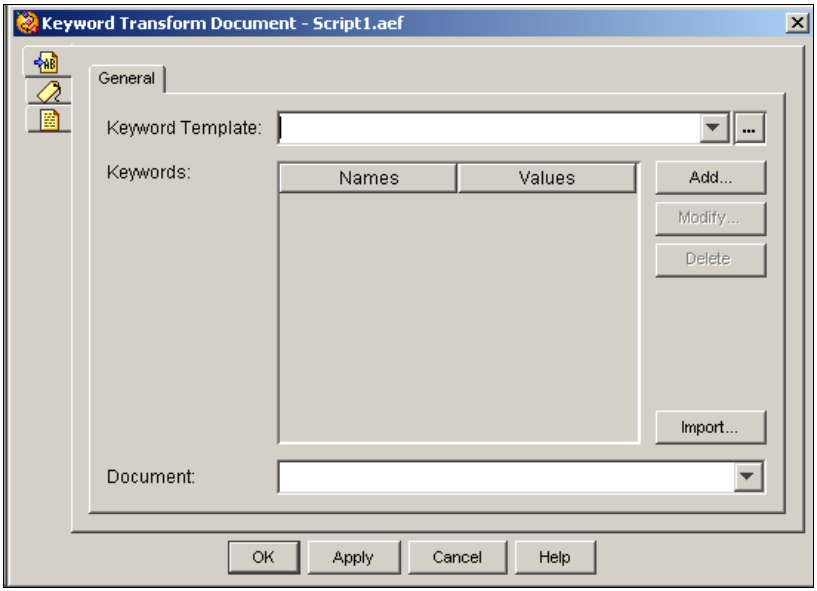
Step 2 Right-click the new **Keyword Transform Document** step icon.

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.

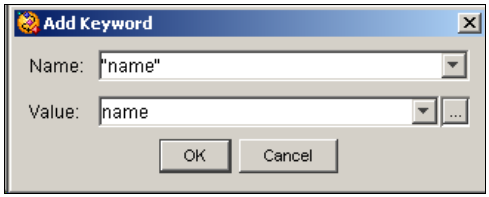
Step 5 From the Document drop-down menu, choose **doc**.

This choice specifies that the completed document is stored back in the same variable.

Step 6 Click **Add**.

The Add Keyword dialog box appears.

Figure 9-7 Configured Add Keyword Dialog Box



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.

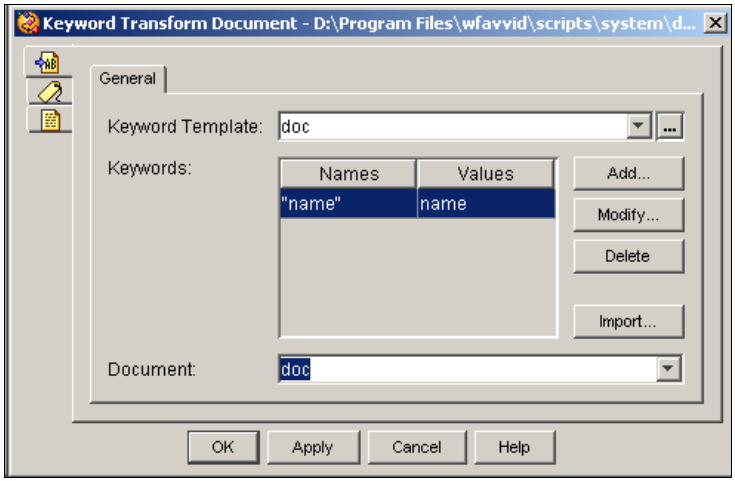
This choice specifies that **name** is the name of the keyword in the sayhello.html template, as shown below:

```
<html>
<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 the following figure.

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 CRS Editor.

You are now ready to add the next step to the hello.aef script in the Design pane of the CRS 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.

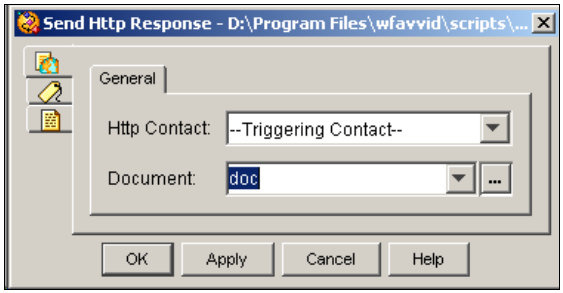
Step 2 Right-click the new **Send Http Response** step icon.

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



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**.

The Send Http Response customizer window closes, and the name of the Http Contact and the Document variable appear next to the Send Http Response step icon in the Design pane of the CRS Editor.

You are now ready to add the next step to the hello.aef script in the Design pane of the CRS Editor.

The End Step

Use the End step to complete each script you create with the CRS 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.

Designing a Web-Enabled Client Script

A *client script* is a script that can retrieve information from a server; a *web-enabled* client script is a script that obtains information from web servers on the Internet or an intranet. 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 Customer Response Solutions (CRS) 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 section contains the following topics:

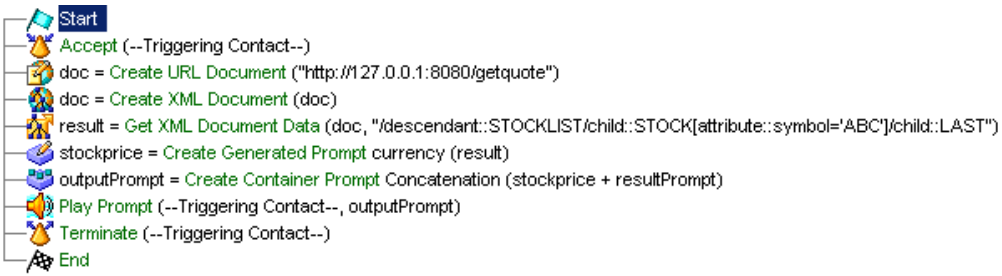
Example Web-Enabled Client Script Template

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.

The figure below shows the getQuoteClient.aef script tempplate as it appears in the Design pane of the CRS Editor window.

Figure 10-1 Completed Client Script



Analyzing the Data Source

Begin the process of building the getQuoteClient.aef script by analyzing the structure of the data that the server obtains.

To determine the XML path (in order to identify the data you want to extract from the XML 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 CRS Engine.

The getQuote.xml file contains the following:

```
<?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>
```

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:

```
"/descendant::STOCKLIST/child::STOCK[attribute::symbol='ABC']
/child::LAST"
```

You will use this XML path to identify the data you want to extract from the XML file.

You are now ready to define the variables you will use to build the getQuoteClient.aef script in the Design pane of the CRS Editor.

Creating the getQuoteClient.aef Script

This section demonstrates the process of writing the getQuoteClient.aef script, a CRS 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)

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS 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 CRS Editor to define five variables, as shown in the following table:

Table 10-1 Variables in the Web-Enabled Client Script

Variable Name	Type	Value	Description
doc	Document	DOC[]	Contains the URL for the client request to the local web server.
result	Float	0.0F	Contains the value obtained by the client script.
stockprice	Prompt	P[stockprice.wav]	Contains the StockPrice.wav file that plays back the sentence, “The stock price of the selected company is.”
resultPrompt	Prompt	P[]	Contains the information in the result variable.
outputPrompt	Prompt	P[stockprice.wav]	Contains the resultPrompt and stockprice prompts.

To define the five variables for the getQuoteClient.aef script, do the following:

Procedure

Step 1 In the CRS Editor window, click the **New Variable** icon in the Variable pane toolbar.

Step 2 In the Name field, enter **doc**.

This variable will contain the URL for the client request to the local web server.

Step 3 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.

Step 4 Click **OK**.

The New Variable dialog box closes, and the name of the variable appears in the Variable pane of the CRS Editor.

Step 5 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 CRS Editor.

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 CRS 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.

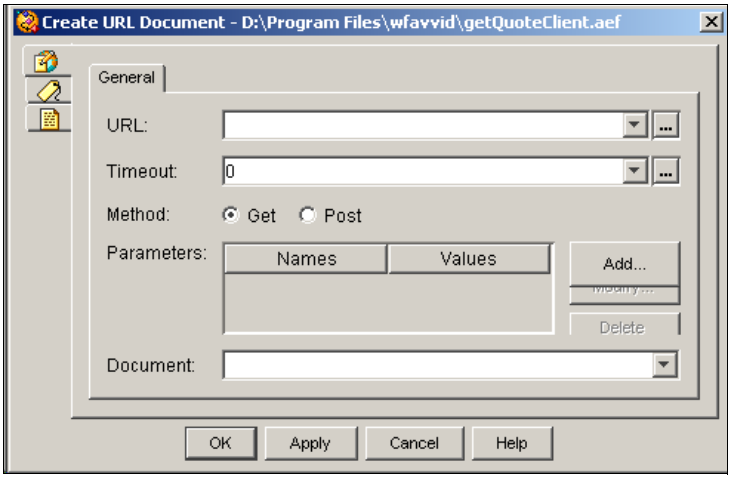
Step 2 Right-click the new **Create URL Document** step icon.

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 CRS 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.

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**.

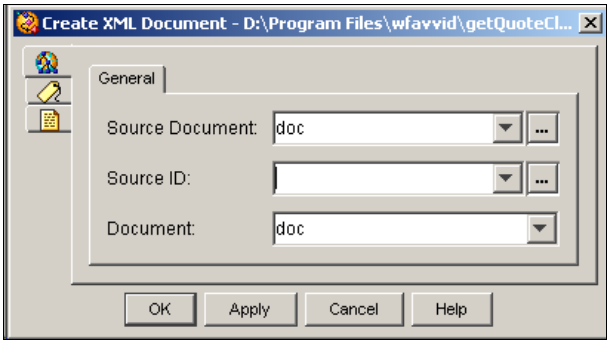
You used the Create URL Document step in the last procedure to define this variable to store the URL for making the request.

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.

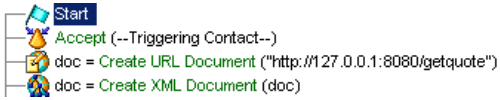
Figure 10-3 Create XML Document Customizer Window



Step 6 Click **OK**.

The Create XML Document customizer window closes, and the names of the chosen variables appear next to the Create XML Document icon in the Design pane.

Figure 10-4 Create XML Document Step in the Design Pane



Note The source document variable name appears in parentheses after the step name next to the step name icon 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 CRS 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.

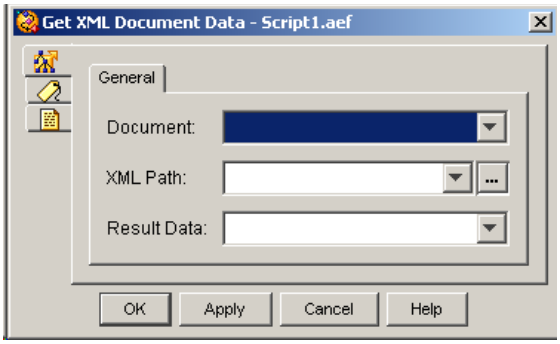
Step 2 Right-click the new **Get XML Document Data** step icon.

A popup menu appears.

Step 3 Choose **Properties**.

The Get XML Document Data customizer window appears.

Figure 10-5 Get XML Document Data Customizer Window



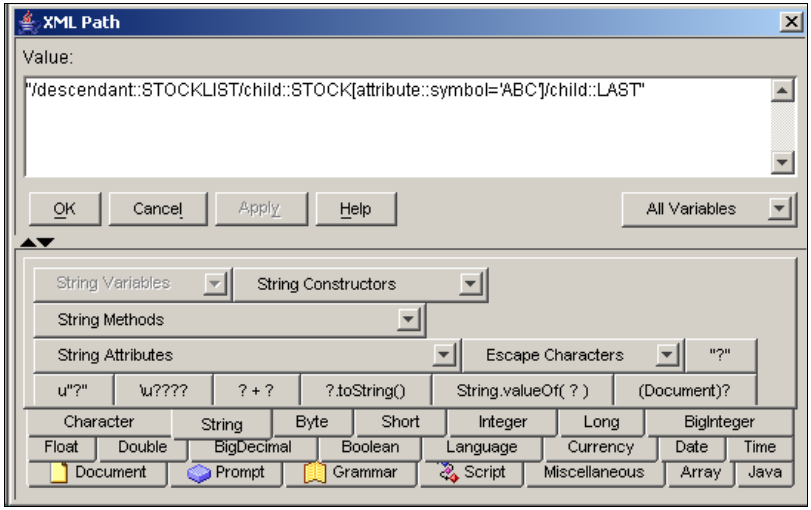
Step 4 From the Document drop-down menu, choose **doc**.

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.

Figure 10-6 Expression Editor Dialog Box



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.**

The Get XML Document Data customizer window closes, and the variables you chose appear next to the Get XML Document Data step icon in the Design pane of the CRS Editor.

You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the CRS 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).

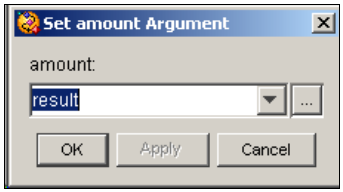
Step 5 From the Generator Type drop-down menu, choose **currency**.

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



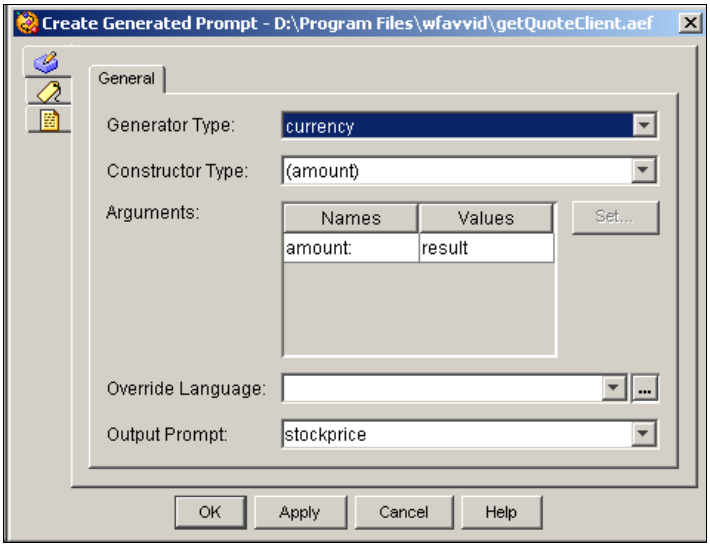
Step 7 From the variable drop-down menu, choose **result**.

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.

Figure 10-8 Create Generated Prompt Customizer Window



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 CRS Editor.

You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the CRS 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.

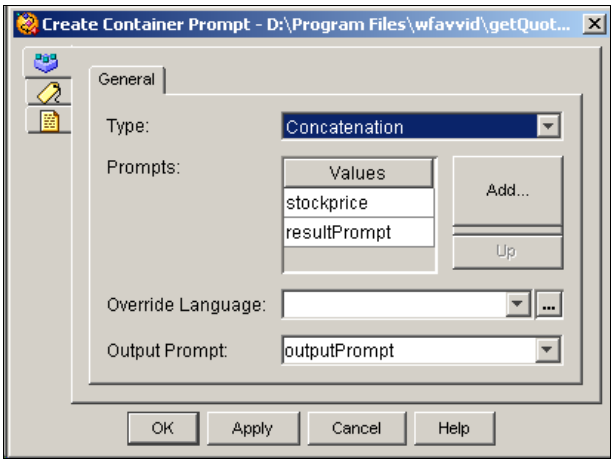
Step 2 Right-click the new **Create Container Prompt** step icon.

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.

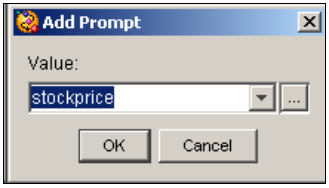
Step 5 From the Prompt Container Type drop-down menu, choose Concatenation, as shown in Figure 10-9.

For more information on concatenated prompts, which are prompts that combine other prompts, see the *Cisco Customer Response Solutions 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 CRS 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.

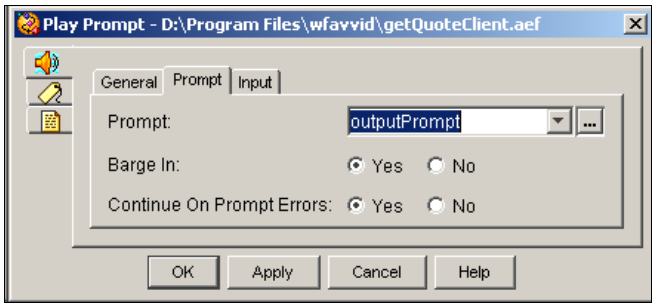
Step 3 Choose **Properties**.

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.

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 CRS Editor.

You are now ready to add the next step to the getQuoteClient.aef script in the Design pane of the CRS 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 CRS Editor.

The End Step

Use the End step to complete each script you create with the CRS Editor. The End step needs no configuration and has no customizer window.

To end the getQuoteClient.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 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.

Step 2 Save the client script as **getQuoteClient.aef**.

Designing a Database Script

You can use the Cisco Customer Response Solutions (CRS) 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.

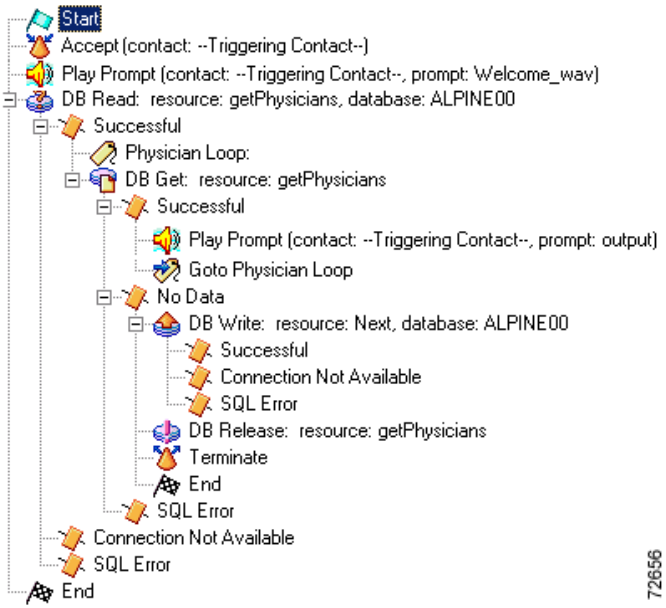
This section contains the following topics:

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.

The following figure shows the database.aef script template as it appears in the Design pane of the CRS Editor window.

Figure 11-1 database.aef Script



The table below shows the physician_locator database table.

Table 11-1 Physician_Locator Database Table

ZIP_CODE	CATEGORY	NAME	SPOKEN_NAME	ADDRESS	PHONE
11111	chiropractor	john doe	(audio document)	222 main st. bedrock ca	5551112222
22222	podiatrist	jane wong	(audio document)	333 oak st. bubble city ny	5552344343

Table 11-1 Physician_Locator Database Table (continued)

ZIP_CODE	CATEGORY	NAME	SPOKEN_NAME	ADDRESS	PHONE
33333	dentist	jim smith	(audio document)	435 state st. oakwood tn	5556458978
99999	general	tia gomez	(audio document)	382 first st. river city ia	5557674444

The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS Editor window.

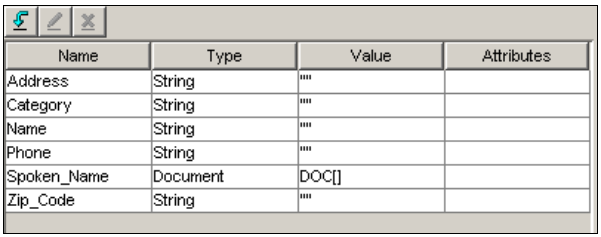
The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar. Our example script is called database.aef.

Database Script Variables

Begin the database.aef script design process by using the Variable pane of the CRS Editor to define script variables.

The figure below shows the variables of the database.aef script as they appear in the Variable pane of the CRS Editor.

Figure 11-2 Variable Pane of the database.aef Script



Name	Type	Value	Attributes
Address	String	""	
Category	String	""	
Name	String	""	
Phone	String	""	
Spoken_Name	Document	DOC[]	
Zip_Code	String	""	

The table below describes the variables used in the database.aef script.

Table 11-2 Variables in the database.aef Script

Variable Name	Variable Type	Value	Function
Address	String	""	Stores the address of the physician. (See The DB Get Step, page 11-9.)
Category	String	""	Stores the category of the physician. (See The DB Get Step, page 11-9.)
Name	String	""	Stores the written name of the physician. (See The DB Get Step, page 11-9.)
Phone	String	""	Stores the phone number of the physician. (See The DB Get Step, page 11-9.)
Spoken_Name	Document	null	Stores the audio document of the spoken name of the physician. (See The DB Get Step, page 11-9.)
Zip_Code	String	""	Stores the Zip code of the physician. (See The DB Get Step, page 11-9)

The Accept Step

Continue the database.aef script by dragging an Accept step from the Contact palette (in the Palette pane of the CRS 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.

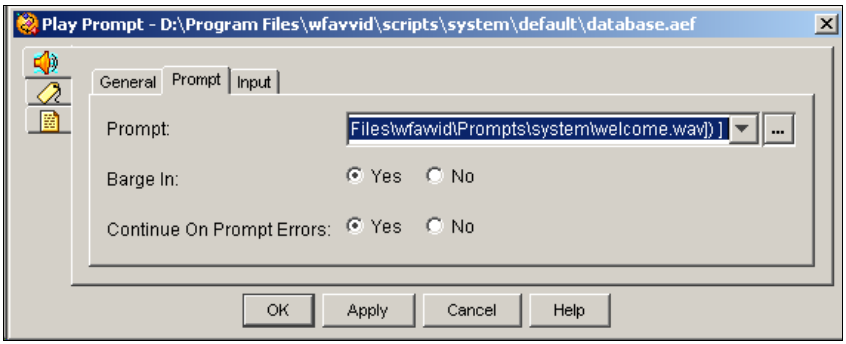
The Play Prompt Step

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.

The figure below 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 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.

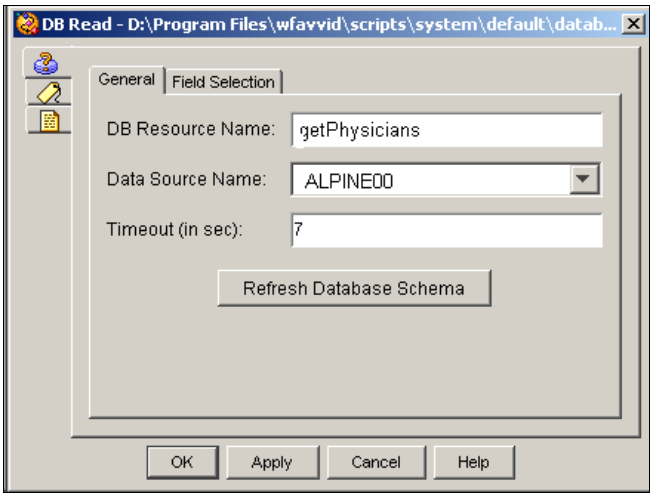
The DB Read Step

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.

The figure below 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**

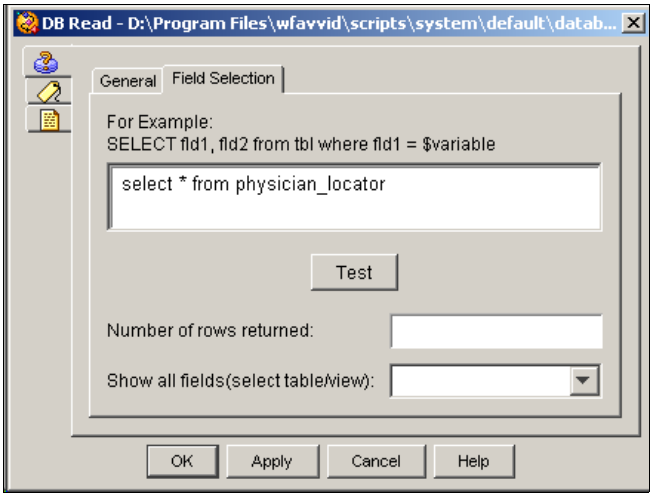
  This choice names the query that is used by the subsequent DB Get step to read data from the database.

- Data Source Name—**ALPINE00**

  This choice specifies the database that contains the desired information.

The figure below shows the configured Field Selector tab of the DB Read customizer window,

Figure 11-5 DB Read Customizer Window—Configured Field Selector Tab



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 physician_locator 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.)

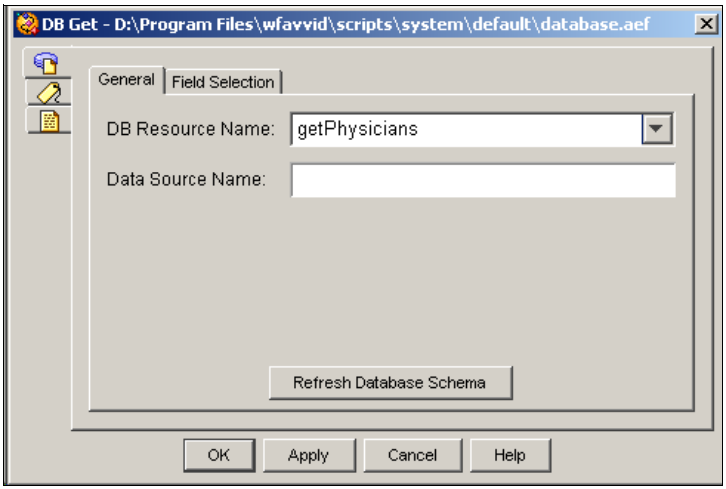
The DB Get Step

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.

The figure below shows the configured General tab of the DB Get customizer window.

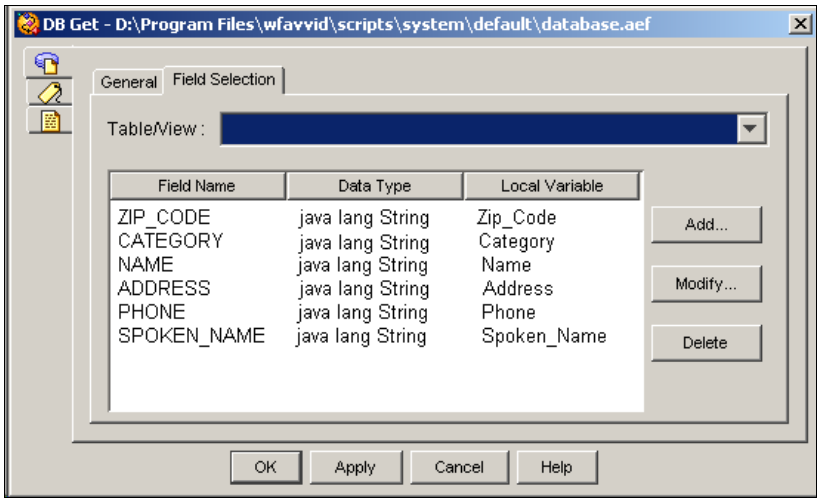
Figure 11-6 DB Get Customizer Window—Configured General Tab



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.

The figure below 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

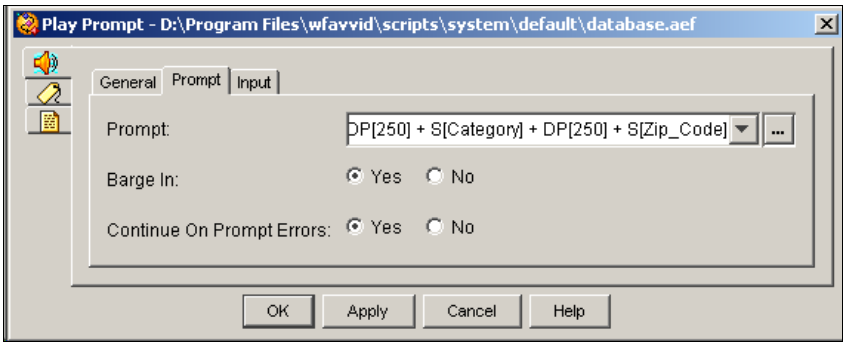
The Play Prompt Step

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.

The figure below 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:

"Spoken_Name + DP[250] + S[Phone] + DP[250] + S[Address] + DP[250] + S[Name] + DP[250] + S[Category] + DP[250] + S[Zip_Code]"

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 S[*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:

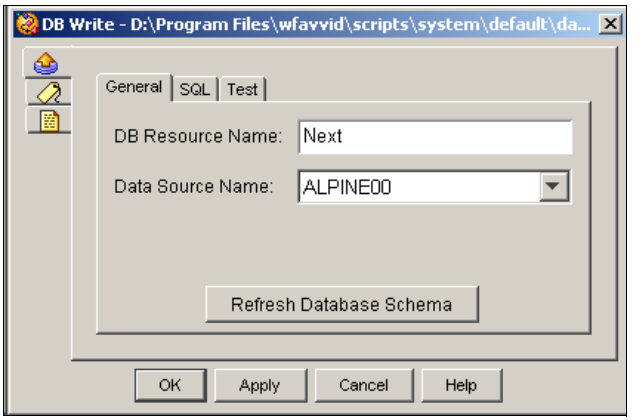
The DB Write Step

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.

The figure below 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**

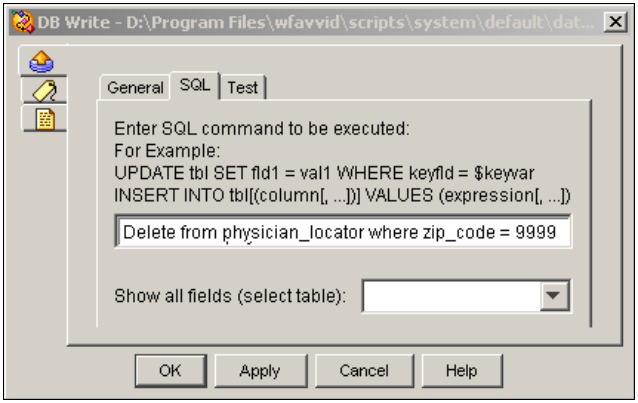
  You assign this name to identify this database query.

- Data Source Name—**ALPINE00**.

  This variable specifies the database that contains the desired information.

The figure below shows the configured SQL tab of the DB Write customizer window.

Figure 11-10 DB Write Customizer Window—Configured SQL Tab



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

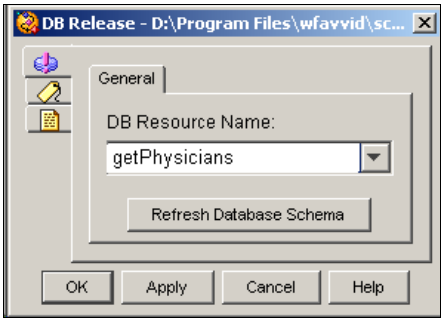
Continue the No Data output branch of the DB Get step by dragging a DB Release step from the Database palette to the Design pane, and dropping it over the DB Write step icon under the No Data output branch of the DB Get step icon, as shown in Figure 11-1.

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.

The figure below 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.

Designing an IP IVR Script

You can use the Cisco Customer Response Solutions (CRS) Editor to design scripts that take advantage of 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 CRS Editor. This script can work in an IP IVR system or a traditional ACD IVR system.

This section contains the following topics:

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 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

The following figure shows the aa.aef script as it appears in the Design pane of the CRS Editor window.

Figure 12-1 aa.aef Script

