Tested Call Flows

This topic provides detailed description and configuration information for a variety of sample call flows that were tested and verified in the two separate test beds in the contact center environment for Cisco Unified Communications System Release 5.0.

- Test Bed 1—Unified IP IVR test bed which handles three types of call flows:
  - Cisco Unified CallManager (Unified CallManager) call flow where the call arrives at Site1/Site4 but is handled by agents at Site2, Site3 and Site8.
  - Parent/Child call flow where the call comes into the parent sites at Site1/Site4 and is handled by agents in the child sites at Site2, Site3, and Site9.
  - Cisco Unified Outbound Dialer (Unified OUTD) call flow where the call is handled by dedicated agents in Site6.

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Note Cisco Unified Customer Voice Portal (Unified CVP) implemented at Site1/Site4 provides initial call treatment for the Parent/Child call flow, while Customer Response Solutions (CRS) provides call queueing capabilities.

- Test Bed 2—Unified CVP test bed which handles two types of call flows:
  - Unified CVP where the call arrives at the branch offices/retail centers and the call is handled by agents at these sites.
  - Unified OUTD where the call is handled by dedicated agents in Site6.

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Note The tasks listed for configuring the various components for the sample call flows are neither exhaustive, sequential, nor complete in detail. Please see the appropriate installation and configuration manuals for the more comprehensive information available on the configuration tasks. For configuration commands specific to the components involved in the call flows, please see Appendix B, "Call Flow Components Configuration Commands".

This topic contains the following sections:

- Cisco Unified CallManager Post-Routed Call Flow
- Cisco Unified Customer Voice Portal Post-Routed Call Flow
- Parent/Child Call Flow
- Cisco Unified Outbound Dialer Call Flow

Cisco Unified CallManager Post-Routed Call Flow

Overview

Cisco Unified CallManager (Unified CallManager) takes care of the switching requirements of the Cisco Unified Contact Center Enterprise (Unified CCE) system.

This section describes a sample Unified CallManager Post-Routed call flow that was tested and verified. In this sample Unified CallManager Post-Routed call flow model, the customer call comes in first to the Unified CallManager. The Unified CallManager can receive the call from the PSTN network on a Cisco Voice Gateway.

The Unified CallManager informs Unified ICM of the new call to request routing information. ICM, using its routing logic, determines the appropriate target (agent or peripheral which is the Unified IP IVR).

In this call flow model, Unified ICM responds to the Unified CallManager with a routing label for Unified IP IVR and then sends the call to the Unified IP IVR. The Unified IP IVR prompts the user for Caller Entered Digits (CED). Based on the caller's response, Unified ICM looks for an available agent in the appropriate skill group. If no agents are available, then the call remains in Unified IP IVR for queueing. Once the agent becomes available, Unified ICM redirects the call to that agent.

Description of Cisco Unified CallManager Post-Routed Call Flow

1. The call comes into the Unified CallManager CTI route point. Unified CallManager sends a NEW_CALL message to the Cisco Unified System Contact Center Gateway (Unified SSCG).

2. Unified SCCG sends a ROUTE_REQUEST message to the Unified ICM Router. The Unified ICM Router executes the Unified ICM script based on the dialed number that was part of the ROUTE_REQUEST.

3. The Unified ICM script executes a RUN_EXTERNAL_SCRIPT node.

4. The Unified ICM Rogger returns a ROUTE_RESPONSE message with a label to the Unified CallManager. The label allows the call to be routed to Unified IP IVR. For Unified IP IVR, the dialed number is a CTI route point that is owned by the Unified IP IVR user.

> ✎
> **Note**   On Unified IP IVR, this CTI route point is defined as a JTAPI Trigger. Unified IP IVR is in the same Unified CallManager cluster as the call.

5. When the call arrives, the JTAPI link on Unified CallManager informs Unified IP IVR, which in turn informs Unified SCCG.

6. When Unified SCCG receives the incoming call arrival message, it sends a REQUEST_INSTRUCTION message to the Unified ICM system.

7. The Unified ICM system instructs Unified IP IVR to play the VRU script prompting the caller to provide CED. Upon receipt of the CED, Unified ICM determines the skill group that can best service the call.

Figure 4-1 shows how the Unified CallManager Post-Routed call is handled prior to agent involvement.

Figure 4-1   *Unified CallManager Post-Routed Call Flow*
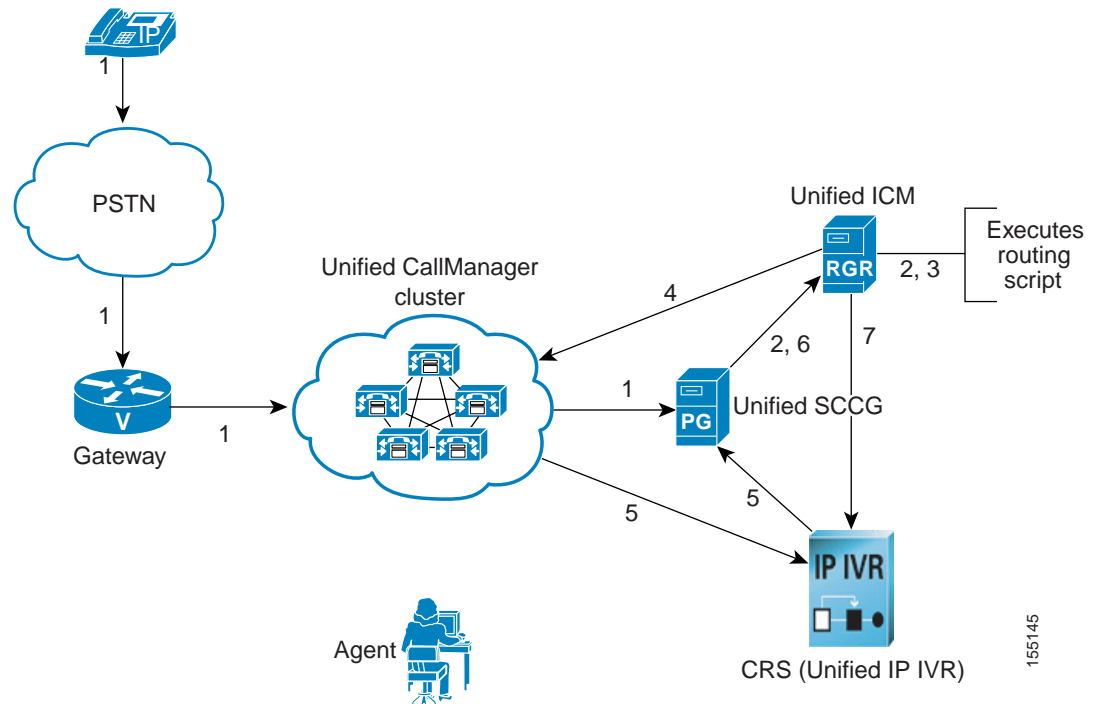
Agent Is Available (Scenario A)

A1. If an agent is available, Unified ICM then:

  – Sends a PRE_CALL message to Unified SCCG with call context information, so that the PG can reserve the agent and wait for the call to arrive at the agent's phone.

  – Instructs Unified IP IVR to redirect the call from the agent queue to the available agent.

A2. Unified IP IVR then sends the call to the Unified CallManager.

A3. Unified CallManager decides whether the agent's phone is in the same Unified CallManager cluster or in a different Cisco CallManager cluster.

Note   If the agent's phone is on a different Cisco CallManager, then the call is routed to the appropriate Unified CallManager.

A4. The Unified CallManager then rings the agent's Cisco Unified IP Phone.

A5. The Cisco CallManager, via the JTAPI link, sends a notification to Unified SCCG that the call has arrived.

A6. Unified SCCG reports to Unified ICM that the call has arrived and is ringing on the agent's phone.

A7. When the agent answers the call via the Unified CCE Agent Desktop, JTAPI sends a MsgEstablished/CS_CONNECT message to Unified SCCG.

A8. Unified SCCG reports to the Unified ICM Rogger that the agent has answered the call.

Figure 4-2 shows how the Unified CallManager Post-Routed call is handled when an agent is available (Scenario A).

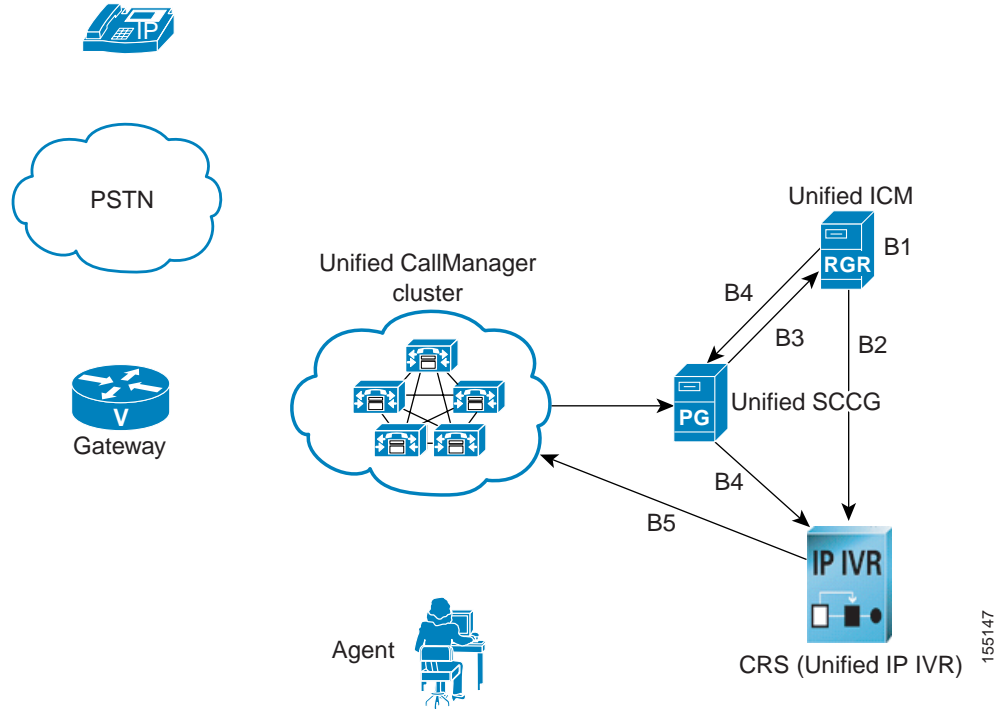*Figure 4-2   Unified CallManager Post-Routed Call Flow (Agent is Available)*
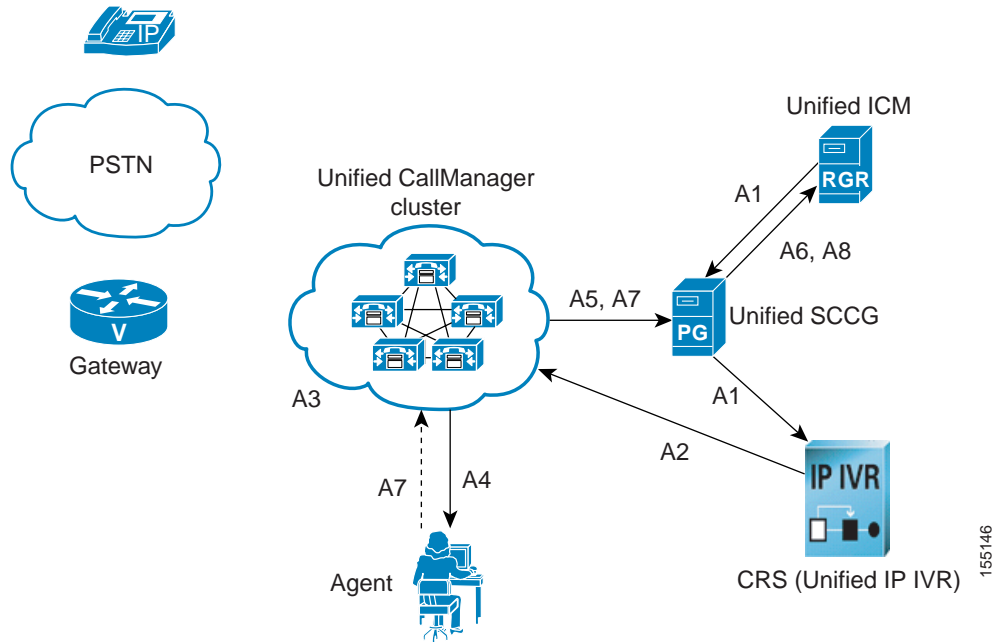
Agent Is Not Available (Scenario B)

B1. If an agent is not available, Unified ICM places the call in an agent queue for the specific skill group and waits for an available agent in the skill group to become available.

B2. Unified ICM instructs Unified IP IVR to play the queue messages for the caller, until such time an agent is available to take the call.

B3. Once an agent becomes available, Unified SCCG sends an AGENT_STATE_CHG message to Unified ICM indicating that a qualified agent has become available.

B4. Unified ICM then:

– Sends PRE_CALL message to Unified SCCG with call context information, so that the PG can reserve the agent and wait for the call to arrive at the agent's phone.

– Instructs Unified IP IVR to redirect the call from the agent queue to the available agent.

B5. Unified IP IVR then sends the call to the Unified CallManager and the call is handled in the same manner as described in steps A3-A8 in Agent Is Available (Scenario A).

Figure 4-3 shows how the Unified CallManager Post-Routed call is handled when an agent is not available (Scenario B).

Figure 4-3   *Unified CallManager Post-Routed Call Flow (Agent is Not Available)*

Cisco Unified CallManager Post-Routed Call Flow at Specific Sites

Please note that the site-specific information described below is not represented in the graphics discussed in Figure 4-1, Figure 4-2, and Figure 4-3.

The sample Unified CallManager Post-Routed call arrives in Site1/Site4 but is handled by agents in Site2, Site3, and Site8:

1. The call comes to Site1/Site4 from the PSTN, but there are no agents located at these data centers.

2. The calls are transferred to agents located in Site2, Site3, or Site8 based on the number dialed by the customer.

3. Based on the menu selection made by the customer and the agent availability for that skill group, the call is transferred to an agent in the skill group to which the call was routed.

4. If an agent is not available, the call is placed in queue at an Unified IP IVR at Site1/Site4 and a recording is played back to the caller.

5. Unified ICM determines that an agent at Site3 is available to handle the call. It requests redirection of the call from Site1/Site4 IP IVR to the Site3 agent.

6. Site3 agent answers the call.

Configuration of Components

In this section, we discuss the procedures for configuring the various components involved in handling the Unified CallManager Post-Routed call flow including:

- Unified CallManager
- CRS (Unified IP IVR)
- Unified ICM

Cisco Unified CallManager Configuration

The following is a high-level checklist of sequential tasks for Unified CallManager configuration in a contact center environment:

1. Configure the agent Unified IP Phones.

2. Configure the CTI Route Points (for calls that are to be serviced by the Unified ICM system).

3. Configure the Unified IP Phones.

4. Configure Gateways and Gatekeepers.

> **Note**   For information on installing and configuring Unified CallManager, please see "Installing and Configuring Cisco CallManager for IPCC Enterprise" in the *IPCC Installation and Configuration Guide for Cisco IPCC Enterprise Edition:*
> http://www.cisco.com/application/pdf/en/us/guest/products/ps1844/c1097/ccmigration_09186a00804d73b7.pdf

Important Reminders

Please be aware of the following as you perform the Unified CallManager configuration tasks listed in Table 4-1.

- Media connections to the CRS server are either all G.711 or all G.729, based on selections made during the CRS installation. This means that the Unified CallManager Region configuration must allow for Devices to connect to the CRS server's CTI Ports with the appropriate codec. If not, the Transcoder resources MUST be configured and available.

- The Redirect activity performed by the CRS server, as a result of the Unified ICM CONNECT_REQUEST message, uses the Call Searching Space (CSS) of the Redirected party. This CSS MUST be able to connect to the agent's device.

- Match the CTI Route Point Dialed Number entered in the CTI Route Point Configuration page with the one you enter during Cisco Unified Intelligent Contact Management Software Configuration.

- You should create the JTAPI user for Unified IP IVR directly in the CRS Administration webpage during CRS (Unified IP IVR) Configuration; you do not need to configure it in Unified CallManager.

- You should configure the CTI Route Points controlled by Unified IP IVR directly in the CRS Administration webpage during CRS (Unified IP IVR) Configuration.

- Record the user names and passwords that you create for the JTAPI users for the Unified CallManager PG and Unified IP IVR. Using these user names and passwords, you should configure a JTAPI user for the PG with the Unified CallManager PIM and VRU PIM (Unified IP IVR) in Unified ICM Setup.

Configuration Tasks

Table 4-1 provides a list of tasks for configuring the Unified CallManagers at Site1/Site4 to handle and process the sample Unified CallManager Post-Routed call flow.

Table 4-1   Unified CallManager Post-Routed Call Flow: Unified CallManager Configuration

Using the...	Complete this Task...	In Order to...
Region Configuration page:	• Configure the appropriate Regions for the sites.	Specify the codecs to be used by calls between devices in that region and between other regions. **Note** See Important Reminders.
Location Configuration page:	• Configure the appropriate locations for the sites.	Implement Call Admission Control (CAC) to regulate voice quality by limiting the available bandwidth for calls. **Note** You can use RSVP, location-based CAC, or a mixture of both for regulating the voice quality of calls.
Device Pool Configuration page:	1. Configure the Devices with the previously configured Regions.	Specify the voice codec to be used for calls in the regions with the devices.
	2. Configure the Unified CallManager Group for the Devices.	Choose the Unified CallManager group to provide redundancy and assign to devices in this device pool.
Phone Configuration page:	1. Configure the Phones with the correct Directory Numbers.	Specify an unique dialable phone number for each phone.
	2. Associate the Phones with the appropriate Device Pool and Locations.	Define characteristics for devices, such as region, date/time group, failover behavior, and others.
CTI Route Point Configuration page:	1. Configure the CTI Route Point name for Unified ICM.	Specify the virtual device that post routes the call to a CTI port for Unified ICM.
	2. Match the Dialed Number here with the one you enter during Unified ICM configuration.	**Note** Cisco Unified Intelligent Contact Management Software Configuration tasks for Unified CallManager Post-Routed call flows are listed later in this section.
User Information page:	1. Configure a User for Unified ICM JTAPI User.	Specify a user to match the JTAPI user configured during the Unified SCCG installation.
	2. Associate all Phones and CTI Route Points that were defined earlier with this User.	Provide the user with monitoring and control capabilities over the devices.
	3. Enable the "Enable CTI Application Use" checkbox for the User you just configured.	Complete the process of providing device control to the user.

Table 4-1   Unified CallManager Post-Routed Call Flow: Unified CallManager Configuration (continued)

Using the...	Complete this Task...	In Order to...
Gateways Configuration page:	• Configure the Gateways.	Receive inbound calls from the PSTN. **Note** Gateways are also used to place outbound calls from the IP enterprise to the PSTN network.
Gatekeeper Configuration page:	1. Configure the Gatekeeper for inter-cluster calls.	Provide effective routing in a scaled-up environment with multiple clusters.
	2. Register the Unified CallManagers in Site1/Site4 and Site5 to the Gatekeeper clusters in Site1/Site4.	Enable the specific Unified CallManagers to use the gatekeepers for inter-cluster routing.
Trunk Configuration page:	1. Configure the Gatekeeper-controlled H.225 Trunk and/or SIP Trunk for inter-cluster calls.	Provide effective routing in a scaled-up environment with multiple clusters.
	2. Associate the H.225 Trunk to the Gatekeeper defined earlier.	Enable the H.225 Trunk to communicate with the Gatekeeper.
Route Group Configuration page:	1. Configure the Route Group to use the H.225 Trunk and/or SIP Trunk defined in the previous task.	Provide effective routing in a scaled-up environment with multiple clusters.
	2. Associate the Route Group to the Route List and then to the appropriate Route Pattern for making inter-cluster calls.	Enable the Unified CallManager to route inter-cluster calls to the Gatekeeper.
Media Resource Group Configuration page:	1. Configure Transcoders.	Allow devices with different audio codecs to communicate with each other.
	2. Associate the Transcoders with a Media Resource Group.	Manage resources within a cluster and define logical groupings of media servers. **Note** Media Resource Groups can either be location-based or resource-based.
Media Resource Group Configuration page:	1. Configure Conference Bridges.	Enable multi-party conferences by connecting multiple devices into an audio conference.
	2. Associate the Conference Bridges with a Media Resource Group.	Manage resources within a cluster and define logical groupings of media servers.
	3. Associate Music on Hold (MOH) with a Media Resource Group.	Set up the MOH capability for call treatment and queueing.
Media Resource Group List Configuration page:	1. Configure the Media Resource Group List.	Group the available media resource groups in logical groupings.
	2. Associate the two Media Resource Groups created previously for the Transcoders and Conference Bridges to the Media Resource Group List.	Specify a list of prioritized media resource groups.
Device Pool Configuration page:	• Associate the Media Resource Group List with the Device Pool configured previously.	Provide media resource group redundancy.

CRS (Unified IP IVR) Configuration

The following is a high-level checklist of sequential tasks for CRS (Unified IP IVR) configuration in a contact center environment:

1. Configure the Unified CallManager information.

2. Configure JTAPI users.

3. Provision a JTAPI Call Control Group.

4. Provision a Cisco Media Termination Dialog Group.

5. Configure JTAPI Trigger.

6. Configure the Unified ICM subsystem.

7. Create and upload VRU scripts on CRS.

8. Configure Unified IP IVR for Unified ICM Translation Routing.

Note   For information on installing and configuring CRS (Unified IP IVR), please see "Installing and Configuring Cisco IP IVR for IPCC Enterprise" in the *IPCC Installation and Configuration Guide for Cisco IPCC Enterprise Edition:*
http://www.cisco.com/application/pdf/en/us/guest/products/ps1844/c1097/ccmigration_09186a00804d73b7.pdf

Important Reminders

Please be aware of the following as you perform the CRS configuration tasks listed in Table 4-2.

- Unified CCE does not support CRS clustering (duplexed Unified IP IVRs that failover to the same CTI route points).

- Because you are configuring JTAPI users for Unified IP IVR in CRS Administration, make sure the JTAPI users are NOT defined in the Unified CallManager.

- Ensure that the JTAPI information in CRS and Unified CallManager is synchronized.

- Make sure that in the Unified ICM Configuration page the Service Control option is set to YES.

- Ensure that the Unified IP IVR script names defined here match script names defined in Unified ICM Network VRU Script List during Cisco Unified Intelligent Contact Management Software Configuration, page 4-11.

- Make sure to configure the VRU PIM on the Unified ICM system with the same VRU Connection Port that you enter for CRS.

- Make sure that the JTAPI Call Control Group number matches Unified ICM Trunk Group Peripheral Number.

- When using CRS for queueing, set the Unified ICM VRU script and the play prompt option in the CRS script to "Interruptible."

- When configuring Translation Routing Applications and defining Triggers for them in CRS, always set the Max Session counts to a number that is greater than or equal to the number of CTI ports being used.

- When configuring the JTAPI Call Control Group, make sure the CTI Port range you specify (when you enter the Starting Directory Number) does not exist as a Directory Number in the Unified CallManager. Otherwise, CRS will ignore the conflicting numbers.

Configuration Tasks

Table 4-2 provides a list of tasks for configuring Unified IP IVR at Site1/Site4 to handle and process the sample Unified CallManager Post-Routed call flow.