```
Start
Accept (--Triggering Contact--)
/* Check if we support ASR */
Get Contact Info (--Triggering Contact--)
/* Initialize Prompts */
menuPrompt = Create Conditional Prompt (asr ? SP[A,A\A,AMainMenu_ASR] : SP[A,A\A,AMainMenu])
extnPrompt = Create Conditional Prompt (asr ? SP[A,A\A,AEnterExtn_ASR] : SP[A,A\A,AEnterExtn])
namePrompt = Create Container Prompt Escalation (SP[A,A\A,ANameDial0_ASR] || SP[A,A\A,ANameDial1_ASR] || ...)
namePrompt = Create Conditional Prompt (asr ? namePrompt : SP[A,A\A,ANameDial])
/* Play Welcome Prompt without any interruptions or barge-in being enabled. */
Play Prompt (--Triggering Contact--, welcomePrompt)
MainMenu:
If (asr || AlwaysEnableDialByName ) Then
prompt = Create Container Prompt Escalation (prefixPrompt + menuPrompt || menuPrompt)
/* Clear Prefix */
Set prefixPrompt = P[]
Simple Recognition (--Triggering Contact--, prompt, SG[A,A\A,AMainMenu])
/* We could not recognize anything or transfer anywhere */
Play Prompt (--Triggering Contact--, prefixPrompt + SP[A,A\A,ASorry])
Call Redirect (--Triggering Contact-- to operExtn)
If (attempts < MaxRetry ) Then
/* Were 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 + DP[1000])
Terminate (--Triggering Contact--)
End
```

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, refer to the *Cisco Customizer Response Solutions 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 wfavvid\prompts\system\en_Us\AA\ directory and installed automatically with the CRS 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 CRS Administration web interface. You can choose to change the default welcome prompt to reference a customized prompt.

Note For custom scripts, you need to record your own prompts. To record a prompt, refer to the Recording step information in the *Cisco Customer Response Solutions Editor Step Reference Guide* or the *Cisco Customer Response Solutions Administration Guide*.

The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS 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.

The aa.aef Script Variables

Begin the aa.aef script design process by using the Variable pane of the CRS Editor to define script variables.

The following figure shows the variables of the aa.aef script as they appear in the Variable pane of the CRS Editor.

Figure 12-2 Variables Pane of the aa.aef Script

Name	Type	Value	Attributes
AlwaysEnableDialByName	boolean	false	
MaxRetry	int	3	Parameter
asr	boolean	false	
attempts	int	1	
extnPrompt	Prompt	P[]	
extnXfer	String	""	
firstName	String	""	
fullNamePrompt	Prompt	P[]	
grammar	Grammar	G[]	
language	Language	L[en_US]	
lastName	String	""	
menuPrompt	Prompt	P[]	
name	String	""	
namePrompt	Prompt	P[]	
operExtn	String	""	Parameter
prefixPrompt	Prompt	P[]	
prompt	Prompt	P[]	
spokenName	Document	null	
ttsPrompt	Prompt	P[]	
user	User	null	
welcomePrompt	Prompt	SP[A,A\A,A\Welcome.wav]	Parameter

The table below describes the variables used in the aa.aef script.

Table 12-1 Variables in the aa.aef Script

Variable Name	Variable Type	Value	Function
AlwaysEnable DialByName	Boolean	False	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 12-18.)
MaxRetry	Integer	3	Stores the maximum retries a caller can make in this script before the script terminates the call. (See Use the Create Language Prompt step to localize the prompt with a specific language., page 12-35.) Define this variable as a parameter so that the administrator can configure it when provisioning an application with this script.
asr	Boolean	False	Stores the information that indicates whether or not ASR is enabled for this call. (See Get Contact Info, page 12-11.)
attempts	Integer	1	Stores the number of times the script has attempted confirmation. (See Use the Create Language Prompt step to localize the prompt with a specific language., page 12-35.)
extnPrompt	Prompt	P[]	Prompts the caller to either press or say the extension number. (See The DialByExtn Output Branch of the Simple Recognition Step, page 12-26.)
extnXfer	String	""	Stores the extension to which the caller is transferred. (See The Get Digit String Step, page 12-28.)

Table 12-1 Variables in the aa.aef Script (continued)

Variable Name	Variable Type	Value	Function
firstName	String	""	Stores the first name of the selected user.
fullNamePrompt	Prompt	P[]	Stores the full name of the user to be played back.
grammar	Grammar	G[]	Stores the value SG[AA/AAWantToCall] assigned to it by the Set step. (See The Explicit Confirmation Step, page 12-62.)
language	Language	L[en_US]	Stores the current language associated with the call. Default: English (United States) (See Get Contact Info, page 12-11.)
lastName	String	""	Stores the last name of the selected user.
menuPrompt	Prompt	P[]	Stores the result from the Create Conditional Prompt step. This prompt presents the initial menu of options for calling by name or by extension. (See The First Create Conditional Prompt Step, page 12-12.)
name	String	""	Stores the written name of the person the caller is trying to reach. (See The Successfully Receiving Caller Input, page 12-50.)
namePrompt	Prompt	P[]	Asks the caller to say the name of the person the caller wants to reach. (See The First Create Container Prompt Step, page 12-14.)

Table 12-1 Variables in the aa.aef Script (continued)

Variable Name	Variable Type	Value	Function
operExtn	String	""	Stores the Operator extension the Call Redirect step uses to transfer the call to the operator. (See The Call Redirect Step, page 12-78.) Define this variable as a parameter so that the administrator can configure it when provisioning an application with this script.
prefixPrompt	Prompt	P[]	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 12-26.)
prompt	Prompt	P[]	Used for a variety of purposes throughout the script. (See The First Create Container Prompt Step, page 12-14.)
spokenName	Document	null	Stores the audio document of the spoken name of the person the caller is trying to reach. (See The Successfully Receiving Caller Input, page 12-50.)
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.

Table 12-1 Variables in the aa.aef Script (continued)

Variable Name	Variable Type	Value	Function
user	User	null	Identifies the user that the caller chooses with the Name To User step. (See The Name To User Step, page 12-47.)
welcomePrompt	Prompt	P[AA\Welcome.wav]	Greets the caller. (See The Play Prompt Step, page 12-16.) Define this variable as a parameter so that the administrator can configure it when provisioning an application with this script.

The Opening Steps

This section contains the following:

Accept

Continue to build the aa.aef script by dragging an Accept step from the Contact palette (in the Palette pane of the CRS Editor window) to the Design pane, and dropping it over the Start step.

Because you intend to accept the default contact, no configuration is necessary for this step.

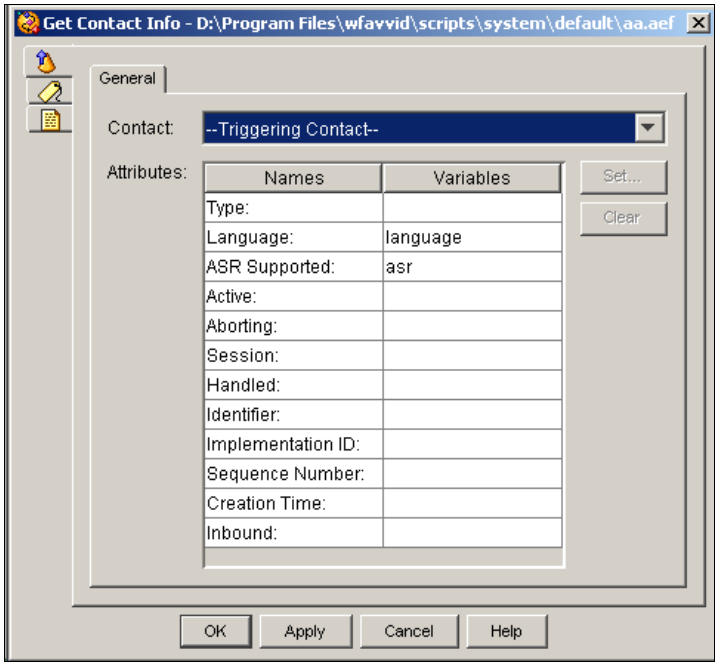
Get Contact Info

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 to determine which prompts to use, based on whether or not Automatic Speech Recognition (ASR) is enabled, and, if so, what language the script uses.

The following figure 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.

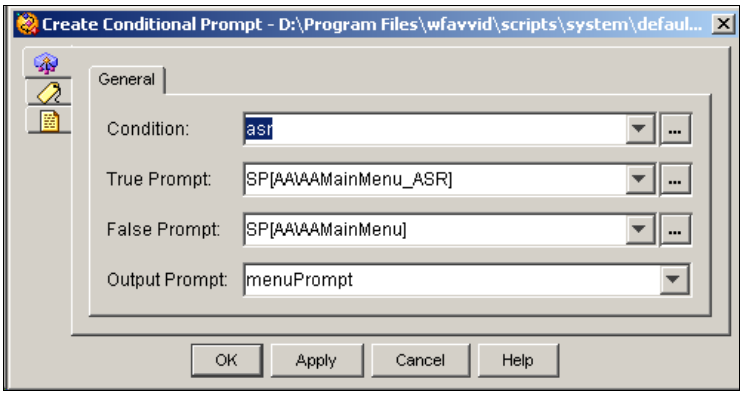
The First Create Conditional Prompt Step

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.

The following figure 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.

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

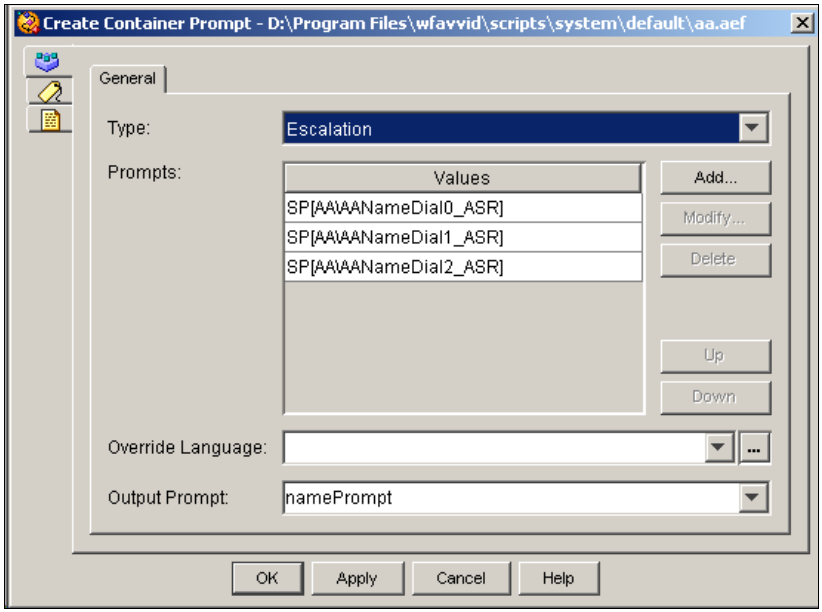
Continue the aa.aef script by dragging a Create Container Prompt step from the Prompt palette to the Design pane, and dropping it over the second Create Conditional Prompt step.

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.

The following figure shows the configured Create Container Prompt customizer window.

Figure 12-5 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/AANameDial

If ASR is not enabled, then the value of **namePrompt** becomes the system prompt AA/AANameDial (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.

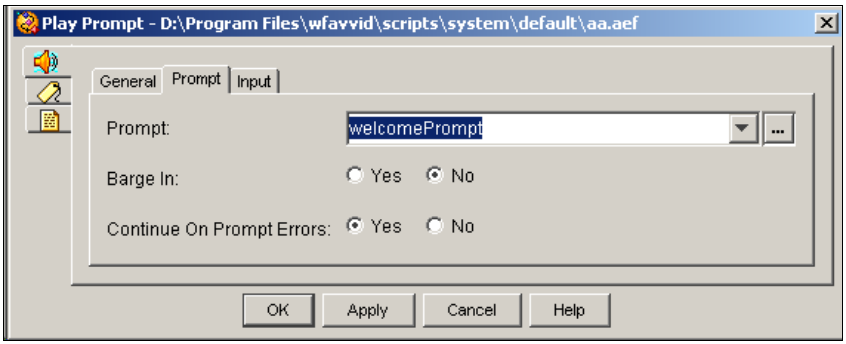
The Play Prompt Step

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.

The following figure 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 7-10.

Determining if the System is ASR Enabled

This section contains the following:

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.

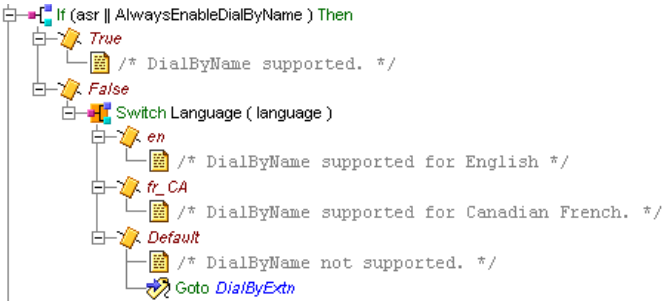
Then configure the If step to determine which segment of the script handles the contact, depending on whether or not the system is ASR-enabled and Name To User capability is enabled or supported.

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 6-17.

The following figure 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 12-19
- The False Output Branch, page 12-19

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 out put branch contains the Switch step, discussed below.

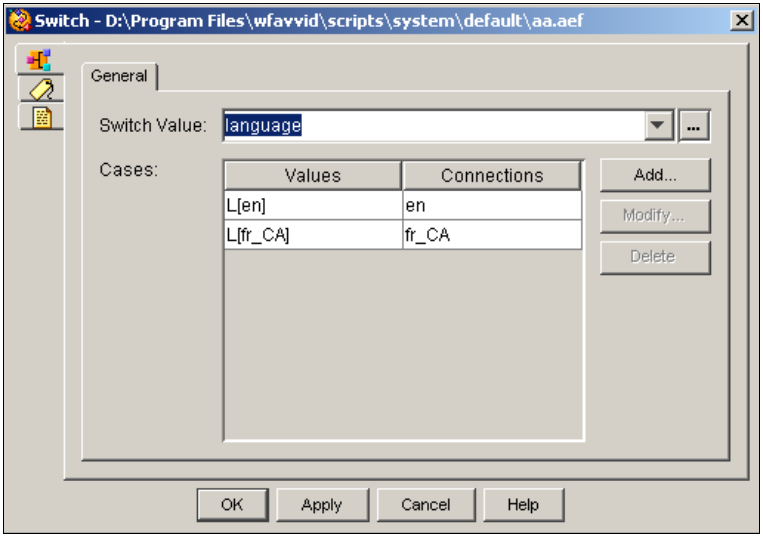
The Switch Step

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.

The following figure 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 12-21
- The L[fr_CA] Output Branch, page 12-21
- The Default Output Branch, page 12-21

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 12-28.)

Creating and Setting an Error MessagePrompt

- The Second Create Container Prompt Step, page 12-22
- The Set Step, page 12-22

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.

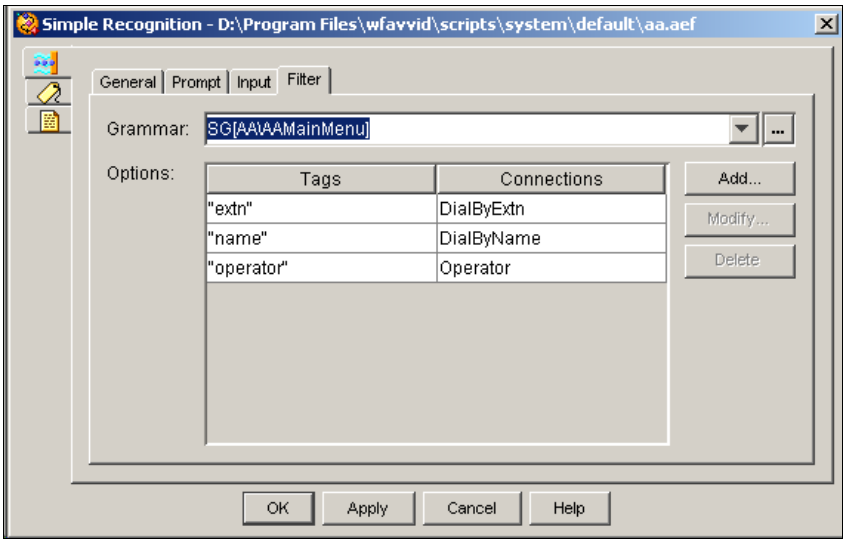
Then configure the Simple Recognition step to receive either speech or digits in response to prompts. The script steps under the Simple Recognition step transfer the call to the proper extension if the script receives valid input from the caller.

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.

The following figure 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]**

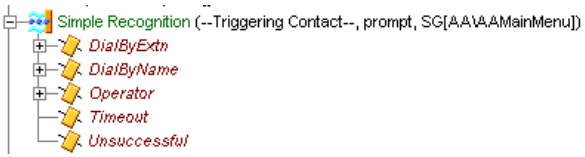
    The system grammar that the step uses to recognize caller input.
  - Options Tag/Connection list box—**DialByExtn**, **DialByName**, **Operator**

    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 The following figure, 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 12-77).

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 12-26
- The DialByName Output Branch of the Simple Recognition Step, page 12-45
- The Operator Output Branch of the Simple Recognition Step, page 12-72

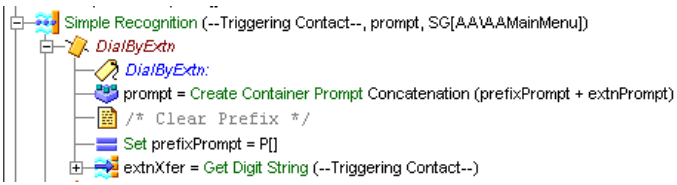
The DialByExtn Output Branch of the Simple Recognition Step

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.

The following figure shows the scripting under the DialByExtn output branch of the Simple Recognition step.

Figure 12-11 DialByExtn Scripting



The DialByExtn contains the following steps, the last of which is discussed in its own section:

- The Label Step, page 12-27
- The Create Container Prompt Step, page 12-27
- The Set Step, page 12-28
- The Get Digit String Step, page 12-28

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 12-18.)

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 12-22) 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.

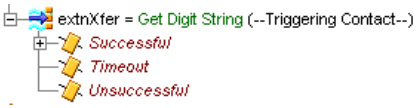
Then configure the Get Digit String step to receive the digits entered by the caller in response to **prompt**, stores them in a result digit string variable named **extnXfer**, and then attempt to transfer the call.

Note For more information on configuring the Get Digit String step, see "The Get Digit String Step" section on page 6-25.

The Get Digit String has three output branches: Successful, Timeout, and Unsuccessful.

The following figure shows the output branches of the Get Digit String step.

Figure 12-12 Get Digit String Output Branches



The following sections describe the three output branches of the Get Digit String step:

- The Timeout Output Branch, page 12-29
- The Unsuccessful Output Branch, page 12-29
- The Successful Output Branch (of Get Digit String), page 12-29

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 12-77).

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 12-77).

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.

The following figure shows the scripting of the Successful output branch of the Get Digit String step.

Figure 12-13 Get Digit String—Successful Branch Scripting

```
Successful
  If (extnXfer == "") Then
    True
      Set prefixPrompt = SP[AA\AAInvalidExtn] + DP[500]
      If (attempts < MaxRetry ) Then
        True
          Increment attempts
          Goto MainMenu
        False
    False
      prompt = Create Generated Prompt telephone.number (extnXfer)
      /* Localize based on Language */
      prompt = Create Language Prompt (L[ja]: prompt + SP[AA\AACallingExtn], L[ko]: prompt + SP[AA\AACallingExtn], ...)
      Implicit Confirmation (--Triggering Contact--, prompt)
        No
          If (attempts < MaxRetry ) Then
            True
              /* Flush Input Buffer in case the caller pushed multiple times on the keys
                 to stop the transfer.

                 We need to do it here because the GetDigitString that queries for the
                 extension doesn't flush the buffer.

                 Now we could also have replace the GetDigitString step for a
                 ExtendedGetDigitStep and dynamically change the boolean variable used
                 for the FlushInputBuffer property to be true before we branch there.
                 */
              Play Prompt (--Triggering Contact--, P[])
              Increment attempts
              prompt = Create Container Prompt Escalation (prefixPrompt + menuPrompt || menuPrompt)
              Goto DialByExtn
            False
        Yes
```

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 12-31
- The False Recognition Branch, page 12-33

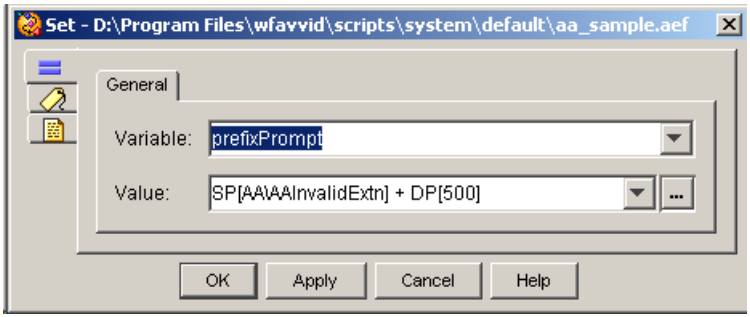
The True Recognition Branch

The True Output branch of the If step contains the following steps:

- Setting the Retry Message, page 12-31
- Configuring the Number of Retries, page 12-32

Setting the Retry Message

From the General palette, drag the Set step below the True label and set the value of the prefixPrompt variable.



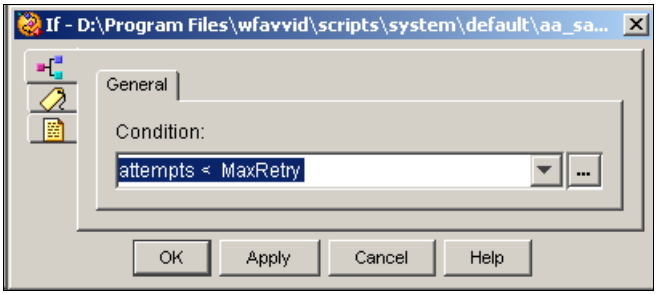
Configure the Set Customzer window as follows:

- 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.

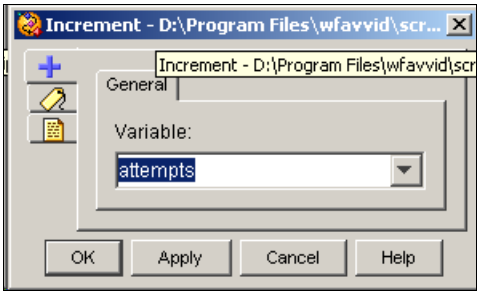
The Retry Branch

The True branch of the IF step contains:

- Increment Step, page 12-32
- Goto MainMenu Step, page 12-33

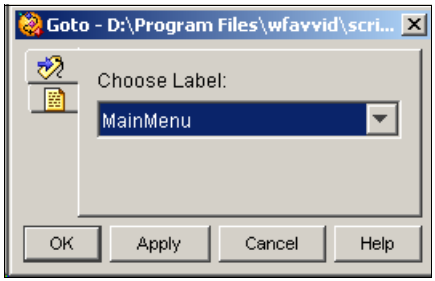
Increment Step

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.



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 12-34
- Use the Create Language Prompt step to localize the prompt with a specific language., page 12-35

- 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 12-37

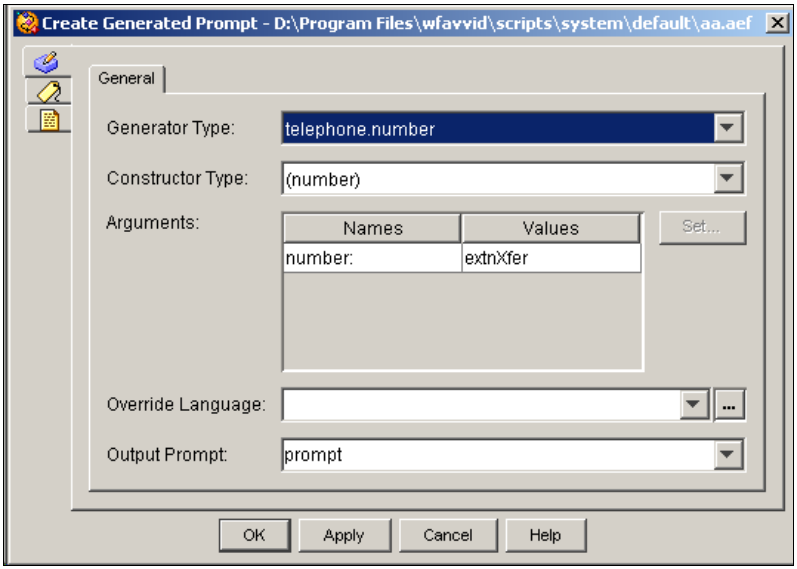
Confirming the Caller Input

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.

The following figure 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:

- Generator Type— **telephone.number**

  Telephone.number is the generator type.
- Constructor Type—**number**

  Number is the constructor type.
- Argument Information list box—**extnXfer**

  The **extnXfer** variable stores the results of the **number** constructor.
- Override Language

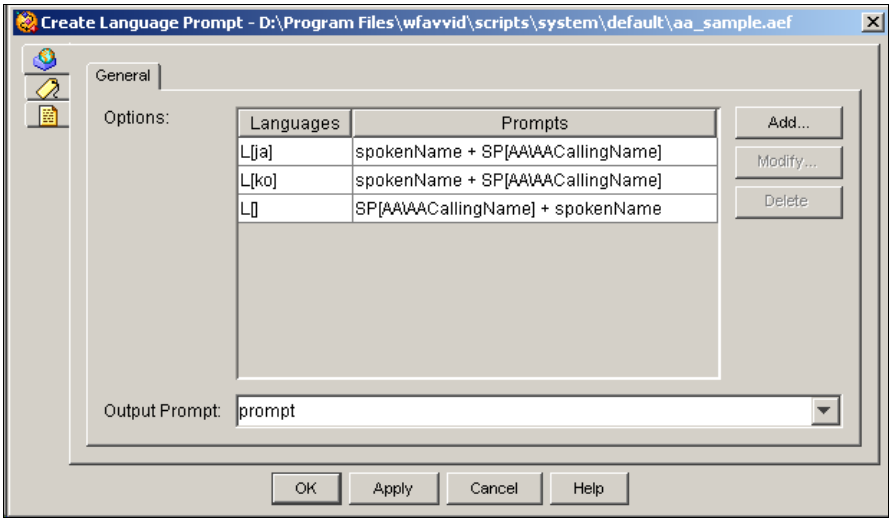
  Optional. Use only if the resulting prompt is played in a different language than the one defined by the contact in which the prompt is played back.
- Output Prompt—**prompt**

  The **prompt** variable stores the value that results from this step.

Localizing the Prompt Language

Use the Create Language Prompt step to localize the prompt with a specific language.

Figure 12-15 Configured Create Language Prompt Customizer Window



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 CRS Scripts” for more information on localizing scripts.

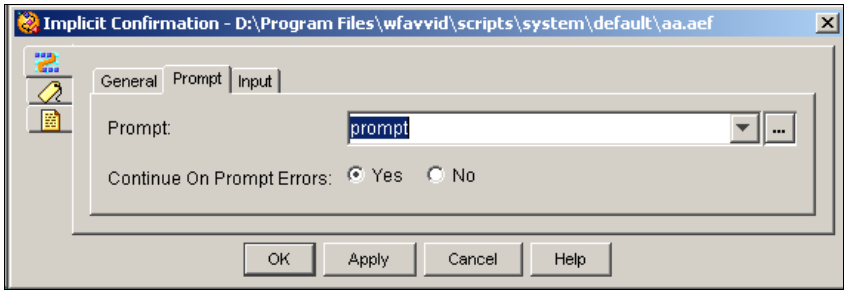
Completing the Input Confirmation

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.

The following figure 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 12-38
- The Extension is Confirmed as Correct, page 12-40

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 12-38

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 12-77).

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 12-40
- The If Step, page 12-44

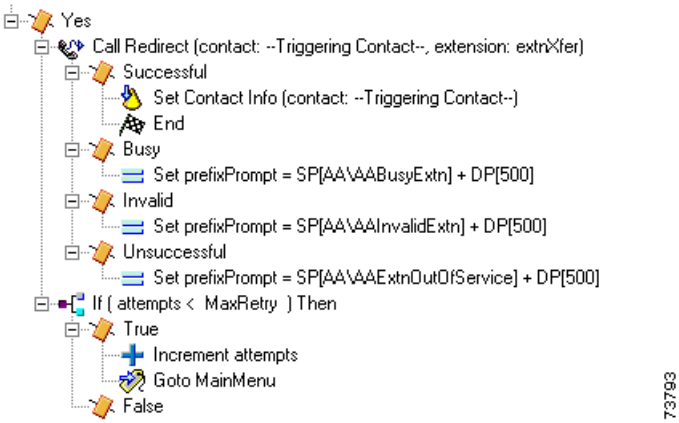
Transferring the Call

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, which attempts to transfer the call, in this case the desired extension number.

As shown in The following figure, 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 12-41
- Receiving a Busy Signal, page 12-42
- Registering an Invalid Transfer Extension, page 12-43
- Unsuccessfully Transferring the Call, page 12-43

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:

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.

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 12-44
- The False Output Branch, page 12-45

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 12-45
- The Goto Step, page 12-45

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 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 12-77).

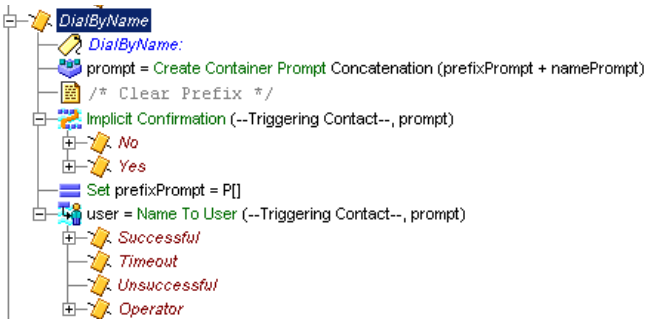
The DialByName Output Branch of the Simple Recognition Step

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 following figure shows the scripting under the DialByName output branch of the Simple Recognition step.

Figure 12-18 DialByName Output Branch Scripting



The DialByName output branch contains four functional steps, the last of which is described in its own section:

- The Label Step, page 12-46
- The Create Container Prompt Step, page 12-47
- 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 12-37
- The Set Step, page 12-47
- The Name To User Step, page 12-47

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

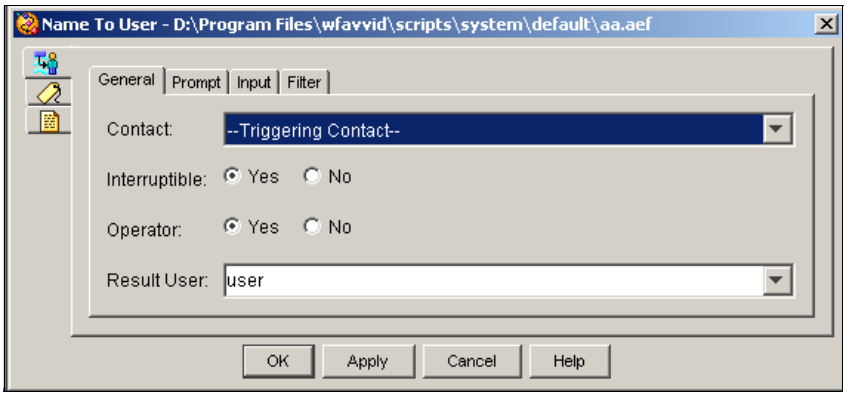
End the DialByName output branch of the Simple Recognition step by dragging a Name To User step from the Media palette to the Design pane, and dropping it over the Set step icon under the Simple Recognition step icon, as shown in Figure 12-18.

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.

The following figure 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.

  - 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 “*”.

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 12-77). 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 12-77).

Two output branches require scripting, each of which is described in its own section:

- The Successfully Receiving Caller Input, page 12-50
- The Operator Output Branch of the Simple Recognition Step, page 12-72

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 12-28; the script requests confirmation, and redirects the call to the desired extension.

The following figure shows the scripting under the Successful output branch of the Name To User step.

Figure 12-20 Name To User—Successful Output Branch Scripting

```
user = Name To User (--Triggering Contact--, prompt)
  Successful
    Get User Info (user)
    If (spokenName == null) Then
      True
        Set prompt = SP[A,A\A,ACalling]
      False
        /* Localize based on Language */
        prompt = Create Language Prompt (L[ja]: spokenName + SP[A,A\A,ACallingName], L[ko]: spokenName + SP[A,A\A,ACallingName], ...)
    Implicit Confirmation (--Triggering Contact--, prompt)
      No
        /* Fall back to Spelling prompt if there is no spoken name and TTS is not available. */
        fullNamePrompt = Create Generated Prompt fullname (firstName, lastName)
        ttsPrompt = Create Generated Prompt fullname (firstName, lastName, ...)
        prompt = Create Conditional Prompt (spokenName == null ? ttsPrompt ||| fullNamePrompt : P[] + spokenName)
        If (asr) Then
        prompt = Create Container Prompt Concatenation (prompt)
        /* Set needs to be removed as soon as the step is fixed to support
           grammar expressions */
        Set grammar = SG[A,A\A,AWantToCall]
        Explicit Confirmation (--Triggering Contact--, prompt, grammar)
        If (attempts < MaxRetry ) Then
      Yes
        Xfer:
        /* Check if extension exist as the new NameToUser step can return users
           that do not have devices associated with them. */
        If (extnXfer != null) Then
        If (attempts < MaxRetry ) Then
```

The Successful output branch of the Name To User step contains three main steps, the last of which is discussed in its own section:

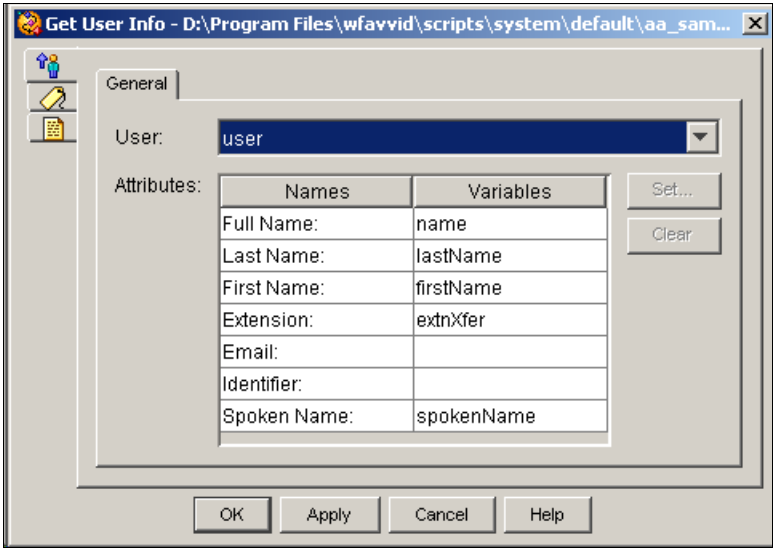
- The Get User Info Step, page 12-52
- The If Step, page 12-53
- The Implicit Confirmation Step, page 12-53

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. The following figure 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 12-53
- The False Output Branch, page 12-53

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 "Use the Create Language Prompt step to localize the prompt with a specific language." section on page 12-35).

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:

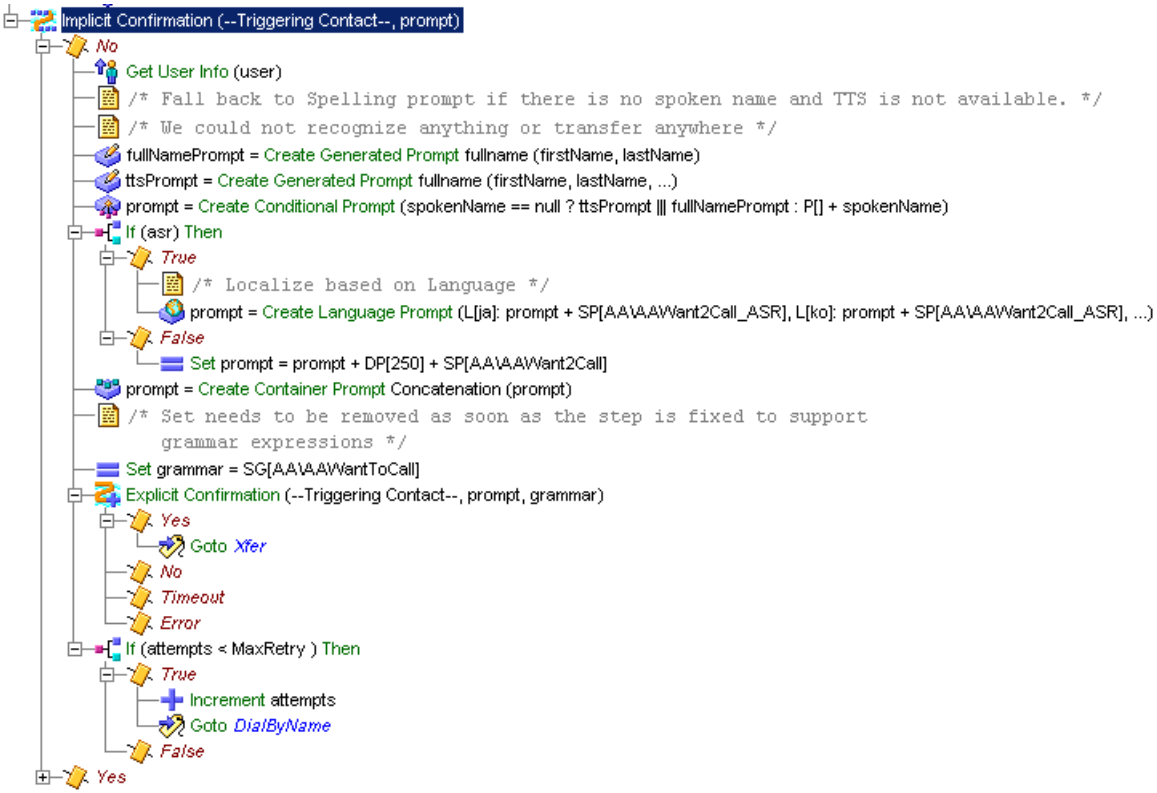
The No Output Branch of the Simple Recognition Step

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.

The following figure shows the scripting under the No output branch of the Implicit Confirmation step.

Figure 12-22 Name To User—No Output Branch of Implicit Confirmation Step



The No output branch of the Implicit Confirmation step contains nine functional steps:

- Get User Info Step, page 12-56
- The First Create Generated Prompt Step, page 12-56
- The Second Create Generated Prompt Step, page 12-57
- The First Create Conditional Prompt Step, page 12-58
- The If Step, page 12-59

- The Create Container Prompt Step, page 12-60
- The Set Step, page 12-61
- The Explicit Confirmation Step, page 12-62
- The If Step, page 12-64

Get User Info Step

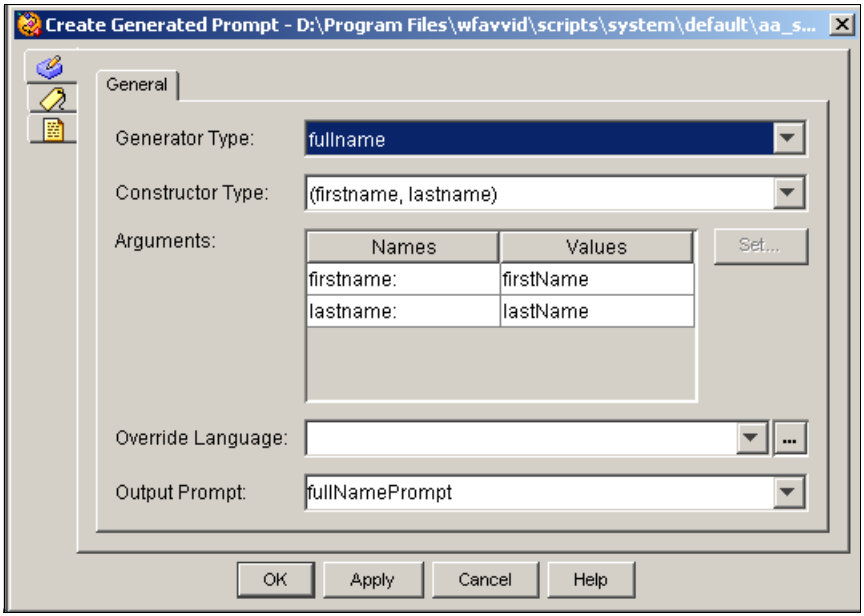
The purpose of this step is to fall back to a spelling prompt if the name is not spoken or text to speech is not available. See The Get User Info Step, page 12-52 for an explanation of how to configure this step.

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.

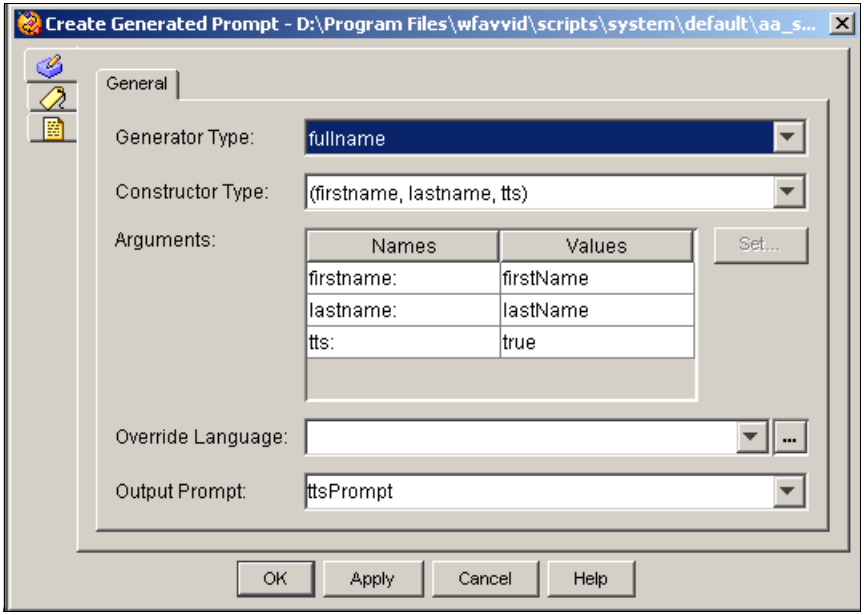
Then configure the Create Generated Prompt step to create a prompt to play back to the caller the digits received, in order to confirm the caller input before transferring the call.

The following figure shows the configured 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.**

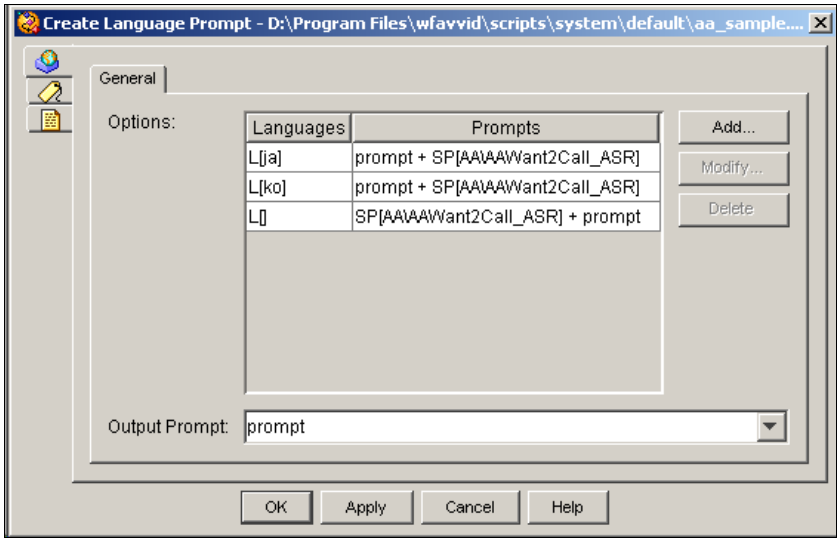
The If Step

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 Use the Create Language Prompt step to localize the prompt with a specific language., page 12-35.



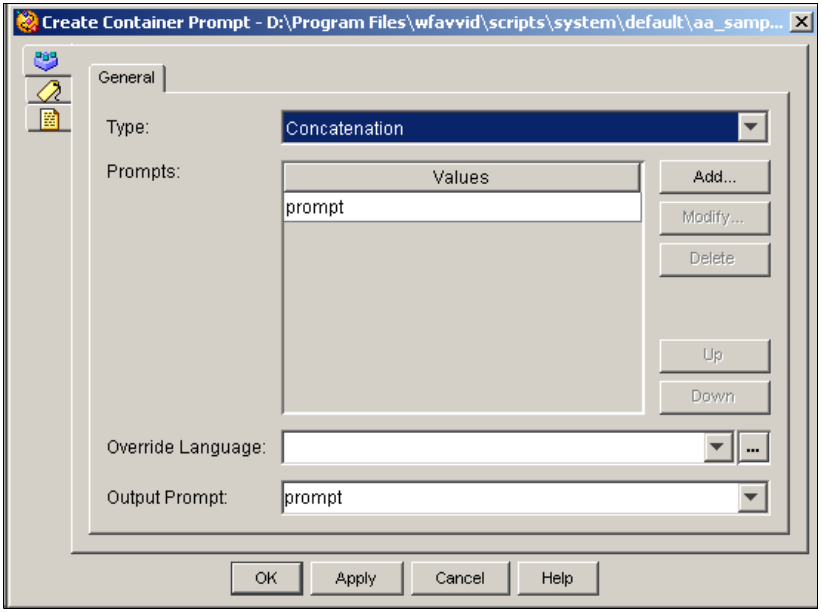
False Branch—Set Prompt

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\AAWant2Call] 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.

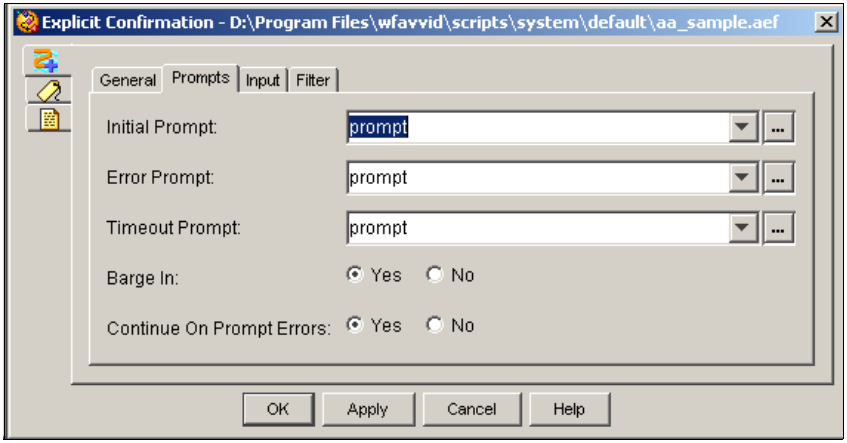
The Explicit Confirmation Step

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.

The following figure shows the configured Prompt tab of the Explicit Confirmation customizer window.

Figure 12-23 Explicit Confirmation Customizer Window—Configured Prompt Tab



Configure the Explicit Confirmation customizer window as followed:

- 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 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/AAWantToCall] 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 12-64) 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 12-67 below), 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 12-64
- The False Output Branch, page 12-65

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 b ranch of the If step:

- The Increment Step, page 12-65
- The Goto Step (DialByName), page 12-65

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.

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 12-77).

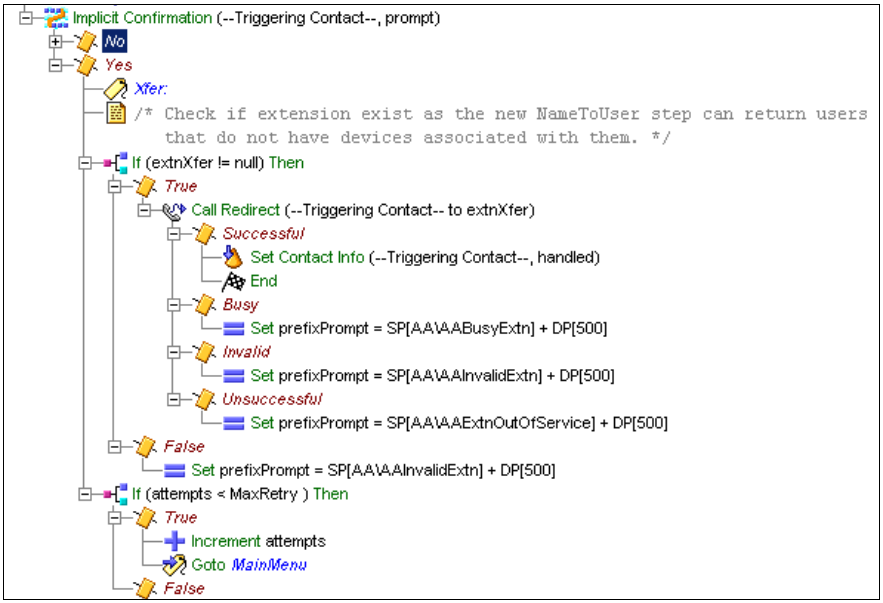
The Yes Output Branch

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.

The following figure shows the scripting under the Yes output branch of the Implicit Confirmation step.

Figure 12-24 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 12-67
- The First If Step, page 12-67
- The Second If Step, page 12-70

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 12-24.

Then configure the Label step to provide a target for the Yes output branch of the Explicit Confirmation step above.

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 12-24.

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 12-24.)

The following sections describe the two output branches of the If step:

- The False Output Branch, page 12-67
- The True Output Branch, page 12-67

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 12-68

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 12-24.

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 12-68
- The Busy Output Branch, page 12-69
- The Invalid Output Branch, page 12-69
- The Unsuccessful Output Branch, page 12-70

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 12-68
- The End Step, page 12-69

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 12-24.

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 12-24.

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 12-24.

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 12-78).

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 12-24.

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 when the script falls through to the final Play Prompt step (see The Call Redirect Step, page 12-78).

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 12-24.

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 when the script falls through to the final Play Prompt step (see The Call Redirect Step, page 12-78).

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 12-24.

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 12-24.)

The following sections describe the two output branches of the If step:

- The False Output Branch, page 12-71
- The True Output Branch, page 12-71

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 12-78).

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 12-71
- The Goto Step, page 12-71

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 12-24.

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 12-24.

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.

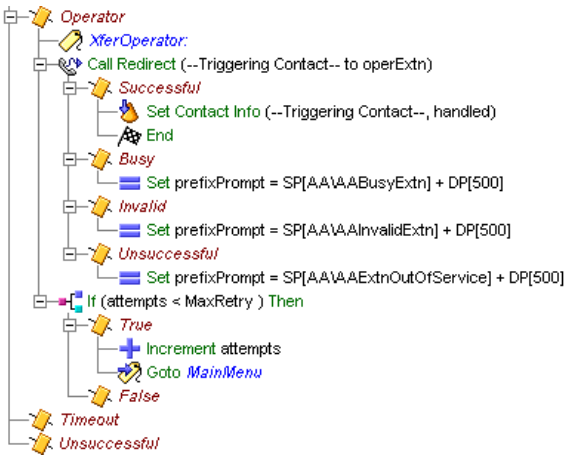
The Operator Output Branch of the Simple Recognition Step

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.

The following figure shows the scripting under the Operator output branch of the Simple Recognition step.

Figure 12-25 Simple Recognition—Operator Output Branch



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 12-73

- The Call Redirect Step, page 12-73
- The If Step, page 12-75

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 12-25.

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 12-25.

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 19, "Designing IPCC Gateway Scripts."

The Call Redirect step has four output branches:

- The Successful Output Branch, page 12-73
- The Busy Output Branch, page 12-74
- The Invalid Output Branch, page 12-75
- The Unsuccessful Output Branch, page 12-75

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 12-25.

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 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 12-25.

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 12-25.

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 12-25.

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 12-76
- The False Output Branch, page 12-77

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 12-76
- The Goto Step, page 12-76

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 12-25.

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 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 12-25.

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

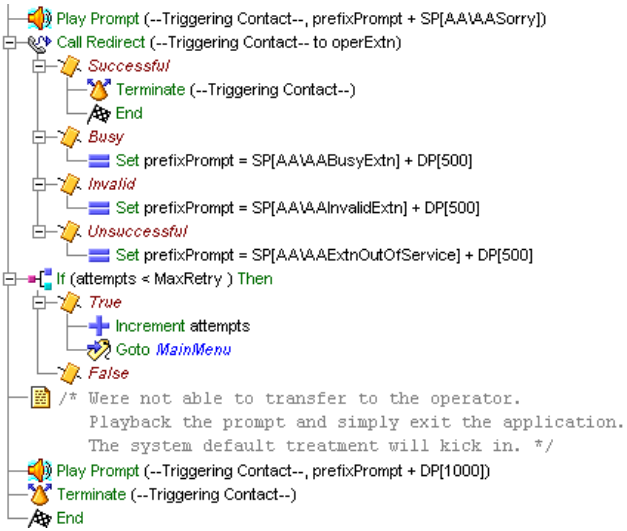
In case none of the steps and branches under the Simple Recognition step succeed in transferring the call, continue the aa.aef script by dragging a Play Prompt step from the Prompt palette to the Design pane, and dropping it over the Simple Recognition step, as shown in Figure 12-1.

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 **prefixPrompt + SP[AA/AASorry]**, which informs the caller the reason the attempted transfer was unsuccessful.

The following figure shows the closing steps of the aa.aef script.

Figure 12-26 End of 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 12-26.

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\AABusyExtn] + 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 12-26.

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.

Designing Contact-Neutral Scripts

You can use the Cisco Customer Response Solutions (CRS) 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 section describes the Cisco CRS 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 IP IVR (Interactive Voice Response) aa.aef script as described in Chapter 12, "Designing an 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:

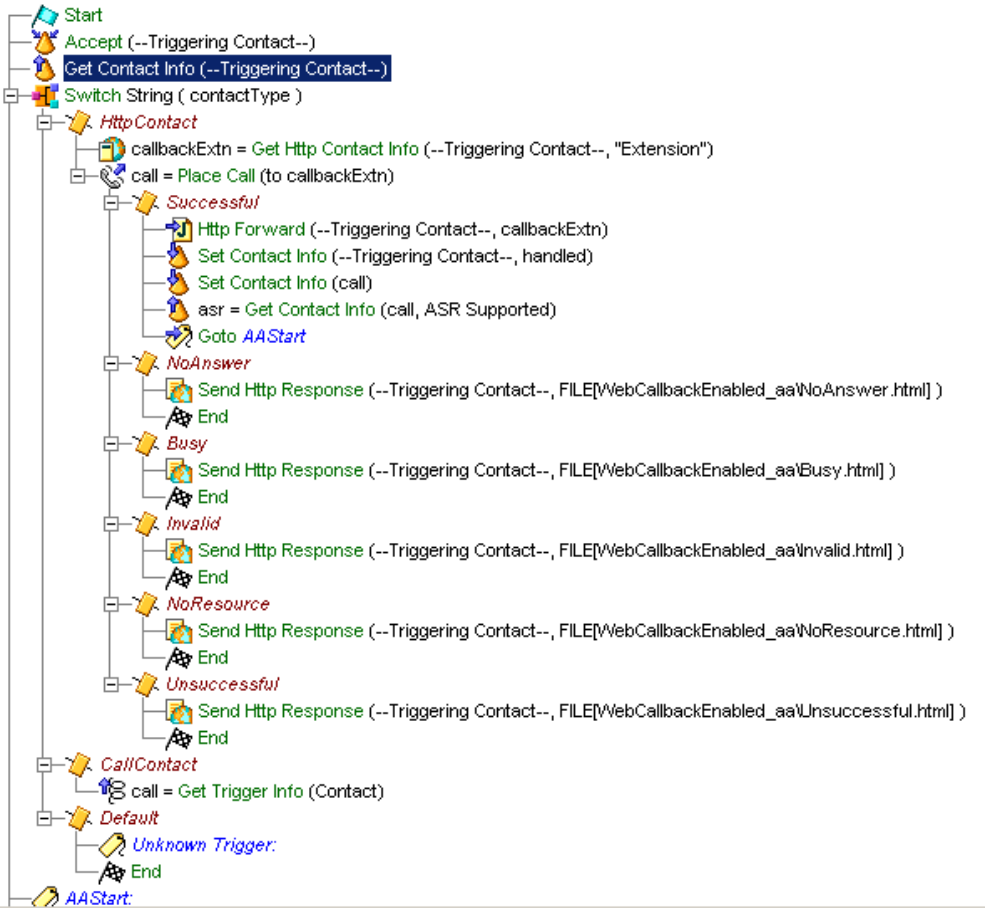
An Example Contact Neutral (Phone or HTTP) Script Template

This example template 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.

Figure 13-1 Contact-Neutral Scripting Example Template



The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS Editor window.

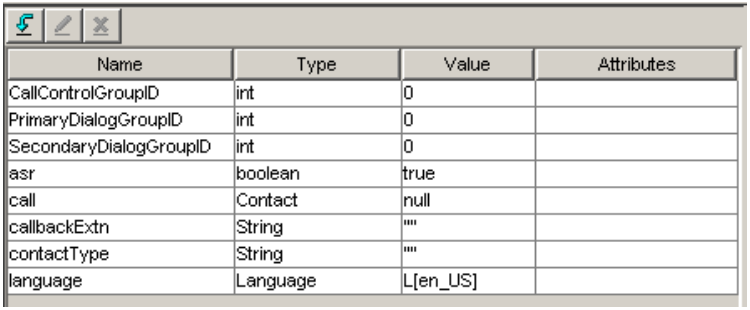
The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar. Our example script is called hello.aef.

Contact-Neutral Script Variables

Begin the contact-neutral sample script design process by using the Variable pane of the CRS Editor to define script variables.

The following figure shows the variables of the contact-neutral sample script as they appear in the Variable pane of the CRS Editor window.

Figure 13-2 Variable Pane of the Contact-Neutral Sample Script



Name	Type	Value	Attributes
CallControlGroupID	int	0	
PrimaryDialogGroupID	int	0	
SecondaryDialogGroupID	int	0	
asr	boolean	true	
call	Contact	null	
callbackExtn	String	""	
contactType	String	""	
language	Language	L[en_US]	

The following table describes the variables used in the contact-neutral sample script.

Table 13-1 Variables in the Contact-Neutral Script

Variable Name	Variable Type	Value	Function
CallControlGroupId	Integer	0	Call Control Group with which the outbound call is associated. (See The HttpContact Output Branch of the Switch Step, page 13-9.) Mark this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, refer to the *Cisco Customer Response Solutions Administrator Guide*.
PrimaryControlGroupId	Integer	0	Stores the identifying number of the primary dialog group for handling the outbound call. (See The HttpContact Output Branch of the Switch Step, page 13-9.) Mark this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, refer to the *Cisco Customer Response Solutions Administrator Guide*.

Table 13-1 Variables in the Contact-Neutral Script (continued)

Variable Name	Variable Type	Value	Function
SecondaryControlGroupId	Integer	0	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 13-9.) Mark this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, refer to the *Cisco Customer Response Solutions Administration Guide*.
asr	boolean	true	Indicates whether or not the script is enabled for speech recognition. (See The Get Contact Info Step, page 13-7.)
call	Contact	0	Stores a handle to the call object to which the IP IVR script will be applied. (See The HttpContact Output Branch of the Switch Step, page 13-9.)
callbackExtn	String	""	Stores the extension number input from the web page prompt. (See The HttpContact Output Branch of the Switch Step, page 13-9.)
contactType	String	""	Stores the information identifying the type of contact (telephone call or HTTP request). (See The following table describes the variables used in the contact-neutral sample script., page 13-5.)
language	Language		Stores the default language used for prompts. (See The Get Contact Info Step, page 13-7.)

The Accept Step

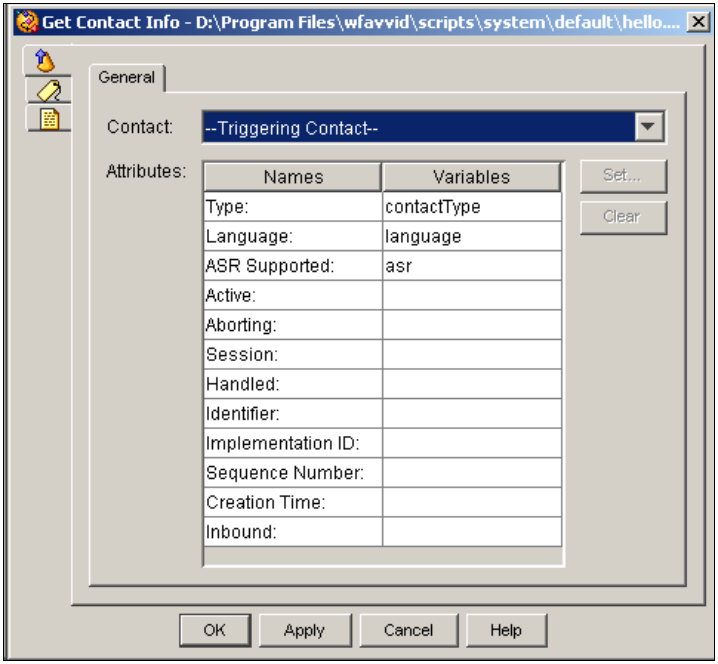
Continue the script by dragging an Accept step from the Contact palette (in the Palette pane) to the Design pane of the CRS Editor window, as shown in Figure 13-1. The script uses an Accept step to accept a contact, in this case either a telephone call or an HTTP request.

The Get Contact Info Step

Use the Get Contact Info step to make available to the script the type of contact received.

The following figure 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**

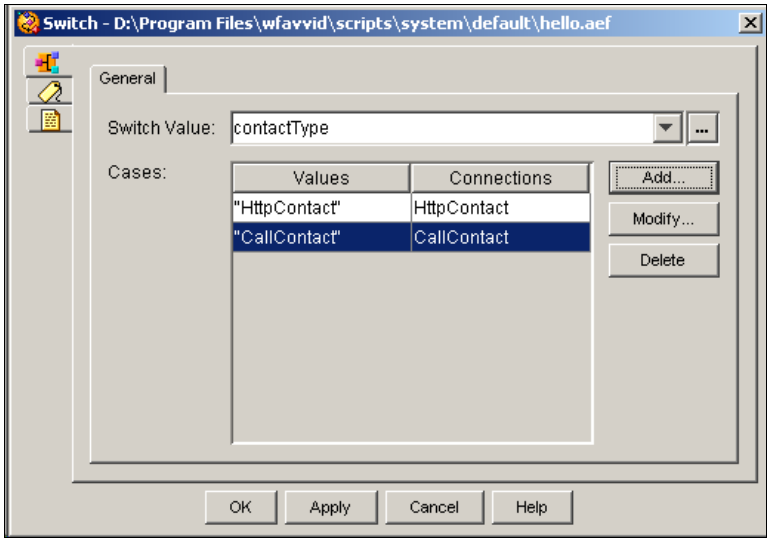
  The **asr** variable stores the information that tells the script whether or not Automatic Speech Recognition (ASR) is supported on the local system.

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.

The following figure 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 the following figure, 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:

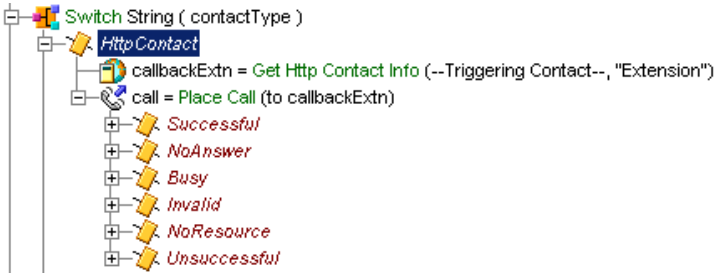
- The HttpContact Output Branch of the Switch Step, page 13-9
- The CallContact Branch of the Switch Step, page 13-19
- The Default Branch of the Switch Step, page 13-22

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.

The following figure shows the scripting under the HttpContact output branch of the Switch step.

Figure 13-6 HttpContact Scripting



This section contains the following steps:

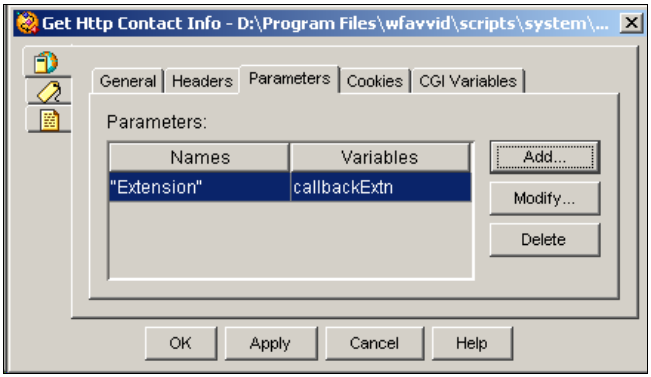
- The Get Http Contact Info Step, page 13-11
- The Place Call Step, page 13-11

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.

The following figure shows the configured Parameters tab of the Get Http Contact Info customizer window.

Figure 13-7 Get Http Contact Info Customizer Window—Configured Parameters Tab



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—**CallControlGroupId**

  The **CallControlGroupId** variable stores the call control group information with which the outbound call is associated.

- Primary Dialog Group ID—**PrimaryDialogGroupId**

  The **PrimaryDialogGroupId** variable stores the primary dialog group information with which the outbound call is associated.

- Secondary Dialog Group ID—**SecondaryDialogGroupId**
- The **SecondaryDialogGroupId** variable stores the secondary dialog group information with which the outbound call is associated.
- Call Contact—**call**

  The **call** variable name stores a handle to the call object that the subsequent 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:

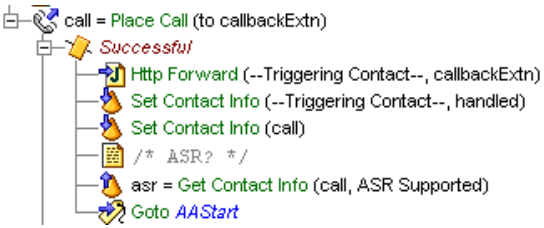
- The Successful Output Branch, page 13-13
- The Other Output Branches, page 13-17

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 IP IVR script.

The following figure 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:

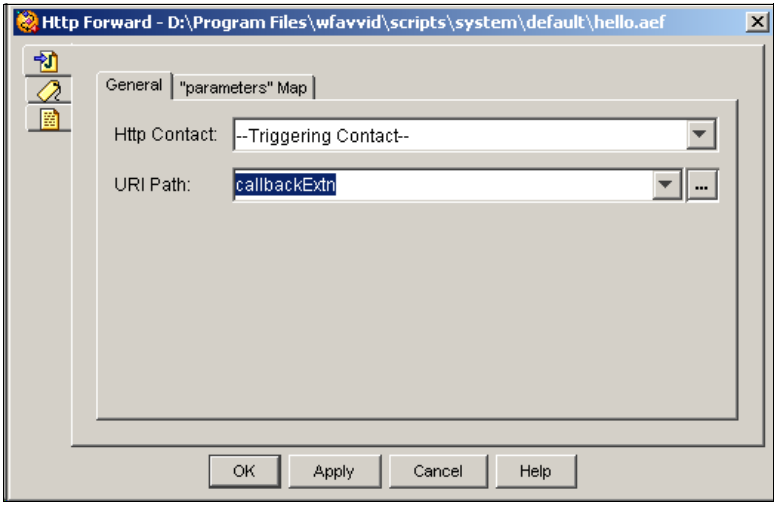
- The Http Forward Step, page 13-13
- The Set Contact Info Steps, page 13-15
- The Get Contact Info Step, page 13-16
- The Goto Step, page 13-17

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.

The following figure 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"**

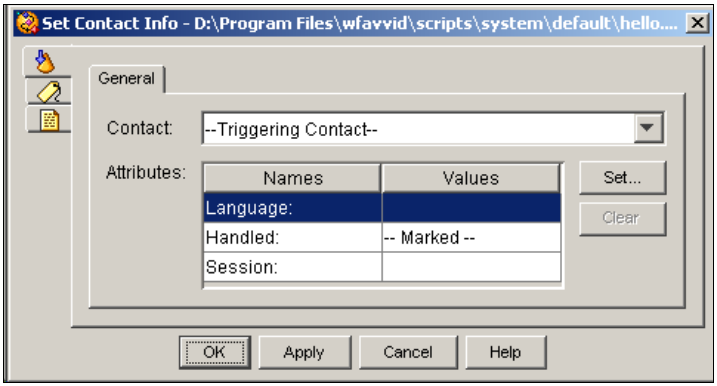
  The **Extension** keyword maps to the **callbackExtn** variable.

- Value—**callbackExtn**

The Set Contact Info Steps

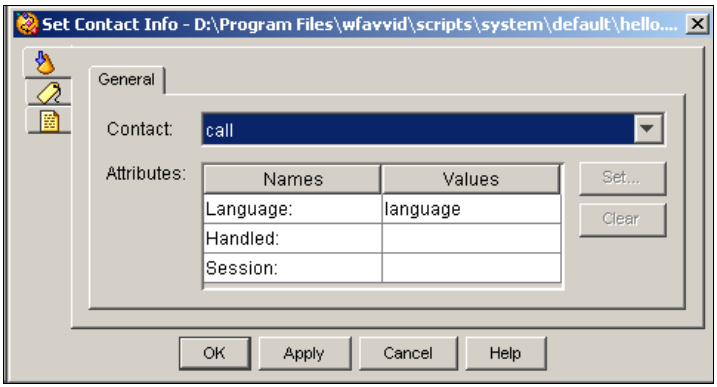
After the Http Forward step, use the first Set Contact Info step to mark the HTTP Contact as Handled, which is useful for reporting purposes. The following figure shows the configured first Set Contact Info customizer window.

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 IP IVR script) the value of the **language** variable as the default language.

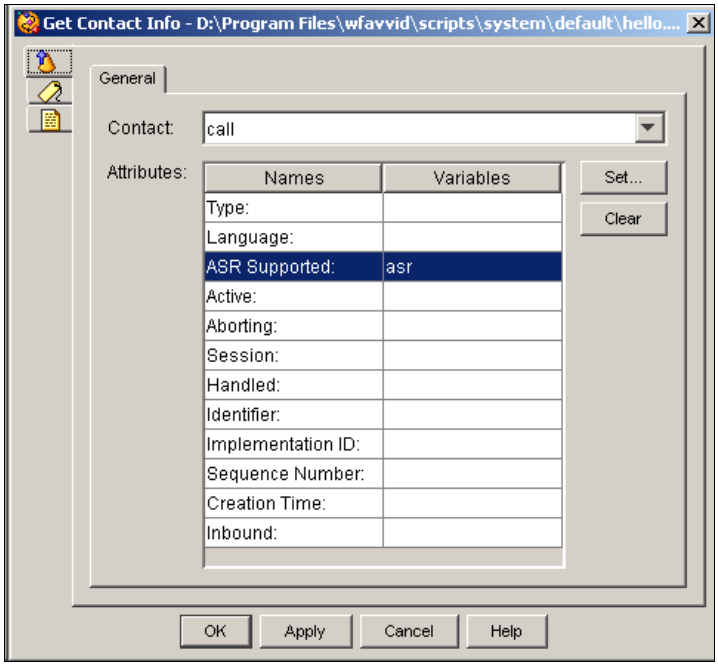
Figure 13-11 Configured Second Set Contact Info Customizer Window



The Get Contact Info Step

Use the Get Contact Info step to determine whether or not ASR is enabled on the system. The following figure 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 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

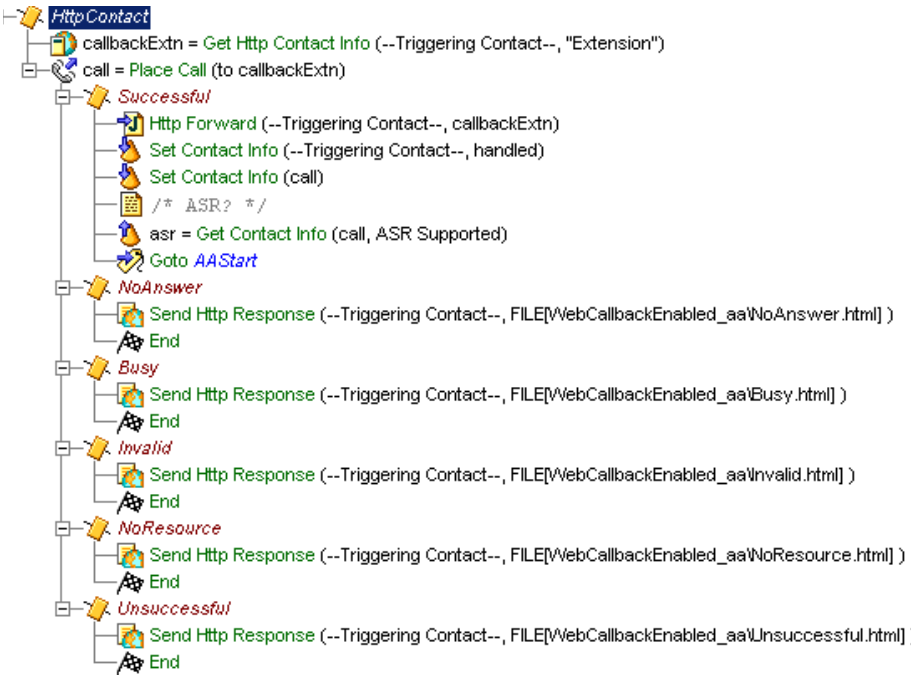
The last step under the Successful output branch of the Place Call step is a Goto step, which directs the script to the Label AAStart at the beginning of the IP IVR script (see Figure 13-1.) From the AAStart label, the script is exactly the same as if the call had been an inbound call.

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.

The following figure 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:

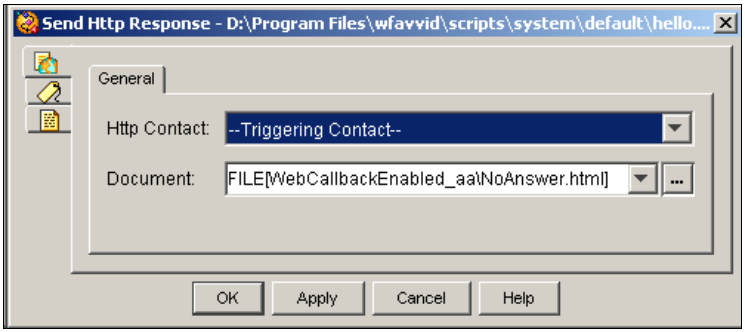
- The Send Http Response Step, page 13-18
- The End Step, page 13-18

The Send Http Response Step

Use the Send Http Response step to send the HTML file back to the originating browser.

The following figure 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

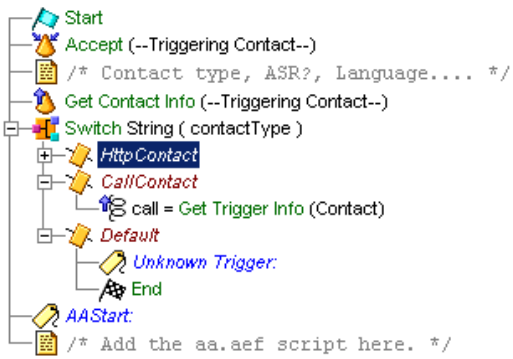
The End step ends the script and releases all system resources. The End step requires no configuration and has no customizer.

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.

The following figure shows the scripting under the CallContact (and Default) case of the Switch step.

Figure 13-15 CallContact and Default Cases of the Switch Step



The CallContact output branch of the Switch step has one step:

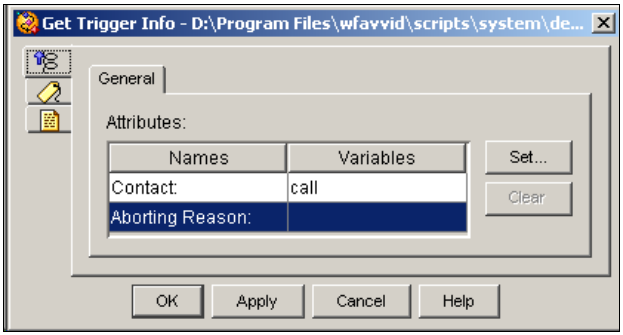
- The Get Trigger Info Step, page 13-20

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**.

The following figure shows the configured Get Trigger Info customizer window.

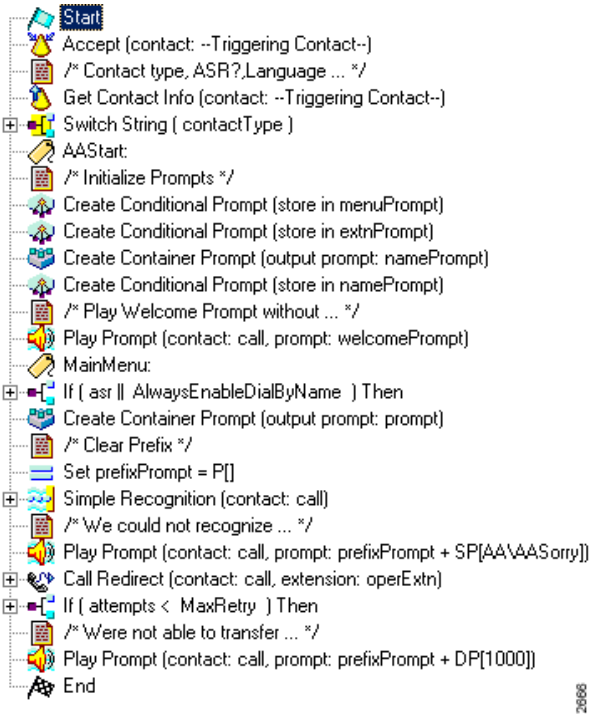
Figure 13-16 Configured Get Trigger Info Customizer Window



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 IP IVR script treats the contact as a call rather than an HTTP request.

The following figure shows the top level of the full IP IVR script.

Figure 13-17 Full IP IVR Scripting Example



After the AA Label, the script is identical to the aa.aef script described in Chapter 12, "Designing an 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 Customer Response Solutions (CRS) Editor to design scripts that take advantage of Text-To-Speech (TTS) capability. This chapter describes the design of such as script, TTSsample.aef.

Note Before using a TTS script as a CRS application, you should first validate the script against the MCRP TTS vendor's list of supported capabilities.

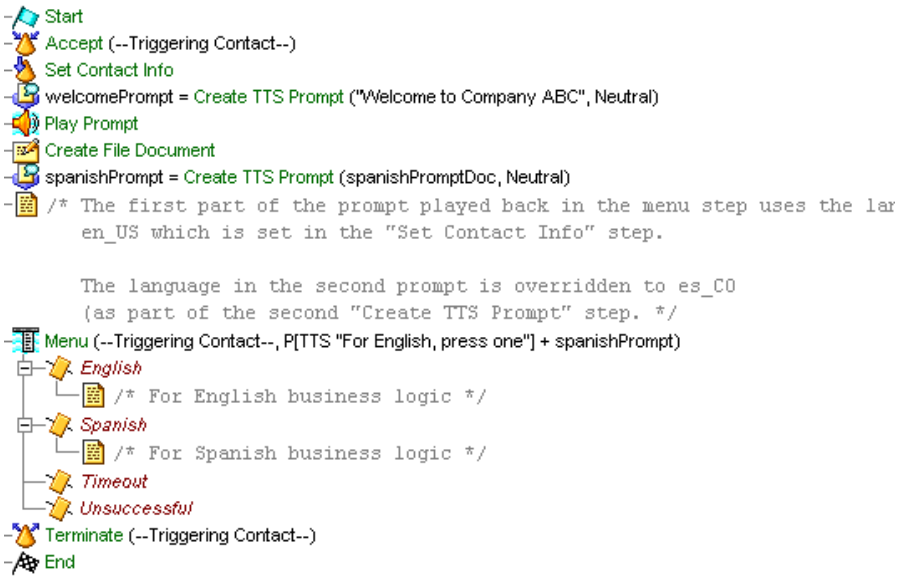
This section contains the following topics:

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.

The following figure shows the TTSsample.aef script as it appears in the Design pane of the Cisco CRS Editor window.

Figure 14-1 Design Pane of the TTSsample.aef Script



The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS Editor window.

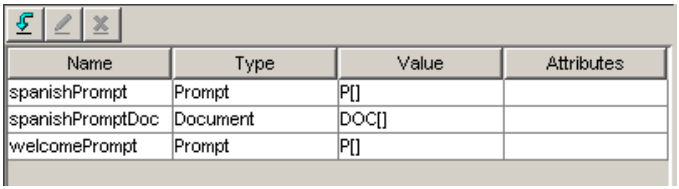
The Start step needs no configuration and has no customizer window. At this time, you might also want to give your new script a name and save it by selecting **File > Save** from the menu bar. Our example script is called TTSsample.aef.

TTS Script Variables

Begin the TTSsample.aef script design process by using the Variable pane of the CRS Editor to define script variables.

The following figure shows the variables of the TTSsample.aef script as they appear in the Variable pane of the CRS Editor window.

Figure 14-2 Variable Pane of the TTSsample.aef Script



Name	Type	Value	Attributes
spanishPrompt	Prompt	P[]	
spanishPromptDoc	Document	DOC[]	
welcomePrompt	Prompt	P[]	

The table below describes the variables used in the TTSsample.aef sample script.

Table 14-1 Descriptions of Variables in the TTSsample.aef Script

Variable Name	Variable Type	Value	Function
spanishPrompt	Prompt	—	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.)
spanishPromptDoc	Document	null	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.)
welcomePrompt	Prompt	—	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.)

The Accept Step

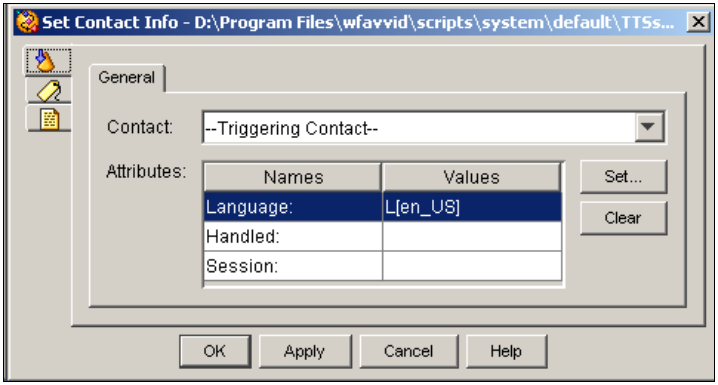
Continue to build the TTSsample.aef script by dragging an Accept step (from the Contact palette in the Palette pane) to the Design pane of the CRS Editor window, as shown in Figure 14-1. The script uses an Accept step to accept a contact.

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.

The following figure shows the configured Set Contact Info customizer window.

Figure 14-3 Configured Set Contact Info Customizer Window

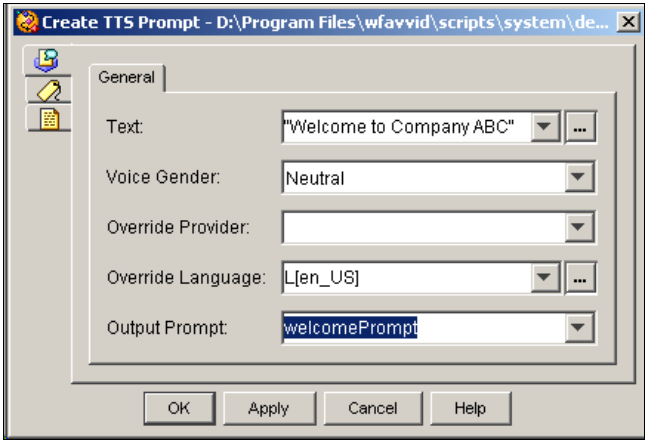


The First Create TTS Prompt Step

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.

The following figure 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 where 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.)

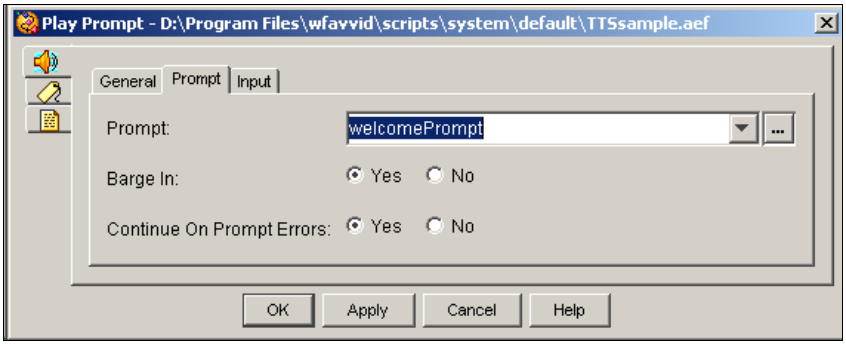
The Play Prompt Step

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.

The following figure shows the configured Prompt tab of the Play Prompt customizer window.

Figure 14-5 Play Prompt Customizer Window—Configured Prompt Tab



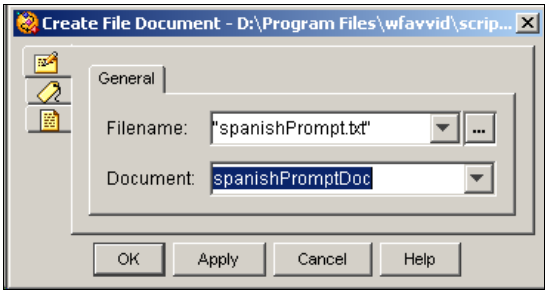
The Create File Document Step

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.

The following figure 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**

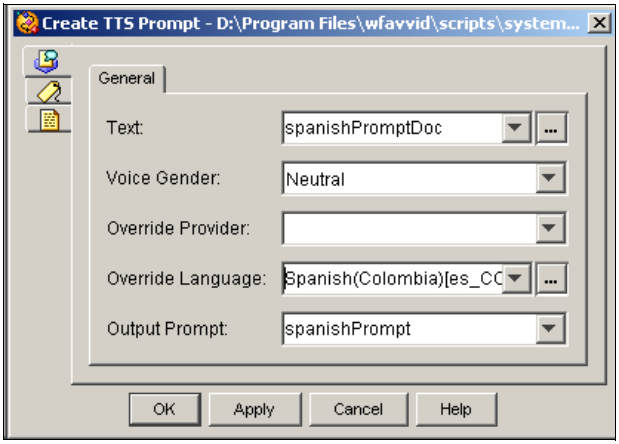
  This document variable will be used by the subsequent Create TTS Prompt step to create a Spanish language prompt.

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.

The following figure 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.

  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**

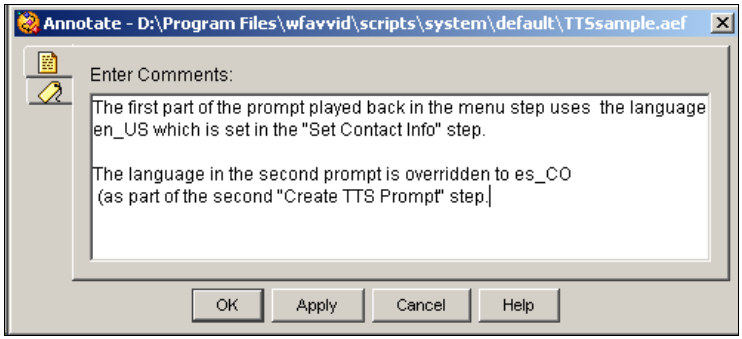
  The name of the prompt that this step creates and that the subsequent Menu step will play.

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.

The following figure shows the configured Annotate customizer window.

Figure 14-8 Annotate Customizer Window



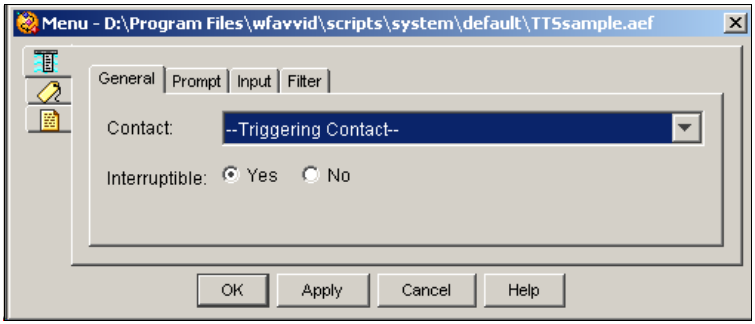
Note The Menu step itself also contains two instances of the Annotate step.

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.

The following figure 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**

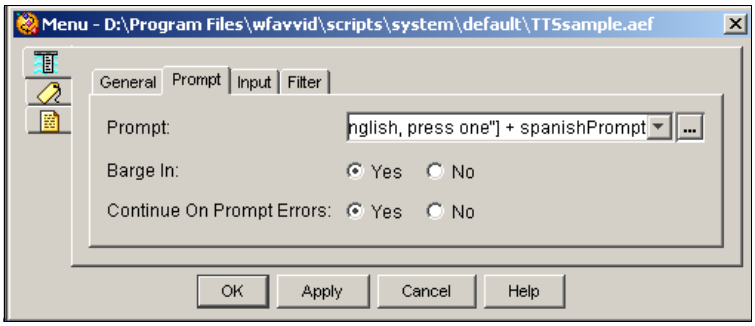
  The Menu step acts upon the contact that triggered the execution of the Menu step.

- Interruptible—**Yes**

  External events can interrupt the execution of this step.

The following figure 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"] + spanishPrompt**

  The Menu step plays this prompt back to the caller. The specified prompt expression combines the TTS prompt, “For English, press one” with **spanishPrompt**, 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**

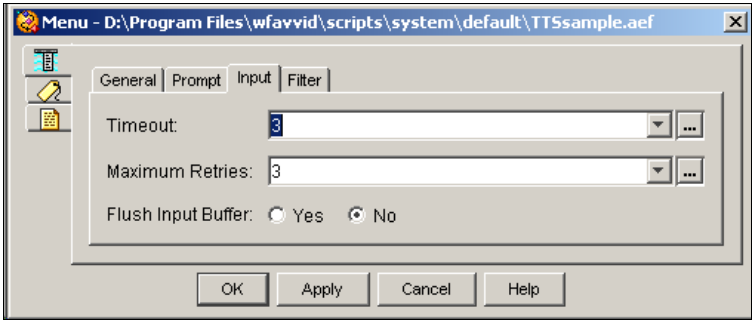
  The caller can respond without having to listen to the whole playback of the prompt.

- 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.

The following figure 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 plays the prompt to the caller up to 3 times after a timeout or invalid input response.

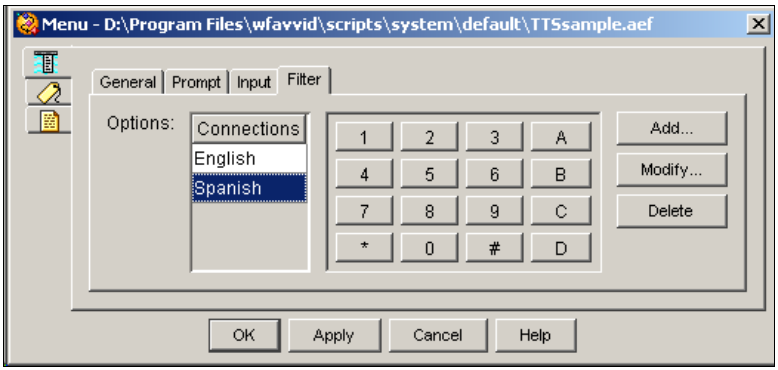
  In this case, after 3 retries, the Menu step executes either the Timeout or Unsuccessful output branches, depending on whether the last try timed out or the caller entered an invalid input response.

- Flush Input Buffer—**No**

  The caller can type ahead and the step will save the previous input.

The following figure 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.

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.

Designing CRS VoiceXML Applications

This section describes how to use the capabilities of Cisco CRS 4.0 to develop VoiceXML applications.

This section includes the following topics:

For further information in this guide on CRS 4.0 VoiceXML applications, see:

- Appendix A, “VoiceXML Implementation for Cisco Voice Browser”
- Appendix B, “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.
- **VoiceXML Document**. An executable VoiceXML file (text_file.vxml) is called a document. A VoiceXML interpreter loads a document file to execute it.
- **CRS Script**.CRS scripts can extend the functionality of a VoiceXML document. A CRS script is a sequence of steps constructed in the Cisco CRS Editor for controlling the flow of customer calls and multimedia contacts. You can use the steps of the Cisco Customer Response Solutions (CRS) Editor to design scripts that take advantage of the capabilities of VoiceXML. In a CRS script you can link any number of times to one or more VoiceXML documents depending on what you need to accomplish.
- **CRS VoiceXML application**. A CRS VoiceXML application is a CRS script (CRS_Editor_file.aef) that links to a VoiceXML document (text_file.vxml).

A Prerequisite and a Recommendation

Before using a VoiceXML document with a CRS 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 Interactive Voice Response (IVR) scripts. To ensure a good user experience, Cisco recommends engaging the services of a professional services company or consultant to develop or assist in developing most ASR applications.

Updating CRS 3.x VoiceXML Applications

All VoiceXML documents (text_file_document.vxml) and CRS scripts (crs_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 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 Cisco 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 refer to 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>, , 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 A-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 4.0(x) Scripts

To convert a VoiceXML CRS 3.x script to a CRS 4.0 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 CRS Scripting and Development Series: Volume 2, CRS Editor Reference guide*.

In CRS 4.0:

- 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 CRS VoiceXML Applications

To develop a CRS 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 CRS Editor script (crs_editor_file.aef) that calls the VoiceXML document.

Note Both VoiceXML documents and CRS Editor scripts can use the CRTP protocol to fetch resources (documents, prompts and grammars) from the CRS Repository. See How and Why To Use the CRTP Protocol, page 2-49.

Creating VoiceXML Documents

A VoiceXML document is an XML (eXtensible Markup Language) text file. VoiceXML 2.0 is the version of VoiceXML that CRS 4.0 supports.

You can use numerous tools to write VoiceXML, including simple text editors, server scripting languages, and third-party VoiceXML editors.

This sections covers:

Related Documentation

See the following documents for further information on VoiceXML:

- The *Voice Extensible Markup Language (VoiceXML) Version 2.0* specification at http://www.w3.org/TR/voicexml20/ defines VoiceXML, the Voice Extensible Markup Language.
- 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 VoceXML 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 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
       <value expr="street"/>
       in
       <value expr="citystate"/>
      </prompt>
      <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.
  - <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

A document type definition (DTD) defines the validity of an XML document. See Appendix A, "VoiceXML Implementation for Cisco Voice Browser," for the DTD defined for VoiceXML 2.0. You can instruct the parser to validate the document by referencing the document in the document type declaration.

The Cisco CRS Voice Browser includes a custom version of voicexml.dtd with some minor enhancements. The simplest way to use voicexml.dtd is to reference it with the URI (Uniform Resource Identifier) "file:voicexml.dtd"in the <!DOCTYPE> element as in the following example:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE vxml SYSTEM "file:voicexml.dtd">
<vxml xmlns="http://www.w3.org/2001/vxml" version="2.0">
```