Table 4-2   Unified CallManager Post-Routed Call Flow: Unified IP IVR Configuration

Using the...	Complete this Task...	In Order To...
Cisco CRS Administration page:	• Configure JTAPI users.	Send and receive calls from Unified CallManager. **Note** Unified IP IVR JTAPI users are automatically created on the Unified CallManager as Application Users. **Note** See Important Reminders.
Cisco CRS Administration page:	• Provision a JTAPI Call Control Group.	Pool together a series of CTI ports, which the system then uses to service calls as they arrive at the CRS server. **Note** CRS automatically adds the CTI ports port assignments as phone devices and the specified call control groups to the Unified CallManager database when you update. These CTI Ports are also automatically associated to the previously created user. **Note** See Important Reminders.
Cisco CRS Administration page:	• Configure Unified IP IVR for Unified ICM Translation Routing.	Map configuration information on Unified ICM to corresponding Unified IP IVR values. **Note** See Important Reminders.
Cisco CRS Administration page:	• Provision the Cisco Media Termination Dialog Group.	Specify the media you need for your system, from simple media capable of supporting prompts and DTMF to a more complex and richer media capable of speech recognition.
Cisco CRS Administration page:	• Create, install, and configure the applications that you plan to use with Unified IP IVR.	Enable the desired Unified IP IVR applications.
Cisco CRS Administration page:	1. Add a new application or customize an existing application.	Perform a telephony task using the CRS system.
	2. Assign a script to the new or existing application.	Enable the use of the application and associated script during call treatment.

Table 4-2 *Unified CallManager Post-Routed Call Flow: Unified IP IVR Configuration (continued)*

Using the...	Complete this Task...	In Order To...
Cisco CRS Administration page:	1. Add the JTAPI Trigger.	Enable the application to respond to JTAPI calls. **Note** See Important Reminders.
	2. Associate JTAPI Call Control Group and Media Termination Dialog Group with the JTAPI Trigger.	Assign a specific range of CTI ports to the JTAPI Trigger. **Note** The JTAPI Trigger is automatically associated with the previously created user.
CRS Script Editor:	1. Create new or edit existing VRU scripts and related prompts.	Provide and customize the VRU scripts and prompts for call treatment.
	2. Set the VRU script and play prompt "Interruptible" checkbox to ON.	Enable the interruption of the media file playing to a queued customer in the event an agent becomes available. **Note** See Important Reminders.
CRS Script Management page:	• Upload the script into to the Unified IP IVR.	Enable Unified ICM to use the compiled script for queueing.
Cisco CRS Administration page:	• Define an Unified ICM VRU script name for the script that was uploaded previously.	Associate the VRU script name with the actual script. **Note** See Important Reminders.

Cisco Unified Intelligent Contact Management Software Configuration

The following is a high-level checklist of sequential tasks for Unified ICM configuration in a contact center environment:

1. Configure agent desk settings.

2. Configure a Network VRU.

3. Configure the Unified SCCG.

4. Configure the MR PG.

5. Configure network trunk groups.

6. Configure trunk groups for each Unified IP IVR.

7. Create network VRU banks.

8. Create labels for each Unified IP IVR (same as defined for JTAPI Trigger).

9. Configure services.

10. Configure skill groups.

11. Configure users.

12. Configure agents.

13. Configure routes.

14. Configure dialed numbers.

15. Configure device targets.

16. Configure labels.

✎
Note You must configure device targets and labels (or use peripheral targets) only if your calls travel across Unified CallManager clusters.

17. Configure call types.

18. Configure dialed number plan.

19. Configure VRU scripts.

20. Configure routing and administrative scripts.

✎
Note For information on installing and configuring Unified ICM, please see "Installing and Configuring Cisco ICM for IPCC Enterprise" in the *IPCC Installation and Configuration Guide for Cisco IPCC Enterprise Edition:*
http://www.cisco.com/application/pdf/en/us/guest/products/ps1844/c1097/ccmigration_09186a00804d73b7.pdf

Important Reminders

Please be aware of the following as you perform the Unified ICM software configuration tasks listed in Table 4-3.

- Make sure of the following:
    - Unified ICM Trunk Group Peripheral number matches the CRS JTAPI Call Control Group number.
    - Unified ICM VRU Script Name matches the Unified IP IVR VRU Script Name.
    - Dialed Number specified while configuring Call Types matches with the number entered during the Cisco Unified CallManager Configuration.
    - Each Unified IP IVR label matches the JTAPI Trigger defined on CRS.
- When using CRS for queueing, set the Unified ICM VRU script and the play prompt option in the CRS Script to "Interruptible."
- While Unified SCCG supports up to four Unified IP IVR, you do not need to create a Network Trunk Group for each Unified IP IVR.

Configuration Tasks

Table 4-3 provides a list of tasks for configuring the Unified ICM Roggers at Site1/Site4 to handle and process the sample Unified CallManager Post-Routed call flow.

Table 4-3   Unified CallManager Post-Routed Call Flow: Unified ICM Configuration

Using the...	Complete this Task....	In Order to....
PG Explorer:	1. Configure one Peripheral Gateway as a Unified SCCG.	Set it up as a consolidated PG for peripherals, Unified CallManager, and CRS.
	2. Add a Unified CallManager PIM and Unified IP IVR PIM to the PG.	Allow communications between the Unified ICM software, Unified CallManager, Unified IP IVR, and Unified CVP.
Label List dialog box:	• Define a Label for each IP IVR.	Enable Unified ICM to route the call to Unified IP IVR for queueing and call treatment. **Note** See Important Reminders.
Agent Desk Settings List dialog box:	• Configure the appropriate Agent Desk Settings for each Skill Group.	Assign common attributes such as RONA, Wrap Up Time, etc. for agents.
Skill Group Explorer:	1. Configure the Skill Groups.	Define different skill sets that exist in a call center, such as language skills, etc.
	2. Associate Agent IDs with them.	Associate agents with specific skill groups to receive Unified ICM-routed calls.
	3. Add a Route to each Skill Group.	Enable routing to each skill group via the Script Editor.
Service Explorer:	1. Configure Services.	Represent the type of processing that a caller requires as a "superset" of skill groups. Create the supersets by assigning various skill groups to them.
	2. Associate the appropriate Skill Groups defined previously to each Service.	Assign specific services to the skill supersets.
	3. Create a Route to the Service.	Provide access to the service for incoming calls.
Skill Group Explorer:	• Reassociate the appropriate Skill Groups to the related Services.	Assign the same skill groups to the related services.
Call Type List dialog box:	1. Configure the Call Types.	Identify and group incoming calls for routing script and reporting purposes.
	2. Specify Dialed Numbers.	Identify the dialed numbers that belong to each call type. **Note** See Important Reminders.
Dialed Number/Script Selector List dialog box:	• Configure the Dialed Numbers that were specified previously.	Identify all the phone numbers that customers can dial to initiate contact. **Note** Dialed numbers are the CTI Route Point numbers which generate the route request to Unified ICM.

Table 4-3   Unified CallManager Post-Routed Call Flow: Unified ICM Configuration (continued)

Using the...	Complete this Task....	In Order to....
Call Type List dialog box:	• Associate the Dialed Numbers configured in the previous task to the Call Types configured earlier.	Build the call types from the dialed numbers, CED, and CLID.
Network VRU Explorer:	1. Define Unified IP IVR as a Type 9 VRU (for the Unified SCCG).	Route calls to the VRU using the Unified SCCG.
	2. Define Network VRU Banks.	Associate multiple Unified IP IVR Trunk Groups to the same pool or bank.
Network VRU Script List dialog box:	1. Define the Unified ICM VRU Script names.	Provide unique names for specific routing scripts. **Note** See Important Reminders.
	2. Make the script "Interruptible."	Enable the interruption of a script that is playing when an agent becomes available. **Note** See Important Reminders.
Network Trunk Group Explorer:	1. Configure the Network Trunk Group for the Unified IP IVR.	Enable routing calls to Unified IP IVR. **Note** See Important Reminders.
	2. Create one Trunk Group for each Unified IP IVR.	Enable routing the calls to a specific Unified IP IVR. **Note** See Important Reminders.
Network VRU Explorer:	1. Associate the Trunk Groups with the Network VRU Banks created previously.	Enable load balancing. **Note** See Important Reminders.
	2. Create a label for each Network VRU Bank by selecting the appropriate Network VRU Bank from the drop-down list in the Network VRU field.	Enable Unified ICM to route the call to the CRS.

Cisco Unified CallManager Post-Routed Call Flow Screens

A few strategic screens have been included to provide additional perspective for configuring Unified CCE components for the Unified CallManager Post-Routed call flow.

- Unified SCCG Configuration
- Dialed Number Configuration
- Skill Group Configuration
- Network VRU Bank Configuration

Cisco Unified System Contact Center Gateway Configuration

Figure 4-4 shows the configuration of the Unified SCCG in Test Bed 1.

Figure 4-4   *Unified CallManager Post-Routed Call Flow: Unified SCCG Configuration*
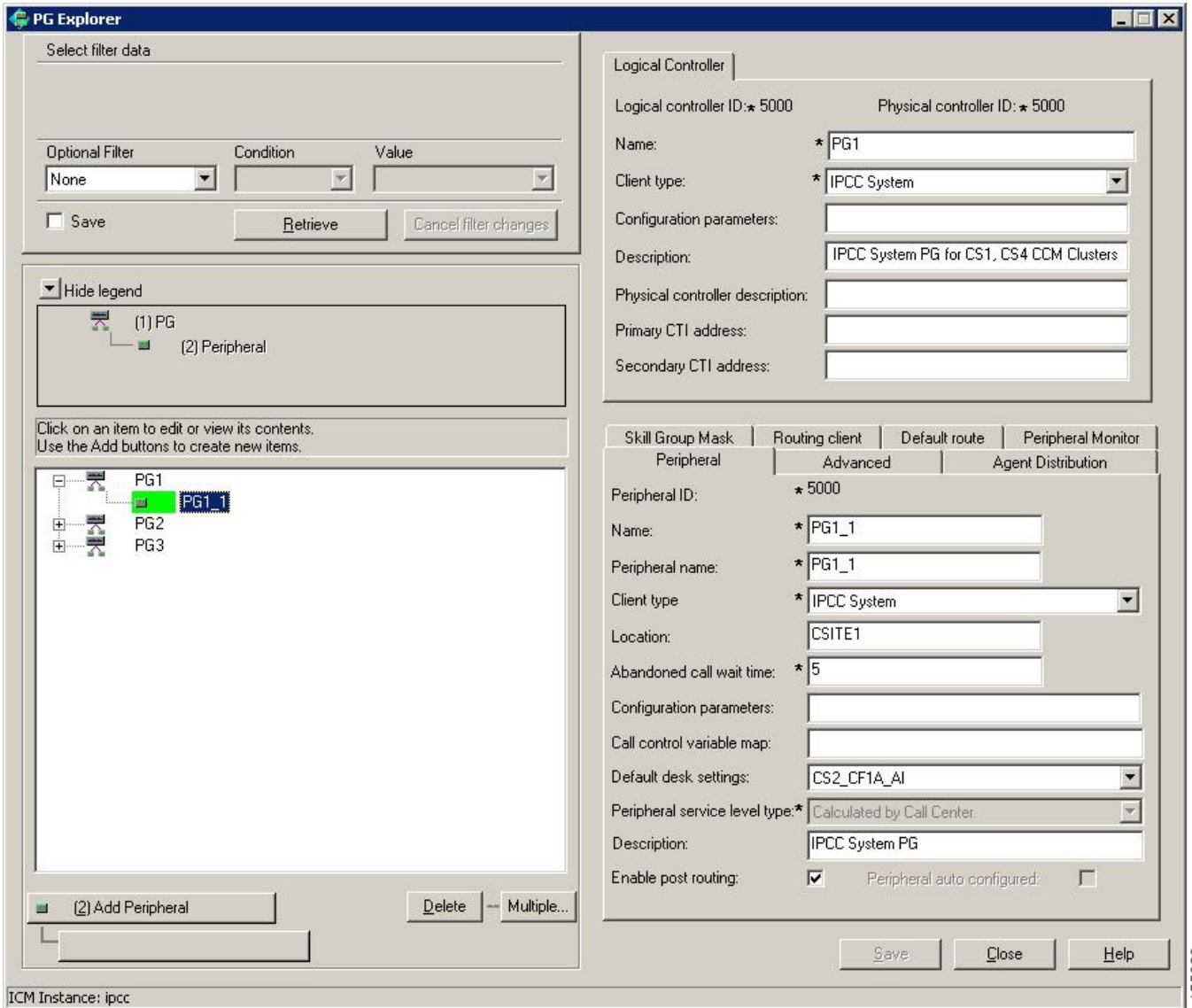
Dialed Number Configuration

Figure 4-5 shows the Dialed Number configuration in Test Bed 1. The information on this screen is strategic because these are the numbers for which an Unified ICM script is triggered to run.

Figure 4-5   *Unified CallManager Post-Routed Call Flow: Dialed Number Configuration*

Skill Group Configuration

Figure 4-6 shows the skill groups configuration in Test Bed 1.
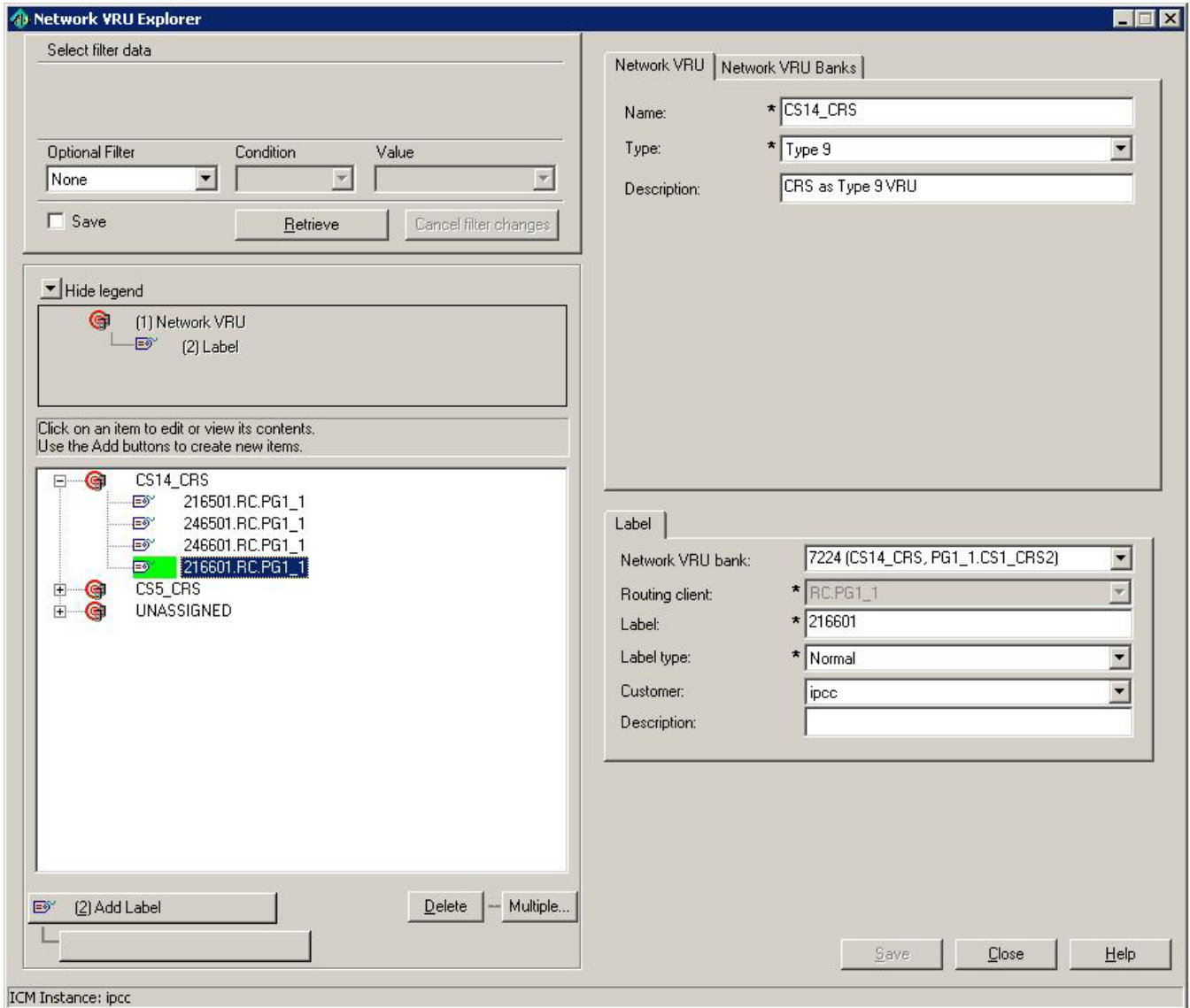
Figure 4-6   Unified CallManager Post-Routed Call Flow: Skill Group Configuration
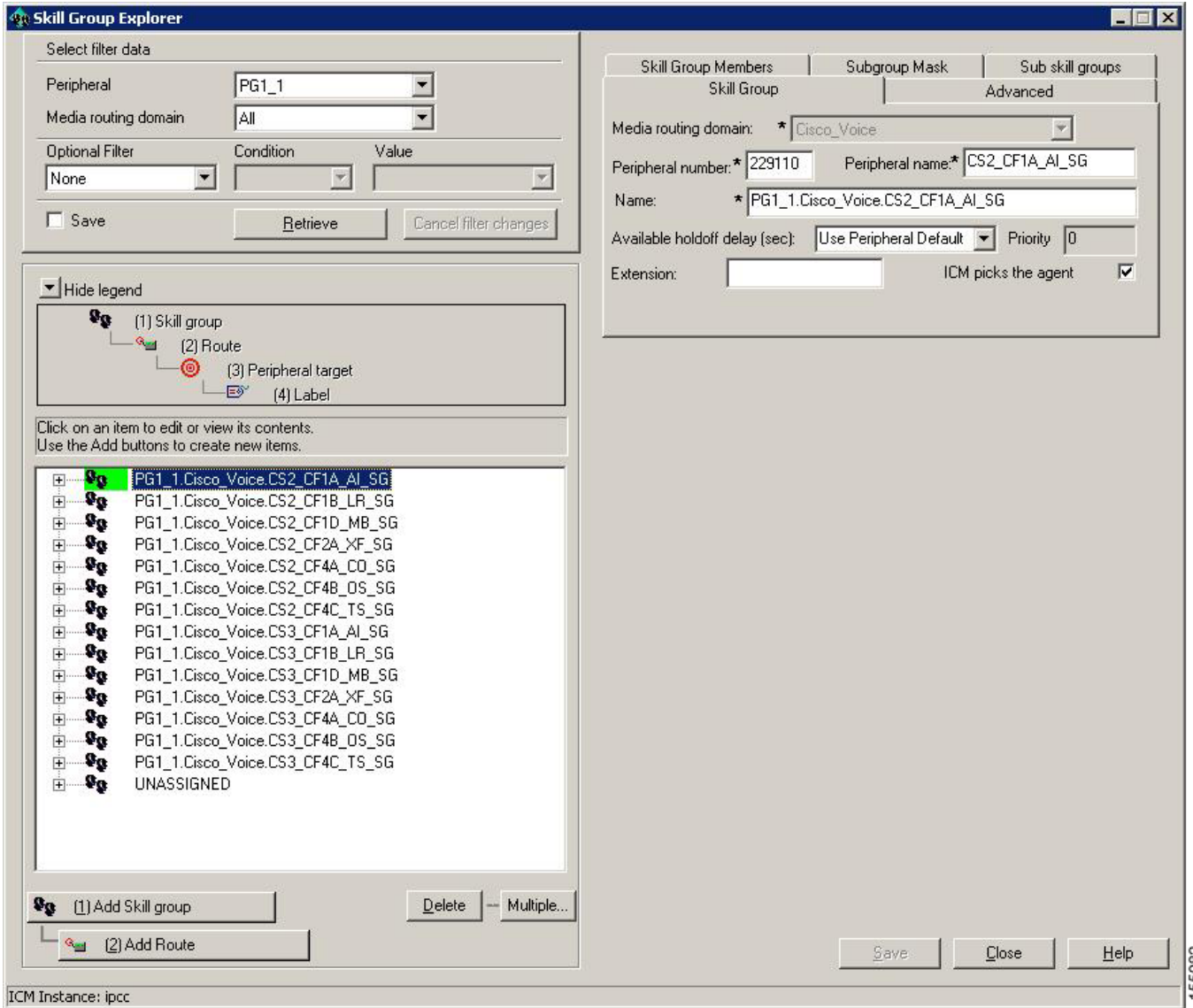
Network VRU Bank Configuration

Figure 4-7 shows the drop-down menu for creating labels for the Network VRU Bank in Test Bed 1.

Figure 4-7   *Unified CallManager Post-Routed Call Flow: Network VRU Bank Configuration*

Cisco Unified Customer Voice Portal Post-Routed Call Flow

Overview

Cisco Unified Customer Voice Portal (Unified CVP) in the comprehensive mode is deployed to provide IVR queueing and call treatment. The Unified CVP comprehensive deployment involves the "ingress gateway", Unified CVP Call Control server (co-located Unified CVP Voice Browser and Unified CVP Application Server), an IOS Voice Browser (VXML-enabled), and the Unified ICM components. Other involved components include the Gatekeeper, Unified CallManager, HTTP Media Server, and Cisco Unified Customer Voice Portal Studio (Unified CVPS) server.

This section describes a sample Unified CVP Post-Routed call flow that was tested and verified in this test environment. In a typical Unified CCE system with Unified CVP (comprehensive mode), there is no pre-routing of customer calls. Calls arrive immediately at the peripheral (Unified CVP) which issues a ROUTE_REQUEST message to Unified ICM. Unified ICM begins its routing script and the caller can experience one of these segments:

- A segment in which the call is queued for an agent

- A segment in which the caller talks to an agent

    Thereafter, the agent may transfer the call to a second agent or supervisor, which might include another queued segment if the second agent is not yet available.

Description of Cisco Unified Customer Voice Portal Call Flow

1. The call comes from the PSTN into an IOS H.323 Gateway which originates an H.323 Admission Request (ARQ) to its Gatekeeper.

2. The Gatekeeper responds with an Admission Confirm (ACF) if it knows how to route the call, and provides the IP address of the Unified CVP Voice Browser (VB) in the ACF.

3. The Gateway routes the call using H.225 Call Setup procedures to the Unified CVP Voice Browser.

4. The Unified CVP Voice Browser sends the details of the call to the Unified CVP Application Server using HTTP.

5. The Unified CVP Application Server sends a NEW_CALL event to Unified ICM using the Unified ICM/VRU Interface protocol via the Unified CVP VRU PIM.

6. Unified ICM, upon receipt of the NEW_CALL event, sends a temporary label to connect a VRU to the Unified CVP Application Server.

7. The Unified CVP Application Server sends the label with a correlation ID to the Unified CVP Voice Browser.

8. The Unified CVP Voice Browser queries the IOS Gatekeeper for the IP address of the endpoint for that label.

9. The Unified CVP Voice Browser initiates the IP Transfer to the VRU based on the IP address returned to it. Typically, this VRU is the originating PSTN Gateway that received the call.

10. The VRU functionality of the PSTN Gateway then sends a message to the Content Switch regarding the new call.

11. The Content Switch routes this message to the appropriate Unified CVP Application Server which in turn sends a REQUEST_INSTRUCTION message to Unified ICM.