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 phrase 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:

- CRS 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>
```

```
</form>
```

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 CRS 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".

- com.cisco.dtmf.termlength—Sets the maximum number of DTMF tones that can be entered and interpreted within a single recognition. Once the caller has entered this number of tones, the result is returned to the Voice Browser.

  The default value is 32.

This section contains the following topics:

- Using DTMF for Menu Navigation, page 15-11
- Receiving Digit String Input, page 15-13
- Using DTMF Grammar, page 15-13

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 <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. The following example 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.

The following example shows the scripting for the preceding banking application.

Example 15-2 Using DTMF

```
<menu id="main">
  <prompt>
      For checking account balance, press 1.
      For savings account balance, press 2.
      For credit card balance, press 3.
      Press * when you are finished.
  </prompt>
  <!-- Just 1 digit is enough -->
  <property name="com.cisco.dtmf.termlength" value="1"/>
  <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.

- Uses the “com.cisco.dtmf.termlength” property to limit the maximum number of digits to 1, so that the result is returned immediately after the caller inputs a single digit, without having to wait for a timeout or for the user to press a terminating key.

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.

The example below shows how to receive DTMF input for a credit card account number.

Example 15-3 Receiving Digit String Input

```
<form>
  <field name="creditNumber" type="digits">

     Please enter your credit card number.
     Press the pound key when finished.

    <filled>
      Your credit card number is
       <value expr="creditNumber" class="digits" mode="recorded"/>
       <exit namelist="creditNumber"/>
     </filled>

  </field>
</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 the following example, you can just 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

```
<form>
  <field name="getPin">
    Please enter your pin

    <!-- The pin is 4321 -->
    <grammar xml:lang="en-US" root = "pin" mode="dtmf">
      <rule id="pin" scope="public">
        <one-of lang-list="en-US">
          <item> 4321 </item>
        </one-of>
      </rule>
    </grammar>
    <!-- accept input after user entered 4 digits -->
    <property name="com.cisco.dtmf.termlength" value="4"/>

    <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>
```

In the preceding example, you use the “com.cisco.dtmf.termlength” property to limit the maximum number of digits to 4, so that the result is returned immediately after 4 digits are input, without having to wait for a timeout or for the caller to press a terminating key.

Using Text to Speech Output

This section covers the following topics:

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 CRS 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 CRS 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 CRS 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 CiscoSSMLLite provider. This provider however is only capable of playing out wav file prompts specified through "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 CRS 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 CRS 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.

  and

- 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 CRS, 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 CRS uses:

1. If a gender property has been specified, CRS uses that gender. If no TTS server is found for that gender, CRS tries the default gender if it's value is different from the overridden gender. If no TTS server is found for the default gender, then CRS fails the request.
2. If a gender property has not been specified, CRS uses the default gender for the locale specified in the TTS prompt. If no TTS server is found for the default gender, then CRS tries Female, Male and Neutral gender in that sequence until a TTS server is found. If none is found, CRS fails the request.

Using the CRTP Protocol

In a VoiceXML document on a CRS system, you can fetch resources from the CRS 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 CRS 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 HTTPO protocol equivalent. This is done by the CRS 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 2-49 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, etc.) 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 CRS Scripts that Run VoiceXML Documents

The CRS Voice Browser is fully integrated with the CRS Engine. You can use scripts designed in the CRS Editor to extend VoiceXML applications (documents) by providing IPCC Express 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 CRS script, and when the agent receives the call, the information collected by VoiceXML will be available.

This section covers:

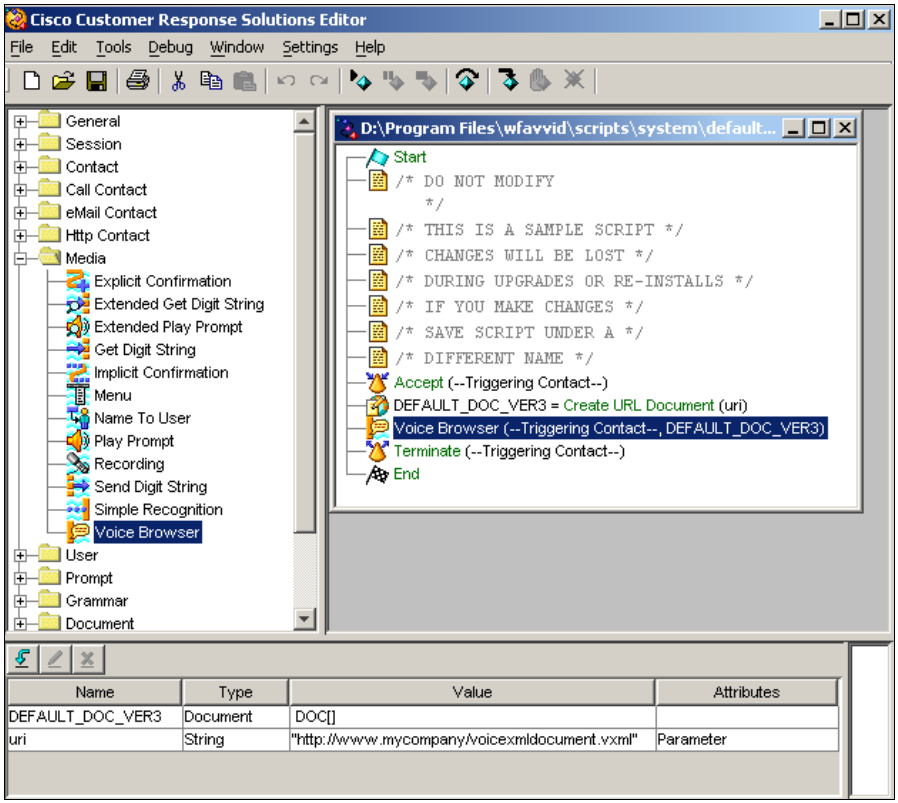
Related Documentation

For complete descriptions of the CRS steps used in creating CRS Editor scripts, see the *Cisco CRS Scripting and Development Series: Volume 2, CRS Editor Reference guide*.

A Sample Voicebrower.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 CRS Editor.

Figure 15-1 Voicebrowser.aef Script



The CRS ***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 CRS Editor to invoke a VoiceXML application. This step can be used as many times in a script as is necessary.

When creating a CRS 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 CRS 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 to create a CRS script that runs a VoiceXML document.

This section covers:

Step 1: The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS 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 CRS 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 CRS Editor window. The following table describes them.

Table 15-1 Descriptions of the Variables in the Voicebrowser.aef Script

Variable Name	Variable Type	Value	Function
DEFAULT_DOC_VER3 (the name is arbitrary)	Document	DOC[]	Specifies the VoiceXML Document that will be used as a parameter in the Voice Browser step. This variable is required.
uri (the name is arbitrary)	String	"" (You need to enter the voiceXML document http address between the quotes)	Specifies the URI address of the VoiceXML document. The example in the previous figure uses: "http://www.mycompany.com/VoiceXmlDocument.vxml" 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.

Step 2: Enter the Start Step

Begin to build your Voicebrowser.aef script by choosing **File > New** from the CRS Editor menu bar. The CRS Editor places a Start step in the Design pane of the CRS 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 CRS 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 **uri** and the document variable **DEFAULT_DOC_VER3** that you created and click **OK**. This assigns the URL address in the string variable to the document variable.

This step defines the XML document variable, 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 15-2 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 CRS VoiceXML script.

Figure 15-2 Voice Browser Customizer Window—General Tab

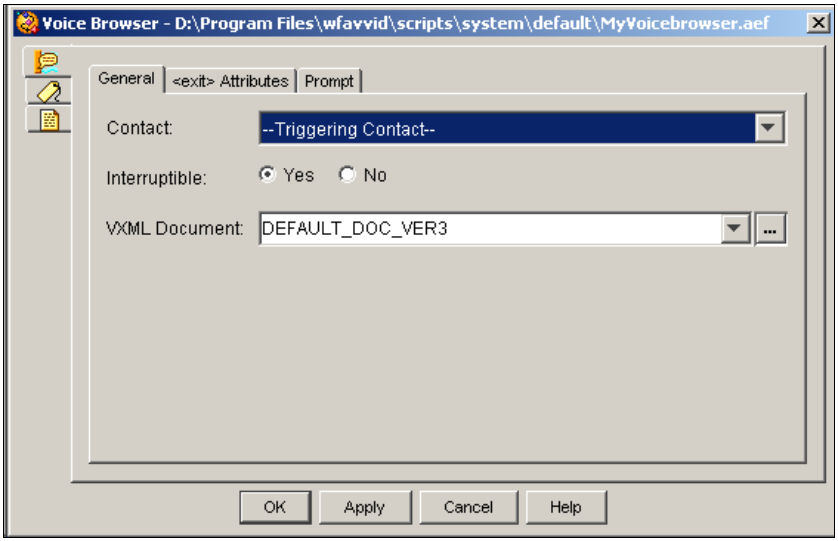


Figure 15-3 shows the <exit> Attributes tab of the Voice Browser customizer window.

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 15-13 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 CRS 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 15-3 Voice Browser Customizer Window—<exit > Attributes Tab

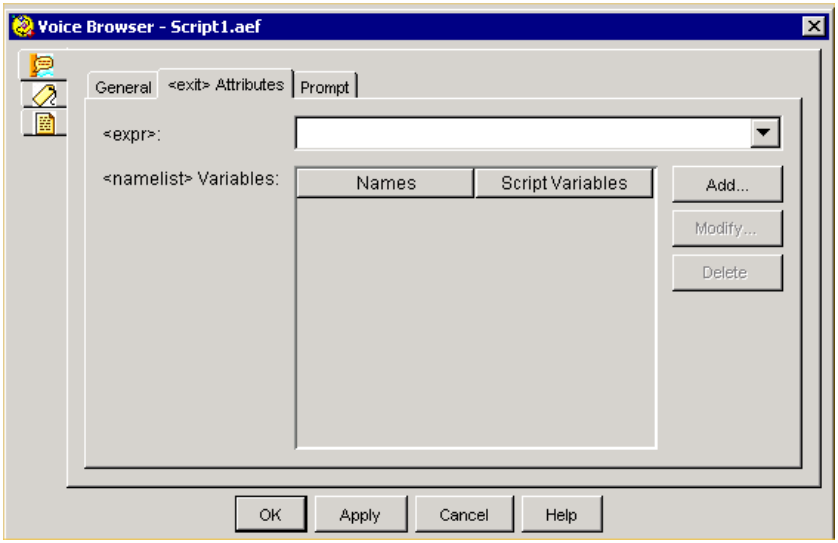
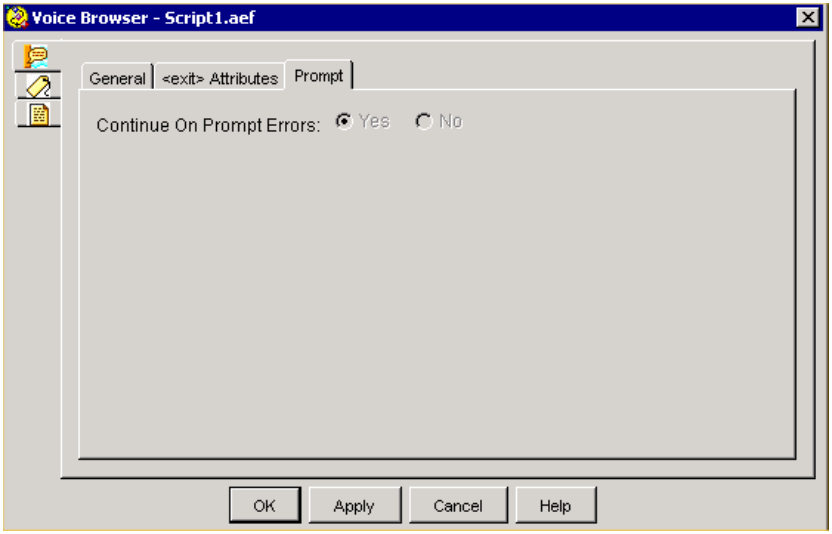


Figure 15-4 shows Prompt tab of the Voice Browser customizer window.

The sample script voicebrowser.aef does not use this tab.

Use this tab if you do not want the CRS script to continue if there are errors when the VoiceXML document is run. The default is for the script to continue.

Figure 15-4 Voice Browser Customizer Window— Prompt Tab



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 CRS Script

In addition to the supported TTS providers, the CRS Administration interface also allows the creation of new providers. Anytime a new provider is added, CRS updates the editor machines with the new TTS provider information. This is done by synchronizing a file between the CRS server and the editor machines.

Designing International CRS VoiceXML Applications

The Cisco CRS 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 A-12 of Appendix A, "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 CRS 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 Customer Response Solutions Administration Guide*.)
- Use the Set Contact Info in the CRS 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 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"/>
      <elseif cond="language=='2'"/>
        <goto next="info_es.vxml"/>
      </if>
    </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 version="1.0" encoding="ISO-8859-1"?>
<vxml xmlns="http://www.w3.org/2001/vxml"version="2.0 "xml:lang="es-M>

<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>
    <filled>
      <submit next="getInfo.jsp"/>
    </filled>
  </field>
</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 CRS 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 CRS, page 4-4 for further information.

CRS VoiceXML Application Troubleshooting Tips

The following are helpful tips when troubleshooting your voiceXML application:

- Check the CRS 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 CRS 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

Designing Scripts for IP Queue Manager

You can use the steps of the Cisco Customer Response Solutions (CRS) Editor to design scripts that take advantage of the Cisco IP CallCenter (IPCC) solution.

This section describes the steps used to create scripts that interact with the Intelligent Call Management (ICM) subsystem of the Cisco CRS system.

This section contains the following topics:

The Service Control Interface

The Service Control interface allows the Cisco ICM software to provide call-processing instructions to the Cisco CRS system. It also provides the Cisco ICM 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 CRS 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 CRS system runs the default script or runs the system default treatment if no default script is configured.

In addition to these label types the IP Queue Manager 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 fastbusy tone. The transfer is successful if at any time the caller hangs up or if the script reaches the end of the fastbusy 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 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

The Cisco ICM software supports several Call Variables. The Cisco ICM, Enterprise Server, and the Cisco CRS 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
- Call.PeripheralVariable1 to Call.PeripheralVariable10
- Call.AccountNumber

Using Expanded Call Variables

The Cisco ICM, Enterprise Server, and Cisco CRS system also pass expanded call variables to each other, but you must use the CRS Editor to define or enable these variables individually.

Note If you are using IPCC Express, your variables must also be defined through the Cisco Desktop Administrator.

See the *Cisco Customer Response Solutions Editor Step Reference Guide* and the *Cisco Customer Response Solutions Administration Guide* for more information about Call variables and ICM-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

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 CRS 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 CRS system receives a Run Script request from the Cisco ICM software. The CRS 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 CRS Editor allow you to set and read different tokens in the variables passed between the Cisco CRS system and the Cisco ICM/Enterprise Server.

Note For more information, see

Configuring Encoding and Decoding Types

When the Cisco CRS system receives variables from the Cisco ICM software or Enterprise Server, the variables do not have an associated type (such as Integer or Float). To use these variables in Cisco VRU or Cisco IPCC Express scripts, the Cisco CRS system first decodes them to one of the available types. When the script sends variables back to the Cisco ICM/Enterprise Server, the Cisco CRS system then encodes them into a form the Cisco ICM/Enterprise Server can use, depending on the type of the local CRS script variable.

The table below lists the encoding types that the Cisco CRS system supports.

Note The Input format is the data decoded from the Cisco ICM Enterprise Server variables to the CRS script local variables. The Output format is the data encoded from the CRS script local variables to the Cisco ICM Enterprise Server variables.

Table 16-1 Encoding Types That Cisco CRS Supports

Encoding Type	Input Format	Example Input	Output Format
Integer—32-bit signed integer Long—64-bit signed integer.	The CRS 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*Digits*, where *Digits* can range from 0 to 9, a to f, and A to F. • Octal—in the form 0*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
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

Table 16-1 Encoding Types That Cisco CRS Supports (continued)

Encoding Type	Input Format	Example Input	Output Format
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:MmTod* 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

ICM Script Types

The Cisco CRS system runs three different types of ICM scripts:

- Initial Scripts, page 16-7
- Default Scripts, page 16-8
- VRU Scripts, page 16-8

Initial Scripts

The Cisco CRS 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 ICM post-route application. (For more information, refer to the *Cisco CRS Application Administration Guide*.)

If you leave the Initial Script field empty, no initial script runs.

Note Because initial scripts are run on the Cisco CRS system before the system notifies the Cisco ICM 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 CRS system runs the default script whenever the Cisco ICM software sends a default label, when the Cisco CRS system times out waiting for the Cisco ICM to provide instructions, or when communication with the Cisco ICM software is lost.

Note Because default scripts can run without access to the Cisco ICM software, you should never use any ICM step in a default script.

You set the default script when you configure the Cisco ICM translation route or post-route applications. (For more information, refer to the *Cisco Customer Response Solutions Administrator Guide*.)

If you leave the Default Scripts field blank, the Cisco CRS system runs the system default message, which announces that the system is experiencing technical difficulties.

VRU Scripts

Cisco VRU script design does not handle complete calls, but provides different call-handling instructions to be executed sequentially by the Cisco CRS 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 ICM software sends a Run VRU Script request to the Cisco CRS system using a Run VRU Script node in an ICM script. Before the Cisco ICM 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 CRS Administration Guide*.)

Note Because the VRU scripts run only when the Cisco CRS system is in communication with the Cisco ICM, you can use any ICM step in a VRU script.

PreConnect scripts and VRU scripts that run when Cisco ICM software sends a connect request to the CRS system before the CRS system routes the call. When the CRS system receives the connect request, it checks the Expanded Call Context variable. If the variable is empty, the CRS system routes the call to the label sent by the Cisco ICM system. If the VRU Script Name variable is not blank, the CRS 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 CRS 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 CRS 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, refer to the "Using Expanded Call Variables" section on page 16-3.

Sample VRU Script Templates

The Cisco CRS 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)

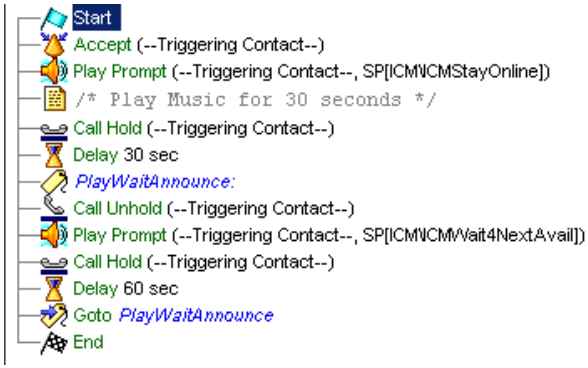
The BasicQ script template (BasicQ.aef) does not use any ICM steps. It simply plays several prompts (and puts the call on hold), looping through them until an agent phone becomes free and the Cisco ICM can route the call to the agent.

This script has no variables defined.

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

The script uses the Call UnHold step to take the call off hold, plays the ICMWait4NextAvail.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.

The following figure shows BasicQ.aef as it appears in the Design pane of the CRS Editor.



Visible Queuing (VisibleQ.aef)

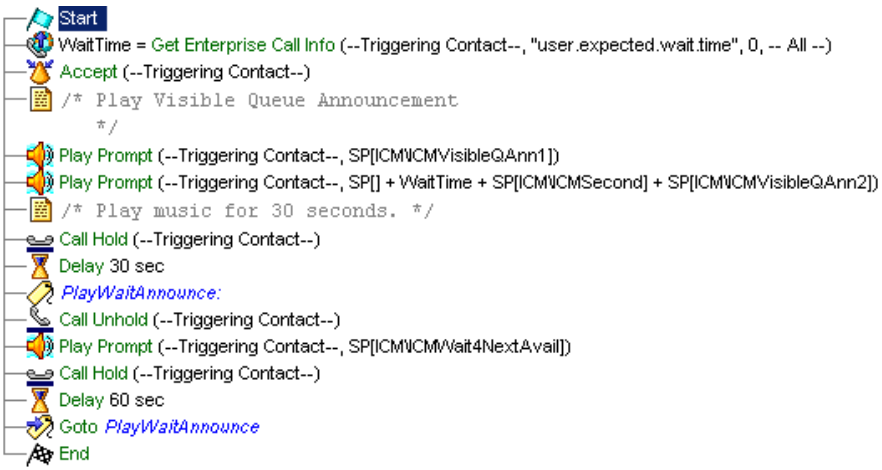
The VisibleQ script template (VisibleQ.aef) uses the GetEnterpriseCallInfo step to retrieve the expected wait time from the Cisco ICM and to relay that information to the caller.

Before accepting the call, the GetEnterpriseCallInfo step retrieves information for the Cisco ICM. 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.

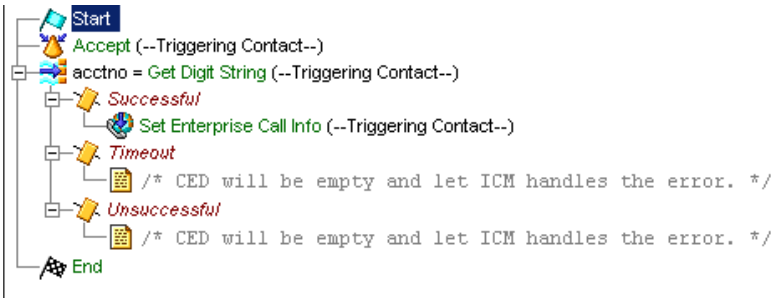
The following figure shows VisibleQ script as it appears in the Design pane of the CRS Editor.



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 ICM system.

The following figure shows the CollectDigits script as it appears in the Design pane of the CRS 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 ICM for further processing.

Designing IPCC Express Scripts

Cisco IPCC Express is an automatic call distributor (ACD) for enterprise organizations.

You can use the Cisco Customer Response Solutions (CRS) Editor to design scripts that take advantage of Cisco IPCC Express capability.

This section 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:

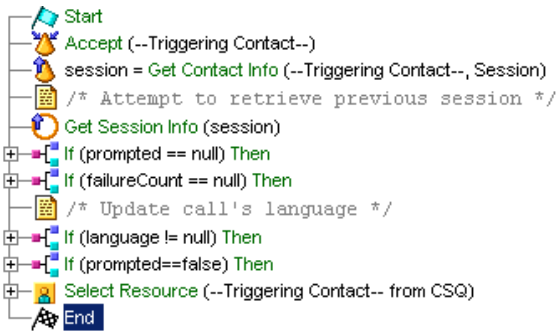
A Sample IPCC Express Script Template

The sample IPCC Express 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.

The following figure shows the top-level view of the sample IPCC Express script in the Design pane of the CRS Editor.

Figure 17-1 IPCC Express Sample Script Design Pane—Top-level View



The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS 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.

IPCC Express Script Variables

The designer begins the script design process by using the Variable pane of the CRS Editor to define script variables.

The following figure shows the variables of the sample IPCC Express script as they appear in the Variable pane of the CRS Editor.

Figure 17-2 IPCC Express Sample Script Variable Pane

Name	Type	Value	Attributes
CSQ	String	""	Parameter
DelayWhileQueued	int	0	Parameter
WelcomePrompt	Prompt	P[CDWelcome.wav]	Parameter
accountNum	String	""	
failureCount	int	0	
language	Language	L[en_US]	
name	Document	null	
prompted	boolean	false	
queued	boolean	false	
resourceID	String	""	
session	Session	null	
session2	Session	null	

Table 17-1describes the variables used in the IPCC Express sample script.

Table 17-1 Variable Descriptions for the Sample IPCC Express Script

Variable Name	Variable Type	Value	Function
CSQ	String	""	Stores Contact Service Queue information from which to find a resource. (See The Select Resource Step, page 17-25.) The designer marks this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, refer to the *Cisco Customer Response Solutions Administration Guide*.
DelayWhileQueued	Integer	30	Length of time the script will delay before sending the call back through the queue loop. (See The Queued Output Branch, page 17-29.) The designer marks this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, refer to the *Cisco Customer Response Solutions Administration Guide*.
WelcomePrompt	Prompt	P[IPCC ExpressWelcome.wav	Welcomes the caller. (See The Play Prompt Step, page 17-11.) The designer marks this variable as a parameter to allow the administrator the option to change the value of this variable. For more information, refer to the *Cisco Customer Response Solutions Administration Guide*.

Table 17-1 Variable Descriptions for the Sample IPCC Express Script (continued)

Variable Name	Variable Type	Value	Function
accountNum	String	""	Stores the account number entered by the caller. (See The Play Prompt Step, page 17-11.)
failureCount	Integer	0	Stores the number of times a call has failed. (See The Session Steps, page 17-14)
language	Language	English (United States) (en_US)	Stores the language selection made by the caller. (See The Third If Step, page 17-9.)
name	Document	null	Stores the spoken name of the caller. (See Recording a Name, page 17-23)
prompted	Boolean	false	Stores information to determine whether or not the caller has heard **WelcomePrompt**. (See The First If Step, page 17-9.)
queued	Boolean	false	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 17-27 and The Queued Output Branch, page 17-29.)
resourceID	String	""	Stores the Resource ID of the chosen agent. (See The Select Resource Step, page 17-25.)
session	Session	null	Stores session information for the call. (See The Get Contact Info Step, page 17-6.)
session2	Session	null	Stores previous session information based on the **accountNum** variable. (See The Session Steps, page 17-14.)

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 CRS 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).

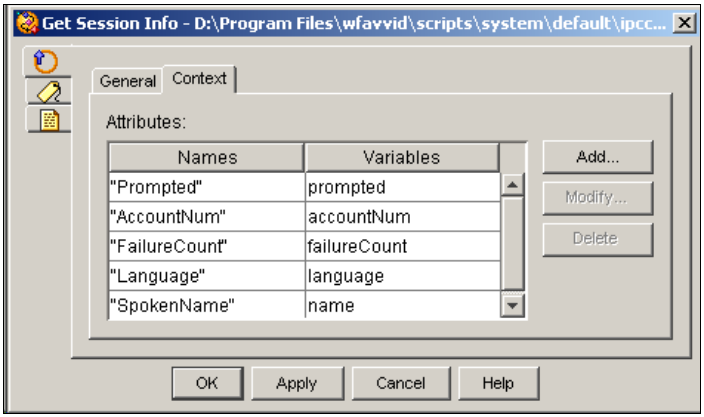
The Get Contact Info step extracts information from the Session object and stores it in a Session variable named **session**.

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 IPCC Express queue by an agent. A caller can be transferred back into the queue if the script fails, in which case the Cisco CRS system falls back to the default script (see Using Default Scripts, page 17-31), or if an agent routes the call back to the route point.

The following figure shows the configured Context tab of the Get Session Info customizer window.

Figure 17-3 Get Session Info Customizer Window—Configured Context Tab



Note 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

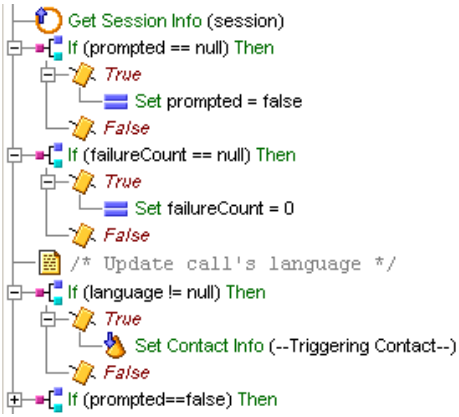
The designer continues the sample script by adding a series of If steps to test to find out if a caller has already entered information.

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.

The following figure shows the scripting under the first three If steps in the beginning of the sample IPCC Express script.

Figure 17-4 If Steps



This section contains the following steps:

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 then 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.

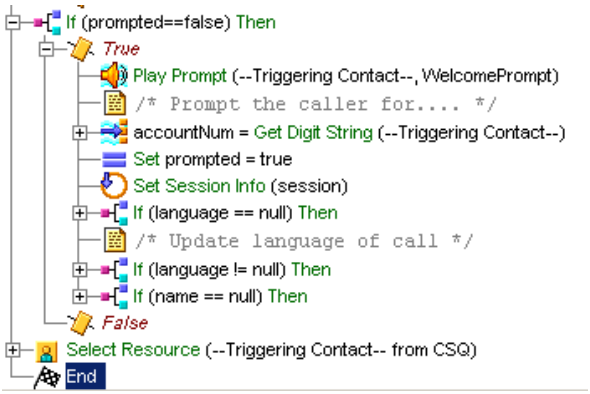
The Fourth If Step

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.

The following figure 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 17-20
- Recording a Name, page 17-23

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).
- Prompt tab
  - Prompt—**P[IPCC ExpressEnterAccountNum]**

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.

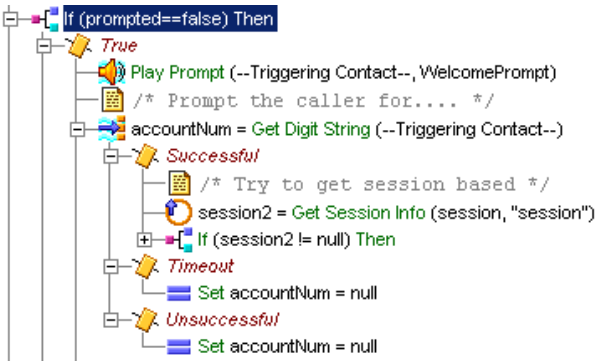
– Cancel Digit—*

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.

Figure 17-6 Get Digit String Step—Output Branches



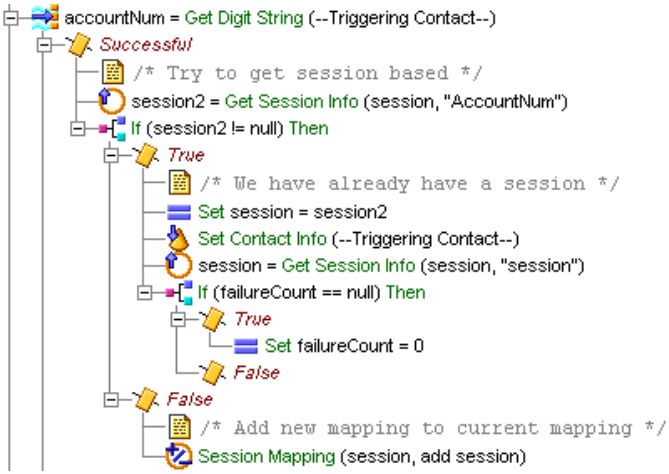
The Session Steps

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.

The following figure shows the scripting under the Successful output branch of the Get Digit String step.

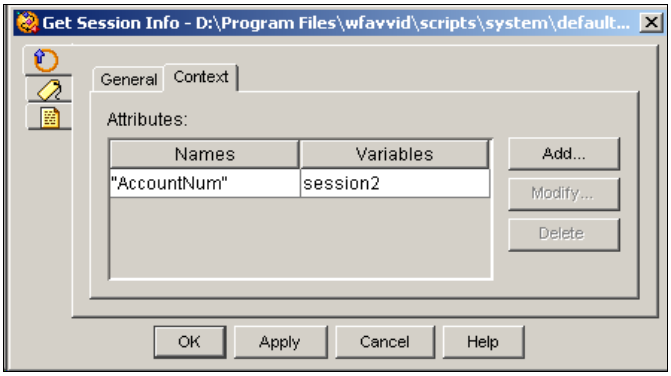
Figure 17-7 Get Digit String Step—Successful Output Branch



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.)

The following figure shows the context tab of the configured Get Session customizer window.

Figure 17-8 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.

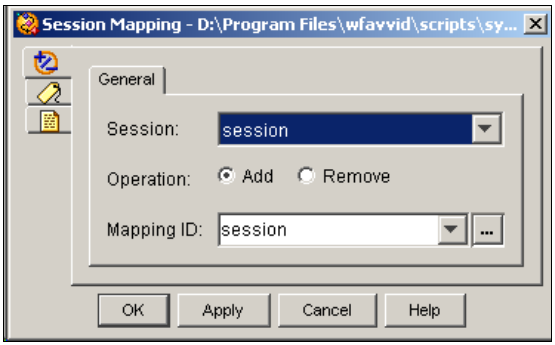
- Set Contact Info step—Associates the new call to the old session and deletes the temporary blank session that the script automatically associated with the new call.
- Get Session Info step—Uses the **session** variable to retrieve values for the **failureCount** and **language** variables (used by 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.

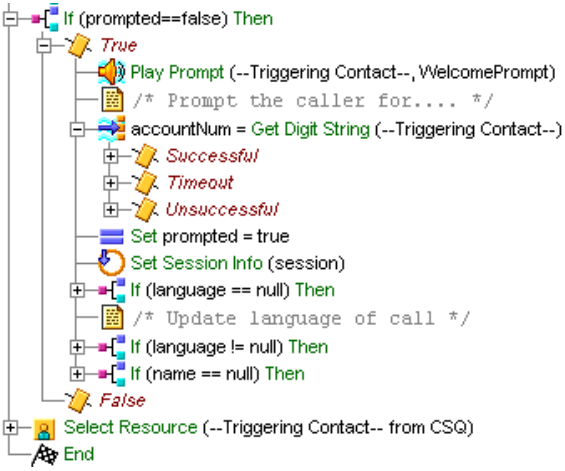
The following figure shows the configured Session Mapping customizer window.

Figure 17-9 Configured Session Mapping Customizer Window



As shown in the following figure, after the steps under the Get Digit String step execute, a Set step sets the value of the **prompted** variable to true.

Figure 17-10 Set Step Scripting

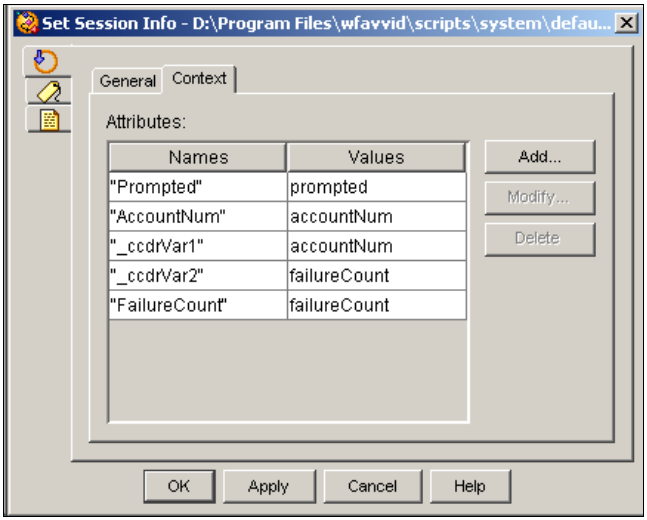


Under the Set step, a Set Session Info step adds context information for this session, in order to record the account number, the current failure count and the fact that the caller has already been prompted.

The special context attributes "_ccdrVar1" and "_ccdrVar2" store the account number and the failure count to make these values available to historical reports for this particular call.

The following figure 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 the table below.

Table 17-2 Set Session Info Properties

Attribute	Value	Description
Prompted	prompted	Stores the value that indicates whether or not the caller has previously heard the welcoming prompt.
AccountNum	accountNum	Caller account number
_ccdrVar1	accountNum	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.)

Table 17-2 Set Session Info Properties (continued)

Attribute	Value	Description
_ccdrVar2	failureCount	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.)
FailureCount	failureCount	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.

Choosing a Language

The next steps in the IPCC Express 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.

The following figure shows the scripting under the If steps that allow the caller to choose between two languages for the context of the call.

Figure 17-12 Steps for Choosing a Language Under the If Step

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 that 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.

- Prompt tab
  - Prompt—**P[IPCC ExpressSelectLanguage]**

    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 play back of the entire prompt.
  - Continue on Prompt Errors—**Yes**

    In the event of a prompt error, the script continues to playback 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.

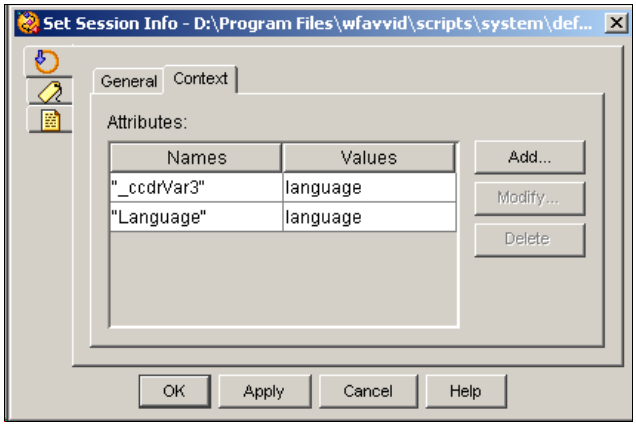
The Menu step in this script has the following output branches (see Figure 17-12):

- **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 the following figure.

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.

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.

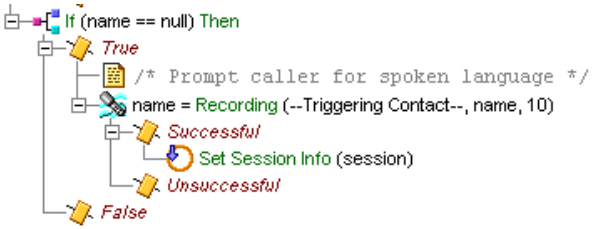
Note The script could also modify the value of the CSQ variable to account for the language chosen by the caller. For example, the system may contain one CSQ for English-speaking callers and another CSQ for Spanish speakers.

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 the following figure, if this expression is true, the caller has not previously recorded a name, and so the Recording step prompts the caller to do so.

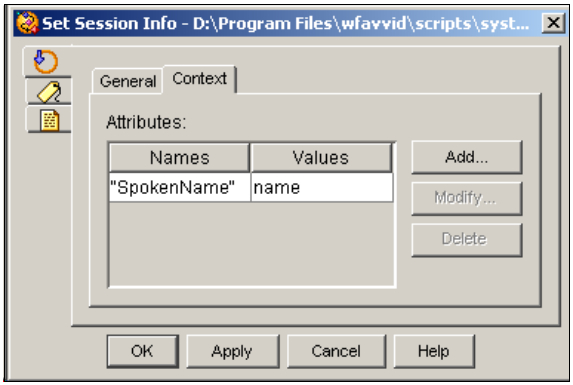
Figure 17-14 Recording Step Scripting



If 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.

The following figure shows the configured Context tab of the Set Session Info customizer window.

Figure 17-15 Configured Set Session Info Customizer Window—Context Tab

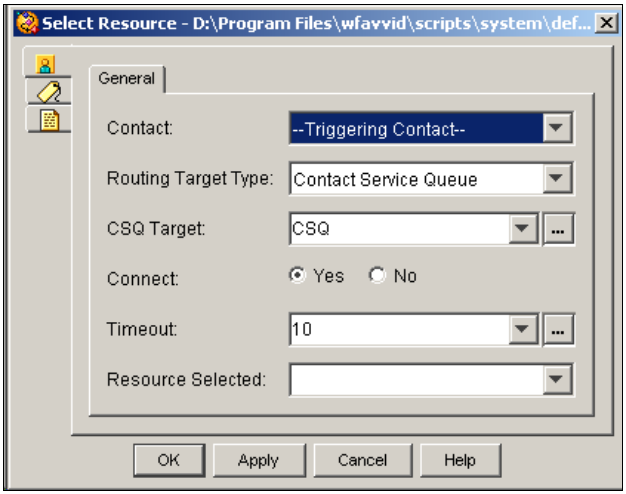


The Select Resource Step

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 CRS Administration web interface.

The following figure 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.

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 IPCC Express Enhanced Edition. If you use Resource Routing Target Type with IPCC Express Standard edition, CRS 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. We are leaving it blank for our application.

Note For more information about the Select Resource step, see the "IPCC Express Step Descriptions," in the *Cisco Customer Response Solutions Editor Step Reference Guide*.

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

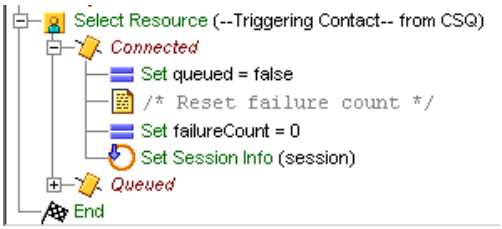
The Select Resource step has two output branches, Connected and Queued, which are described in the following sections.

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.

The following figure shows the scripting under the Connected output branch of the Select Resource step.

Figure 17-17 Select Resource Step Scripting—Connected Output Branch



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.

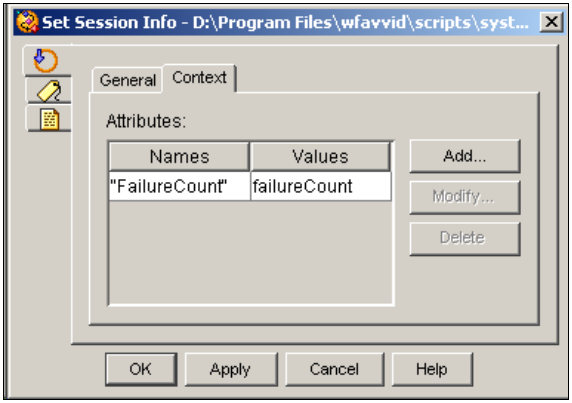
- Set step—Sets the value of the variable **failureCount** to 0.

  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.

The following figure shows the configured Set Session Info customizer window.

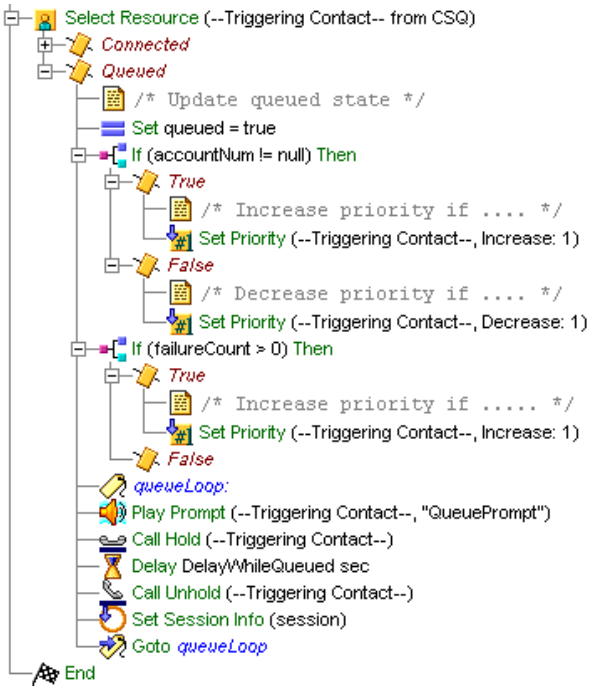
Figure 17-18 Set Session Info Customizer Window—Context Tab



The Queued Output Branch

As shown in the following figure, 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 CRS 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 IPCC Express Script, page 17-31
- Writing a Default Script, page 17-33

Variables for a Default IPCC Express Script

The following figure shows the Variable pane of a default IPCC Express script.

Figure 17-20 Variable Pane of the Default IPCC Express Script

Name	Type	Value	Attribute
CSQ	String		
session	Session	null	
failureCount	Integer	0	
accountNum	String		
name	Document	null	
active	Boolean	true	
queued	Boolean	false	
extn	String		

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The following table describes the variables used in the example default IPCC Express script.

Table 17-3 Variable Descriptions for the Example Default IPCC Express Script

Variable Name	Variable Type	Value	Function	Correspondence
CSQ	String	—	Stores Contact Service Queue information from which to find a resource. (See The Select Resource Step, page 17-25.)	This variable is populated with the corresponding value of the variable with the same name from the main IPCC Express script.
session	Session	null	Stores session information for the call. (See The Get Contact Info Step, page 17-6.)	This variable is populated with the corresponding value of the variable with the same name from the main IPCC Express script.
failureCount	Integer	0	Stores the number of times a call has failed. (See The Session Steps, page 17-14)	This variable is populated with the corresponding value of the variable with the same name from the main IPCC Express script.
accountNum	String	—	Stores the account number entered by the caller. (See The Play Prompt Step, page 17-11.)	This variable is populated with the corresponding value of the variable with the same name from the main IPCC Express script.
name	Document	null	Stores the spoken name of the caller. (See Recording a Name, page 17-23)	This variable is populated with the corresponding value of the variable with the same name from the main IPCC Express script.
active	Boolean	true	Stores information to determine whether or not the call is active. (See Using Default Scripts, page 17-31.)	—

Table 17-3 Variable Descriptions for the Example Default IPCC Express Script (continued)

Variable Name	Variable Type	Value	Function	Correspondence
queued	Boolean	false	Stores the information used to determine whether or not the call has been queued. (See The Connected Output Branch, page 17-27 and The Queued Output Branch, page 17-29.)	This variable is populated with the corresponding value of the variable with the same name from the main IPCC Express script.
extn	String	—	Stores the extension used by the Call Redirect step to attempt to re-queue the caller. (See Using Default Scripts, page 17-31.)	—

Writing a Default Script

The following example describes a sample IPCC Express default script using the variables described in the previous section.

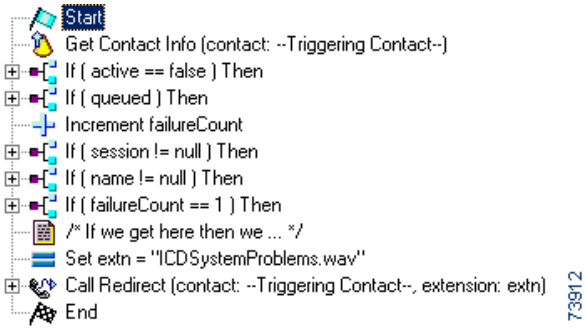
The default script performs the following function:

- 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 scripts 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 IPCC Express 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.

The following figure shows the top level of the example IPCC Express default script as it appears in the Design pane.

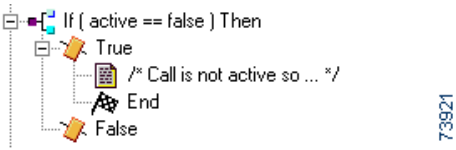
Figure 17-21 IPCC Express Default Script—Top Level



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 the following figure, 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.

Figure 17-22 IPCC Express Default Script—Inactive 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.

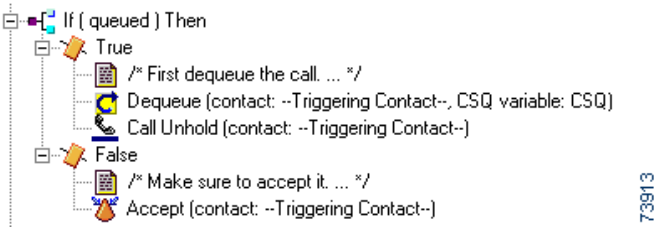
Note It is important to remember that the script defines the queued variable with the same type and name as in the main IPCC Express script, so that its value is populated with the last value of the corresponding variable in the IPCC Express script.

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 IPCC Express 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.

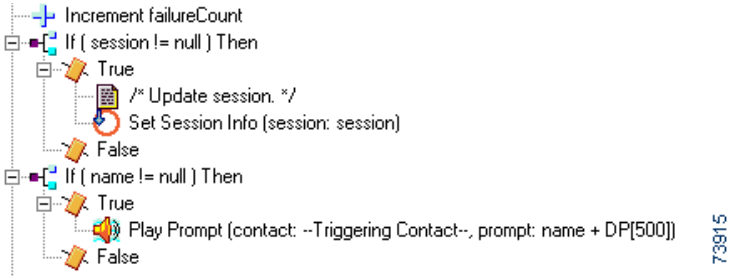
The following figure shows the scripting of these steps.

Figure 17-23 IPCC Express Default Script—Queued Status



As shown in the following figure, 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 IPCC Express Default Script—Session and Name Status



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 IPCC Express script, then a Play Prompt step plays this name, followed by a short silence.

As shown in the following figure, 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 IPCC Express 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.

Designing Remote Monitoring Scripts

The Cisco CRS Remote Monitoring feature allows a supervisor to call into any site (where the supervisor has a Cisco CallManager user profile) and to monitor an agent's conversation at that site.

When a supervisor monitors a conversation, the supervisor can hear all parties on the call. The parties have no indication that the supervisor is monitoring the call. The supervisor cannot join the call or be heard by the parties.

Note The Remote Monitoring application comes with IPCC Express Enhanced or Premium systems. If you do not have an IPCC Express Enhanced or Premium package, even though you can create a remote monitoring script, you cannot use it.

Note The incoming and outgoing streams to/from the agent phone and the outgoing stream to the supervisor phone must have the same encoding with only G.711 being supported.

See the "Configuring and Using Remote Monitoring" section in the *Cisco Customer Response Solutions Administration Guide*, Release 4.0(1) for a complete explanation of remote monitoring in CRS applications.

This section covers the following topics:

Two Ways of Monitoring a Call