12. Unified ICM uses the correlation ID, which is relayed to it as a part of the REQUEST_INSTRUCTION message, with the call it processed earlier.

13. Unified ICM, upon receipt of the REQUEST_INSTRUCTION message, also sends a CONNECT_TO_RESOURCE event back to the Unified CVP Application Server.

14. The Unified CVP Application Server acknowledges Unified ICM with a RESOURCE_CONNECTED event, and then Unified ICM executes the routing script enabled for that call.

15. Upon execution of the routing script by Unified ICM, the Unified CVP Application Server gets a RUN_SCRIPT_REQ event from Unified ICM.

16. The Unified CVP Application Server runs the script and sends instructions to the Voice Browser Client (PSTN GW) via HTTP (VXML) to play the media file.

17. The Voice Browser Client sends HTTP requests to the HTTP Media Server to get the media file and then plays it out to the caller.

18. The caller is requested by the contents of the media file to respond to the prompts in the recording.

19. The Voice Browser Client detects the response or caller-entered digits (CED) and sends it to the Unified CVP Application Server which then forwards it to Unified ICM.

Figure 4-8 is a graphical representation of the Unified CVP Post-Routed call flow as described up to this point (steps 1-19):
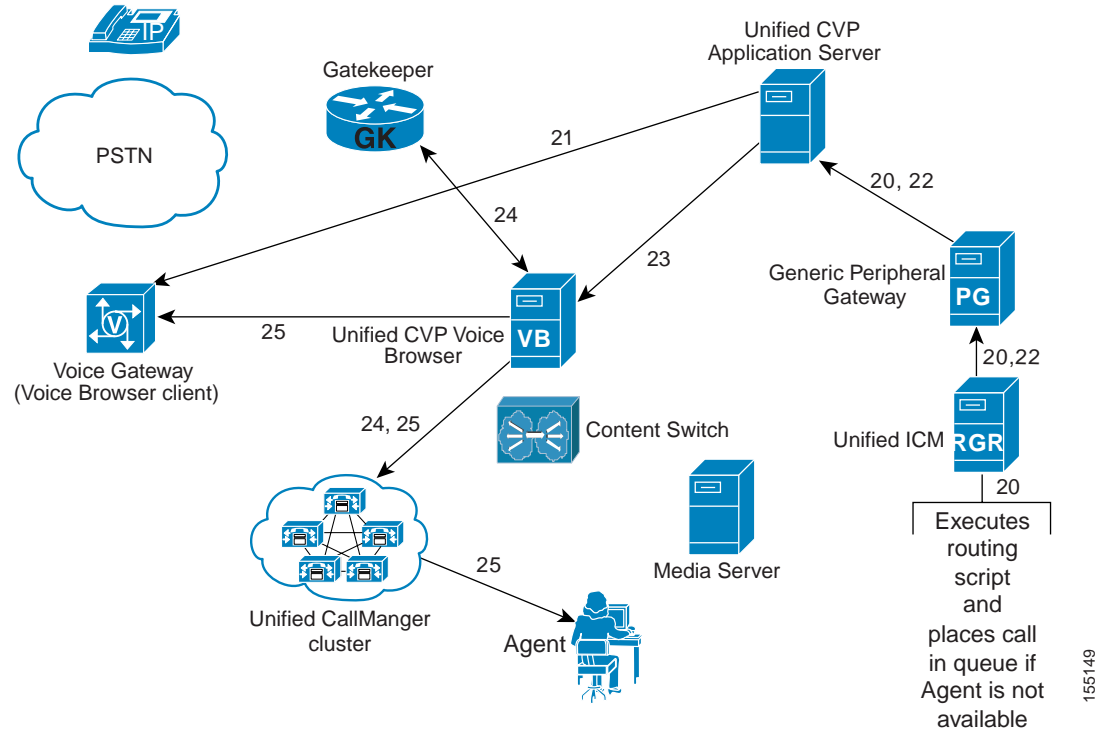
Figure 4-8 **Unified CVP Post-Routed Call Flow**
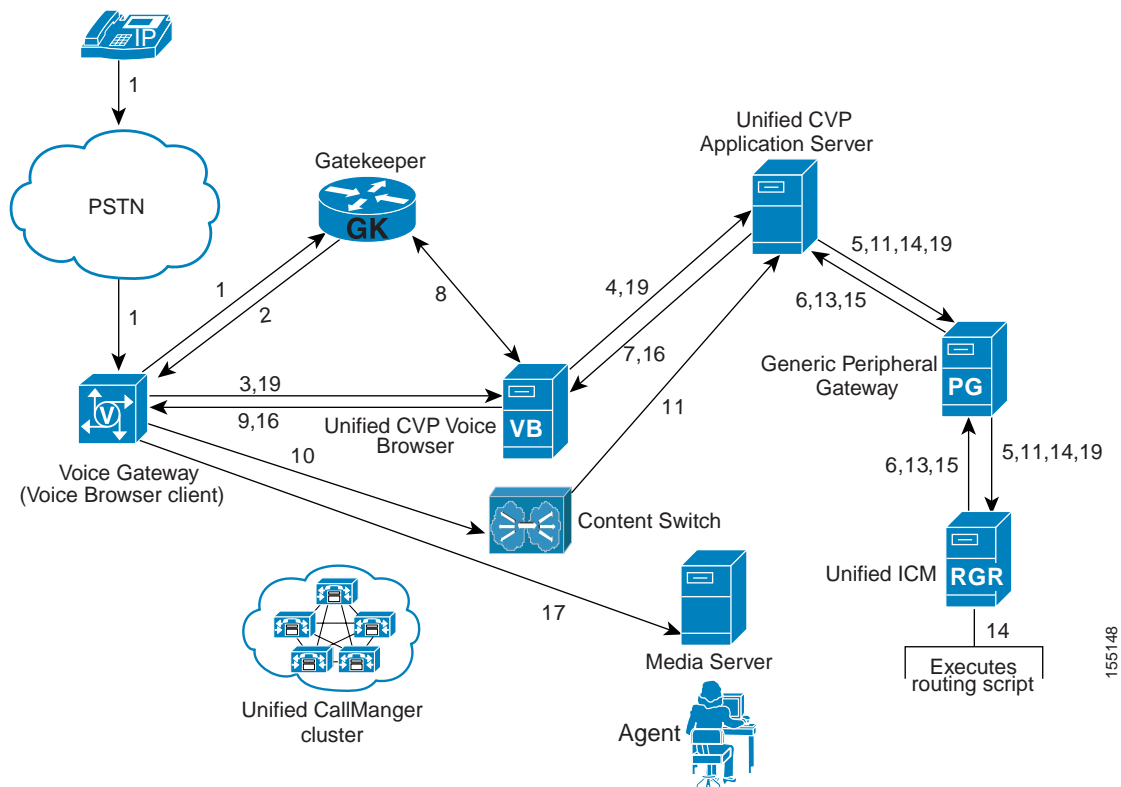
20. Upon receiving the digits, Unified ICM executes the rest of its script and tries to find an agent in a skill group based on the customer's entry. If an agent is not available, it queues the call to that skill group and sends a RUN_SCRIPT_REQ to the Unified CVP Application Server.

21. The Unified CVP Application Server instructs the Voice Browser Client to play a hold announcement and music.

22. When an agent becomes available, Unified ICM instructs the Unified CVP Application Server, with a CANCEL and a CONNECT event, to stop playing the media and start setting up the IP Transfer to the agent.

23. The Unified CVP Application Server sends a VXML Transfer to the Unified CVP Voice Browser to start call setup to the agent.

24. The Unified CVP Voice Browser queries the Gatekeeper via ARQ to find out where the agent is located. Upon receiving an ACF, it sends an H.225 Call Setup to the Unified CallManager where the agent is located.

25. The Unified CVP Voice Browser goes through several H.245 procedures to:

   a. Open and close the appropriate logical channels with the originating PSTN Gateway and the VRU.

   b. Transfer the call to the agent phone device in Unified CallManager.

   c. Connect the call to the agent.

Figure 4-9 is the second graphical representation of the Unified CVP Post-Routed call flow describing the rest of the call flow (steps 20-25).

Figure 4-9   *Unified CVP Post-Routed Call Flow*

Cisco Unified Customer Voice Portal Post-Routed Call Flow at Specific Sites

Please note that the site-specific information described below is not represented in the graphics discussed in Figure 4-8 and Figure 4-9.

The sample Unified CVP Post-Routed call arrives at the branch office sites and retail centers (not at the data centers) and is handled by agents at the remote sites. Note that the Unified CVP Call Control Servers are located at the data centers (Site1/Site5).

1. Call comes to a PSTN gateway at one of the remote sites from the PSTN and is delivered to Unified CVP at the data centers.

2. The Unified CVP Application Server informs Unified ICM of the call which returns the temporary label to connect to the VRU.

3. The Unified CVP Voice Browser switches the call to the VRU (which is the Voice Browser Client at the Unified CVP VXML Gateway).

4. Unified ICM instructs the Voice Browser Client to play a media file with menu prompts requesting the caller to enter digits.

5. Once the caller responds, Unified ICM searches for an available agent at any of the remote sites and delivers the call to that agent.

Configuration of Components

In this section, we discuss the procedures for configuring the various components involved in handling the Unified CVP Post-Routed call flow including:

- Unified ICM
- Unified CVP

You must configure Gateway(s) and Gatekeeper(s) to properly route inbound calls (calls originating from the caller into Unified CVP) and outbound calls (calls being transferred to an agent through Unified CVP). For more detailed information, see "Installing and Configuring Cisco CVP for IPCC Enterprise" in the *IPCC Installation and Configuration Guide for Cisco IPCC Enterprise Edition:* http://www.cisco.com/application/pdf/en/us/guest/products/ps1844/c1097/ccmigration_09186a00804d73b7.pdf

> **Note**   Using the Unified CallManager Administration webpage, configure the Unified CVP Voice Browser as a gateway. This enables Unified CallManager to receive multiple calls from the Unified CVP Voice Browsers. When configuring Unified CVP for the Parent/Child call flow, you do not need to configure Unified CVP Voice Browser as a gateway on Unified CallManager.

Cisco Unified Intelligent Contact Management Software Configuration

See Cisco Unified Intelligent Contact Management Software Configuration for a high-level sequential task list for Unified ICM configuration in a contact center environment.

Important Reminders

Please be aware of the following as you perform the Unified ICM software configuration tasks listed in Table 4-4.

- Ensure that the System Information includes correlation ID settings.
- Make sure that the Unified ICM VRU Scripts are associated with the applicable Network VRU.
- Enable the Service Control Queue Reporting option so that the VRU PGs use service control.
- Make a note of the VRU Connection Port used for each VRU PG peripheral (PIM).
- When configuring a Network VRU Script/Micro-application Timeout value, either retain the default setting (180 seconds) or lengthen it to a duration longer than the longest time the script is expected to execute. This is especially true for Music On Hold (MOH) scripts.
- Note that the Expanded Call Variable *user.microapp.error_code* indicates the type of failure out of the Run VRU Script node.
- Remember that the VRU Script Name and Configuration Parameter field for all five Unified CVP Micro-applications (PM, PD, GD, M, and GS) are case-sensitive.

Configuration Tasks

Table 4-4 provides a list of tasks for configuring the Unified ICM Rogger at Site1/Site5 to handle and process the sample Unified CVP Post-Routed call flow.

Table 4-4   Unified CVP Post Routed Call Flow: Unified ICM Configuration

Using the...	Complete this Task...	In Order to...
Network VRU Explorer:	1. Configure Type 5 VRU for Unified CVP.	Enable post-routing the call to the Unified CVP so that it can receive the call before Unified ICM.
	2. Configure Type 2 VRU for Unified CVP.	Enable agents to perform blind, consultative, and Ad hoc transfers/conferencing.
PG Explorer:	1. Configure the PGs with the appropriate number of routing clients for each Unified CVP Application Server.	Enable the Unified CVP Application Servers to be connected to Unified ICM via the PG.
	2. Use the VRU as the Network VRU in the routing client configured under PG configuration.	Make the routing client accept the inbound call from the Type 5 VRU configured in the previous task.
Network VRU Explorer:	1. Configure Type 7 VRU.	Enable control of the VRU by the routing client.
	2. Associate all the Unified CVP routing clients configured previously with distinctive Labels for each client.	Enable sending the call from Unified ICM to an Unified CVP Voice Browser.
Call Type List dialog box:	• Configure the Call Types for the Unified CVP Post-Routed call flow.	Identify and group incoming calls for routing script and reporting purposes.
Dialed Number/Script Selector List dialog box:	1. Configure the appropriate inbound Dialed Numbers for each Unified CVP routing client.	Identify all the phone numbers that customers can dial to initiate contact.
	2. Associate them with their respective Call Types.	Build the call types from the dialed numbers, CED, and CLID.
Unified ICM Script Editor:	• Develop routing scripts for the Unified CVP Call Types.	Provide the ultimate destination information for the incoming call.
Enterprise System Information tool:	1. Change the system information and configure the default VRU to use the Type 7 VRU.	Enable the Unified CVP as the default setting for Unified ICM.
	2. Set the adequate number of Correlation IDs (minimum/ maximum).	Define the lower/upper limits of the number used by Unified ICM to track Network VRU calls.
Label List dialog box:	• Define the Labels for each routing client.	Enable the routing client to perform the correct routing for the labels returned by Unified ICM and associate it with the correct VRU.

Table 4-4   Unified CVP Post Routed Call Flow: Unified ICM Configuration (continued)

Using the...	Complete this Task...	In Order to...
Device Target Explorer:	1. Configure all the Device Targets for the site, including all the remote sites.	Enable Unified ICM to locate the label that will route the call to an Unified CCE agent.
	2. Associate the appropriate Labels to the Device Targets for the corresponding routing clients.	Enable the routing client to use the labels to route to the correct device targets.
Agent Desk Settings List dialog box:	• Configure the appropriate Agent Desk Settings for each Skill Group.	Assign common attributes such as RONA, Wrap Up Time, etc. for agents.
Agent Explorer:	• Configure Agents and Supervisors for the sites.	Define all agents and supervisors located at the site.
Skill Group Explorer:	1. Configure the Skill Groups.	Define different skill sets that exist in a call center, such as language skills, etc.
	2. Associate Agent IDs with them.	Associate agents with specific skill groups to receive Unified ICM-routed calls.
	3. Add a Route to each Skill Group that you configured.	Enable routing to each skill group via the Script Editor.
Service Explorer:	1. Configure Services.	Represent the type of processing that a caller requires as a "superset" of skill groups. Create the supersets by assigning various skill groups to them.
	2. Associate each Service that was configured to appropriate Skill Groups defined in the previous task.	Assign specific services to the skill supersets.
	3. Create a Route to the Service.	Provide access to the service for incoming calls.
	4. Reassociate the appropriate Skill Groups to the related Services.	Assign the same skill groups to the related services.

Cisco Unified Customer Voice Portal Configuration

The following is a high-level sequential task list for Unified CVP configuration in a contact center environment:

1. Configure the Application Server on the Unified CVP Call Control Server.

2. Configure the Voice Browser on the Unified CVP Call Control Server.

3. Set up Cisco Gateways/Gatekeepers to interact with Unified CVP.

4. Define Unified CVP Voice Browser as a gateway on Unified CallManager.

Note   When configuring Unified CVP for the Parent/Child call flow, remember not to configure Unified CVP Voice Browser as a gateway on Unified CallManager.

5. Set up Unified ICM software to interact with Unified CVP.

Note   For information on installing and configuring Unified CVP, see "Installing and Configuring Cisco CVP for IPCC Enterprise" in the *IPCC Installation and Configuration Guide for Cisco IPCC Enterprise Edition:*
http://www.cisco.com/application/pdf/en/us/guest/products/ps1844/c1097/ccmigration_09186a00804d73b7.pdf

Important Reminders

Please be aware of the following as you perform the Unified CVP software configuration tasks listed in Table 4-5.

- To maximize performance, do not install the Voice Browser or Application Server on the Media Server, to which you copy System Media Files.

- Record the user name and password entered during Unified CVP installation. You need to use this user name and password combination when configuring the Application Server.

- The Call Restart feature can only be used when Unified CVP is a Type 5 or Type 6 Network VRU or when Unified CVP is the main routing client for the call. In configurations where a call is pre-routed to an Unified CVP (that is, Unified CVP is a VRU Type 2, 3, 7 or 8), the Restart feature cannot be used.

- On the Unified CVP Application Server, make sure to set the VRU Connect Port to match the VRU Connection Port defined in the Unified ICM configuration for the corresponding VRU PG peripheral (PIM).

- On each Unified CVP Voice Browser, configure the total number of calls and IVR ports according to the number of licenses purchased, call profiles, and capacity.

- Due to possible performance issues, do not set tracing on the Unified CVP Application Server or the Unified CVP Voice Browser unless instructed by Cisco Technical Support.

- When creating new *.wav* files, make sure they are placed in the appropriate system folder.

- The media file types that Unified CVP supports are Mu-Law 8-bit and A-law 8-bit *.wav* files. Recording media files in another format and converting them to the supported type may cause intermittent problems.

Configuration Tasks

Table 4-5 provides a list of tasks for configuring Unified CVP at Site1/Site5 to handle and process the sample Unified CVP Post-Routed call flow:

Table 4-5   Unified CVP Post-Routed Call Flow: Unified CVP Configuration

Using the...	Complete this Task...	In Order to...
IOS CLI:	• Configure the correct Zone and Dial Plan information for the Gatekeepers.	Create the appropriate dial plan in the Gatekeeper. **Note** See Appendix B, "Call Flow Components Configuration Commands" for configuration commands specific to the PSTN Gateway that is involved in the Unified CVP Post-Routed call flow.

Table 4-5   *Unified CVP Post-Routed Call Flow: Unified CVP Configuration (continued)*

Using the...	Complete this Task...	In Order to...
IOS CLI:	• Configure the IOS Gateways to receive inbound calls from the PSTN.	Receive inbound calls and route them appropriately. **Note** See Appendix B, "Call Flow Components Configuration Commands" for configuration commands specific to the Gatekeeper that is involved in the Unified CVP Post-Routed call flow.
Unified CVP Application Server Administration page:	• Configure the Unified CVP Application Server.	Receive inbound calls and communicate with Unified ICM.
Voice Browser Administration CLI:	• Configure the Unified CVP Voice Browser Client on the IOS gateway.	Receive inbound calls and perform IP transfers. **Note** See Appendix B, "Call Flow Components Configuration Commands" for configuration commands required for the configuration discussed in this step.
IOS CLI	• Configure the IOS Gateway with the appropriate TCL and VXML scripts and the VRU configuration.	Specify which Unified CVP Application Server to communicate with and also provide the correct VRU treatment for the call. **Note** See Appendix B, "Call Flow Components Configuration Commands" for configuration commands required for the configuration discussed in this step.

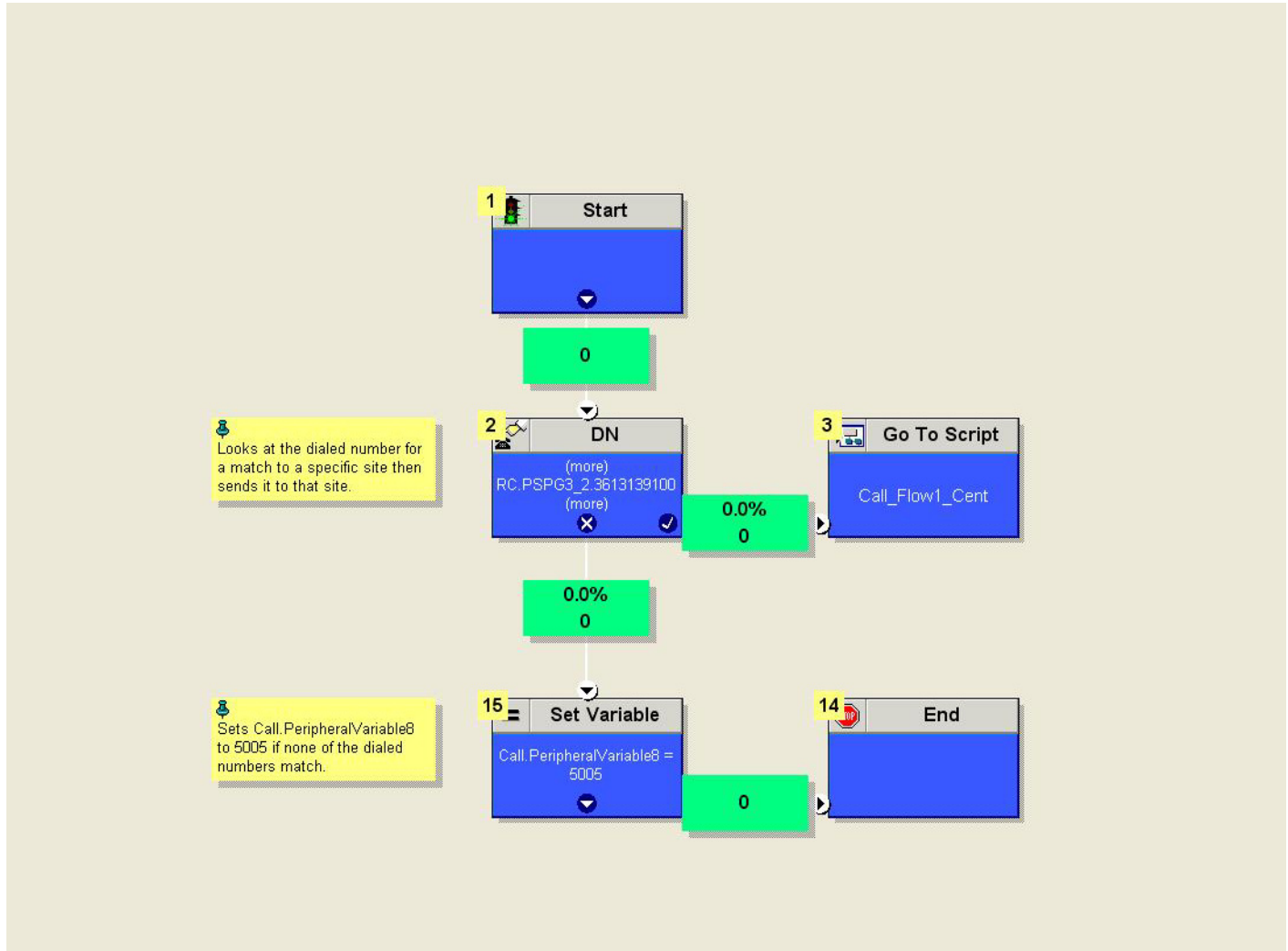## Customer Voice Portal Post-Routed Call Flow Screens

A few strategic screens have been included to provide additional perspective for configuring Unified CCE components for the Unified CVP Post-Routed call flow.

- Unified CVP Call Flow #1 Main Site Script
- Unified CVP Call Flow #1 Central Site Script
- Unified CVP Call Flow #2 Main Site Script
- Unified CVP Call Flow #2 South-Central Site Script

Cisco Unified Customer Voice Portal Call Flow # 1 Main Site Script

Figure 4-10 shows the main call flow in Test Bed 2 (Unified CCE with Unified CVP) that routes calls to more specific call flows based on the Dialed Number. This is the first call flow that a call will encounter prior to the call flows described in the business logic in Chapter 1, "Test Case Studies".
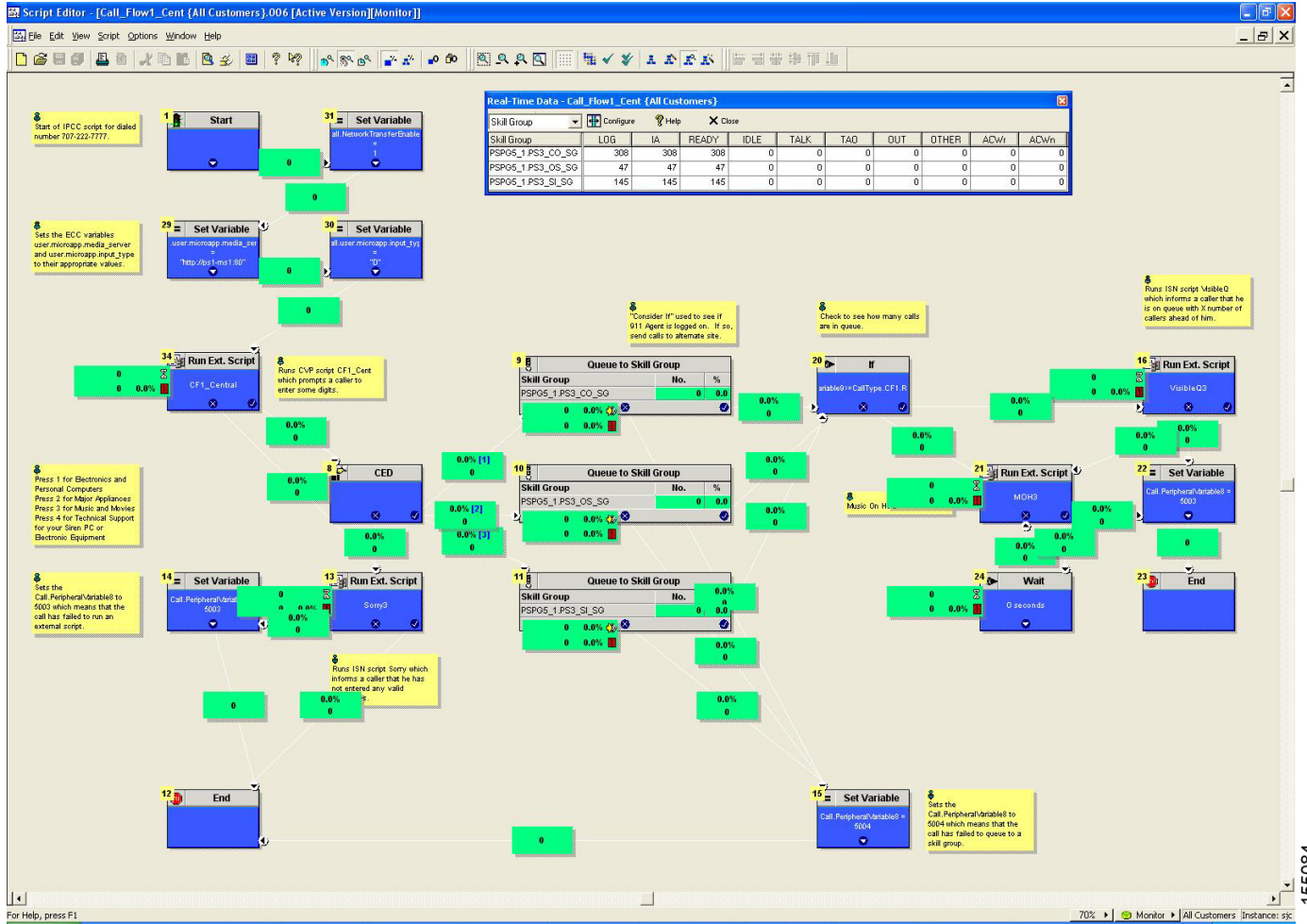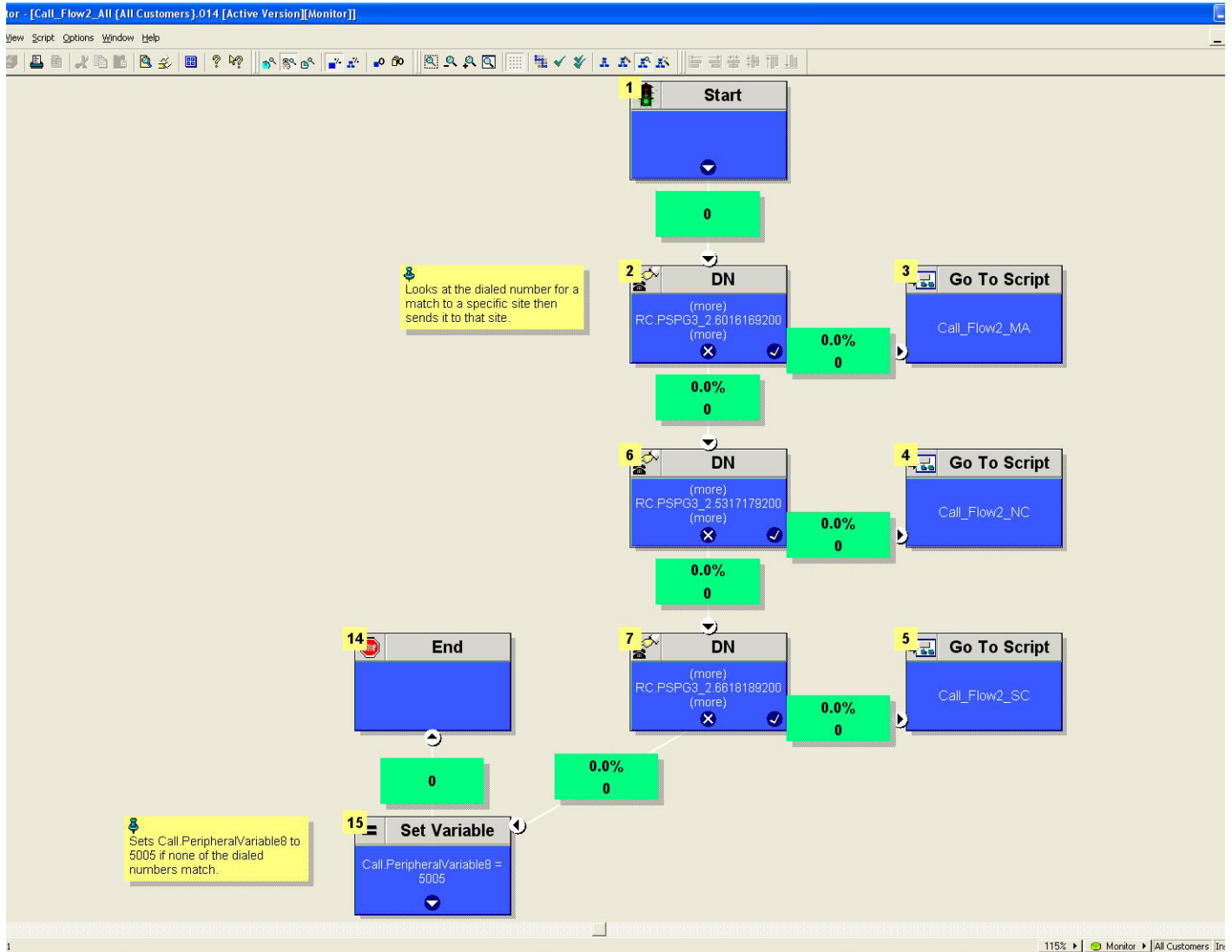
Figure 4-10   *Unified CVP Post-Routed Call Flow: Call Flow #1 Main Site Script*

Cisco Unified Customer Voice Portal Call Flow #1 Central Site Script

Figure 4-11 shows Call Flow #1 in Test Bed 2 (Unified CCE with Unified CVP) based on the business logic described in Chapter 1, "Test Case Studies".

Figure 4-11   Unified CVP Post-Routed Call Flow: Call Flow #1 Central Site Script

Cisco Unified Customer Voice Portal Call Flow #2 Main Site Script

Figure 4-12 shows Call Flow #2 in Test Bed 2 (Unified CCE with Unified CVP) based on the business logic described in Chapter 1, "Test Case Studies".

Figure 4-12   *Unified CVP Post-Routed Call Flow: Call Flow #2 Main Site Script*

Cisco Unified Customer Voice Portal Call Flow #2 South-Central Site Script Editor

Figure 4-13 shows Call Flow #2 in Test Bed 2 (Unified CCE with Unified CVP) based on the business logic described in Chapter 1, "Test Case Studies".

Figure 4-13   *Unified CVP Post-Routed Call Flow: Call Flow #2 South-Central Site Script*
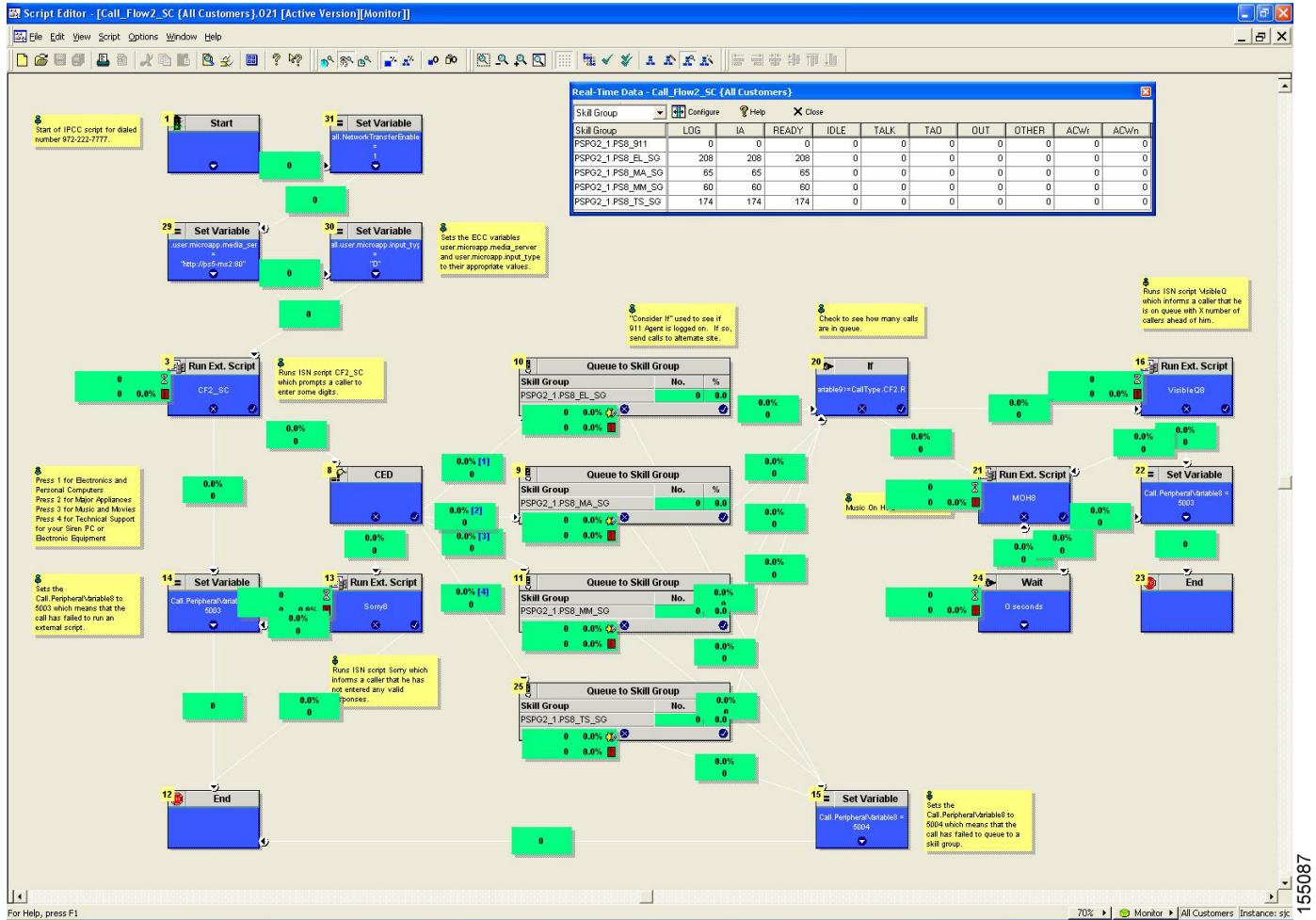
Parent/Child Call Flow

Overview

The Cisco Unified Contact Center Gateway Enterprise (Unified CCGE) feature, which includes the parent Unified Intelligent Contact Management Enterprise (Unified ICME) system and the child Unified Contact Center Enterprise (Unified CCE) system, allows Unified CCE to appear as a traditional ACD connected to the Unified ICME system. Unified CCGE feature does this by using Unified CCGE to communicate through the CTI layer interface in the Unified CCE system, which has a Cisco Unified System Contact Center Gateway (Unified SCCG).

In addition to the Unified CCGE feature, a Cisco Unified System Contact Center (Unified SCC) is implemented for testing the parent/child call flow.

In an Unified SCC deployment, there is only a single PG which is combined with a CallRouter, Logger, CRS, CTI, CTI OS and CAD Servers (all-in-one deployment). This is usually referred to as a Progger. However, this implementation of the Progger is different in that it has a simplified installation and a browser-based interface associated with it.

> **Note**   Typically, a parent Unified ICME system, including Unified CVP, VXML and PSTN gateways, is located in a different location than a child Unified CCE system. This section describes a sample Parent/Child call flow, components, and configuration that were tested and verified in this contact center test environment.

## Description of Parent/Child Call Flow

In the Parent System

1. The call comes from the PSTN into an IOS H.323 Gateway which originates an H.323 Admission Request (ARQ) to its Gatekeeper.

2. The Gatekeeper responds with an Admission Confirm (ACF) if it knows how to route the call, and provides the IP address of the Unified CVP Voice Browser (VB) in the ACF.

3. The Gateway routes the call using H.225 Call Setup procedures to the Unified CVP Voice Browser.

4. The Unified CVP Voice Browser sends the details of the call to the Unified CVP Application Server using HTTP.

5. The Unified CVP Application Server sends a NEW_CALL event to the Unified ICM using the Unified ICM/VRU Interface protocol via the Unified CVP VRU PIM.

6. Unified ICM, upon receipt of the NEW_CALL event, sends a temporary label to connect a VRU to the Unified CVP Application Server.

7. The Unified CVP Application Server sends the label with a correlation ID to the Unified CVP Voice Browser.

8. The Unified CVP Voice Browser queries the IOS Gatekeeper for the IP address of the endpoint for that label.

9. The Unified CVP Voice Browser initiates the IP Transfer to the VRU based on the IP address returned to it. Typically, this VRU is the originating PSTN Gateway that received the call.

10. The VRU functionality of the PSTN Gateway then sends a message to the appropriate Unified CVP Application Server which in turn sends a REQUEST_INSTRUCTION message to Unified ICM.

11. Unified ICM uses the correlation ID, which is relayed to it as a part of the REQUEST_INSTRUCTION message, with the call it processed earlier.

12. Unified ICM, upon receipt of the REQUEST_INSTRUCTION message, also sends a CONNECT_TO_RESOURCE event back to the Unified CVP Application Server.

13. The Unified CVP Application Server acknowledges Unified ICM with a RESOURCE_CONNECTED event, and then Unified ICM executes the routing script enabled for that call.

14. Upon execution of the routing script by Unified ICM, the Unified CVP Application Server gets a RUN_SCRIPT_REQ event from Unified ICM.

15. The Unified CVP Application Server runs the script and sends instructions to the Voice Browser Client (PSTN GW) via HTTP (VXML) to play the media file.

16. The Voice Browser Client sends HTTP requests to the HTTP Media Server to get the media file and then plays it out to the caller.

17. The caller is requested by the contents of the media file to respond to the prompts in the recording.

18. The Voice Browser Client detects the response or caller-entered digits (CED) and sends it to the Unified CVP Application Server which then forwards it to Unified ICM.

19. Unified ICM does the following:

    – Receives the CED and determines the appropriate child system to handle the call by returning a label for the peripheral target. In this case, the peripheral is the child Unified CallManager.

    – Sends a PRE_CALL message to the Unified CCGE.

20. Unified ICM instructs the Unified CVP Application Server, with a CONNECT event, to start setting up the IP Transfer to the peripheral target. In this case, the label for the peripheral target is defined as a CTI route point on the Unified CallManager in the child system.

21. The Unified CVP Application Server sends a VXML Transfer to the Unified CVP Voice Browser to start call setup to the peripheral target.

22. The Unified CVP Voice Browser queries the Gatekeeper via ARQ to determine how to route the call. Upon receiving an ACF, it sends an H.225 Call Setup to the Unified CallManager.

23. The Unified CVP Voice Browser goes through several H.245 procedures to:

    a. Open and close the appropriate logical channels with the originating PSTN Gateway and the VRU.

    b. Set up the call to the Unified CallManager in the child system.

Figure 4-14 is the graphical representation of the Parent/Child call flow. Note that while the Unified CVP Application Browser, the Unified CVP Voice Browser, and Media Server are represented as separate entities in the graphic below, they are all on the same physical Unified CVP Call Control server.

Figure 4-14   Parent/Child Call Flow (in the Parent System)
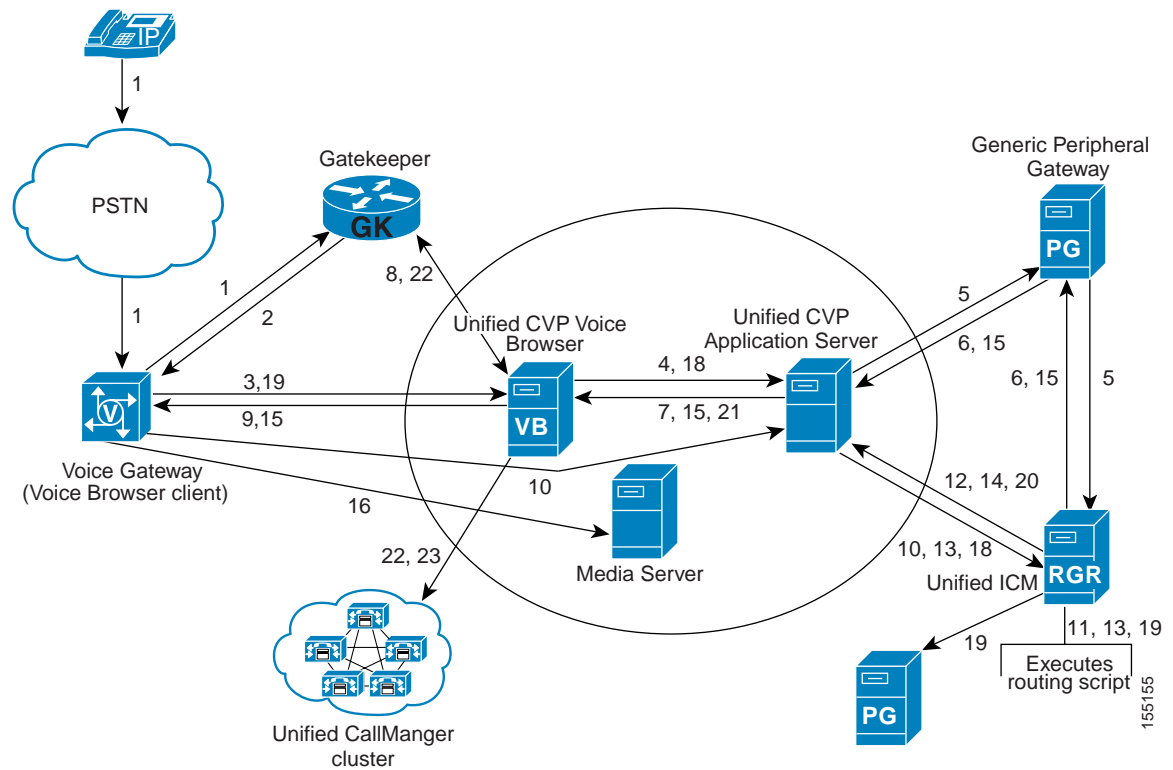

In the Child System

1. The call comes to the CTI route point on the Unified CallManager of the child system. Unified CallManager sends a NEW_CALL message to the Unified SCCG.

2. The Unified SCCG sends a ROUTE_REQUEST message to the Unified CCGE.

3. The Unified CCGE responds with a ROUTE_SELECT (and a label), which is a CTI route point on the child Unified CallManager.

4. The Unified SCCG sends the CTI route point to the child Unified CallManager.

5. Unified CallManager sends a NEW_CALL message to the Unified SCCG.

6. The Unified SCCG sends a ROUTE_REQUEST to the child Unified ICM Rogger.

7. Based on agent availability, follow the procedures listed below:

    a. If an agent is available, see Agent is Available at the Child Site (Scenario A)

    b. If an agent is not available, see Agent is Not Available at the Child Site (Scenario B).

Agent is Available at the Child Site (Scenario A)

A1. The Unified ICM Router executes the Unified ICM script based on the dialed number that was part of the ROUTE_REQUEST. The script determines the skill group that can best answer the call and checks for agent availability.

A2. Unified ICM then does the following:

– Sends a PRE_CALL message to the Unified SCCG with call context information, so that the Unified SCCG can reserve the agent and wait for the call to arrive at the agent's phone.

– Returns a ROUTE_RESPONSE message with a routing label to the Unified CallManager.

A3. Unified CallManager translates the digits in the label and rings the agent's phone.

A4. The Unified CallManager, via the JTAPI link, sends a notification to the Unified SCCG that the call has arrived.

A5. The Unified SCCG reports to Unified ICM that the call has arrived and is ringing on the agent's phone.

A6. When the agent answers the call via the Unified CCE Desktop, JTAPI sends a MsgEstablished/CS_CONNECT message to the Unified SCCG.

A7. The Unified SCCG reports to the Unified ICM Rogger that the agent has answered the call.

Figure 4-15 shows how the Parent/Child call flow is handled by the child system when an agent is available (Scenario A).

Figure 4-15   Parent/Child Call Flow (Child System with Agent Available)
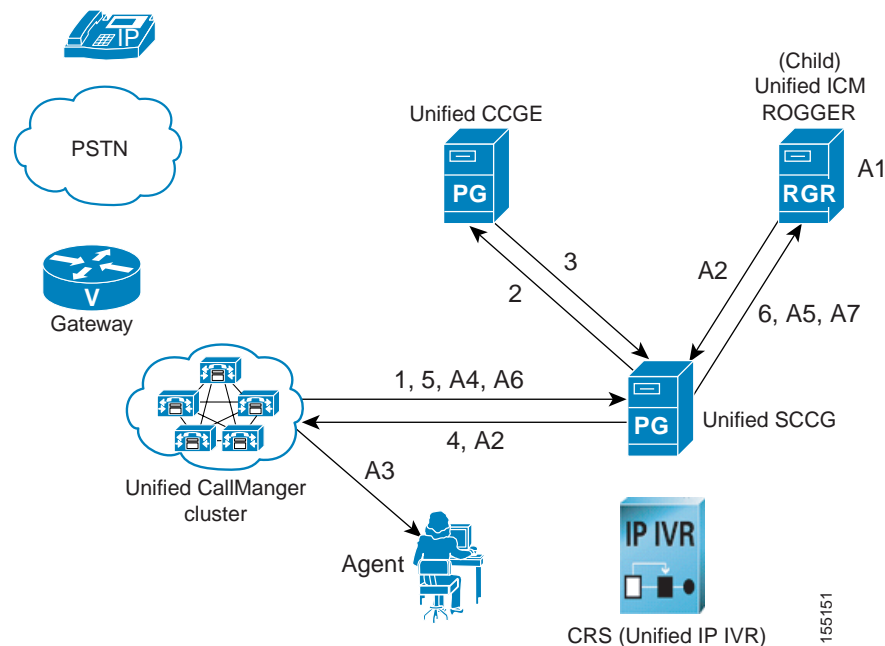
Agent is Not Available at the Child Site (Scenario B)

B1. The Unified ICM Router executes the Unified ICM script based on the dialed number that was part of the ROUTE_REQUEST. The script determines the skill group that can best answer the call and checks for agent availability.