With Remote Monitoring, you can choose to monitor a call in either of two ways:

- By agent— In this case, you identify the agent by phone extension. If the agent is on a call, monitoring begins immediately. If the agent is not on a call, monitoring begins when the agent is presented with a call (that is, when the agent's phone rings) or when the agent initiates a call (that is, when the agent's phone goes off-hook).
- By contact service queue (CSQ)—In this case, you monitor the call of an agent who belongs to the CSQ. When you monitor by CSQ, you select the CSQ from a menu. When a Cisco IPCC Express call is presented to an agent who belongs to the selected CSQ, monitoring begins for that agent and call.

Note For CSQ monitoring, the supervisor cannot start monitoring the call after it connects to the agent; the call must arrive at the agent after supervision begins. For agent monitoring, supervision can begin after the call connects to the agent.

The following section describes how the rmon.aef script works. See the *Cisco Customer Response Solutions Administration Guide, Release 4.0(1)* for how to:

- Create a Remote Monitoring Supervisor

  A supervisor needs to be assigned an ID allowing that supervisor to monitor calls.
- Assign Resources and CSQs to a Supervisor

  CSQ Names and User IDs of agents need to be assigned to a supervisor before that supervisor has permission to monitor them.

- Configure a Remote Monitoring Application

  After you create a remote monitoring script, you need to use the CRS Administration Web page to configure a remote monitoring application to control the script.

Monitoring Agents or CSQs

This section covers the following topics:

Conditions to Remember when Monitoring

Whether you are monitoring by agent or by CSQ:

- If an agent transfers the call that you are monitoring to another agent, the monitoring session will continue for the agent to whom the call was transferred.
- If an agent transfers the call that you are monitoring to a non-agent, a CTI route point, or an agent who is not logged in, the monitoring session will end automatically.
- If the call that you are monitoring is or becomes part of a conference, the monitoring session will end when there are no agents left in the conference.
- If the agent on the call that you are monitoring conferences another agent and then drops out of the conference, the monitoring session will continue for the agent to whom the call was conferenced.

How to Monitor an Agent (and what the rmon.aef script does)

To monitor the call of a particular agent, you designate the agent by extension as explained in the following steps.

Procedure

Step 1 Call the Remote Monitoring application and follow the voice prompts to enter your supervisor user ID and personal identification number (PIN).

The user ID and the PIN were set up for you when your user profile was created in Cisco CallManager.

Step 2 Press 1 on your telephone keypad.

Step 3 On your telephone keypad, enter the extension of the agent that you want to monitor.

- If the agent is on a call, monitoring begins immediately.
- If the agent is not on a call, monitoring begins when the agent's phone rings or when the agent picks up the phone's handset to make a call. You will hear no sound until the agent picks up the phone's handset.
- If the agent does not answer a call, monitoring stops when the phone stops ringing. If the unanswered call was an IPCC Express call, monitoring starts again when the phone rings again or the agent picks up the handset. If the unanswered call was not an IPCC Express call, the monitoring session ends when the caller hangs up. You can then choose to monitor the same agent again, monitor a different agent, monitor a CSQ, or terminate your call.
- A monitoring session ends automatically when the monitored call ends. You can then choose to monitor the same agent again, monitor a different agent, monitor a CSQ, or terminate your call.
- To stop a monitoring session in progress or to stop waiting for a monitoring session to begin, press * on your telephone keypad. You can then choose to monitor another agent or monitor a CSQ.

How to monitor a CSQ (and what the rmon.aef script does)

When you monitor calls by CSQ, you designate a CSQ. Monitoring starts automatically for the next agent who belongs to that CSQ when the agent is presented with an IPCC Express call.

To monitor a call by CSQ, follow these steps:

Procedure

Step 1 Call the Remote Monitoring application and follow the voice prompts to enter your supervisor user ID and personal identification number (PIN).

The user ID and the PIN were set up for you when your user profile was created in Cisco CallManager.

Step 2 Press 2 on your telephone keypad.

You hear a list of CSQs.

Step 3 Follow the prompts to select the CSQ that you want.

- When an IPCC Express call is presented to an agent who belongs to the CSQ that you select, monitoring begins for that call. You will hear no sound until monitoring begins.
- If the agent does not answer a call, monitoring stops when the phone stops ringing. Monitoring starts again for the next IPCC Express call presented to an agent who belongs to the CSQ.
- A monitoring session ends automatically when the monitored call ends. You can then choose to monitor the same CSQ again, monitor a different CSQ, monitor an agent, or terminate your call.
- To stop a monitoring session in progress or to stop waiting for a monitoring session to begin, press * on your telephone keypad. You can then choose to monitor another CSQ or monitor an agent.

Enabling Remote Monitoring

You enable the Remote Monitoring feature by including the Remote Monitoring license with the other license(s) when you install the Cisco IPCC Express Premium software package.

In addition, you must configure a Cisco script application for remote monitoring before you can use this feature. Do this after you have created a remote monitoring script or else use the rmon.aef script, the default sample remote monitoring script provided by Cisco.

See also:

- For CRS installation instructions, see the *Cisco Customer Response Solutions Installation Guide.*
- For CRS application configuration instructions, see the *Cisco Customer Response Applications Administrator Guide*

Script Steps for Remote Monitoring

Use the following steps in the IPCC Express palette of the CRS Editor to start and stop monitoring in a remote monitoring script:

- Start Monitor Step, page 18-6
- Stop Monitor Step, page 18-9

For complete descriptions of these steps, see the *Start Monitor Step, page 5-202 and the Stop Monitor Step, page 18-9.*

Start Monitor Step

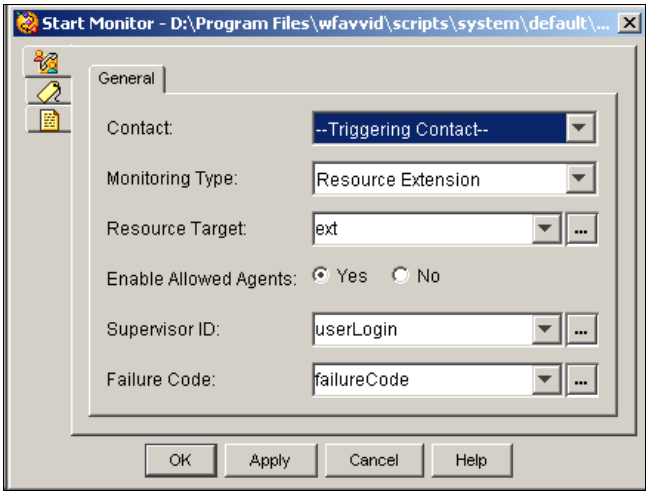
Use the Start Monitor step to start a monitoring session. This section describes the following:

- Start Monitor Step Customizer Window, page 18-7
- Start Monitor Step Properties, page 18-7
- Start Monitor Step Output Branches, page 18-8
- Procedure for using the Start Monitor Step, page 18-9

Start Monitor Step Customizer Window

The following figure shows the customizer window for the Start Monitor step.

Figure 18-1 Start Monitor Customizer Window



Start Monitor Step Properties

The following table describes the properties of the Start Monitor customizer window.

Table 18-1 Start Monitor Properties

Properties / Buttons	Description
Contact	Contact that will perform remote monitoring.
Monitoring type	Two options: • Resource Extension - Remote monitoring will be performed by the agent extension. • Contact Service Queue- Remote monitoring will be performed by the CSQ.

Table 18-1 Start Monitor Properties (continued)

Properties / Buttons	Description
Resource Target	Variable or expression indicating the Resource extension or the Contact Service Queue to be monitored.
Enable allowed agents	Check box enabling/disabling the security feature which allows only the agents associated with the remote supervisor to be monitored. Default setting is that no agents can be monitored. **Note** Leave this box **checked** (the default) and use the Supervisor's Allowed List to manage which agents are allowed to Monitor Remotely. This results in a possible security risk, as supervisors can then monitor **all** the agents/CSQs in the CRS system.
Supervisor ID	User ID identifying the supervisor.
Failure Code	Variable used for storing the reason code in the event of a step failure.

Start Monitor Step Output Branches

The Start Monitor step has five output branches:

- **WaitForCall**. No call is currently at the monitored agent or CSQ; monitoring session continues.
- **Monitor**. Remote supervisor starts listening to a call; monitoring session continues.
- **NotAnswered**. Agent didn't answer the call or call forwarding is set on agents phone; monitoring session ends
- **Error**. The Start Monitor step encounters an error (such as an invalid CSQ or Agent extension, agent not in allowed list, agent not logged in); monitoring session ends.
- **Done**. Caller/agent hangs up or monitored call ended; monitoring session continues.

Procedure for using the Start Monitor Step

Step 1 From the IPCC Express palette, drag the Start Monitor step to the place in the script where you want it.

Step 2 Right click and select properties, and in the customizer window, enter the properties you want for the step and click **OK**.

Step 3 Fill in the code that you would like for each of the five output branches.

Stop Monitor Step

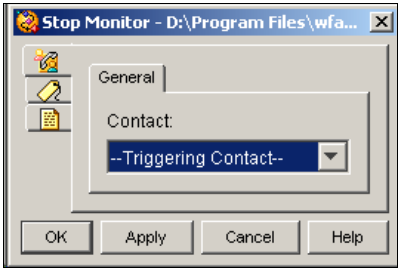
Use the Stop Monitor step to stop a monitoring session. This section describes the following:

- Stop Monitor Step Customizer Window, page 18-9
- Stop Monitor Step Properties, page 18-10
- Stop Monitor Step Output Branches, page 18-10
- Procedure for using the Stop Monitor Step, page 18-10

Stop Monitor Step Customizer Window

The following figgure shows the customizer window for the Stop Monitor step.

Figure 18-2 Stop Monitor Customizer Window



Stop Monitor Step Properties

Table 1 describes the property of the Stop Monitor customizer window.

Table 1 Stop Monitor Properties

Property	Description
Call Contact	Contact that will stop remote monitoring.

Stop Monitor Step Output Branches

The Stop Monitor step has two output branches:

- Success
- Fail

In each of these output branches you can put a Goto step to direct the call flow to the next section of the script depending on the outcome. In the sample rmon.aef script both branches go to the same place, the section of the script labeled getOptionOfCsqOrExt.

Procedure for using the Stop Monitor Step

Step 1 In the Stop Monitor Customizer window, from the Call Contact drop-down list, choose the contact that will stop remote monitoring.

Step 2 Click **OK**.

The Stop Monitor customizer window closes, and the information you entered appears next to the Stop Monitoring step icon in the Design pane of the CRS Editor.

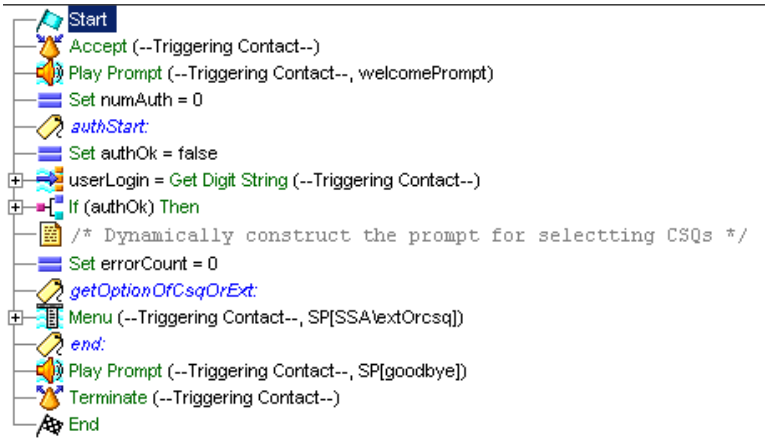
Getting Started with a Remote Monitoring Script

This section contains the following sections:

The Remote Monitoring Sample Script

This section describes the design of the Cisco CRS sample script template that enables remote monitoring, rmon.aef. The following figure shows the top-level view of this Remote Monitoring script template in the Design pane of the CRS Editor.

Figure 18-3 Remote Monitoring Sample Script Design Pane—Top-level View



For a full description of each step used in this script, see CRS Editor Palette Step Descriptions, page 5-1.

The Start Step (Creating a Script)

Begin to build the sample script by choosing **File > New** from the CRS 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 CRS 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 rmon.aef.

Remote Monitoring Script Variables

The designer begins the script design process by using the Variable pane of the CRS Editor to define script variables.

The following figure shows the variables of the sample Remote Monitoring script template as they appear in the Variable pane of the CRS Editor.

Figure 18-4 Remote Monitoring Sample Script Template Variable Pane

Name	Type	Value	Attributes
AuthenticationRetry	int	3	Parameter
authOk	boolean	false	
csq	String	""	
csqNameWavePrompt	Prompt	P[]	
errorCount	int	0	
ext	String	""	
extStr	String	""	
failureCode	int	0	
maxTotalFails	int	10	
numAuth	int	0	
password	String	""	
userLogin	String	""	
welcomePrompt	Prompt	SP[SSA\welcomeRmon]	Parameter

The following table describes the variables used in the Remote Monitoring sample script template.

Table 18-2 Variable Descriptions for the Remote Monitoring Sample Script Template

Variable Name	Variable Type	Value	Function
AuthenticationRetry	Integer	3	Holds the number of allowed times the caller can enter authentication information (see If authOK then Step, page 18-21). The designer marks this variable as a parameter to allow the administrator the option to change the value of this variable.
AuthOK	Boolean	false	Hold the result of the caller authentication steps (see Set authOK True Step, page 18-21).
csq	String	“““	Stores caller-selected Contact Service Queue resource (see Output 2 of Menu Step: A CSQ, page 18-35).
csqNameWavePrompt	Prompt	P[]	Stores the Contact Service Queue Output prompt (see Output 2 of Menu Step: A CSQ, page 18-35).
errorCount	Integer	0	Stores the number of user-entered errors (see Set errorCount = 0 Step, page 18-23).
ext	String	“““	Stores the extension number used in the code for connecting to a resource (see Output 1 of Menu Step: Extension, page 18-25).
extStr	String	“““	Stores the digits entered by the caller for a phone extension number (see ExtSTR = GetDigit String Step, page 18-25).
failureCode	Integer	0	The type of failure made in establishing a remote monitoring session (see failurecode - Start Monitor, page 18-30).
maxTotalFails	Integer	10	Stores the number of times a call is allowed to fail before the contact session is ended (see Start Monitor — Error, page 18-33).

Table 18-2 Variable Descriptions for the Remote Monitoring Sample Script Template (continued)

Variable Name	Variable Type	Value	Function
numAuth	Integer	0	A counter for the number of times the caller is allowed to enter his or her pin number for authorization (see Set numAuth Step, page 18-15).
password	String	“““	The variable to hold the caller’s password (see Get Caller’s Password (Get Digit String) Step, page 18-19).
userLogin	String	“““	Stores the digits entered by this caller. The subsequent Authenticate User step uses this **userLogin** variable (see Get Caller’s Login ID (Get Digit String) Step, page 18-16).
welcomePrompt	Prompt	SP[SSA\WelcomeRmon.wav	Welcomes the caller (see The Play Prompt Step, page 18-14). The designer marks this variable as a parameter to allow the administrator the option to change the value of this variable.

The Accept Step

Continue to build the sample script by dragging an Accept step from the Contact palette to the Design pane of the CRS Editor window.

The script uses an Accept step to accept a contact, which, in this case, is a telephone call.

The Play Prompt Step

Continue to build the sample script by adding a Play Prompt step from the Media palette. In the General tab of the customizer window, select **triggering contact**. In the Prompt tab of the customizer window, select the **welcomePrompt**. This prompt welcomes the caller when the caller phones. Leave all the other options as is.

Caller Authentication Section

Continue to build the script by adding a caller authentication section to identify the caller. In this section, the caller is first asked for a PIN ID number (Get Caller's Login ID (Get Digit String) Step, page 18-16 step). This section consists of the following steps:

- Set numAuth Step, page 18-15
- Label authSart Step, page 18-15
- Set authOK Step, page 18-15
- Get Caller's Login ID (Get Digit String) Step, page 18-16
- Get Caller's Password (Get Digit String) Step, page 18-19
- Authenticate User Step, page 18-20
- Set authOK True Step, page 18-21

Set numAuth Step

From the General palette, add a Set step, in which you assign the variable **numAuth** the value of **0**. This initializes this variable, which is used as a counter for the number of times the caller is allowed to enter his/her pin number for authorization.

Label authSart Step

From the General palette, add a Label step, and enter the label name as **authStart**. This indicates the begging of the caller authentication section. Each time the authentication fails, the script loops the user back to this section with this label to try again until the numAuth number of times occurs.

Set authOK Step

From the General palette, add a Set step, and assign the **authOK** the value of **false**. This variable will become true once the caller is authenticated. Then the caller can continue.

Get Caller's Login ID (Get Digit String) Step

From the Media palette, add a Get Digit String step under the Set authOK step in the Design pane. Configure the Get Digit String step to authenticate the caller before allowing the caller to record a name. In this case, we use an account number as the caller's login ID.

After adding the Get Digit String step to the Design pane of the CRS Editor, configure the 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—**userLogin**

    The **userLogin** variable stores the digits entered by this caller. The subsequent Authenticate User step uses this **userLogin** variable. In this example, we are using a userLogin variable. However, you could also create variable called a callerAccount variable for this situation, depending on how you want your system to identify the caller.
  - Interruptible—**Yes**

    External events cant interrupt the execution of this step.
- Prompt tab
  - Prompt—**SP[ssa\enterUserID]**

    This prompt asks the caller to enter their User ID. Barge In—**Yes**
  - Barge In—**Yes**

    The caller can enter a User ID 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
  - 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.)

- Terminating Key—**#**

  The caller can use the "#" key to indicate completion of input.

- Cancel Key—**None**

  The caller cannot cancel the script to start over.

- Maximum Retries—**3**

  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 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 to ASR channels.)

- Flush Input Buffer—**No**

  The script does not erase previously entered input before capturing new caller input.

- DTMF Buffer on Retry—**Yes**

  The script clears the DTMF buffer, erasing previously-entered digits whenever the step makes a new attempt at collecting caller input.

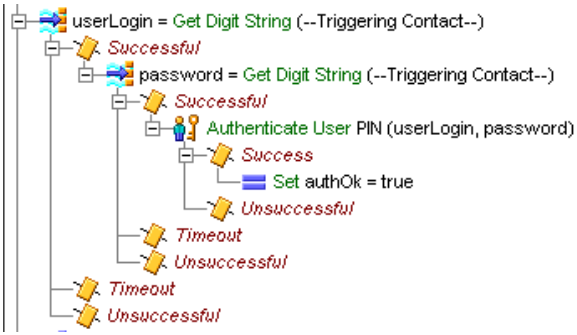
• Filter tab

- All options are checked except "#"

  The script considers numbers from 0 to 9 to be valid entries, and does not consider the terminating key "#" to be a valid digit for collecting a PIN ID.

The following figure shows the three output branches under the Get Digit String step.

Figure 18-5 Get Digit String UserLogin Step—Output Branches



This section contains the following topics:

- Successful Output Branch for UserLogin Step, page 18-18
- Timeout and Unsuccessful Output Branches for UserLogin Step, page 18-18

Successful Output Branch for UserLogin Step

If the Get Digit String step successfully receives a user login ID, the script executes the Successful output branch.

Configure the Successful output branch of the Get Digit String step 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 Get Caller's Password (Get Digit String) Step, page 18-19.

Timeout and Unsuccessful Output Branches for UserLogin Step

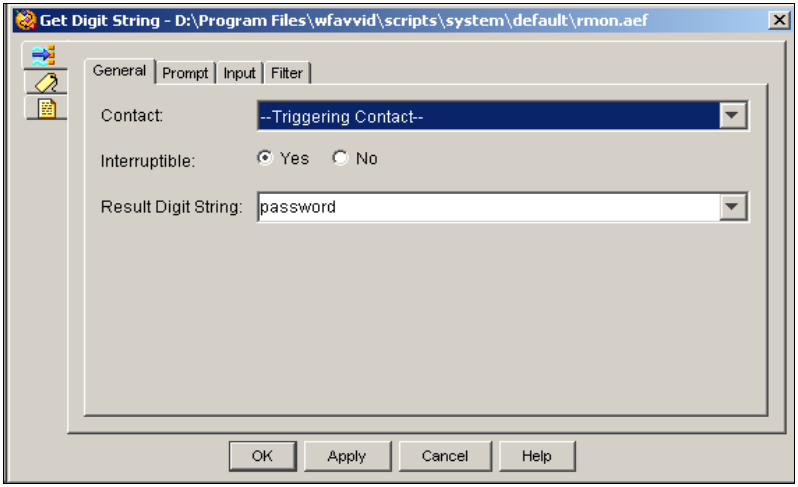
For descriptions of a basic timeout and a basic unsuccessful output branch, see the descriptions of how to code such in Chapter 6, "Designing a Basic Script." If the caller does not respond after the period of time set in the customization window of the Get Digit String step or the caller is unsuccessful, then the caller is transferred to a menu or final prompt

Get Caller's Password (Get Digit String) Step

Once the caller's login ID number is identified as accurate, then the caller is requested to enter a password or PIN. To configure this step, from the Media palette, drag the Get Digit String step under the Successful output branch as in Figure 18-3.

- In the General tab of the customization window, enter the following as in Figure 18-6:
  - Contact—Triggering Contact
  - Interruptible—Yes
  - Result Digit String—password

Figure 18-6 Getting the User's Password



- In the Prompt tab:
  - Prompt—SP[SSA\EnterPIN]
  - Barge In—Yes
  - Continue on Prompt Errors—Yes
- In the Input tab:
  - Initial Timeout—5

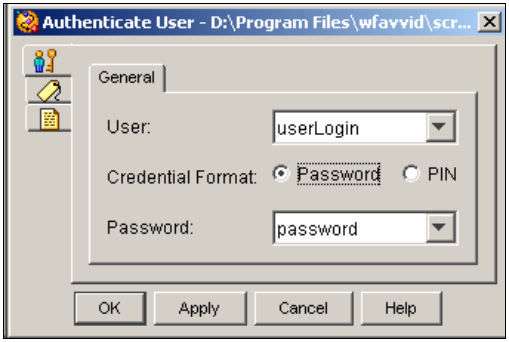
  - Interdigit Timeout—3
  - Maximum Retries—3
  - Flush Input Buffer—No
  - Clear Input Buffer on Retry—Yes
- In the Filter tab:
  - Input Length—21
  - Digits Filter—All options are checked except "*" and "#." The script considers numbers from 0 to 9 and letters A through D to be valid entries, and does not consider the cancel key "*" and the terminating key "#" to be valid digits to collect.
  - Terminating Digit—#
  - Cancel Digit—*

Authenticate User Step

In the successful output branch of the Get User's password step, from the User Palette, add an Authenticate User step. Configure the Authenticate User step to compare the value of the password variable with information contained in the user password variable (as configured in the User Administration web page of the CRS Administration web interface).

Note You can select to compare either a password or a PIN number. In this example, we use a password.

Figure 18-7 The Authenticate User Step Customization Window



Set authOK True Step

Under the successful branch of the Authenticate step, from the General palette, drag a Set step and set the authoOK variable to True. This variable holds the caller authentication result.

Monitoring Section

The section of the script description contains the following:

- If authOK then Step, page 18-21
- Options Subsection, page 18-23
- Output 1 of Menu Step: Extension, page 18-25
- Output 2 of Menu Step: A CSQ, page 18-35
- Timeout and Unsuccessful Output of Menu Step, page 18-36

If authOK then Step

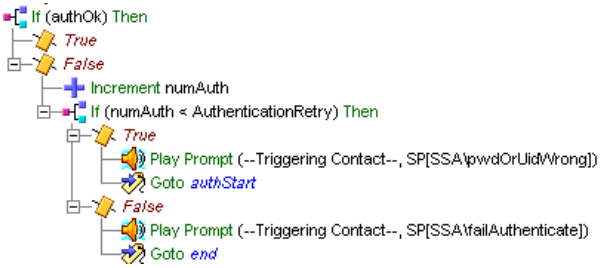
Depending on the outcome of the authentication steps, the “IF authOK then” step carries the flow of the call forward.

If the authentication is false, then the numAuth variable is incremented. If the number of attempts to authenticate is less than that allowed, then the prompt for input is played again and the call flow goes back to the authStart section of the code. The AuthenticationRetry variable holds the number of allowed retries.

The authentication is valid (true), then the call flow goes to the next section of code, the Set errorCount step.

The following figure shows the scripting of the "If AuthOK then" section of code.

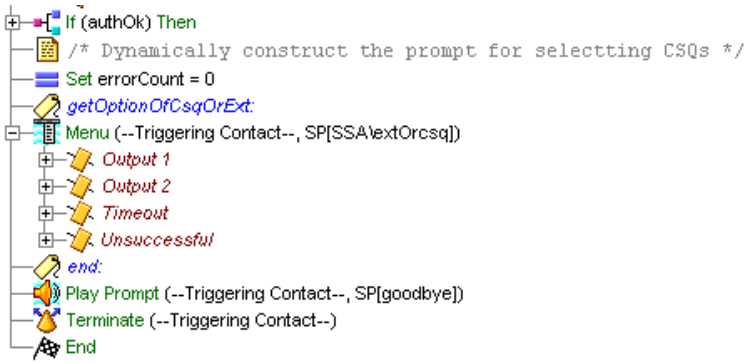
Figure 18-8 If authOK Then Step



For other ways to configure this section of code, see Chapter 6, "Designing a Basic Script."

The rest of the script continues as in the following figure.

Figure 18-9 From the IF Step to the Menu Step



Options Subsection

This section contains the following:

Set errorCount = 0 Step

From the General palette, drag a Set step and place it under the If step. In the Set customizer window, set the errorCount variable to 0. This begins the section of code that will dynamically create the prompt for selecting CSQs (Contact Service Queues) to handle the call.

GetOptionOrCsqOrExt Label

From the General palette, drag a Label step under the Set errorCount = 0 step. In the customization window, enter the label **getOptionOrCsqOrExt**. This marks the menu selection section of the code.

Menu Step

Continue the script by dragging a Menu step from the Media palette and dropping it under the **getOptionOfCsqOrEx** Label step.

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—**Output 1** and **Output 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[SSA\extOrcsq]**

    This system prompt offers the caller the choice to enter an extension number or to select the type of service wanted.
  - 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)—**10**

    The script executes the Timeout output branch if the script receives no input within 10 seconds.
  - Maximum Retries—**5**

    The step attempts 5 times to receive valid input before executing the Unsuccessful output branch.
  - Flush Input Buffer—**No**

    The script does not erase previously entered input before capturing new user input.

The Menu step in this script has the following output branches (see Figure 18-10):

- Output 1—Executes if the caller enters an extension number.
- Output 2—Executes if the caller selects a service (CSQ); for example, sales or customer support.
- Timeout—Executes if the step reaches the timeout limit without receiving input.
- Unsuccessful—Executes if the step receives invalid input.

The following sections summarize the scripting under each of these output branches:

- Output 1 of Menu Step: Extension, page 18-25
- Output 2 of Menu Step: A CSQ, page 18-35

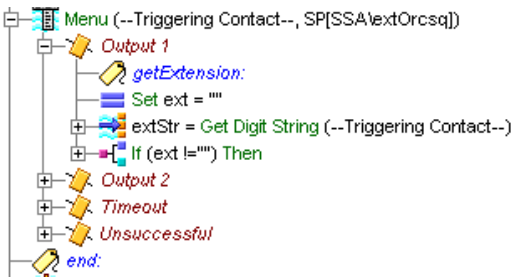
- Timeout and Unsuccessful Output of Menu Step, page 18-36

Output 1 of Menu Step: Extension

The Output 1 branch contains the following steps as seen in Figure 18-10:

- getExtension Label and Set ext Steps, page 18-25
- ExtSTR = GetDigit String Step, page 18-25p
- If Extension Does Not Equal Null, Then Step, page 18-28

Figure 18-10 Menu Step—Output 1 Branch (Top Level)



getExtension Label and Set ext Steps

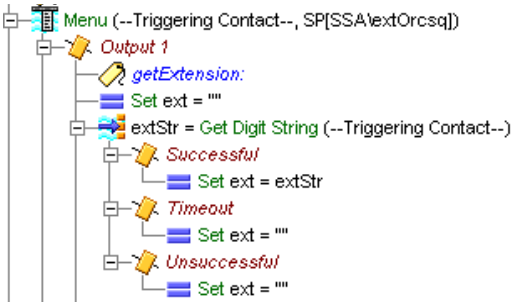
The getExtension label marks this section of code so the call flow can loop back if there is an error. The Set ext="" initializes the ext variable to be empty before accepting input. This variable stores the user-entered phone extension.

ExtSTR = GetDigit String Step

The Get Digit String step prompts the caller to enter an extension and then receives the caller input and puts that into the **ext** variable if successful.

The following figure shows the code for the extSTR = GetDigit String Step.

Figure 18-11 Menu Step—extStr = Get Digit String



Configure 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.
  - Result Digit String—**extStr**

    The **extStr** variable stores the digits entered by the caller (and is used by the subsequent If step to connect the caller to the extension).
  - Interruptible—**Yes**

    External events can interrupt the execution of this step.
- Prompt tab
  - Prompt—**SP[SSA\enterExtension]**

    This prompt asks the caller to enter an extension number.

    Barge In—**Yes**

    The caller can enter an extension 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
  - 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.)
  - Terminating Key—**#**

    The key the caller can use to indicate completion of input.
  - Cancel Key—*****

    The key the caller can use to start over. (The cancel key works only until the script reaches the maximum number of retries.)
  - Maximum Retries—**0**

    The step does not allow any retries 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 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.)
  - Flush Input Buffer—**No**

    The system saves previously entered input while the caller types ahead.
  - DTMF Buffer on Retry—**Yes**

    The script clears the DTMF buffer, erasing previously-entered digits whenever the step makes a new attempt at collecting caller input.
- Filter tab
  - All options are checked except “*” and “#”

    The step treats the numbers from 0 to 9 as valid entries, and treats the keys “*” and “#” as invalid digits to collect.

The Get Digit String step contains three output branches:

- Successful—This branch contains a single Set step which configures the **ext** variable to contain the information in the **extStr**.
- Timeout—This branch contains a single Set step which configures the **ext** variable to be null.
- Unsuccessful—This branch also contains a single Set step which configures **ext** variable to be null.

If Extension Does Not Equal Null, Then Step

If the extension number does not equal null, this output directs the system to play a prompt to the caller and monitor the extension number.

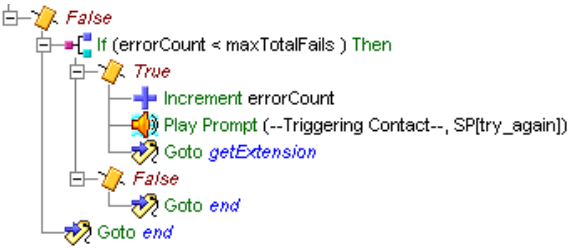
The following figure shows the two output branches under the If step: True and False.

Figure 18-12 Menu Step, Output 1 Branch (If Step)

False Branch for Output 1

The following figure displays the false branch for Output 1.

Figure 18-13 Output 1 of IF Step: False Branch



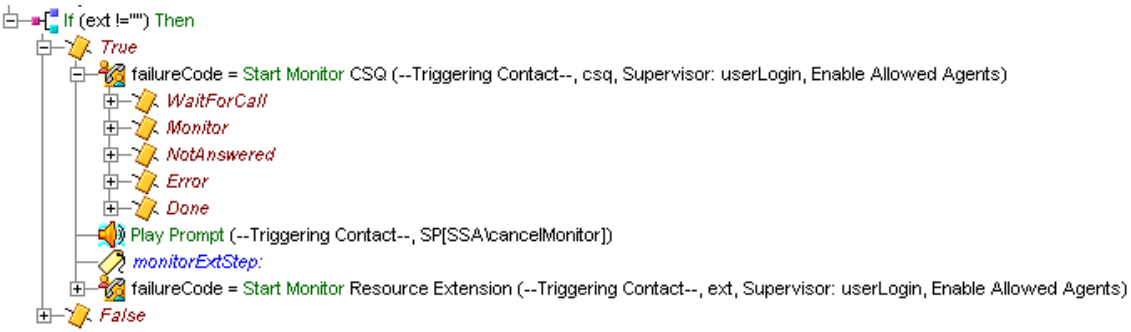
True Branch for Output 1

This section contains the following:

- Play Prompt, page 18-30
- Label monitorExtStep, page 18-30
- failurecode - Start Monitor, page 18-30

Since the Play Prompt and Label steps are short and the Start Monitor step begins and ends this branch, the last step described in this section is the start monitor step.

Figure 18-14 Output 1 Branch (If Step) True Branch



Play Prompt

From the Media palette, select the Play Prompt step and configure it as follows:

- General tab
  - Contact—Triggering Contact
  - Interruptible—Yes
- Prompt tab
  - Prompt—SP[SSA\cancelMonitor]
  - Barge In—Yes
  - Continue on Prompt Errors—Yes
- Input tab
  - Flush Input Buffer—Yes

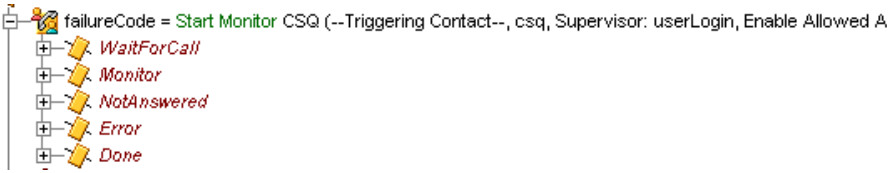
Label monitorExtStep

From the General palette, drag a Label step and enter the label monitorExtStep.

failurecode - Start Monitor

From the IPCC Express palette, drag a Start Monitor step. This step initiates remote monitoring. The following figure shows a general view of the monitoring steps.

Figure 18-15 OverView of the Monitoring Section of Code



Configure the Start Monitor customizer window as described in Start Monitor Step, page 18-6. Depending on the type of resource you select, you can monitor either a CSQ or an agent's extension:

- If Resource Extension is selected as the resource type, then remote monitoring will be performed for an extension.

- If Contact Service Queue is selected as the resource type, remote monitoring will be performed for a CSQ.

Output1 of Menu Step: Start Monitor Output Branches

The Start Monitor step has five output branches:

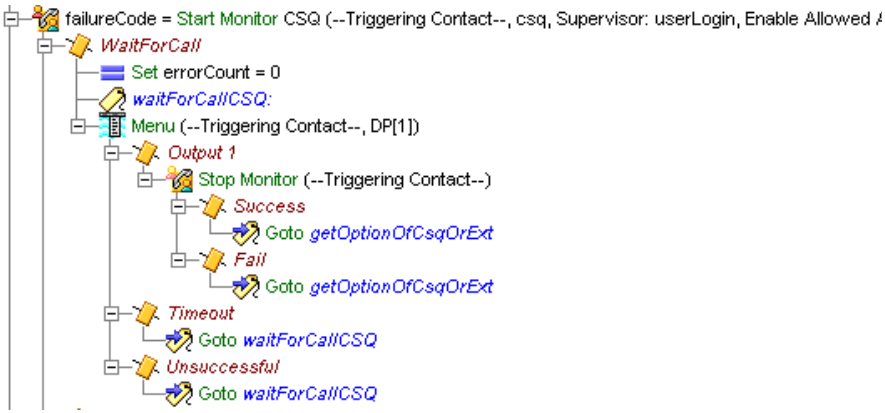
- Waiting_To_Monitor—Supervisor is waiting to monitor a call. See Figure 18-21 for example scripting.
- Monitoring—Supervisor is monitoring a call. See
- Not_Answered—IPCC Express call to monitor is not answered by an agent.
- Error—The Start Monitor step encounters an error.
- Done—Remote monitoring session is complete.

The following sections display the code for each output. See the CRS

Start Monitor — Waiting To Monitor

The following figure shows the code for the Waiting To Monitor branch.

Figure 18-16 WaitForCall



Start Monitor — Monitoring

The following figure shows the code for the monitoring branch.

Figure 18-17 Start Monitor — Monitor

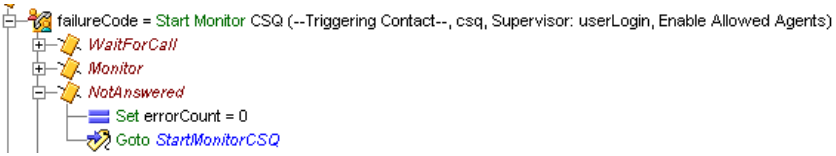
```
failureCode = Start Monitor CSQ (--Triggering Contact--, csq, Supervisor: userLogin, Enable Allowed Agents)
    WaitForCall
    Monitor
        Set errorCount = 0
        monitorCSQ:
        Menu (--Triggering Contact--, DP[1])
            Output 1
                Stop Monitor (--Triggering Contact--)
                    Success
                        Menu (--Triggering Contact--, SP[SSA\doneMenu])
                            Output 1
                                Play Prompt (--Triggering Contact--, SP[SSA\cancelMonitor])
                                Goto StartMonitorCSQ
                            Output 2
                                Goto getOptionOfCsqOrExt
                            Output 3
                                Goto end
                            Timeout
                                Goto end
                            Unsuccessful
                                Goto end
                    Fail
                        Goto getOptionOfCsqOrExt
            Timeout
                Goto monitorCSQ
            Unsuccessful
                Goto monitorCSQ
```

See the *Cisco CRS Scripting and Development Series: Volume 1, Script Reference Guide, Release* for a description of each CRS Editor step.

Start Monitor — Not Answered

The following figure shows the code for the Not Answered branch.

Figure 18-18 Start Monitor — Not Answered



Start Monitor — Error

The following figure shows the code for the Error branch.

Figure 18-19 Start Monitor — Error

Start Monitor — Done

The following figure shows the code for the Done branch.

Figure 18-20 Start Monitor — Done

Output 2 of Menu Step: A CSQ

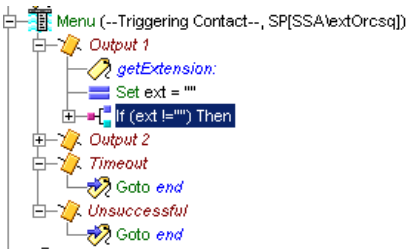
The following figure is an overview of the scripting for the Output 2 branch.

Figure 18-21 Menu Output 2 Branch (Overview)

Timeout and Unsuccessful Output of Menu Step

The scripting under both the Timeout and Unsuccessful output branches of the Menu step is identical: each branch consists of a GoTo step pointing to the Label step named **end**.

Figure 18-22



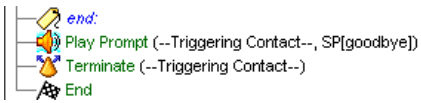
Note For more information about the end Label step, see "Closing Section" section on page 18-36

Closing Section

Close the rmon.aef script by using steps that play back a final prompt to the caller, terminate the connection, and end the script.

The following figure shows the steps used to close the script.

Figure 18-23 Closing Steps of the rmon.aef Script



This section briefly describes these steps:

- The Label Step (end), page 18-37
- The Play Prompt Step, page 18-37
- The Terminate Step, page 18-37
- The End Step, page 18-37

The Label Step (end)

Identify the beginning of the ending steps of this script by inserting a Label step with the name **end**. This label is pointed to in the GoTo End step in the False portion of the IF step in the Output 1 section of code.

The Play Prompt Step

Configure the Play Prompt step to play **goodbye** back to the caller.

Note For an example of configuring the Play Prompt step, see The Play Prompt Step, page 18-14.

The Terminate Step

Use the Terminate step to terminate the contact by disconnecting the call.

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.

Designing IPCC Gateway Scripts

You can design CRS scripts to interact with ICM scripts in an IPCC Express system integrated with an ICM system through the IPCC Gateway.

In such an integrated system, the IPCC Express software is linked as an ACD to the ICM software.

This section contains the following topics:

For further information on designing IPCC Gateway scripts, see the following:

- *Cisco IPCC Gateway Deployment Guide, Release 7.0*
- *Cisco ICM/IP Contact Center Enterprise Edition Scripting and Media Routing Guide, Release 7.0*

Scripting on an IPCC Express IPCC Gateway System

The CRS Editor contains three steps that specifically interface with the IPCC 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 an IPCC Gateway deployment this enables getting/setting data from IPCC Express to ICM software and to the Cisco Agent Desktop.

  Note This step should be placed in an IPCC Express 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 (IPCC Express palette).

  Use the Request Route step to request a call routing location from Cisco ICM software. An IPCC Express 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 ICM software.
  - Failed. The Request Route step failed to return a routing destination from ICM software.

See the *Cisco CRS Scripting and Development Series: Volume 2, Editor Step Reference Guide* for descriptions of the preceding steps.

Using Variables

In CRS scripts that interact with ICM scripts through the IPCC Gateway, you can use three types of variables:

- Local variables that you define in the CRS script in the Variable pane of the CRS 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 Expanded Call Context (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.

IPCC Express uses enterprise Call Variables and enterprise Expanded Call Context Variables when passing data between the integrated systems that make up an IPCC Gateway system: the Cisco ICM Enterprise Server, the Cisco CRS system, and the Cisco Agent Desktop.

This means that you must use the Set Enterprise Call Info and Get Enterprise Call Info steps to take data stored in a local CRS script variable and to make it available for display in the Cisco Agent Desktop or for use in an ICM script.

Defining Local CRS Script Variables

Begin the IPCC Gateway script design process first by using the Variable pane of the CRS Editor to define your local variables for your CRS script.

For information about defining variables in CRS scripts, see Defining, Using, and Updating Script Variables, page 2-26. For example CRS script variables used in a CRS IPCC Gateway script, see Script Variables Used in the PostRouteSimple.aef Script, page 19-23.

Using Cisco Pre-Defined Enterprise Call Variables

In addition to the script variables that you can define in the Variable pane of the CRS Editor window, you can use the following Cisco predefined strings as enterprise call variables in CRS in the Set Enterprise Call Info and Get Enterprise Call Info steps to pass information between the ICM system and the CRS 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 an ICM 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 ICM Enterprise Server, the Cisco CRS system, and the Cisco Agent Desktop support these call variables for passing data among themselves.

If you need more call variables than those predefined in the General tab, use Expanded Call Context (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 dabase and cannot be used in CRS reporting.

Using Enterprise Expanded Call Context (ECC) Variables

The Cisco ICM Enterprise Server, the Cisco CRS system, and the Cisco Agent Desktop can also pass ECC variables to each other.

Enterprise Expanded Call Context (ECC) data fields are used by all applications in the CRS 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.

CRS has some pre-defined ECC variables. For a list of the CRS system default ECC variables, see *Cisco CRS 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 CRS Editor in IPCC Express, the Cisco Agent Desktop, and the ICM software.

Defining ECC Variables in the Cisco Desktop Administrator

To define an ECC variable in the Cisco Desktop Administrator, 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 Desktop Administrator User's Guide* for more information on defining ECC variables in the Cisco Desktop Administrator.

Defining ECC Variables in the CRS Editor

To define an ECC variable in the CRS Editor, do the following.

Procedure

Step 1 From the CRS Editor menu bar, choose **Settings > Expanded Call Variables.**

The Expanded Call Variables window appears

Step 2 In the tool bar, 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 ICM configuration (or the Cisco Desktop Administrator using Cisco IPCC Express).

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 ICM Expanded Call Variables window (or the Cisco Desktop Administrator using Cisco IPCC Express).

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 CRS Script

Use the Expanded Call Variables tab of the Set and Get Enterprise Call Info step property windows to configure ECC variables in CRS 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 Customer Response Solutions Administration Guide*" and the *Cisco ICM Software IPCC Installation and Configuration Guide* for information on configuring ICM software for CRS and for defining and configuring ECC variables in ICM software.

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 IPCC Gateway Post-Routing Scripts

In IPCC Gateway deployments where the IPCC Express system is connected to an ICM system as the child system, the IPCC Express system can use the ICM system for *post routing*. Post routing is typically used to enable the ICM 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 IPCC Gateway. In each of these examples, the script accepts the call from the Cisco CallManager in the CRS system and then queries the ICM system through the Request Route step. The CRS system then routes the call based on the return value of the Request Route step supplied by the ICM 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.

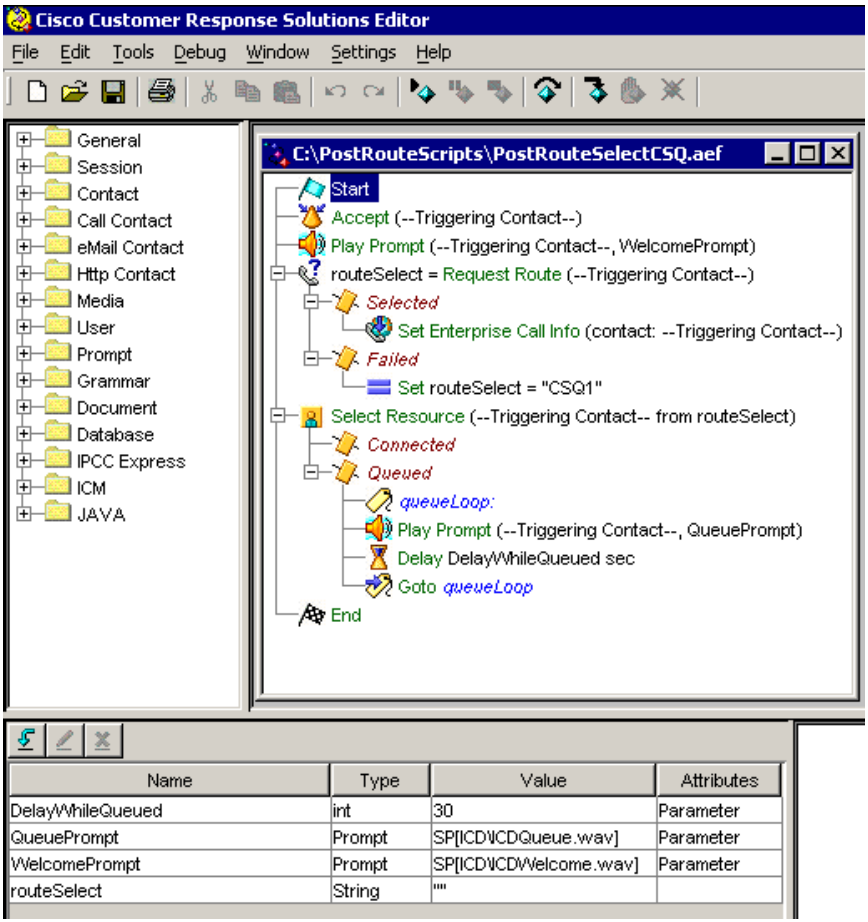
Each of three sample IPCC Express scripts presume an ICM script designed to interact with the IPCC Express script, depending on what IPCC Express resource is wanted: a CSQ, an agent, or a route point.

Note An important point from these examples is that the ICM and IPCC Express script writers need to work together during both design and implementation to ensure that the correct type of information is returned by the ICM script through the CRS Request Route step and is used properly by the CRS script to route the call appropriately.

A Sample IPCC Express Script that Selects a CSQ

The following figure displays the sample PostRouteSelectCSQ script as it appears in the CRS Editor window.

Figure 19-1 PostRouteSelectCSQ.aef Script—Select CSQ



Script Variables Used in the PostRouteSelectCSQ.aef Script

The following table describes the variables used in the PostRouteSelectCSQ.aef sample script.

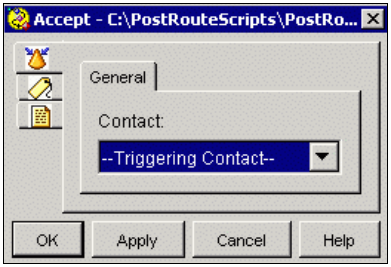
Table 19-1 PostRouteSelectCSQ.aef Variable Descriptions

Variable Name	Variable Type	Initialized Value	Function
DelayWhileQueued	int	30	Stores the number of seconds to delay in the queue before prompting the call again. Used in the Queued section of the script.
QueuePrompt	Prompt	SP[ICD\ICDQueue.wav]	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.
WelcomePrompt	Prompt	SP[ICD\ICDWelcome.wav]	Stores the message the caller hears when the system answers the call. Used in the opening prompt of the script.
routeSelect	String	""	Stores the CSQ name to be used in the script. Returned by the Request Route step and passed into the Select Resource step.

Script Flow for the PostRouteSelectCSQ.aef Script

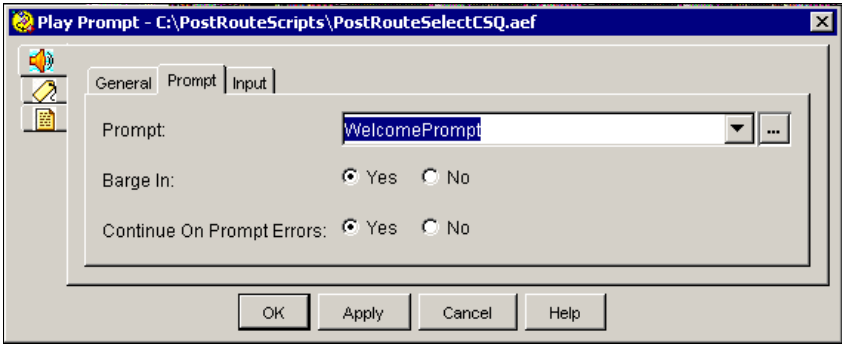
1. The script receives the call from the Cisco CallManager.

Figure 19-2 Configured General tab of the Accept Step



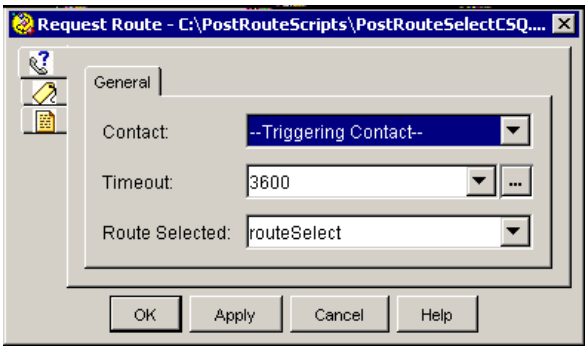
2. The script plays a welcome message to the caller.

Figure 19-3 Configured Prompt tab of the Play Prompt Step



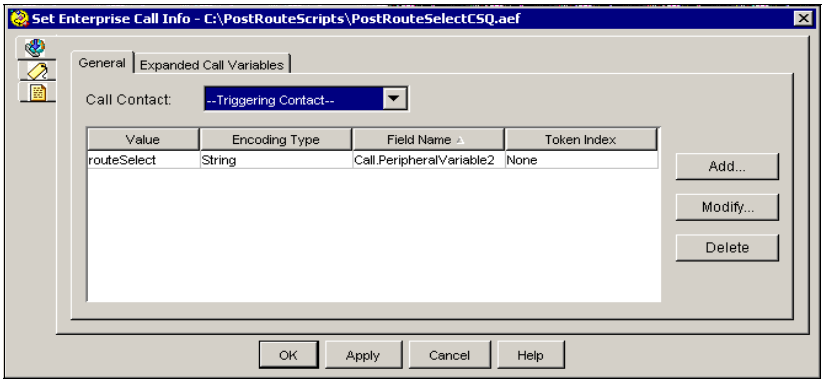
3. In the Request Route step, the script requests a route label from the ICM system for a CSQ in the IPCC Express system.

Figure 19-4 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, call.PeripheralVariable2. In this case, the label is a CSQ identifier. This variable can be displayed on the Cisco Agent Desktop.

Figure 19-5 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 19-6 Configured General tab of the Set Step

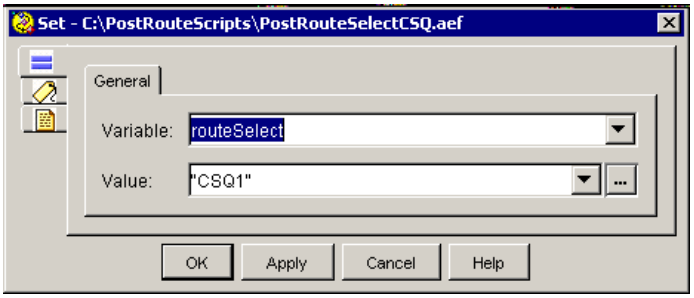
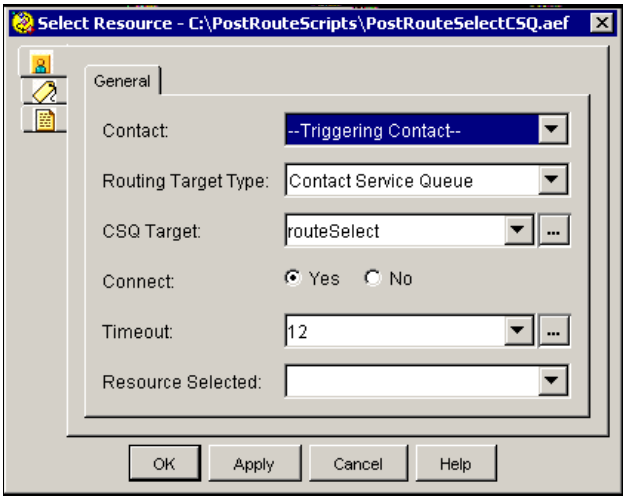
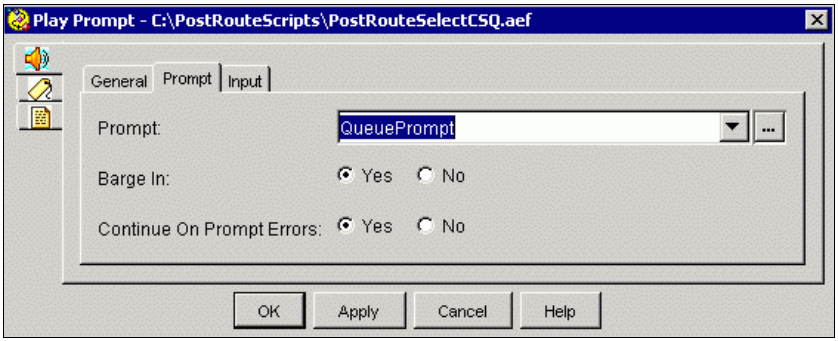


Figure 19-7 Configured General tab of the Select Resource Step



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 droped by the caller.

Figure 19-8 Configured Prompt tab of the Play Prompt Step



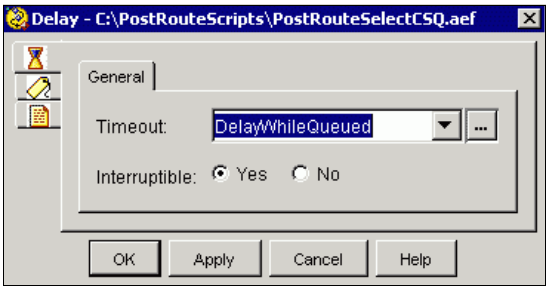
In the General tab of the Play Prompt Step:

- 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:

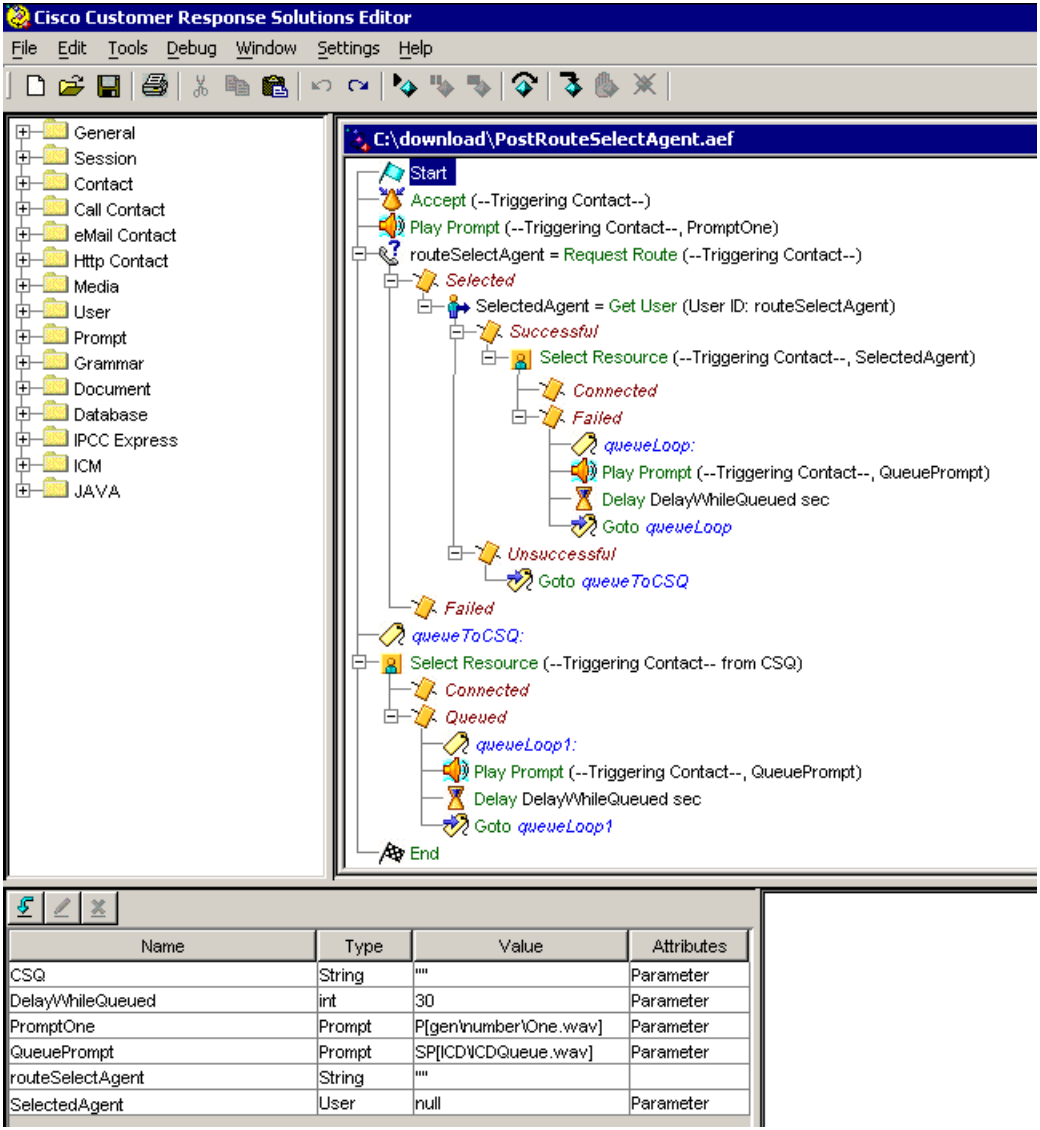
- Flush Input Buffer option is No

Figure 19-9 Configured General tab of the Delay Step



A Sample IPCC Express Script that Selects an Agent

Figure 19-10 PostRouteSelectAgent.aef Script—Select Agent



Script Variables Used in the PostRouteSelectAgent.aef Script

The following table describes the variables used in the PostRouteSeclectAgent.aef sample script dispalyed in Figure 19-10.

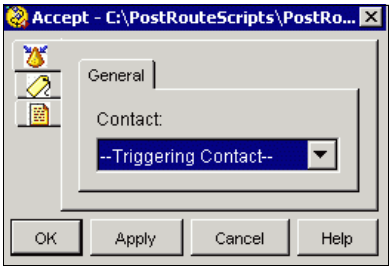
Table 19-2 PostRouteSelectAgent.aef Variable Descriptions

Variable Name	Variable Type	Initialized Value	Function
CSQ	String	"Should be initialized to a default CSQ name"	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.
DelayWhileQueued	int	30	Stores the number of seconds to delay in the queue before prompting the call again. Used in the Queued section of the script.
PromptOne	Prompt	P[gen\number\One.wav]	Stores the message the caller hears when the call is answered. Used in the opening Play Prompt step.
QueuePrompt	Prompt	SP[ICD\ICDQueue.wav]	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.
RouteSelectAgent	String	""	Stores the agent identifier that is received from the ICM system. Returned by the Request Route step and passed to the Get User step.
SelectedAgent	User	null	Stores the Agent User information corresponding to the routeSelectAgent string selected by the ICM system. A user object returned from the Get User step and passed into the Select Resource step.

Script Flow for the PostRouteSelectAgent.aef Script

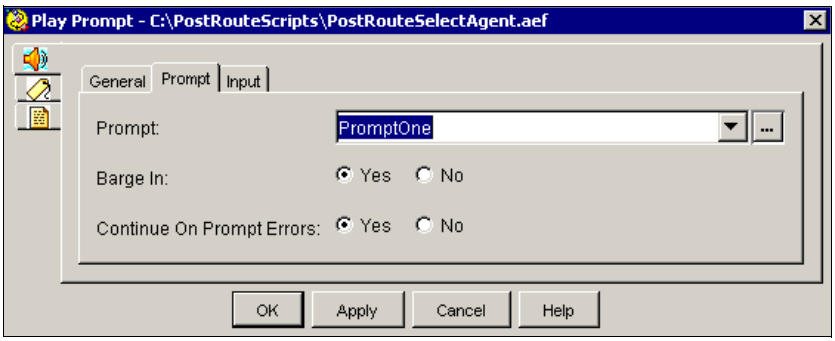
1. The script accepts the call from the Cisco CallManager.

Figure 19-11 Configured General tab of the Accept Step



2. The caller is welcomed.

Figure 19-12 Configured Prompt tab of the Play Prompt Step



In the General tab of the Play Prompt Step:

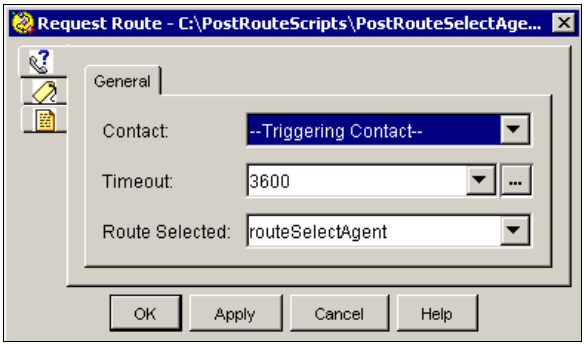
- Triggering Contact is selected as the contact
- Interruptible option is Yes

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 ICM system.

Figure 19-13 Configured General tab of the Request Route Step

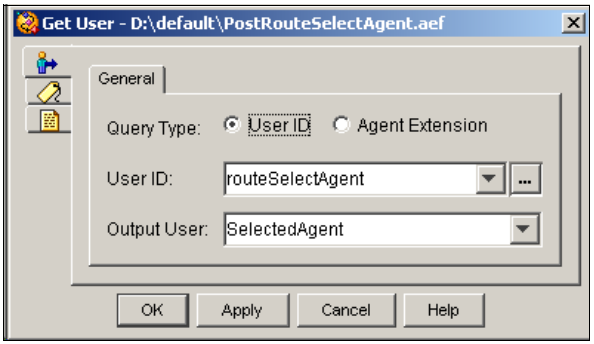


The agent identifier returned by the ICM software is put in the local routeSelectAgent IPCC Express script variable.

Note In this script, if the ICM script returns a CSQ or a route point, rather than a string identifying the agent, the script will fail.

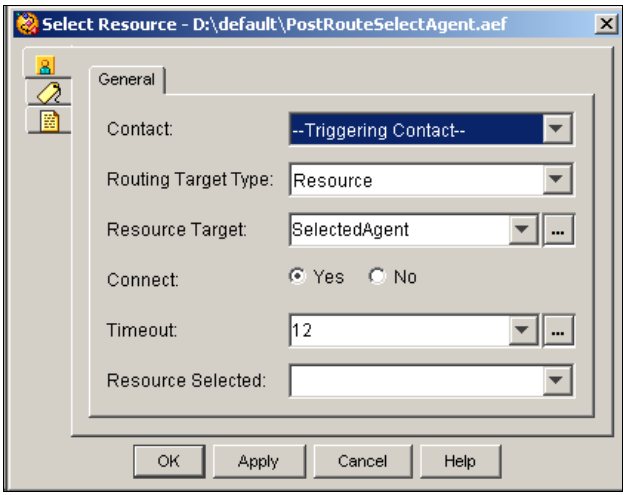
4. In the Get User step, the IPCC Express script returns a user object corresponding to the input agent identifer named in the RouteSelectAgent variable, which is stored in the SelectedAgent variable.

Figure 19-14 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.

Figure 19-15 Configured General tab of the Select Resource Step

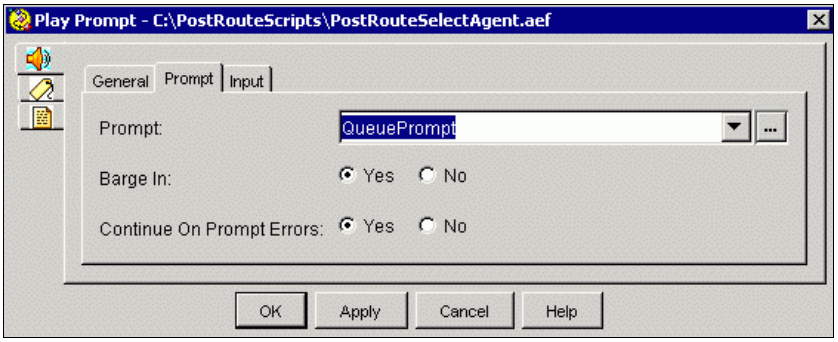


Note For agent based routing to succeed, the state of the selected agent must be **ready**. The Select Resource step will fail if the selected agent is in any state other than ready. The ICM system can determine the current state of an agent, although there

is no guarantee that the agent state will not change between when the ICM system returns information and the IPCC Express 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 19-16 Configured Prompt tab of the Second Play Prompt Step



In the General tab of the Play Prompt Step:

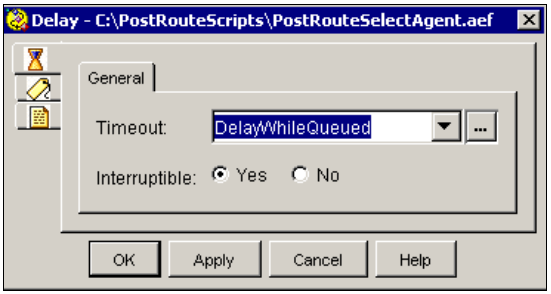
- Triggering Contact is selected as the contact
- Interruptible option is Yes

In the Input tab of the Play Prompt Step:

- Flush Input Buffer option is No

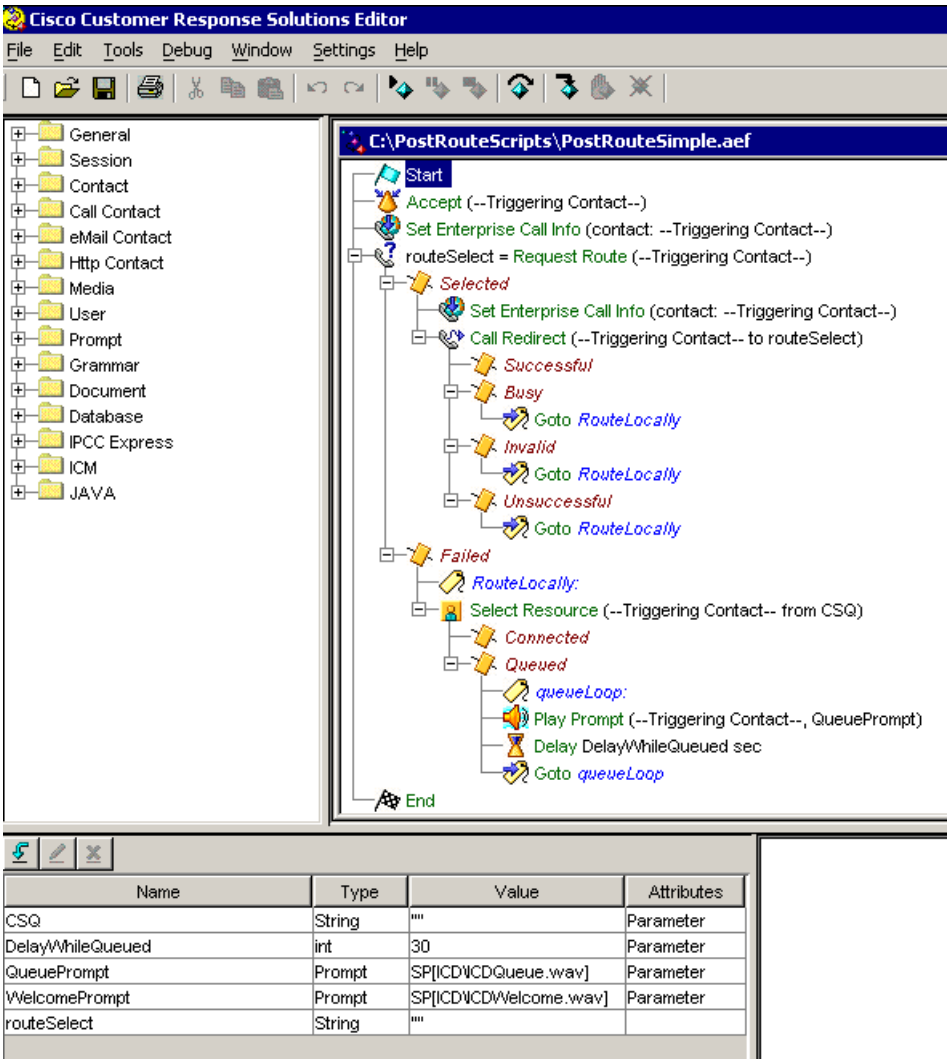
7. The script will ring for the time set in the DelayWhileQueued variable, play a prompt to tell the caller to please wait, and then ring again.

Figure 19-17 Configured General tab of the Delay Step



A Sample IPCC Express Script that Selects a Route Point

Figure 19-18 PostRouteSimple.aef Script — Select Route Redirect



Script Variables Used in the PostRouteSimple.aef Script

The following table describes the variables used in the PostRouteSimple.aef sample script as displayed in Figure 19-18.

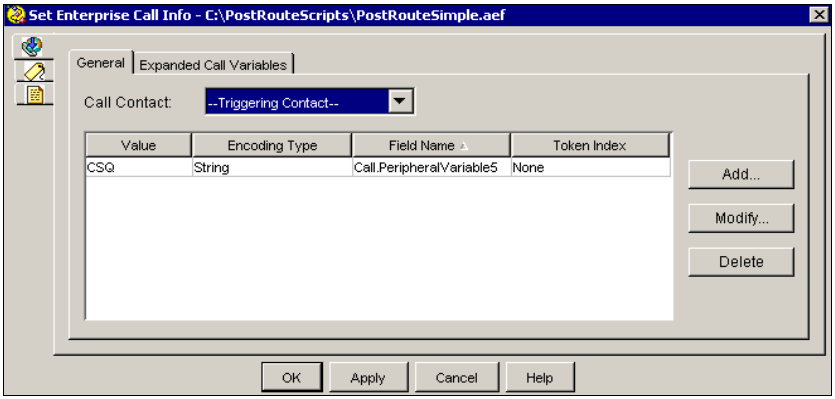
Table 19-3 PostRouteSimple.aef Variable Descriptions

Variable Name	Variable Type	Initialized Value	Function
CSQ	String	"Should be initialized to a default CSQ name"	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.
DelayWhileQueued	int	30	Stores the number of seconds to delay in the queue before playing the prompt message again. Used in the Queued section of the script.
QueuePrompt	Prompt	SP[ICD\ICDQueue.wav]	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.
WelcomePrompt	Prompt	SP[ICD\ICDWelcome.wav]	Stores the message the caller hears when the system first answers the call. Used in the opening prompt of the script.
RouteSelect	String	""	Stores the route identifier received from the ICM system. Returned by the Request Route step and passed into the Call Redirect step.

Script Flow for the PostRouteSimple.aef Script

1. The IPCC Express script accepts the call from the Cisco 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 Agent Desktop software or in an ICM script. This might be used, for example, to display the current CSQ on the Agent Desktop.

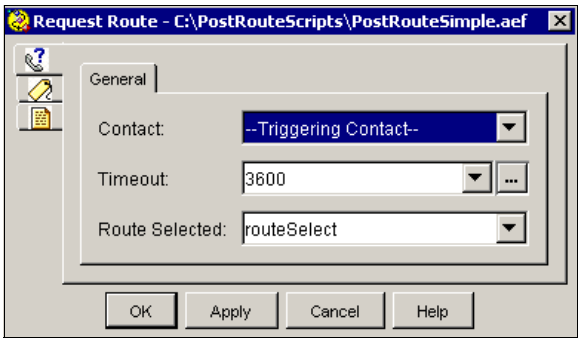
Figure 19-19 Configured General tab of the Set Enterprise Call Info Step



Expanded Call Variables are not used in this sample script.

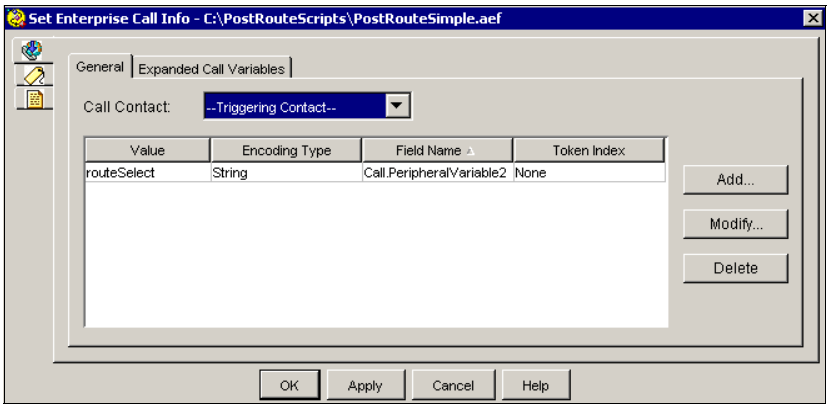
3. The Request Route step requests a label from the ICM system which the ICM system sends back and which is stored in the RouteSelect variable. In this example, the returned value is a route point rather than an agent or CSQ identifier. For example: extension 13526.

Figure 19-20 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 Agent Desktop.

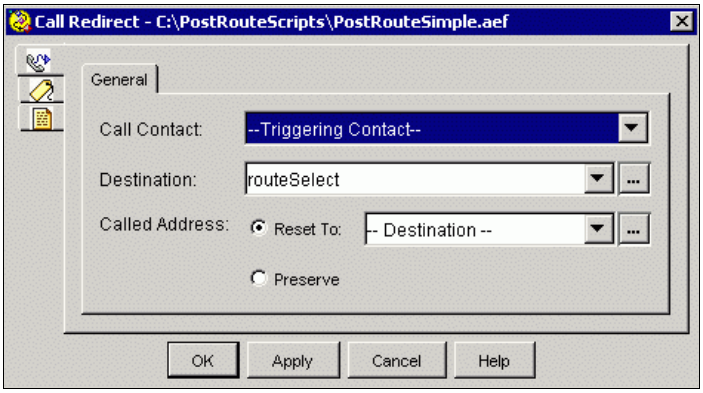
Figure 19-21 Configured General tab of the Second Set Enterprise Call Info Step



Expanded Call Variables are not used in this script.

5. The IPCC Express script, in the Call Redirect step, redirects the call to the selected route point and is stored in the string variable routeSelect.

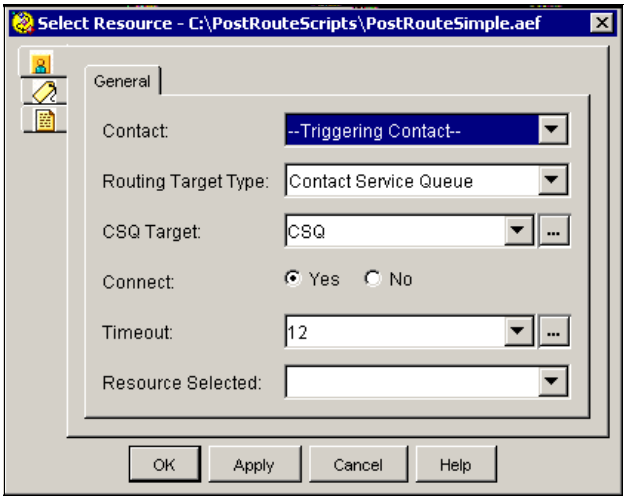
Figure 19-22 Configured General tab of the Call Redirect Step



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.

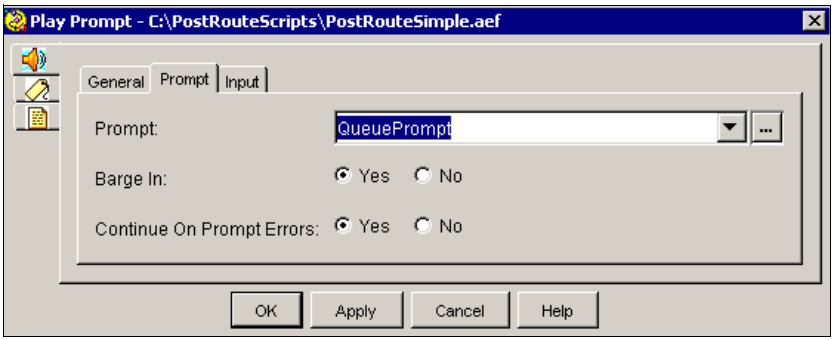
6. In the case of failure from the Request Route step or the Call Redirect step, the script is designed to route the call through the Select Resource step to the default CSQ specified in the CSQ variable.

Figure 19-23 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 19-24 Configured Prompt tab of the Play Prompt Step



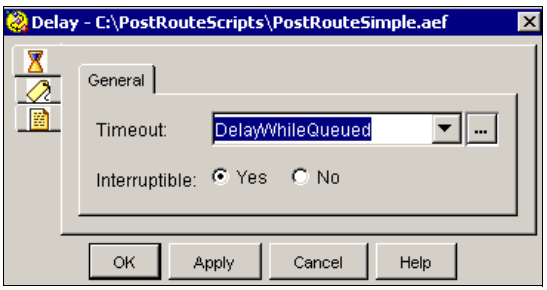
In the General tab of the Play Prompt Step:

- 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

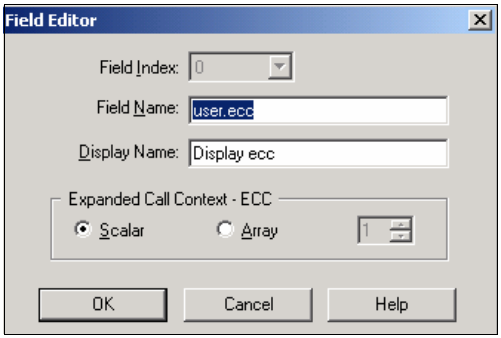
Figure 19-25 Configured General tab of the Delay Step



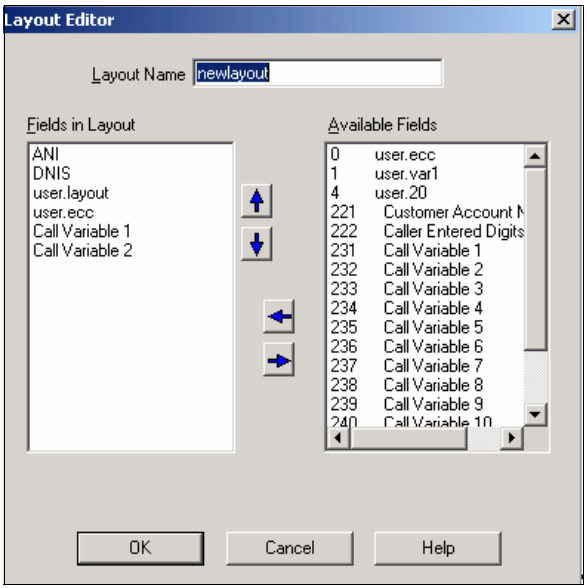
A Summary Process for Defining Enterprise Variables

The following steps summarize the process for defining enterprise variables in the IPCC Express system. See the ICM documentation for how to define ECC variables in ICM software.

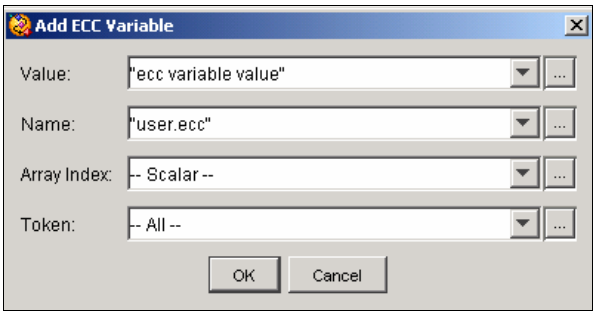
Step 1 Create an ECC variable in the Cisco Desktop Administrator (Enterprise Data Configuration > Enterprise Data > Field List).



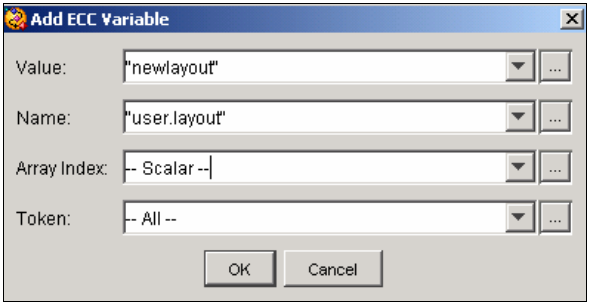
Step 2 Create a new layout using the Cisco Desktop Administrator and add fields to the layout (Enterprise Data Configuration > Enterprise Data).



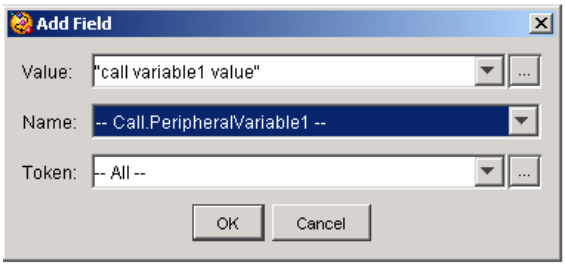
Step 3 Configure the Set Enterprise Call Info (Expanded Call Variables tab) step in your IPCC Express script to set values for the ECC Variables.

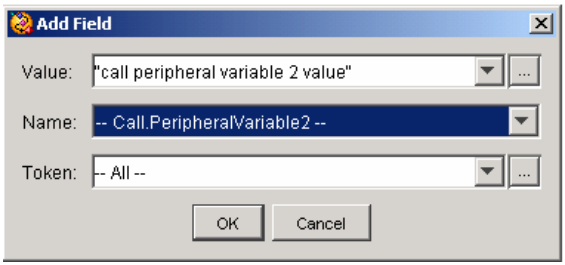


Step 4 Configure the Set Enterprise Call Info (Expanded Call Variables tab) step in your IPCC Express script to use a custom layout that was created in Step 2.

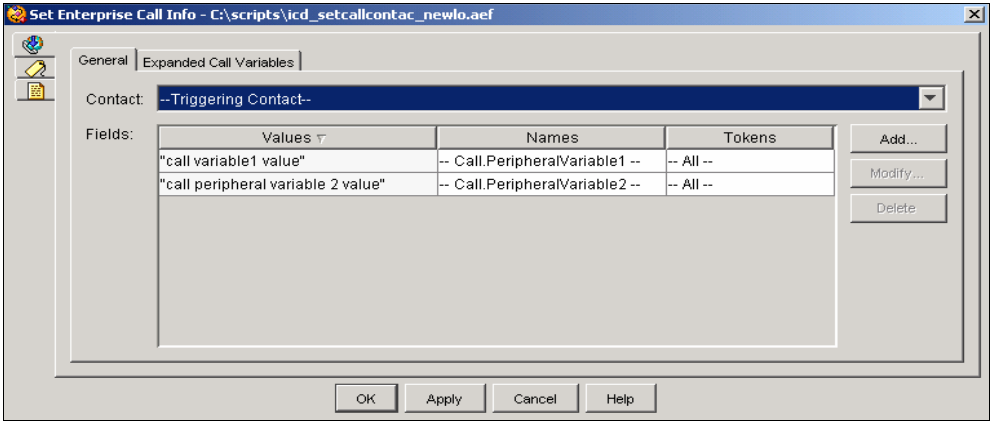


Step 5 Configure the Set Enterprise Call Info (General tab) step using in your IPCC Express script to set values for the Cisco predefined Call Peripheral Variables.

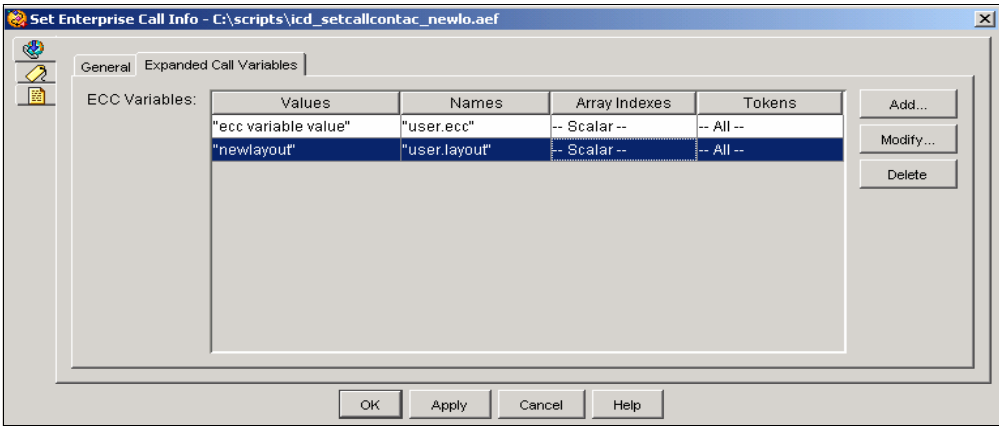




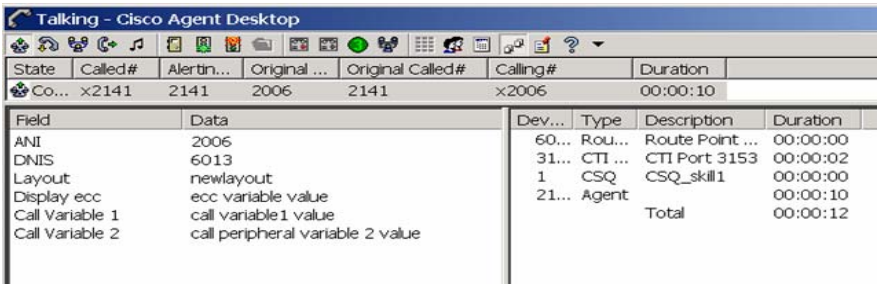
Step 6 Check your list of Call Peripheral Variables in the Set Enterprise Call Info step.



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 Agent Desktop.



VoiceXML Implementation for Cisco Voice Browser

This section includes the following topics:

VoiceXML 2.0 Element Implementation

Table A-1 describes the Cisco CRS 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 CRS supports. SML elements are available in VoiceXML 2.0.
- The elements in the Speech Recognition Grammar Specification (SRGS) Version 1.0 that CRS supports. SRGS elements are available in VoiceXML 2.0.

Note At run time, the system ignores unsupported or unimplemented attributes.

Table A-1 VoiceXML 2.0 Element Implementation

Element	Attributes	Notes
<assign>	name expr	Fully supported by the Cisco CRS implementation.
<audio>	src fetchtimeout fetchint maxage maxstale expr	The following attributes are not supported: • fetchint 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 CRS implementation.
<break>	strength time	Fully supported by the Cisco CRS implementation.

Table A-1 VoiceXML 2.0 Element Implementation (continued)

Element	Attributes	Notes
<catch>	event count cond	Fully supported by the Cisco CRS implementation.
<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 CRS implementation.
<desc>	xml:lang	Not supported by the Cisco CRS implementation.
<disconnect>	no attributes	Fully supported by the Cisco CRS implementation.
<else>	no attributes	Fully supported by the Cisco CRS implementation.
<elseif>	cond	Fully supported by the Cisco CRS implementation.
<emphasis>	level	Fully supported by the Cisco CRS implementation.
<enumerate>	no attributes	Fully supported by the Cisco CRS implementation.
<error>	count cond	Fully supported by the Cisco CRS implementation.
<example>	no attributes	Fully supported by the Cisco CRS implementation.
<exit>	expr namelist	Fully supported by the Cisco CRS implementation. Parameters are returned to variables configured in the Voice Browser step.

Table A-1 VoiceXML 2.0 Element Implementation (continued)

Element	Attributes	Notes
<field>	name expr cond type slot modal	Fully supported by the Cisco CRS implementation.
<filled>	mode namelist	Fully supported by the Cisco CRS implementation.
<form>	id scope	Fully supported by the Cisco CRS implementation.
<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 CRS implementation.

Table A-1 VoiceXML 2.0 Element Implementation (continued)

Element	Attributes	Notes
<if>	cond	Fully supported by the Cisco CRS implementation.
<initial>	name expr cond	Fully supported by the Cisco CRS implementation.
<item>	tag weight	Fully supported by the Cisco CRS implementation.
<lexicon>	type uri	Not supported by the Cisco CRS implementation.
<link>	next dtmf expr event eventexpr fetchaudio fetchint fetchtimeout maxsize maxstate message messageexpr	The following attributes are not supported: • fetchint
<log>	label expr	Fully supported by the Cisco CRS implementation.
<mark>	name	Not supported by the Cisco CRS implementation.
<menu>	id scope dtmf accept	Fully supported by the Cisco CRS implementation. **Note** If the <menu> element dtmf attribute is set to **`dtmf="true"`**, then the <choice> element dtmf attribute can be set to only one of the following: **`dtmf="*"`**, **`dtmf="#"`**, and **`dtmf="0"`**.
<meta>	name content http-equiv	Fully supported by the Cisco CRS implementation. http-equiv may contain Date and Expires properties

Table A-1 VoiceXML 2.0 Element Implementation (continued)

Element	Attributes	Notes
<metadata>	creator rights subject	Fully supported by the Cisco CRS implementation.
<noinput>	count cond	Fully supported by the Cisco CRS implementation.
<nomatch>	count cond	Fully supported by the Cisco CRS implementation.
<object>	name expr cond classid codebase codetype data type archive fetchint fetchtimeout maxage maxstale	No platform object is supported in the Cisco CRS implementation.
<one-of>	tag	Fully supported by the Cisco CRS implementation.
<option>	dtmf accept value	Fully supported by the Cisco CRS implementation.
<p>	XML:lang	Fully supported by the Cisco CRS implementation.
<param>	name expr value valuetype type	Fully supported by the Cisco CRS implementation.
<phoneme>	alphabet ph	Fully supported by the Cisco CRS implementation.

Table A-1 VoiceXML 2.0 Element Implementation (continued)

Element	Attributes	Notes
<prompt>	bargein bargeintype cond count timeout xml:lang xml:base	For bargein, only “speech” is supported.
<property>	name value	Supported in the Cisco CRS implementation. See VoiceXML Properties Implementation, page A-10 for the list of properties supported.
<prosody>	pitch contour range rate duration volume	Not supported by the Cisco CRS 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 CRS implementation.

Table A-1 VoiceXML 2.0 Element Implementation (continued)

Element	Attributes	Notes
<return>	event eventexpr message messageexpr namelist	Fully supported by the Cisco CRS implementation.
<rule>	ID scope	Fully supported by the Cisco CRS implementation.
<ruleref>	tag uri	Fully supported by the Cisco CRS implementation.
<s>	no attributes	Fully supported by the Cisco CRS implementation.
<say-as>	phon sub class	Fully supported by the Cisco CRS implementation.
<script>	src charset fetchint fetchtimeout maxage maxstale	The following attributes are not supported: • fetchint
<sub>	alias	Not supported by the Cisco CRS implementation.
<subdialog>	name expr cond namelist src srcexp method enctype fetchaudio fetchtimeout fetchint maxage maxstale	The following attributes are not supported: • fetchint

Table A-1 VoiceXML 2.0 Element Implementation (continued)

Element	Attributes	Notes
<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 CRS implementation.
<token>	xml:lang	Fully supported by the Cisco CRS 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 CRS implementation.
<var>	expr name	Fully supported by the Cisco CRS implementation.

Table A-1 VoiceXML 2.0 Element Implementation (continued)

Element	Attributes	Notes
<voice>	xml:lang gender age variant name	Not supported by the Cisco CRS implementation.
<vxml>	application version xmlns xml:base xml:lang	Fully supported by Cisco's CRS implementation. The version attribute must contain the value "2.0".

VoiceXML Properties Implementation

The table below lists standard VoiceXML 2.0 properties supported in CRS implementation.

Table A-2 Supported Standard VoiceXML 2.0 Properties

Property Name	Description
bargein	Specifies whether or not barge-in to voice prompts is allowed. Allowed values are "true" and "false". Default value is "true".
fetchtimeout	Sets the timeout for fetching the content from the web. The default value is "4s".
timeout	The time after which a noinput event is thrown by the platform. The default value is "5s".
termchar	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.)
termtimeout	Specifies the timeout in seconds for DTMF recognition. The default value is "4s".

Table A-3 lists other proprietary properties supported.

Table A-3 Supported Cisco Proprietary Properties

Property Name	Description
com.cisco.dtmf.termlength	Specifies the maximum number of DTMF digits to be recognized. The recognition returns as soon as this maximum number of digits has been entered. The user does not need to enter the termination key or wait for timeout. The default value is "32".
com.cisco.tts.gender	Select male or female voice for Text-to-Speech prompts. The allowed values are "male" and "female" (default).
com.cisco.tts.provider	Override the default TTS provider, default = “name”

Standard Session Variables Implementation

The table below lists supported standard session variables.

Table A-4 Supported Standard VoiceVML 2.0 Session Variables

Variable	Description
session.connection.ani	Automatic Number Identification (ANI). This variable provides the calling party number.
session.connection.dnis	Dialed Number Identification Service (DNIS). This variable provides the number that the caller dialed.
session.connection.iidigits	Not supported.
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.

Table A-4 Supported Standard VoiceVML 2.0 Session Variables (continued)

Variable	Description
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.
session.connection.protocol.name	The connection protocol. The name also represents the subobject name for protocol specific information. For instance, if session.connection.protocol.name is 'q931', session.connection.protocol.q931.uui might specify the user-to-user information property of the connection.
session.connection.protocol.version	The version of the connection protocol.
session.connection.redirect	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 "unknown", "user busy", "no reply", "deflection during alerting", "deflection immediate response", "mobile subscriber not reachable".
session.connection.originator	Directly references either the local or remote property (For instance, the following ECMAScript would return true if the remote party initiated the connection: var caller_initiate = connection.originator == connection.remote).
session.cisco.asravailable	Cisco Proprietary. Read Only. Indicates whether or not the ASR server is available.

Built-in Type Implementation

Supported built-in types are listed below:

- Boolean
- date
- digits
- currency
- number

- phone
- time (Time designations for properties and attributes is “s” or “ms,” except maxage, maxstale, (and audio/document/grammar/script variants).

Some deviations are listed below:

- Digit grammar accepts maximum of 16 digits.
- 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\.

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 A-5 TTS/SSML/Audio Built-In Type Summary

VXML <prompt> (VXML 2.0 Appendix P)	**SSML <say-as> element (SSML S 2.1.4)**		**Mapping from VXML to SSML**
	interpret-as	**Format** (optional field)	
Number	Number	ordinal	Format field not used
	Number	cardinal	Format field not used
Phone	Number	telephone	Format field is used
Date	Date	mdy	Format field not used
Digits	Digits		Format field not used
	Ordinal, Cardinal, Letters, Words		Not mapped
Boolean, currency, Time			No mapping – Unchanged from VXML 1

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 CRS 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 A-6 <value> Data Format

Language code	Date format	Time format
de-DE	EEEE, d. MMMM yyyy	H.mm' Uhr 'z
	d. MMMM yyyy	HH:mm:ss z
	dd.MM.yyyy	HH:mm:ss
	dd.MM.yy	HH:mm
en-CA	EEEE, MMMM d, yyyy	h:mm:ss 'o''clock' a z
	MMMM d, yyyy	h:mm:ss z a
	d-MMM-yy	h:mm:ss a
	dd/MM/yy	h:mm a
en-GB	dd MMMM yyyy	HH:mm:ss 'o''clock' z
	dd MMMM yyyy	HH:mm:ss z
	dd-MMM-yy	HH:mm:ss
	dd/MM/yy	HH:mm
en-US	EEEE, MMMM d, yyyy	h:mm:ss a z
	MMMM d, yyyy	h:mm:ss a z
	MMM d, yyyy	h:mm:ss a
	M/d/yy	h:mm a

Table A-6 <value> Data Format (continued)

es-CO	EEEE d' de 'MMMM' de 'yyyy d' de 'MMMM' de 'yyyy d/MM/yyyy d/MM/yy	hh:mm:ss a z hh:mm:ss a z hh:mm:ss a hh:mm a
es-MX	EEEE d' de 'MMMM' de 'yyyy d' de 'MMMM' de 'yyyy d/MM/yyyy d/MM/yy	hh:mm:ss a z hh:mm:ss a z hh:mm:ss a hh:mm a
fr-CA	EEEE d MMMM yyyy d MMMM yyyy yy-MM-dd yy-MM-dd	H' h 'mm z HH:mm:ss z HH:mm:ss HH:mm
fr-FR	EEEE d MMMM yyyy d MMMM yyyy d MMM yy dd/MM/yy	HH' h 'mm z HH:mm:ss z HH:mm:ss HH:mm

The table below lists the legend of the format. The information is based on Sun JDK's java.text.SimpleDateFormat documentation.

Table A-7 Format Legend

Symbol	Meaning	Presentation	Example
G	era designator	(Text)	AD
y	year	(Number)	2005
M	month in year	(Text & Number)	July & 07
d	day in month	(Number)	10
h	hour in am/pm (1~12)	(Number)	12

Table A-7 Format Legend (continued)

Symbol	Meaning	Presentation	Example
H	hour in day (0~23)	(Number)	0
m	minute in hour	(Number)	30
s	second in minute	(Number)	55
S	millisecond	(Number)	978
E	day in week	(Text)	Tuesday
D	day in year	(Number)	189
F	day of week in month	(Number)	2 (2nd Wed in July)
w	week in year	(Number)	27
W	week in month	(Number)	2
a	am/pm marker	(Text)	PM
k	hour in day (1~24)	(Number)	24
K	hour in am/pm (0~11)	(Number)	0
z	time zone	(Text)	Pacific Standard Time
'	escape for text	(Delimiter)	
''	single quote	(Literal)	'

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.

- 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.

A Sample VoiceXML Log File

This section includes the following topics:

Note This is a sample voiceXML log file with SS_VB debug turned on. Your log file contents may vary depending on your system configuraiton, scripts, and caller interactions.

A Brief Description of a Voice XML Log File

Each line in a VoiceXML 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

Note For easier reference, the lines in the sample log file that are listed in Table B-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 B-1 Some Items to Notice in the Sample Log File

Line Number	Message	Event
615109	`Instantiating new WFMRCPDialogServicesAdapterImpl`	The start of the MRCP(ASR) Voice Browser
615120	`Invoke: http://mediaserver/vxmldocs/AA.vxml`	The URL for the Voice Browser
615126	`WFCallControlImpl.getOriginator() = 2011`	The caller ID
615127	`WFCallControlImpl.getLocalUri() = 1002`	The dialed number
615186	`handlMenuElement(): adding dtmf choice grammar string = one`	Managing a VXML menu
615233	`<speak version="1.0" xmlns="http://www.w3.org/2001/10/synthesis "> 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>`	The first prompt to the caller

Table B-1 Some Items to Notice in the Sample Log File

Line Number	Message	Event
615243	`Heard: 'one'`	The first heard caller resonse = “one”

Sample VoiceXML Log File Selection