B2. Since an agent is unavailable to answer the call, the Unified ICM script executes a RUN_EXTERNAL_SCRIPT node. It then places the call in a queue for the specific skill group.

B3. The Unified ICM Rogger returns a ROUTE_RESPONSE message with a label to the Unified CallManager. The label allows the call to route to the Unified IP IVR. For Unified IP IVR, the dialed number is a CTI route point that is owned by the Unified IP IVR user.

Note   On Unified IP IVR, this CTI route point is defined as a JTAPI Trigger. Unified IP IVR is in the same Unified CallManager cluster as the call.

B4. When the call arrives, the JTAPI link on Unified CallManager informs Unified IP IVR, which in turn informs the Unified SCCG.

B5. When the Unified SCCG receives the incoming call arrival message, it sends a REQUEST_INSTRUCTION message to Unified ICM.

B6. Unified ICM instructs Unified IP IVR, via the Unified SCCG, to play the queue messages for the caller, until such time an agent is available to take the call.

B7. Once an agent becomes available, the Unified SCCG sends an AGENT_STATE_CHG message to Unified ICM indicating that a qualified agent has become available.

B8. Unified ICM then:

– Sends PRE_CALL message to the Unified SCCG with call context information, so that the Unified SCCG can reserve the agent and wait for the call to arrive at the agent's phone.

– Instructs Unified IP IVR to redirect the call from the agent queue to the available agent.

B9. Unified IP IVR then sends the call to the Unified CallManager and the call is handled in the same manner as described in steps A3-A7 in Agent is Available at the Child Site (Scenario A).

Figure 4-16 is the graphical representation of steps B1-B9 of the Parent/Child call flow describing the call treatment provided by the child system when an agent is not available.

Figure 4-16   Parent/Child Call Flow (Child System with Agent Not Available)
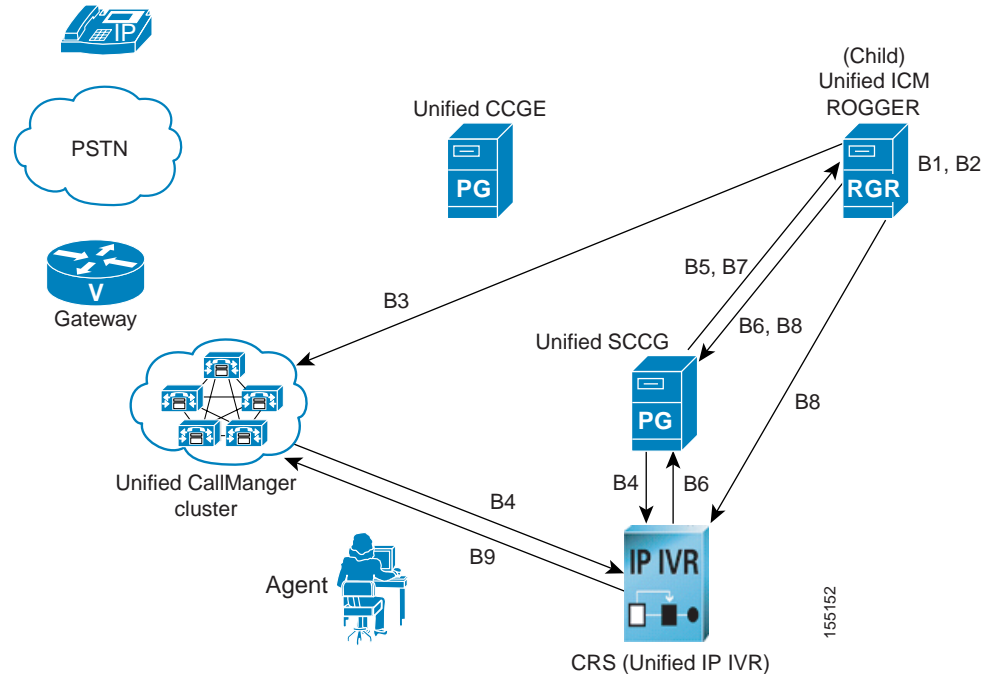
Parent/Child Call Flow at Specific Sites

Note that the site-specific information described below is not represented in the graphics in this section.The sample Parent/Child call arrives at the data centers (Site1/Site4) and is routed by the parent systems (Unified ICME) to the child systems (Unified CCE). The call is handled by agents at the child sites. Note that the child CRS (Unified IP IVR) servers and parent Unified CVP Call Control Servers are located at the data centers.

At the Parent Site:

1. Call comes to a PSTN gateway at Site1 and is delivered to the parent Unified CVP Call Control Server at Site1.

2. The parent Unified CVP Call Control Server informs the parent Unified ICME system at Site1 of the call which returns the temporary label to connect to the Site1 VRU.

3. The parent Unified CVP Call Control Server switches the call to the VRU.

4. The parent Unified ICME system instructs the parent Unified CVP Call Control Server to play a media file with menu prompts requesting the caller to enter digits.

5. Once the caller responds, Unified ICM determines the best child system to deliver the call, for instance, the first child system. In this contact center environment, Site2 is part of the first child system.

At the Child Site:

1. The call is transferred to an available agent located in Site2. If an agent is not available, the call is placed in queue at the Site1 Unified IP IVR and a recording is played back to the caller.

2. The child Unified ICME system determines that an agent at Site3 is available to handle the call. It requests redirection of the call from Site1 Unified IP IVR to the Site3 agent.

3. Site3 agent answers the call.

Configuration of Components

In this section, we discuss the procedures for configuring the various components involved in handling the Parent/Child call flow.

Child Systems at Site1/Site4

The configuration tasks in this subsection are required to set up the standalone child systems at the parent sites.

Cisco Unified CallManager Software Configuration

The procedures for configuring Unified CallManager for the Parent/Child call flow at the parent sites are the same as the configuration tasks for the Unified CallManager Post-Routed call flow.

See Cisco Unified CallManager Configuration for information on configuring Unified CallManager.

Customer Response Solutions Software Configuration

The procedures for configuring CRS (Unified IP IVR) for the Parent/Child call flow at the parent sites are the same as the configuration tasks for the Unified CallManager Post-Routed call flow.

See CRS (Unified IP IVR) Configuration for information on configuring CRS (Unified IP IVR).

Cisco Unified Intelligent Contact Management Software Configuration

The procedures for configuring the Unified ICME system for the Parent/Child call flow at the parent sites are the same as the configuration tasks for the Unified CallManager Post-Routed call flow.

See Cisco Unified Intelligent Contact Management Software Configuration for information on configuring the Unified ICME system.

Child System at Site9

The configuration tasks in this subsection are required to set up the standalone child system at the single site (Site9) with Cisco Unified System Contact Center (Unified SCC) implementation.

Cisco Unified CallManager Software Configuration

The Cisco CallManager sub-cluster implemented at Site9 is at a previous software release (Release 4.1(3)). Therefore, configure the Cisco CallManager using the procedures for the Cisco CallManager Post-Routed call flow in "Testing Call Flows" in the *Systems Test Architecture Reference Manual for IPCC Enterprise* at:

http://www.cisco.com/univercd/cc/td/doc/product/voice/ip_tele/gblink/system/gbtst4x/4_0/gb40ipcc.pdf

Customer Response Solutions Software Configuration

The CRS system implemented at Site9 is at a previous software release (Release 3.5(3)). Therefore, configure the CRS using the procedures for the Cisco CallManager Post-Routed call flow in "Testing Call Flows" in the *Systems Test Architecture Reference Manual for IPCC Enterprise* at:

http://www.cisco.com/univercd/cc/td/doc/product/voice/ip_tele/gblink/system/gbtst4x/4_0/gb40ipcc.pdf

Cisco Unified Intelligent Contact Management Software Configuration

For information on configuring Unified ICM using the new web-based administration (after the streamlined installation process), see *System IPCC Enterprise Installation and Configuration Guide, Cisco IPCC Enterprise Edition* at:

http://www.cisco.com/application/pdf/en/us/guest/products/ps1844/c1676/ccmigration_09186a00804d8b1c.pdf

Parent Systems at Site1/Site4

The configuration tasks in this subsection are required to set up the standalone parent systems at the parent sites.

Cisco Unified Customer Voice Portal Software Configuration

The procedures for configuring Unified CVP for the Parent/Child call flow at the parent sites are the same as the configuration tasks for the Unified CVP Post-Routed call flow.

See Cisco Unified Customer Voice Portal Configuration for information on configuring Unified CVP.

Cisco Unified Intelligent Contact Management Software Configuration

Important Reminders for Parent Systems

Please be aware of the following as you perform the Unified ICM auto configuration tasks in the parent system listed in Table 4-7.

- For auto configuration to work, the PIMs on both Unified CCGE and Unified SCCG must be "Active" and the CTI OS process on the Unified SCCG must be running.

- Each Unified CCGE PIM must have the "Peripheral auto configured" check box enabled to enable the "autoconfig" capability.

- After the auto configuration occurs, the PIM "Peripheral Monitor" devices (see PG Explorer in Table 4-7) get populated with the child configuration data.

- Ensure that the Label routing client is the parent PIM.

> **Note** For information on installing and configuring Unified ICM, see *Cisco IPCC Gateway Deployment Guide ICM/IPCC Enterprise Edition Release 7.0(0) at*:
> http://www.cisco.com/application/pdf/en/us/guest/products/ps1001/c1097/ccmigration_09186a 0080626383.pdf
>
> and "Installing and Configuring Cisco ICM for IPCC Enterprise" in the *IPCC Installation and Configuration Guide for Cisco IPCC Enterprise Edition:*
> http://www.cisco.com/application/pdf/en/us/guest/products/ps1844/c1097/ccmigration_09186a 00804d73b7.pdf

Configuration Tasks

Table 4-6 provides a list of tasks for configuring the Unified ICM parent system at Site1/Site4 to handle and process the sample Parent/Child call flow. Note that the auto configuration process auto-populates the following Unified ICM tables on the parent Unified ICM from the child Unified ICM.

Table 4-6   Unified ICM Tables Mapping from Child System to Parent System

Child	Parent
Agent/Person	Agent/Person
Skill Group	Skill Group
Call Types	Service
Dialed Number	Peripheral Monitor (see PG Explorer in Table 4-7)

Table 4-7 lists the additional tasks required to complete the Parent/Child call flow configuration after the auto configuration occurs.

Table 4-7   Parent/Child Call Flow: Parent Unified ICM Configuration

Using the...	Complete this Task...	In Order to...
PG Explorer:	• Configure one Peripheral Gateway as a client-type Unified CCGE with two PIMs. One PIM is for the first child system at Site2/Site3 and the other PIM is for the second child system at Site9.	To add Unified CCGE for the Peripherals (ACMI PIMs) that communicate with Unified SCCG. **Note** See Important Reminders for Parent Systems.
Network Trunk Group Explorer:	1. Configure a Network Trunk Group for the Unified CCGE between the parent and the child. 2. Add two trunks, one for each child system (at Site2/Site3 and Site9).	Enable routing the calls from the parent to the child.
Agent Explorer:	• Check that all Agent data is copied from the child to the parent. Further configuration is not required.	Auto populate agent data from child system to parent system.

Table 4-7   Parent/Child Call Flow: Parent Unified ICM Configuration (continued)

Using the...	Complete this Task...	In Order to...
Skill Group Explorer:	1. Check that all the Skill Group data, including Skill Group Members, is copied from the child to the parent. Further configuration is not required.	Auto populate skill group data from child system to parent system.
	2. Configure a parent Route for each Skill Group.	Enable routing to each skill group via the Script Editor.
Service Explorer:	1. Check that all the Service data is copied from the child system to the parent system	Provide access to the service for incoming calls. The parent Service Type maps to a child Call Type. The DNIS and Label are the child "Dialed Number/Script Selector" DNs in the child call flow scripts.
	2. Add the Service Members and configure a parent Route, Peripheral Target, and Label for each Service Type (since the parent Unified ICM script is using a Service node)	**Note** See Important Reminders for Parent Systems.

Parent/Child Systems Interoperability Configuration

The configuration tasks in this subsection are required to enable the standalone parent and child systems to interoperate with each other.

Cisco Unified CallManager Software Configuration (Child System)

Configuration Tasks

Table 4-8 provides a list of tasks for configuring the child Unified CallManager to handle and process the sample Parent/Child call flow.

Note   You should perform these additional Unified CallManager configuration tasks after the child standalone system is configured for the Unified CallManager Post-Routed call flow, and before the parent standalone system is configured.

Table 4-8   Parent/Child Call Flow: Child Unified CallManager Configuration

Using the...	Complete this Task...	In Order to...
Unified CallManager Administration CTI Route Point page:	1. Configure the CTI Route Points for the child Dialed Number/Script Selector call flows and the parent Translation Route DNIS number ranges.	Enable Unified CallManager to route the call to the agent.
	2. Assign the directory number to the line setting.	Enable the phone to ring.

Table 4-8   Parent/Child Call Flow: Child Unified CallManager Configuration (continued)

Using the...	Complete this Task...	In Order to...
Unified CallManager Administration End User Configuration page:	1. Associate all CTI Route Point devices to the Unified CallManager End User for that PG User (for example, pg1user1).	Enable the Unified CallManager to send CTI device information to Unified SCCG via JTAPI communications for monitoring and control.
	2. Check that the CTI Route Point devices are all registered to the Unified CallManager.	Ensure the child Unified ICM is aware of the CTI device status.

Cisco Unified Intelligent Contact Management Software Configuration (Child System)

Important Reminders for Child Systems

Please be aware of the following as you perform the child Unified ICM software configuration tasks listed in Table 4-9.

- For the Dialed Number/Script Selector, ensure that the Routing Client is Unified SCCG.

Configuration Tasks

Table 4-9 provides a list of tasks for configuring the child Unified ICM at Site1/Site4 to handle and process the sample Parent/Child call flow.

> **Note**   After you configure the parent standalone system, you must perform these additional Unified ICM configuration tasks on the child system.

Table 4-9   Parent/Child Call Flow: Child Unified ICM Configuration

Using the...	Complete this Task...	In Order to...
Call Type List Explorer:	- Configure the Call Types.	Identify and group incoming calls for routing script and reporting purposes.
		Note These are the Parent/Child call flow scripts to agent sites. For example, Site2, Site3, and Site9 support outsourced calls as described in the business logic in Chapter 1, "Test Case Studies".

Table 4-9   Parent/Child Call Flow: Child Unified ICM Configuration (continued)

Using the...	Complete this Task...	In Order to...
Dialed Number/Script Selector Explorer:	1. Configure the Dialed Numbers for each particular call flow script from the Call Type List.	Identify all the phone numbers that customers can dial to initiate contact. Note Dialed numbers are the CTI Route Point numbers that generate the route request to Unified ICM.
	2. Configure the Parent Translation Route DNIS numbers for the child (Site2, Site3, and Site9) call flows and enable "Permit application routing." Note You can use the "bulk insert" feature to add all the numbers.	Indicate to the child system that the parent system will perform the routing decision.
Agent Desk Settings List:	• Configure the appropriate Agent Desk Settings for each child Skill Group (which is used by the parent system)	Assign common attributes such as RONA, Wrap Up Time, and so on for agents.

Cisco Unified Intelligent Contact Management Software Configuration (Parent System)

Important Reminders for Parent Systems

Please be aware of the following as you perform the parent Unified ICM software configuration tasks listed in Table 4-10.

- Network VRUs—The VRU leg returns a label from Unified ICM, which is configured on the Unified CVP as the "ID from Unified ICM" (for example, 1111111111). The Switch leg returns a label from the Unified ICM for new calls, which is based on the calling number (for example: 219400 where the original PSTN calling number is 422-121-9400 before dial plan translation).

- Network Trunk Group & Trunk Group—The trunk Peripheral Number for the Call leg corresponds to the Group Number on the Unified CVP. For example, Switch leg "New Call" is 100 and VRU leg "ID from Unified ICM" is 200. These values must match what is configured on the Unified CVP and the Network Trunk Group.

- Dialed Number/Script Selector—Ensure that the correct customer is configured and the dialed number is on the correct routing client, which is the Unified CVP. After the Unified ICM parent script for the Call Type is scheduled, the "Dialed Number Mapping" will populate with the script information.

- Translation Route Wizard—The post-routing client (returned Label) is the Unified CVP. When configuring the returned Label, select the "Set prefix = DNIS" button. Ensure the Network Trunk Group and Routing Client are on the correct targets. The Network Trunk Group is associated with the child system and the routing client is the Parent CVP for the parent system (at Site1/Site4).

  Note that you must configure the same pool of Translation Route DNIS numbers on the child Unified CallManager as CTI Route Points and on the child Unified ICM as Dialed Numbers (with Permit Application Routing enabled). This notifies the child system that the parent system will perform the routing. This is how the original parent Unified CVP Label gets associated with the child DN/Label.

- Services, agents and skill groups are auto populated from the child systems to the parent systems. You do not need to reconfigure these on the parent systems.

- You need to add the service members to the services on the parent system.

Configuration Tasks

Table 4-10 provides a list of tasks for configuring the parent Unified ICM at Site1/Site4 to handle and process the sample Parent/Child call flow.

Note Auto configuration does not auto populate all the data. Start the configuration by following the ICM "Step by Step Configuration" for Telephony.

Table 4-10   *Parent/Child Call Flow: Parent Unified ICM Configuration*

Using the...	Complete this Task...	In Order to...
Call Type List Explorer:	• Configure the Call Types.	Identify and group incoming calls for routing script and reporting purposes. These are the Parent/Child call flow scripts to agent sites. For example, Site2, Site3, and Site9 support outsourced calls as described in the business logic in Chapter 1, "Test Case Studies".
Network VRU Explorer:	• Configure four Network VRUs. The Network VRU has a Switch and VRU leg for each Unified CVP.	Enable the Unified ICM to route the call to the Unified CVP. There are two Unified CVP Call Control servers (Unified Voice Browser/Unified Application Server) for the parent system; one each for Site1 and Site4. The Unified CVP has two call legs; one is the VRU leg (Type 7) and the other is the Switch leg (Type 5).
PG Explorer:	• Configure a Peripheral Gateway (PG) on the Unified ICM PROGGER with the appropriate number of routing clients for each Unified CVP Application Server. This PG is the VRU PIM to the parent Unified CVP.	Enable the Unified CVP Application Servers to be connected to Unified ICM via this PG.
Network Trunk Group Explorer:	• Configure a Network Trunk Group for the PG between the parent system and the Unified CVP.	Enable routing the calls to a specific Unified CVP. Since there is a trunk for each call leg (Switch and VRU), there are four trunks in this trunk group.
Service Explorer:	1. Configure a Service for each Unified CVP PIM. 2. Create a Route to the Service.	Provide access to the service for incoming calls.

Table 4-10   Parent/Child Call Flow: Parent Unified ICM Configuration (continued)

Using the...	Complete this Task...	In Order to...
Call Type List Explorer:	1. Configure the Call Types.	Identify and group incoming calls for routing script and reporting purposes.
		This is the main call flow from the parent system to the child systems and is used for calls going into the Site1/Site4 data centers.
	2. Specify Dialed Numbers.	Identify the dialed numbers that belong to each call type.
		Within the main parent Unified ICM script, there are two called numbers, one for Site1 and another for Site4.
Dialed Number/Script Selector Explorer:	• Configure the Dialed Numbers that were specified previously.	Identify all the phone numbers that customers can dial to initiate contact.
		Dialed numbers are the CTI Route Point numbers that generate the route request to Unified ICM.
Translation Route Wizard:	• Configure the Translation Routes on the Unified CCGE for each Service (child call flow) as a single peripheral with multi-routing clients.	Enable each translation route, which has a pool of ten DNIS numbers, to handle simultaneous calls to each child call flow.
		A translation route is added for each service in the parent Unified ICM script.
Tools/Explorer/ICM Instance Explorer:	• Configure two customers; one for each Unified CVP Network VRU.	Route calls to the specific data center customer (for example, Site1 and Site4).
Agent Desk Settings List:	1. Define the parent Unified ICM VRU Script names.	Assign the Unified CVP script names that are used in the parent Unified ICM scripts.
		For example, there is a set of scripts for parent sites (Site1/Site4), since Site1 handles child call flows for Site2 and Site9 agents and Site4 handles child call flows for Site3 an Site9 agents.
		Note These VRU scripts are invoked in the parent Unified ICM "Run External Script" node, which causes a *.wav* file to play on the Unified CVP VXML gateway.
	2. Make the script "Interruptible."	Enable the interruption of a script that is playing when an agent becomes available.

Parent/Child Call Flow Screens

A few strategic sets of screens have been included to provide additional perspective for configuring contact center components for the Parent/Child call flow.

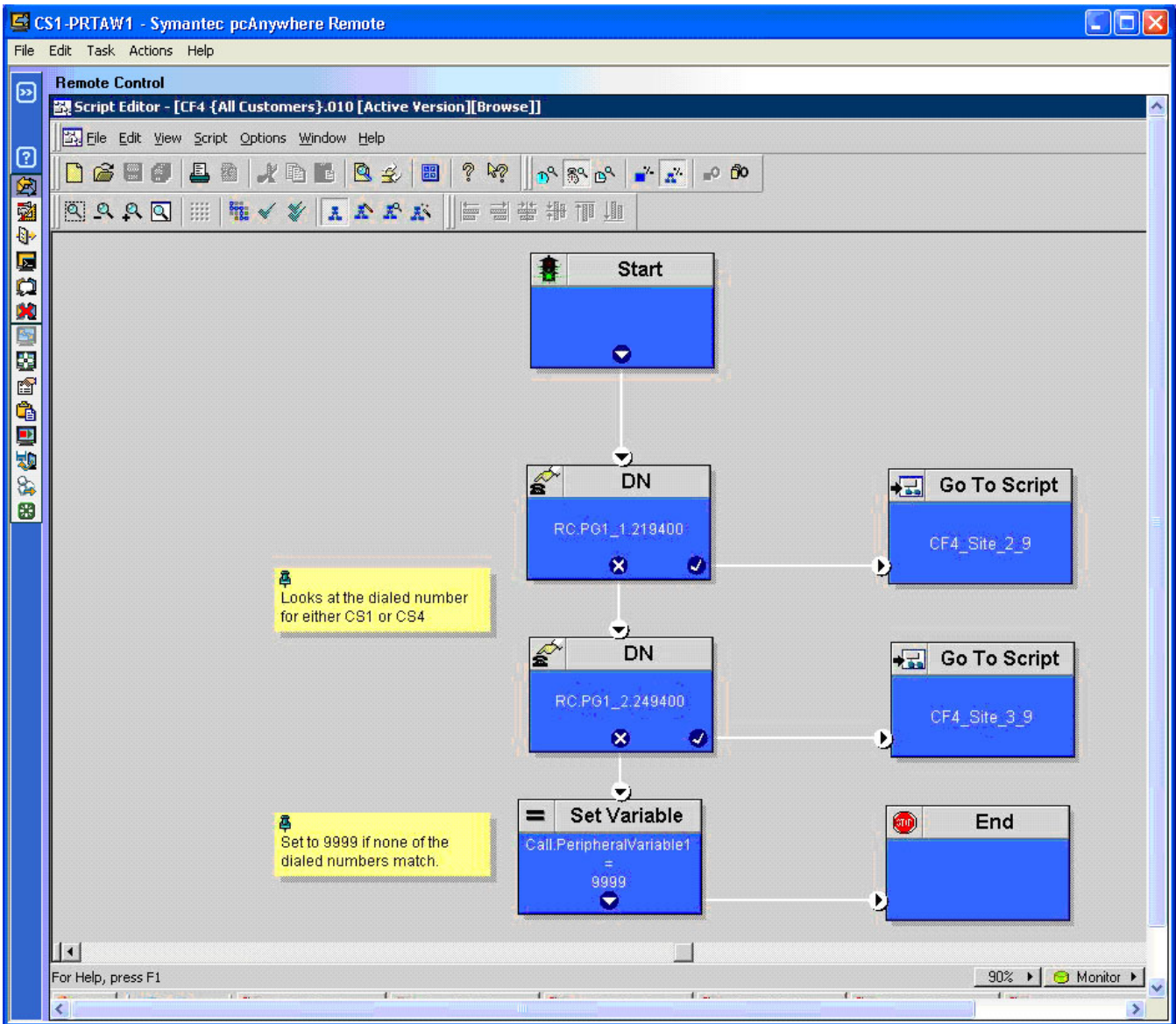• Parent Call Flow #4 Main Site Scripts

- Parent Call Flow #4 to Child Sites (Site2 and Site9) via Child Data Center (Site1)

- Parent Call Flow #4 to Child Sites (Site3 and Site9) via Child Data Center (Site4)

- Child Call Flow #4 to Child Sites (Site2, Site3, and Site9)

- Child Call Flow #4 for RONA

Parent Call Flow #4 Main Site Scripts

Figure 4-17 shows the main call flow in Test Bed 1 (Unified CCE with Unified CallManager) that routes calls from the parent data centers to the specific child sites based on the Dialed Number. In the typical Parent/Child call flow:

1. The PSTN customer dials a 10-digit number to the parent site:

   - Parent site Site1 (CS1) is 422-121-9400, which is directed to agents in Site2 (CS2) and Site9 (CS9)

   - Parent site Site4 (CS4) is 942-424-9400, which is directed to agents in Site3 (CS3) and Site9 (CS9)

2. The call arrives into the parent Unified CVP from the PSTN and based on the called number is directed to either Site1 or Site4. The main parent script (CF4) in this example contains two DN nodes to direct the call to the appropriate child sites:

   - CS1 DN handles the agents in child site 2 and 9 and uses the 'CF4_Site_2_9' script

   - CS4 DN handles the agents in child site 3 and 9 and uses the 'CF4_Site_3_9' script

Figure 4-17   Parent /Child Call Flow #4: Main Site Script 1

Figure 4-18 depicts the following:

3. The PSTN caller hears the parent Unified CVP prompt (via the Run External Script node) for an agent skill group, which is a child skill group.

4. The PSTN caller enters the DTMF caller entered digit (CED) based on the desired service (for example, 1 for Catalog Orders, 2 for Order Status, 3 for Tech Support, and so on).

Figure 4-18   *Parent/Child Call Flow: Main Site Script 2*
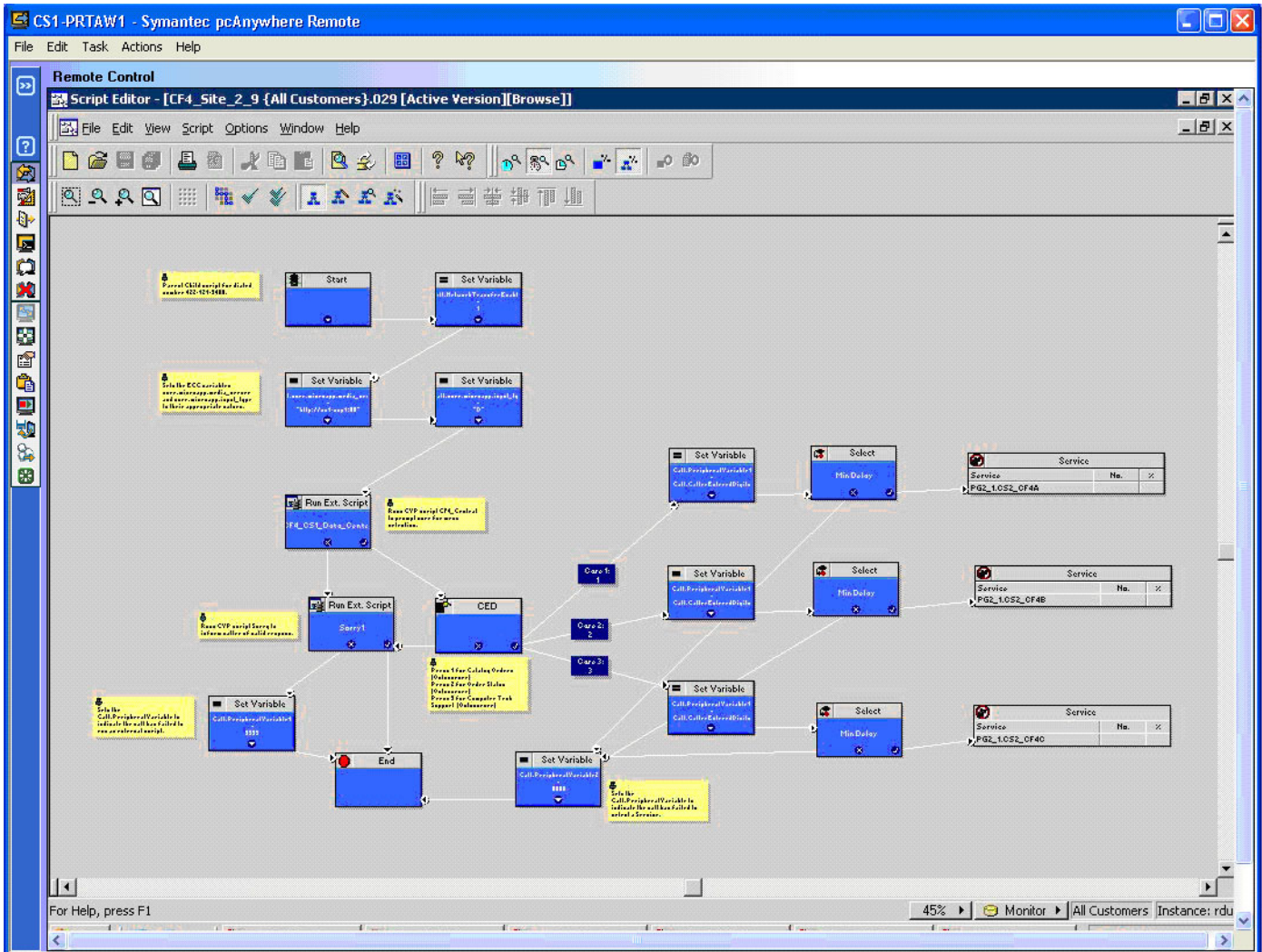
Parent Call Flow #4 to Child Sites (Site2 and Site9) via Child Data Center (Site1)

Figure 4-19 shows the following:

5. The parent Unified CVP script (CF4_CS1_Data_Center) at Site1 invokes a *.wav* file (CF4_Central) that is loaded on the Unified CVP VXML gateway.

Figure 4-19   Parent/Child Call Flow: Run External Script Properties
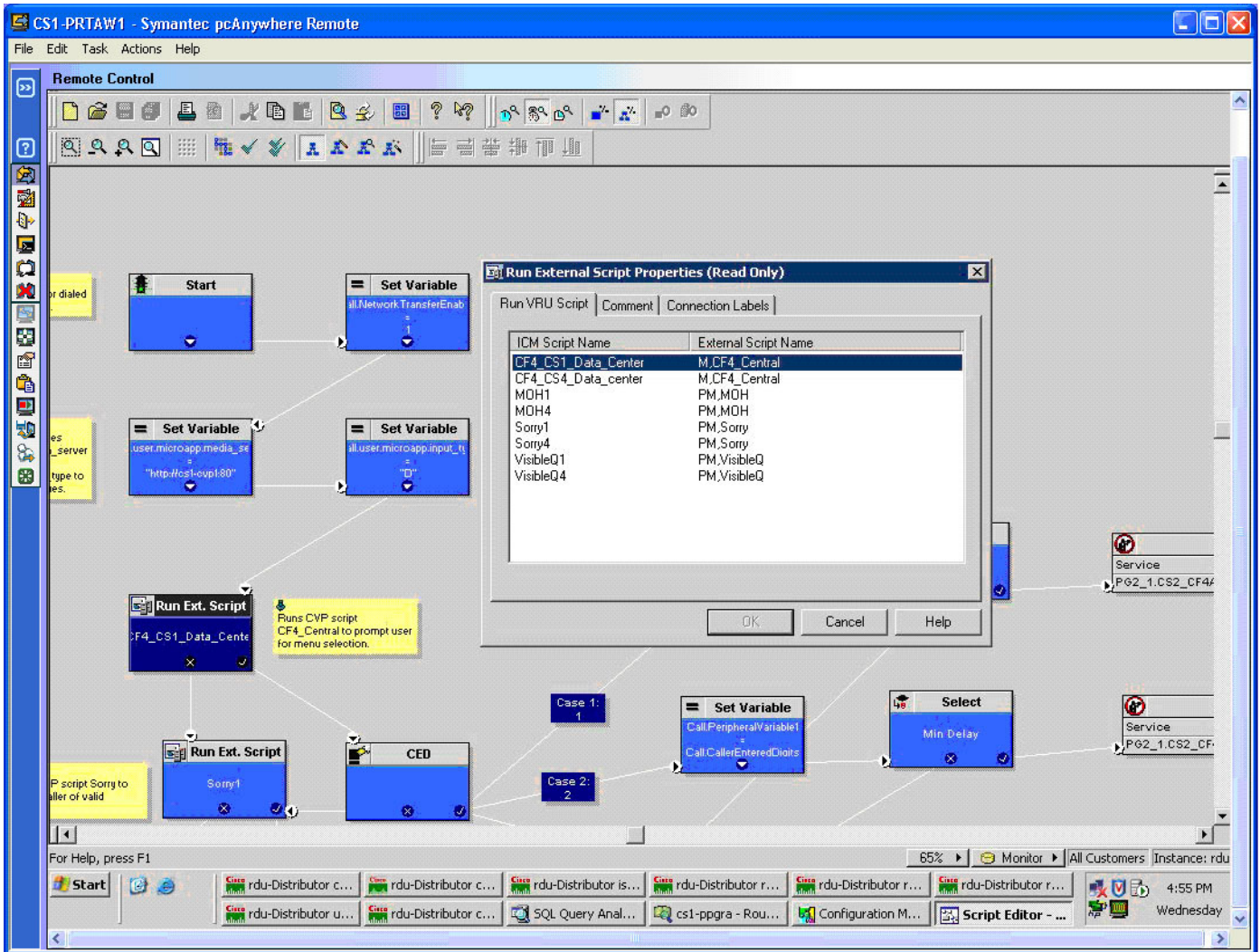
Figure 4-20 shows how to:

6. Ensure that this script is configured on the parent Network VRU Script list.

Figure 4-20   *Parent/Child Call Flow: Network VRU Script List*
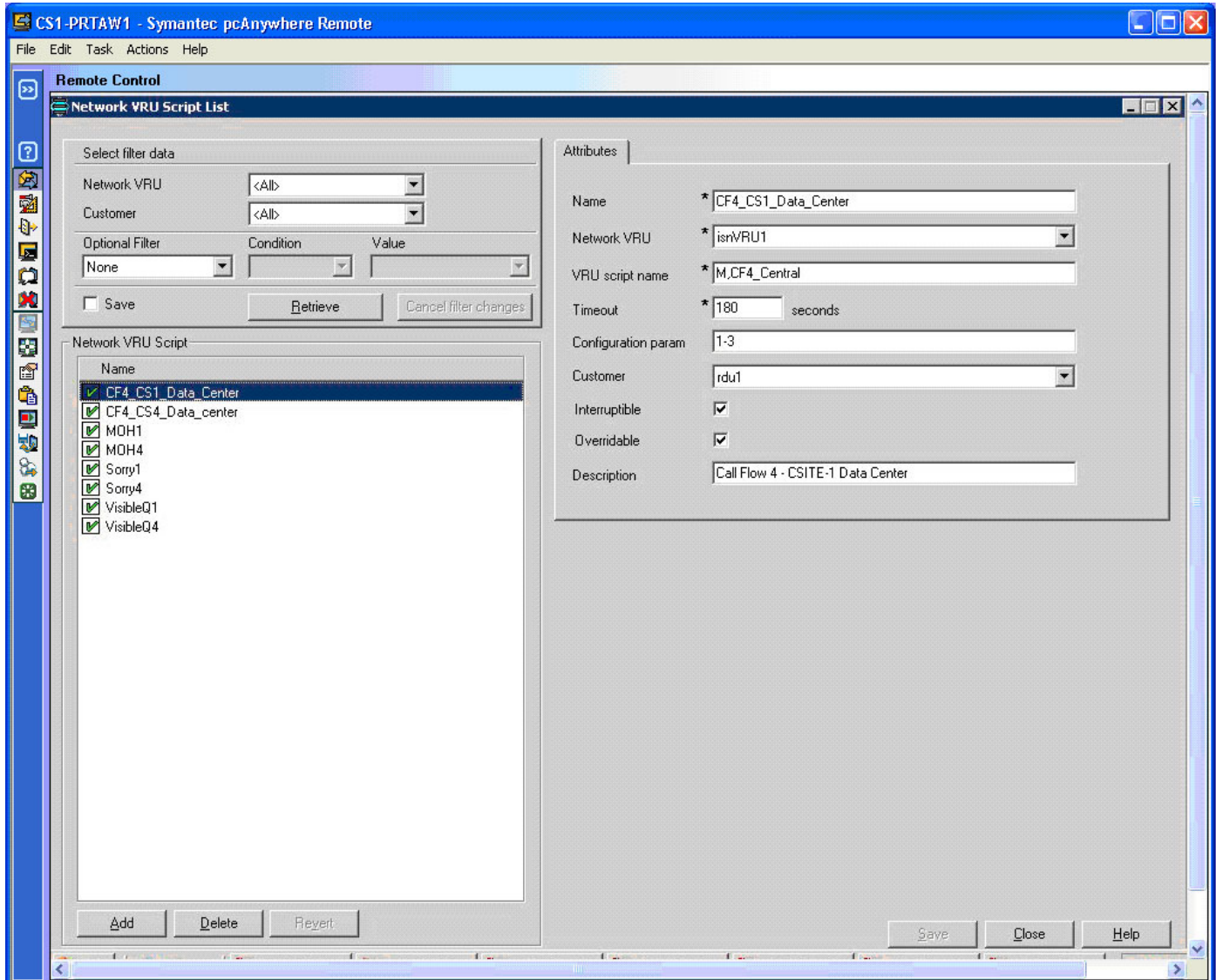
Parent Call Flow #4 to Child Sites (Site3 and Site9) via child Data Center (Site4)

In the Parent/Child call flow, certain values such as the CED are not passed by the parent system to the child system. The parent Unified CCGE only passes call variables and ECC variables from the parent Unified ICM PROGGER to the child system. As a result, the data passed via the ROUTE_REQUEST / ROUTE_SELECT is only a subset of the total values that need to be passed.

Figure 4-21 illustrates how to pass the parent CED to the child system.

7. Create a Set Variable node of Object Type "Call" for Variable "PeripherialVariable1" where the Value equals "Call.CallerEnteredDigits." The Set Variable Value is as follows:
Call.PeripheralVariable1 = Call.CallerEnteredDigits

Figure 4-21   Parent/Child Call Flow: Set Variable Properties
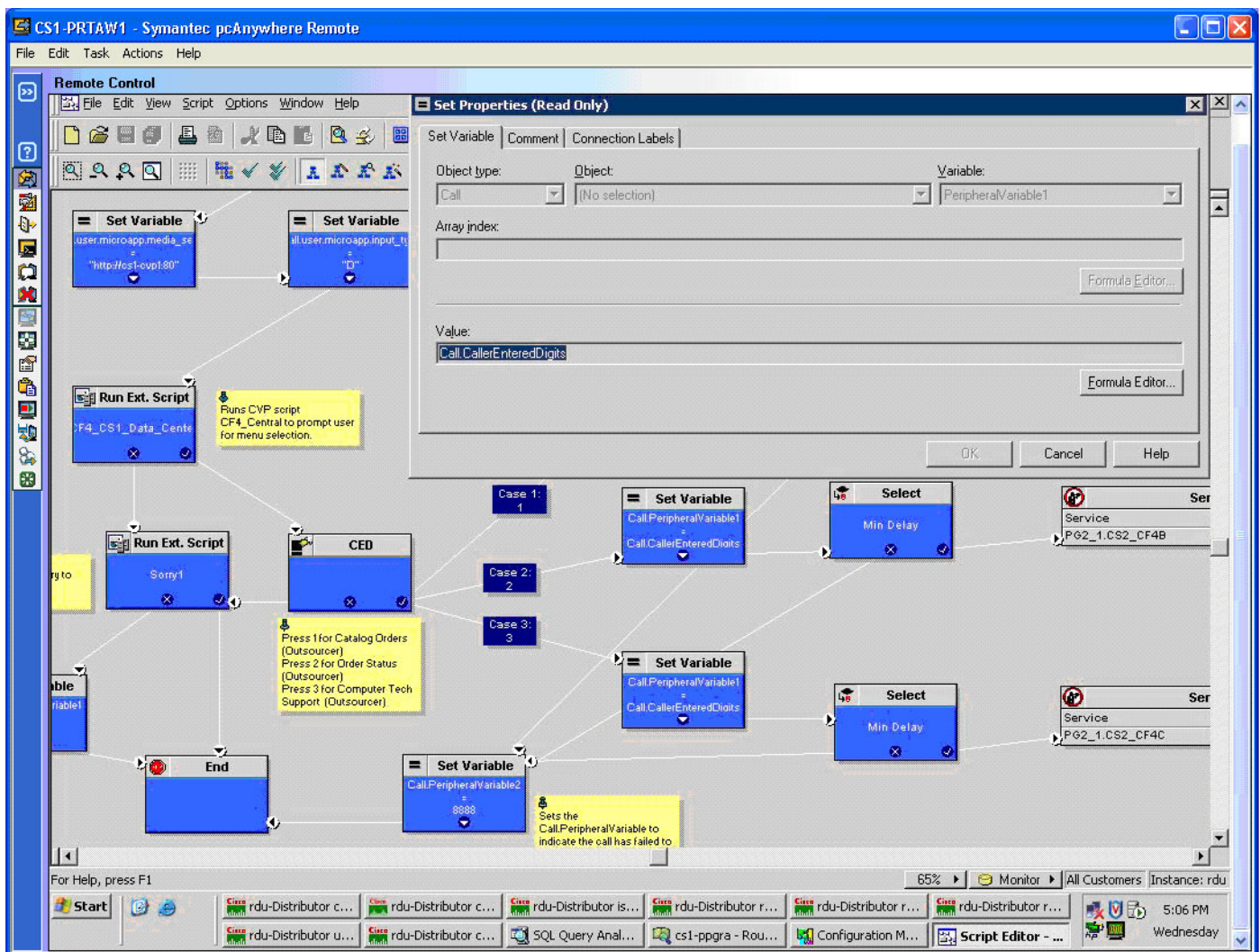
Figure 4-22 shows what happens after the PSTN caller enters the CED.

8. The applicable Service node is selected and the call is eventually routed to the child agent.

9. If a child agent is not available, the PSTN caller is queued until an agent becomes available. Each parent Service represents a Call Type (call flow) on the child system. Remember that the configuration data auto populated from the child system to the parent system maps as follows: Child.CallType = Parent.Service.

In this example, for the Services, the calls route to Site 2 and Site9 (CS2/CS9) and Site3/Site9 (CS3/CS9).

Figure 4-22   Parent/Child Call Flow: Service Properties
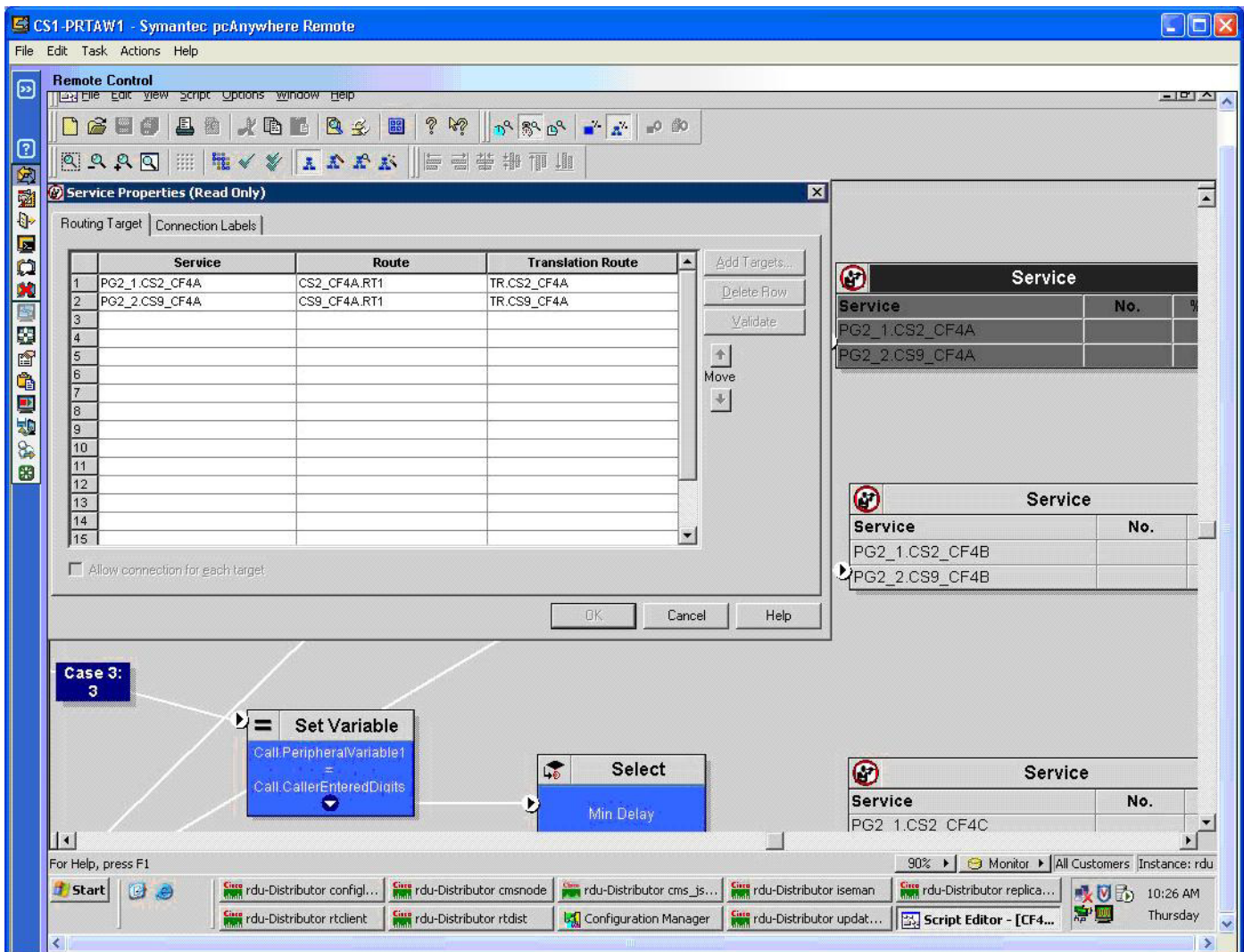
Figure 4-23 shows the following:

10. The parent Service uses a translation route for each child call flow to handle simultaneous incoming PSTN calls.

11. Each parent Service has a pool of ten translation route peripheral targets/labels (you can use the Translation Route Wizard to create this DNIS pool).