```
615109: Jun 01 08:25:21.912 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 VoiceBrowserDialogImpl:
Instantiating new WFMRCPDialogServicesAdapterImpl

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/

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
```

```
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

615154: Jun 01 08:25:22.600 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 Set property:
name='com.cisco.dtmf.termlength' value='32'

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
VXMLDocumnet.loadbAndParse() start = 1117628722631

615161: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocumnet.loadAndParse(), req.getMethod() =
```

```
615162: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocumnet.loadAndParse(), add thread (TimeoutThread_1117628722631_1) to Map

615163: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocumnet.loadbAndParse(): the total number of fetching threads = 0

615164: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocumnet.loadbAndParse(): calling aThread (TimeoutThread_1117628722631_1) start().

615165: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocumnet.loadbAndParse(): fetching (http://mediaserver/vxmldocs/AA.vxml) timeout
attribute=0

615166: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VXMLDocumnet.loadbAndParse().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
VXMLDocumnet.loadbAndParse().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
VXMLDocumnet.loadbAndParse().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
VXMLDocumnet.loadbAndParse(): after join(), state=DONE time=1117628722631 fetching took=0



615171: Jun 01 08:25:22.631 EDT %MIVR-SS_VB-7-UNK:Task:43000009351

VXMLDocumnet.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

615174: Jun 01 08:25:22.803 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 [Error] AA.vxml (line:8

column:18) Document is invalid: no grammar found.
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
VXMLDocumnet.loadbAndParse() end = 1117628722818 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:

http://mediaserver/vxmldocs/AA.vxml base=http://mediaserver/vxmldocs/AA.vxml

615186: Jun 01 08:25:22.834 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
PormItemTraverser: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 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): choice grammar string = 2
615200: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615201: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2

615202: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615203: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VBGrammaraHandler::addInLineGrammar() grammar =  [grammar: null] Type = 1

615204: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 handleGrammarElement :
value of grammar string = null
615205: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615206: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2

615207: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615208: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VBGrammaraHandler::addInLineGrammar() grammar =  [grammar: null] Type = 1

615209: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 handleGrammarElement :

value of grammar string = null
615210: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): adding dtmf choice grammar string = 0

615211: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
FormItemTraverser:handlMenuElement(): choice grammar string = 0
615212: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2



615213: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615214: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615215: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351

VBGrammaraHandler::addInLineGrammar() grammar =  [grammar: null] Type = 1

615216: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 handleGrammarElement :
value of grammar string = null
615217: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615218: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615219: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 goToLevel:: 2->2
615220: Jun 01 08:25:22.865 EDT %MIVR-SS_VB-7-UNK:Task:43000009351

VBGrammaraHandler::addInLineGrammar() grammar =  [grammar: null] Type = 1
```

```
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[<?xml version="1.0"?>

<speak version="1.0" xmlns="http://www.w3.org/2001/10/synthesis">

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[<?xml
version="1.0"?>
<speak version="1.0" xmlns="http://www.w3.org/2001/10/synthesis">
    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:handlMenuElement(): adding dtmf choice grammar string = one

615236: Jun 01 08:25:22.990 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
```

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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

615245: Jun 01 08:25:39.288 EDT %MIVR-SS_VB-7-UNK:Task:43000009351
VoiceDomParser:handleMenuElement: utterance = one

615246: Jun 01 08:25:39.288 EDT %MIVR-SS_VB-7-UNK:Task:43000009351 DialogTraverser:
traverseDialog(): -- Beginning Process phase

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></in
stance></interpretation></result>
```

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