Figure 4-23   *Parent/Child Call Flow: Translation Route Explorer*
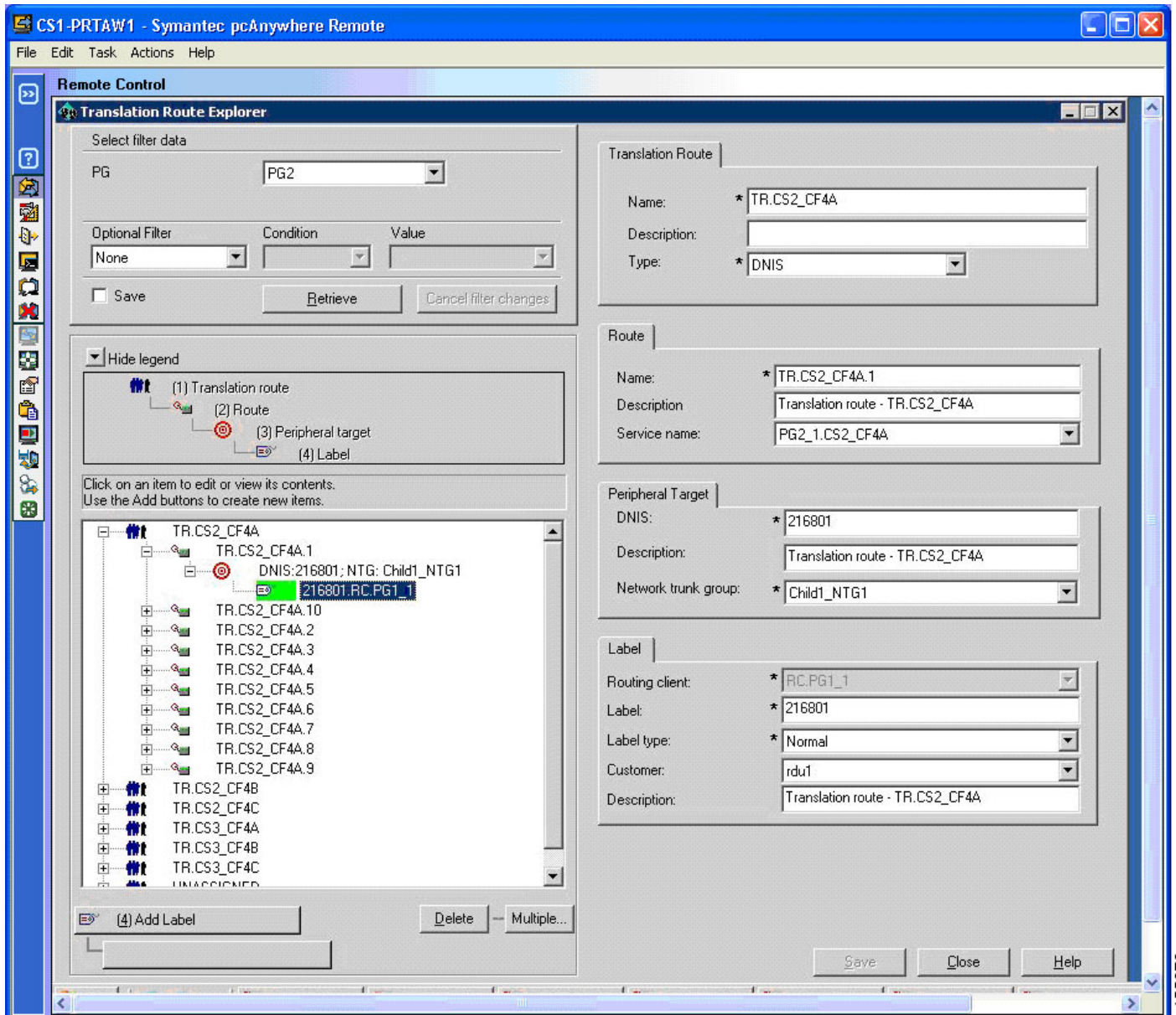
Figure 4-24 shows the following:

12. The Peripheral Target DNIS values are also configured on the child Dialed Number/Script Selector window with the "Permit application routing" checkbox enabled.

✎

Note   The parent Label Routing Client is the parent Unified CVP, which is PG1_1 in this example.

Figure 4-24   *Parent/Child Call Flow: Dialed Number Script Selector*
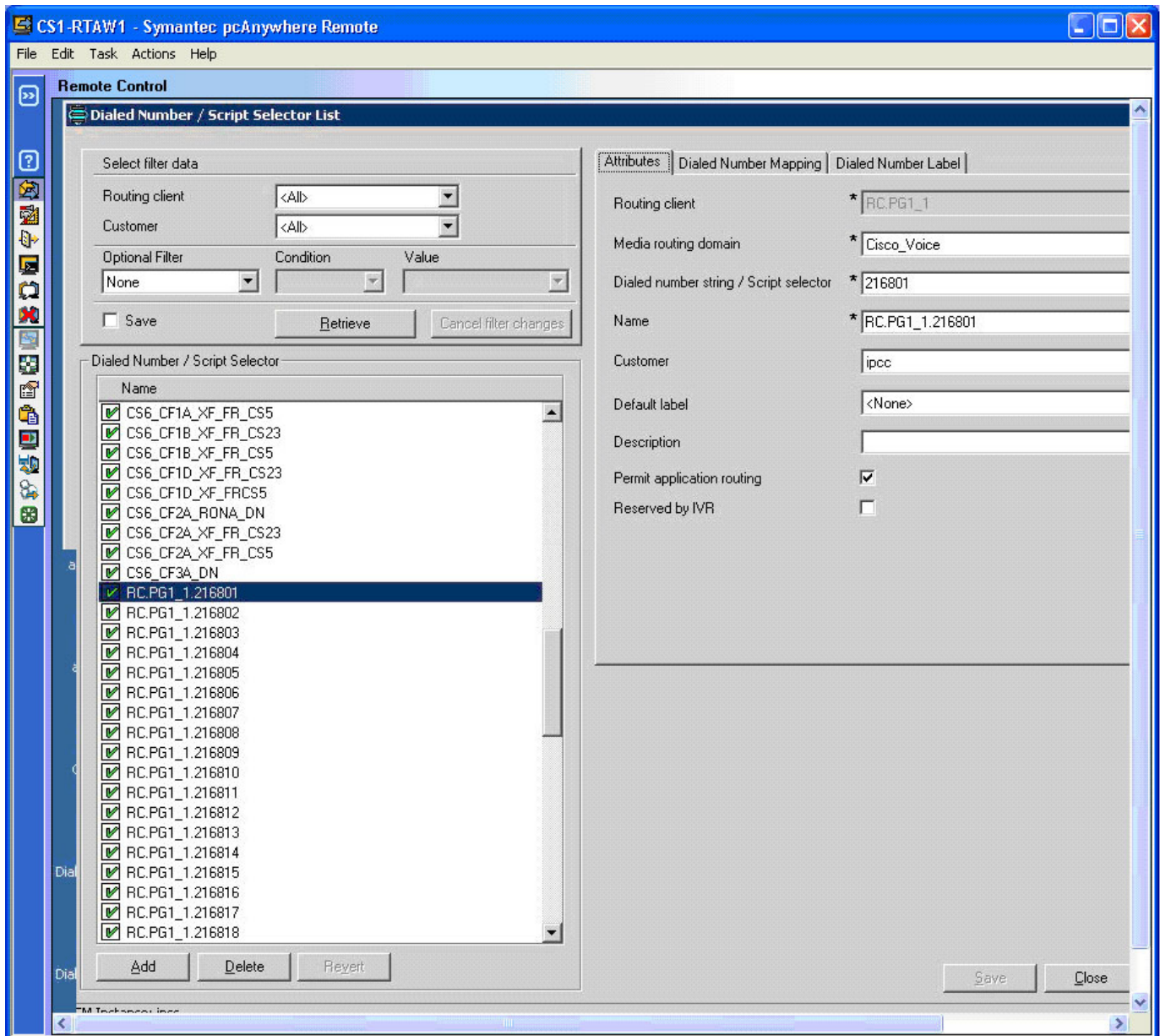
Child Call Flow #4 to Child Sites (Site2, Site3, and Site9)

Figure 4-25 shows call flow information for the two child systems.

- Child system 1 has six total scripts that correspond to the three different child call flows (one for each skill group). Three scripts are for Site2 (CS2) and three scripts are for Site3 (CS3)

- Child system 2 has three total scripts that correspond to the three different child call flows for Site9 (CS9). All child scripts are the same, except for the different skill groups.

13. Thus, after the PSTN caller enters the CED to select a Service from the parent system, the call is routed to the child Skill Group for that Service.

Figure 4-25   Parent/Child Call Flow: Child Sites Scripts
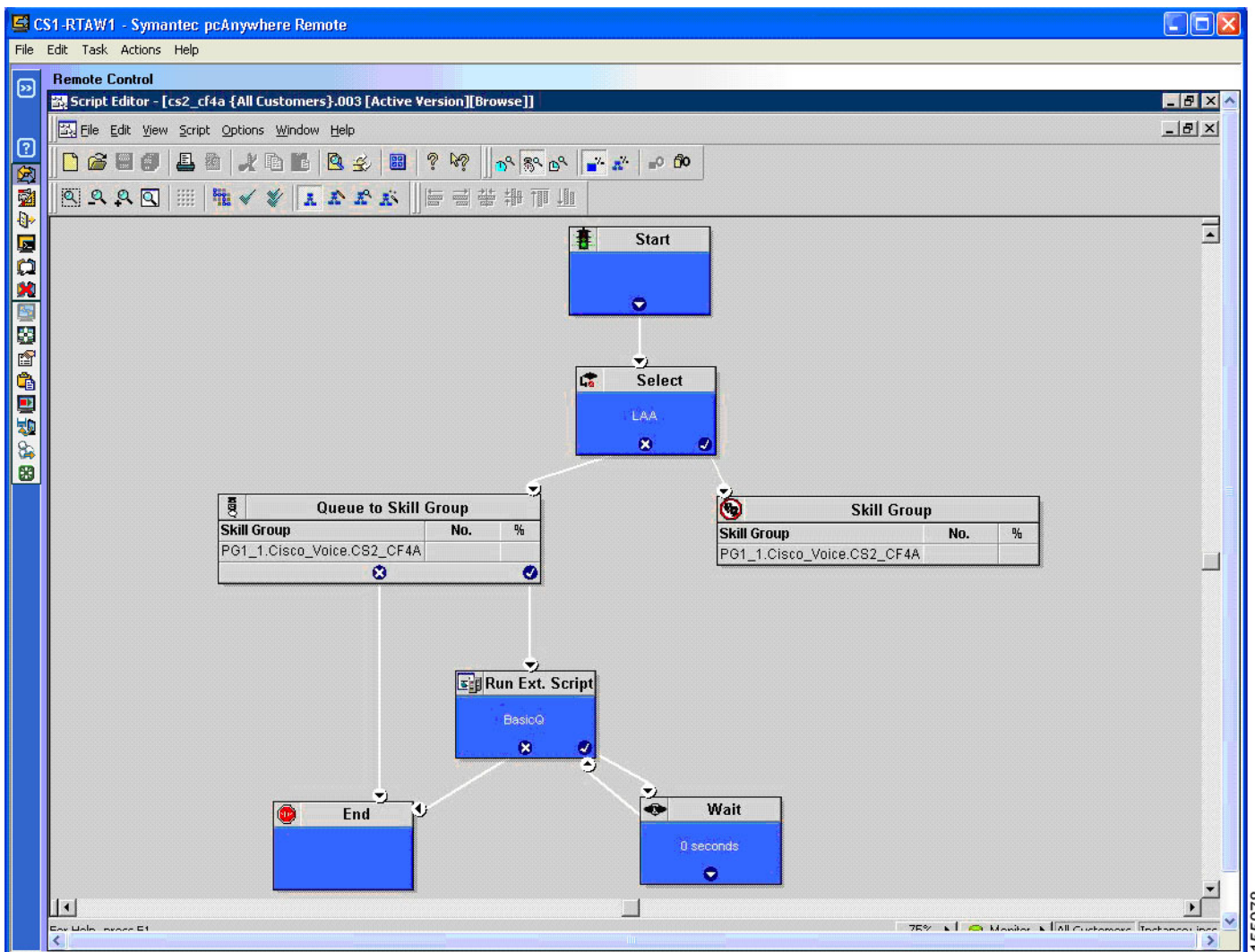
Figure 4-26 shows that the Queue to Skill Group node has the route as a Service.

Figure 4-26   *Parent/Child Call Flow: Queue to Skill Group Properties*

Figure 4-27 shows that in the case of Site9 (CS9) (Unified CCE with Unified SCCG), there are no Services; so the Queue to Skill Group node has the Route as a Skill Group.

Note   Remember to schedule the scripts via the Call Type Manager.
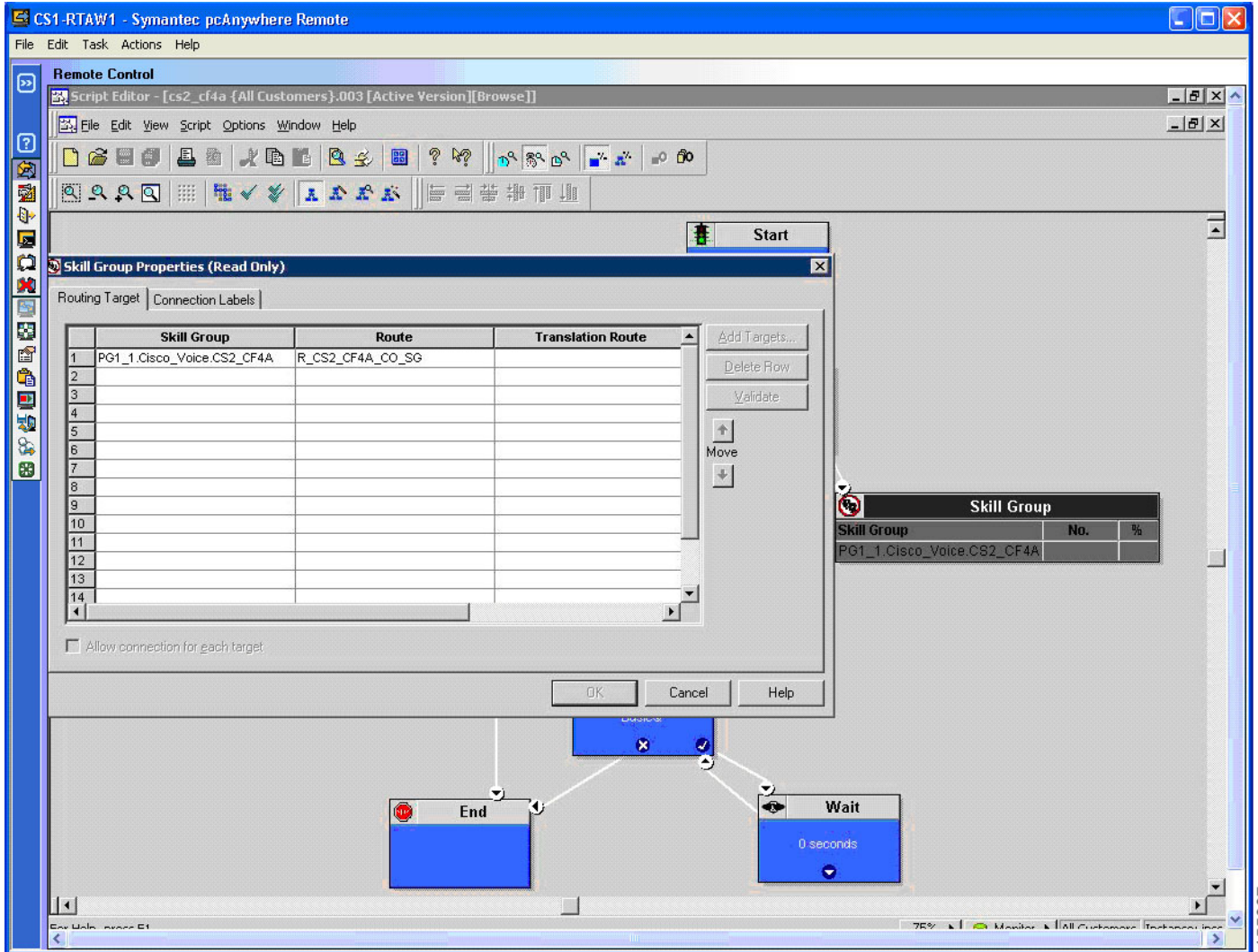
Figure 4-27   Parent/Child Call Flow: Child Site9 Queue to Skill Group Properties
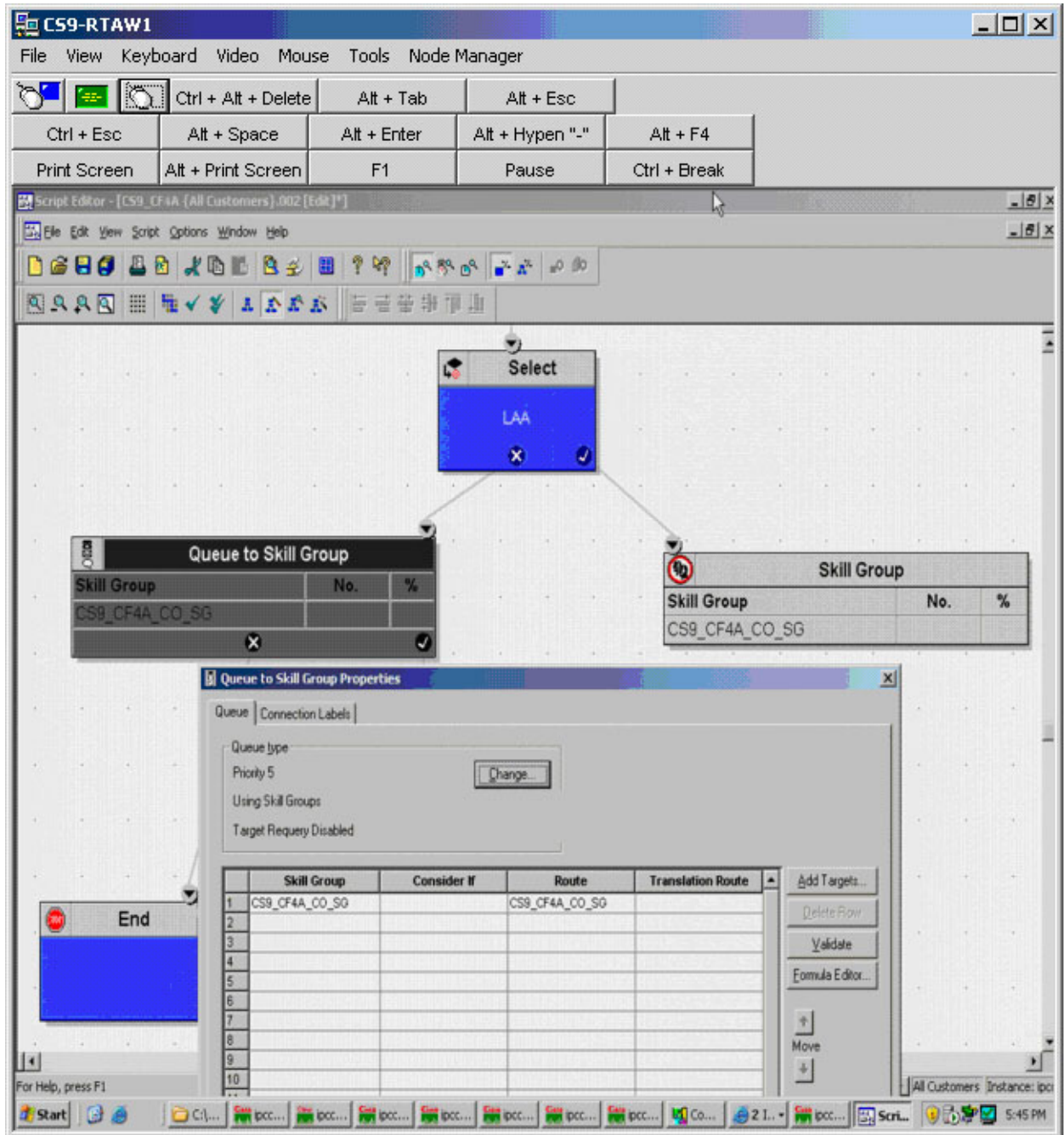
Figure 4-28 shows that the Skill Group node has a Route to Skill Group.

Figure 4-28   Parent/Child Call Flow: Skill Group Properties

Child Call Flow #4 for RONA

Figure 4-29 shows an example of the Reroute on No Answer (RONA) child script. Note the Route Select node has a route for each child Skill Group based on the CED variable that is passed from the parent to the child.

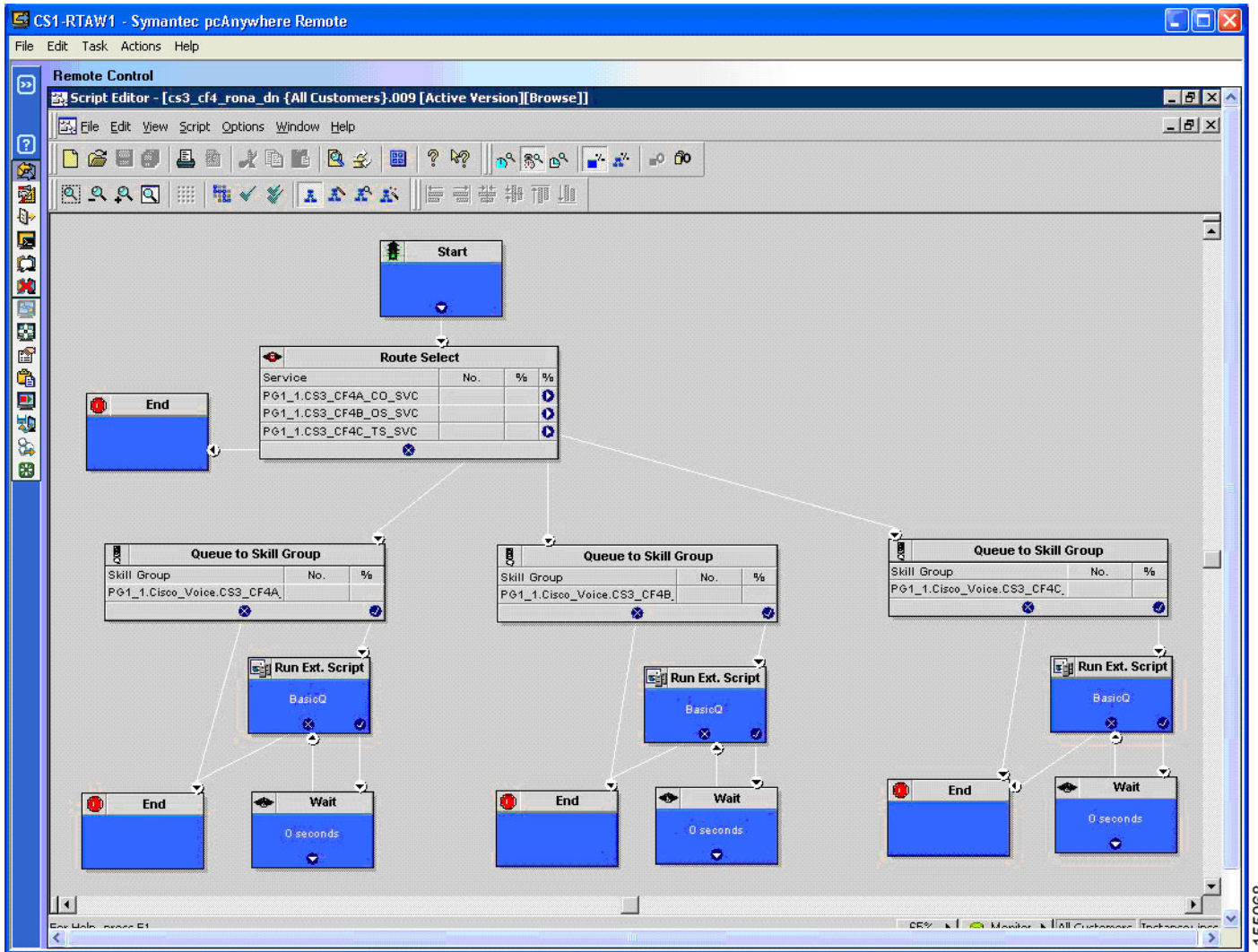*Figure 4-29   Parent/Child Call Flow: Child RONA Script*

Figure 4-30 depicts that the Route Select node has a route for each child Skill Group based on the CED variable that is passed from the parent to the child.

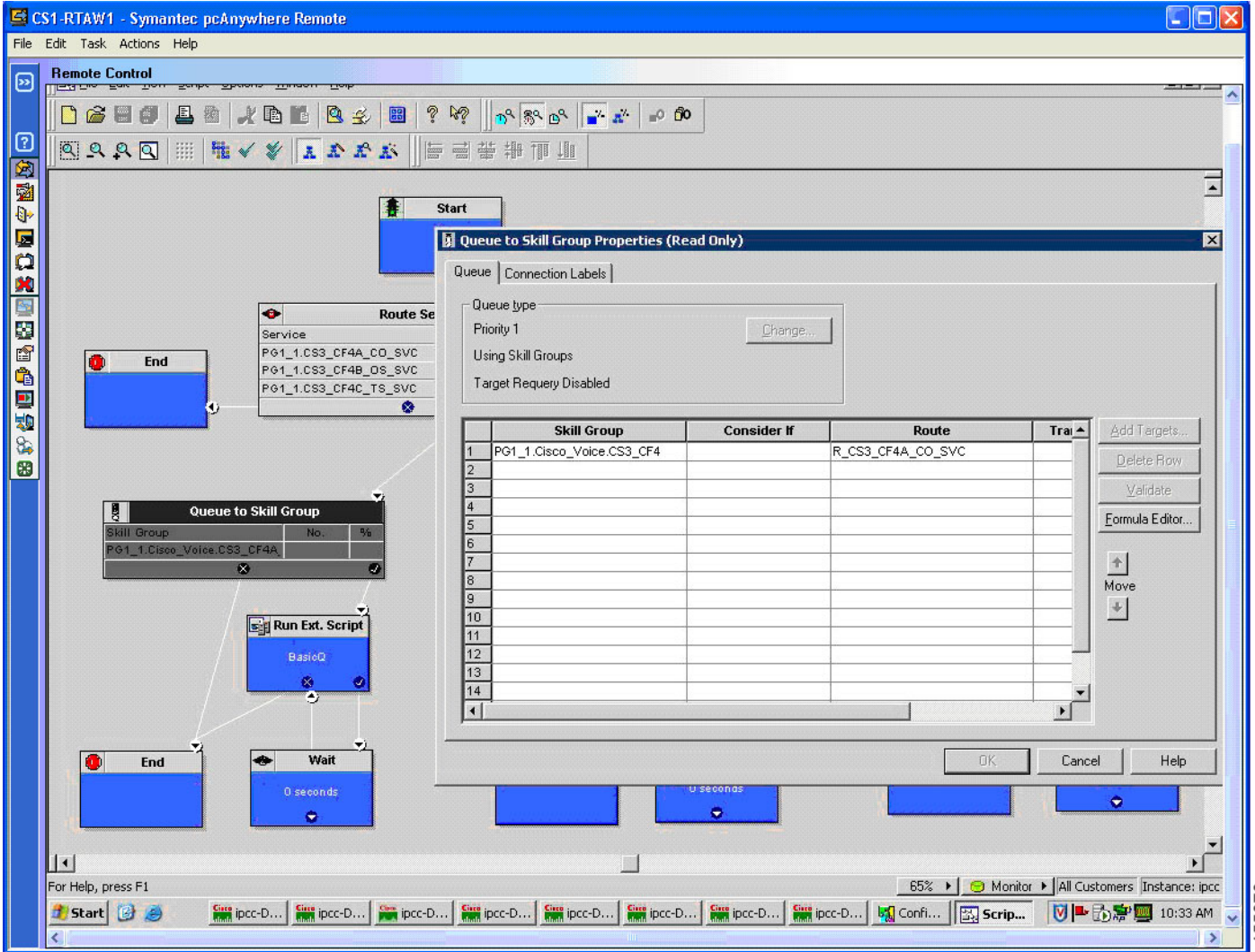*Figure 4-30*   *Parent/Child Call Flow: Route Select Properties*

Figure 4-31 shows that the Queue to Skill Group node has the route as a Service.

Figure 4-31   *Parent/Child Call Flow: Queue to Skill Group Properties*

Cisco Unified Outbound Dialer Call Flow

Overview

Cisco Unified Outbound Dialer (Unified OUTD) is a feature of Unified ICM that provides outbound dialing functionality along with existing inbound capabilities of the Unified ICM software. With Outbound Option, contact centers can be configured for automated outbound activities. Agents who are not busy handling inbound requests can perform outbound calls.

Call blending and predictive dialing offer a way to increase resource utilization and increase productivity in a contact center. Unified OUTD enables contact center managers in need of outbound campaign solutions to take advantage of the enterprise view that Unified ICM maintains over agent resources.

This section describes a sample Unified OUTD Post-Routed call flow that was tested and verified in this test environment.
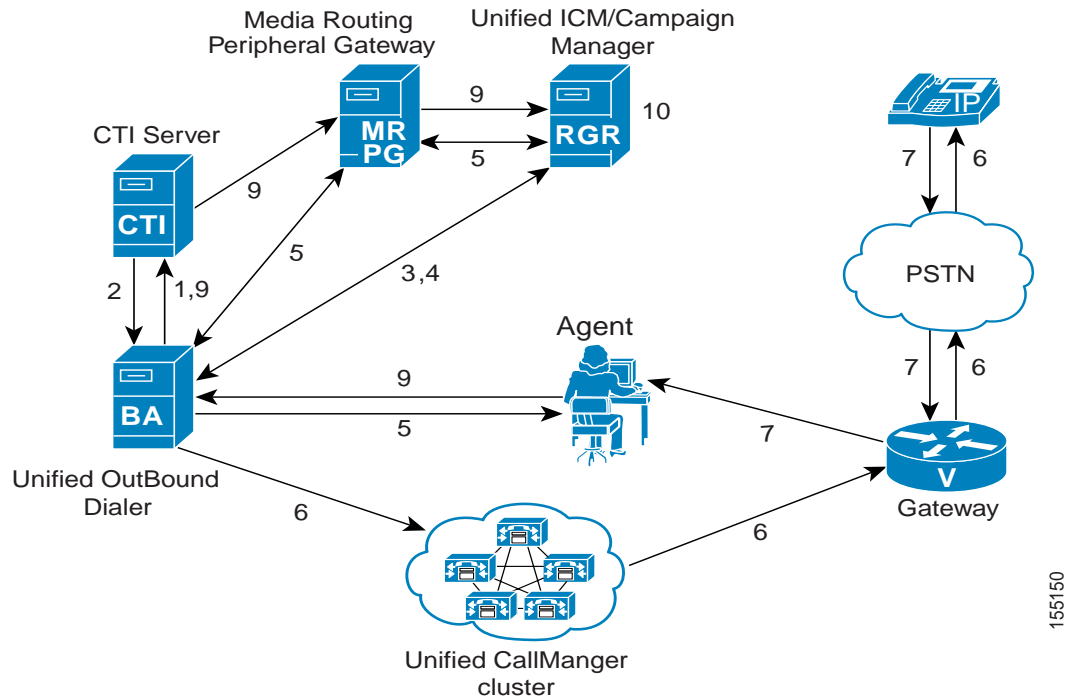
Description of Cisco Unified Outbound Dialer Call Flow

Mode: Predictive /Progressive/Preview/Direct Preview

1. Unified OUTD requests skill group statistics from the CTI Server.

2. The CTI Server returns skill statistics from the ACD/Unified CallManager.

3. Unified OUTD uses predictive logic to calculate the number of lines to dial and requests customer records from the Campaign Manager.

4. The Campaign Manager retrieves the required customers from its database and sends those customers to Unified OUTD.

5. Unified OUTD makes reservation requests via the MR PG interface. Once an agent is selected by the router, a physical reservation call is placed to continue to reserve the agent.

6. Once agents are reserved, Unified OUTD makes customer calls via a Cisco Voice Gateway. Call classification (that is, the result of the call: busy response, answering machine detection, etc.) is handled on Unified OUTD.

7. If a customer is contacted, they are transferred to an available agent within that skill group via the agent's call waiting line.

8. (Optional functionality provided by Cisco Client Services) When agents receive customer calls, they get an HTML-based script popup on their desktops, originating from Microsoft Active Server Pages which provides them with customer data.

9. After the customer call ends, a wrap-up code is sent to Unified OUTD which sends it to Unified ICM via the CTI Server and the MR PG.

10. The Campaign Manager then saves call disposition information in the Logger database.

Figure 4-32 is a graphical representation of the Unified OUTD call flow as described here:

Figure 4-32   Unified OUTD Call Flow (Call is Handled by Agents at Site6)

Cisco Unified Outbound Dialer Call Flow at Specific Sites

Please note that the site-specific information described below is not represented in the graphics in this section.

Sample Unified OUTD call flows are tested in both the two test beds:

- In the Unified IP IVR test bed (Test Bed 1), Unified OUTD calls are handled by a set of dedicated agents in Site6.
- In the Unified CVP test bed (Test Bed 2), Unified OUTD calls are handled by a set of dedicated agents in Site6.

Listed below is how the Unified OUTD call flow is handled in either test bed:

1. Customer records are imported at the (Site1/Site4 for Test Bed 1 and Site1/Site5 for Test Bed 2) Logger dynamically. A Dialing List is created.

2. During an active Campaign, the Unified OUTD at Site6 makes a reservation call to an agent dedicated to making outbound calls at Site6 via the MR PG.

3. The agent is set to a reserved state.

4. Unified OUTD dials out to a customer from the Dialing List via the Cisco Voice Gateway.

5. If the customer is contacted, Unified OUTD transfers the call to the reserved agent at Site6 within the Unified OUTD skill group.

6. After the customer call ends, call disposition information is saved in the Logger database.

Configuration of Components

In this section, we discuss the procedures for configuring the various components involved in handling the Unified OUTD call flow including:

- Unified ICM
- Unified CallManager

The following is a sequential list of high-level tasks for Unified OUTD configuration in a contact center environment:

1. Configure Unified ICM for Outbound Option.
2. Configure Unified CallManager for Outbound Option.
3. Configure routing and administration scripts.

> **Note**   For information on installing and configuring Unified OUTD, see "Installing and Configuring Cisco Outbound Option for IPCC Enterprise" in the *IPCC Installation and Configuration Guide for Cisco IPCC Enterprise Edition:*
> http://www.cisco.com/application/pdf/en/us/guest/products/ps1844/c1097/ccmigration_09186a00804d73b7.pdf

Cisco Unified Intelligent Contact Management Software Configuration

See Cisco Unified Intelligent Contact Management Software Configuration for a high-level sequential task list for Unified ICM configuration in a contact center environment.

Important Reminders

Please be aware of the following as you perform the Unified ICM software configuration tasks listed in Table 4-11.

- Associate Unified OUTD with the Unified CallManager PG or Unified SCCG and NOT with the MR PG.
- When defining the MR PG, make sure to use the same Network VRU that was defined when setting up the Cisco Unified CallManager Post-Routed Call Flow
- Export the defined range of Dialer ports into a file and then import the file into Unified CallManager using the Bulk Administration Tool (BAT).
- Since Unified OUTD uses Dialed Numbers to run routing scripts, ensure that the appropriate Dialed Numbers are created and associated with the MR PG.
- Match the Dialed Numbers configured using the Call Type List configuration Page with those entered during the Cisco Unified CallManager Configuration.
- Create an Admin script to assign a dialing mode to the outbound/blended skill groups.
- Create a Routing script to enable Unified OUTD to reserve agents.
- Make sure the dialing times specified in the Campaign configuration tool and System Options tool encompass the complete and actual dialing time period.
- When installing the AW and Logger, if you plan to deploy the Unified OUTD feature, enable Unified OUTD.

Configuration Tasks

Table 4-11 provides a list of tasks for configuring the Unified ICM Rogger at either of the test beds to handle and process the sample Unified OUTD call flow.

Table 4-11   ***Unified OUTD Call Flow: Unified ICM Configuration***

Using the...	Complete this Task...	In Order to...
PG Explorer:	1. Create an Unified CCE Peripheral Gateway.	Set it up as a consolidated or generic Unified CCE PG.
	2. Create a Media Routing Peripheral Gateway (MR PG).	Allow control of Unified OUTD for outbound calls. **Note** See Important Reminders.
Label List dialog box:	• Define the Labels for each routing client.	Enable the routing client to perform the correct routing for the labels returned by Unified ICM.
Device Target Explorer:	1. Configure all the Device Targets for this site.	Enable Unified ICM to locate the label that will route the call to an Unified CCE agent.
	2. Associate the Labels defined previously to the Device Targets for the corresponding routing clients.	Enable the routing clients to use the labels to route to the correct device targets.
Agent Desk Settings List dialog box:	• Configure the appropriate Agent Desk Settings for each Skill Group.	Assign common attributes such as RONA, Wrap Up Time, etc. for agents and also ensure that the outbound agents have outbound access.
Agent Explorer:	• Configure Agents and Supervisors for the site.	Define all the agents and supervisors located at this site.
Call Type List dialog box:	1. Configure the Call Types.	Identify and group outbound calls for routing script and reporting purposes.
	2. Specify Dialed Numbers.	Identify the dialed numbers that belong to each call type. **Note** See Important Reminders.
Dialed Number dialog box:	1. Configure the Dialed Numbers for making Reservation Calls.	Identify the phone numbers that can be used by the agents for making reservation calls. **Note** These dialed numbers are not CTI Route Points but actual outbound numbers.
	2. Associate the Dialed Numbers with the Call Types that were configured in the previous task.	Build the call types from the configured dialed numbers.

Table 4-11   Unified OUTD Call Flow: Unified ICM Configuration (continued)

Using the...	Complete this Task...	In Order to...
Skill Group Explorer:	1. Configure the Skill Groups.	Define different skill sets that exist in a call center, such as language skills, etc.
	2. Associate Agent IDS with them.	Associate agents with specific skill groups to receive Unified ICM-routed calls.
	3. Add a Route to each Skill Group that you configured.	Enable routing to each skill group via the Script Editor.
Service Explorer:	1. Configure a Service	Represent the type of processing that a caller requires as a "superset" of skill groups. Create the supersets by assigning various skill groups to them.
	2. Associate the Service that was configured to the appropriate Skill Groups defined in the previous task.	Assign specific services to the skill groups.
	3. Create a Route to the Service.	Provide access to the service for incoming calls.
	4. Reassociate the Skill Groups to the related Services.	Assign the same skill groups to the related services.
Unified OUTD Query Rule:	• Configure the Query Rules for the Outbound Option.	Define the parameters to choose a specific dialed number from the Import file.
Unified OUTD Import Rule:	• Configure the Import Rule information for the Outbound Option.	Define the actual Import file to be used.
Unified OUTD Systems Options:	• Configure the amount of time allocated to the Campaign.	Define the time parameters for a particular campaign.
Unified OUTD:	• Configure a range of ports for Agent Reservation calls and Customer calls.	Define a range of ports to be used for making outbound calls. **Note** See Important Reminders.
Unified OUTD Campaign:	1. Configure the general information and purpose of the Campaign.	Assign the unique name and description for the particular campaign.
	2. Associate a Query Rule and Skill Group for the Campaign.	Assign a specific query rule and skill group for the particular campaign.

Cisco Unified CallManager Configuration

See Cisco Unified CallManager Configuration section in the Cisco Unified CallManager Post-Routed Call Flow topic for a high-level sequential task list for Unified CallManager configuration in a contact center environment.

Important Reminders

Please be aware of the following as you perform the Unified CallManager configuration tasks listed in Table 4-12.

- Create the Unified OUTD ports on the Unified CallManager and assign them to the PG User.

- Ensure that you configure the Unified OUTD ports as Cisco 30 VIP phones.
- Enable the Call Waiting feature on the phones of agents who will use Unified OUTD.

Configuration Tasks

provides a list of tasks for configuring the Unified CallManagers at either of the test beds to handle and process the sample Unified OUTD call flow.

Table 4-12   Unified OUTD Call Flow: Unified CallManager Configuration

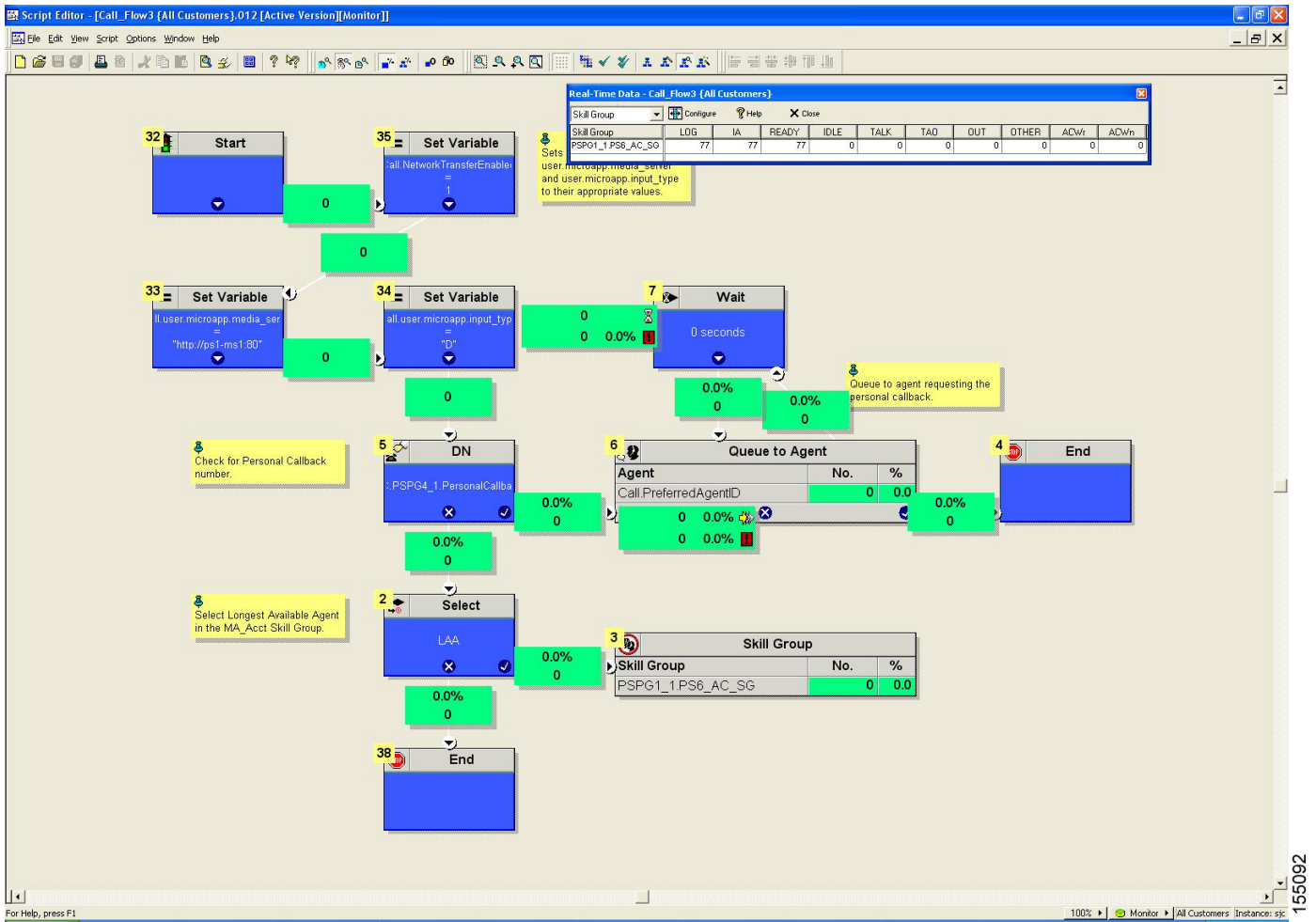| Using the...	Complete this Task...	In Order to....
Gateway Configuration page:	• Configure the Gateways.	Receive outbound calls from the PSTN and route them to Unified ICM. **Note**: Gateways are also used to place outbound calls from the IP enterprise to the PSTN network.
Route Group Configuration page:	• Associate the configured Gateways to the Route Group.	Enable the outbound call to exit the contact center via the correct gateways.
Route List Configuration page:	• Associate the Route Group to the Route List.	Create a list containing several route groups.
Route Pattern Configuration page:	• Create a Route Pattern and associate it with the Route List.	Define a route pattern to choose a specific route list that can be used for routing the call.
Phone Configuration page:	• Configure the Phones to be used by the Agents at this site.	Create a phone and define the phone type and device pool information.
Directory Number Configuration page:	• Assign Directory Numbers to the Agent Phones.	Specify an unique dialable phone number to each phone.
User Information page:	• Create a User.	Define a user to match the JTAPI user configured during Unified CallManager PG or Unified SCCG installation, as appropriate.
Device Association Configuration page:	• Associate Agent Hard Phones to the User you just created.	Provide the user with monitoring and control capabilities over the devices.

Cisco Unified Outbound Dialer Call Flow Screens

A strategic screen has been included to provide additional perspective for configuring Unified CCE components for the Unified OUTD call flow.

Cisco Unified Outbound Dialer Call Flow

Figure 4-33 shows the Unified OUTD call flow based on the business logic described in Chapter 1, "Test Case Studies".

Figure 4-33   *Unified OUTD Call Flow*