Cisco Internet Service Node (ISN) Configuration and Administration Guide

Internet Service Node (ISN) Release 2.0

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About This Guide

Purpose

This manual describes how to set up, run, and administer the Cisco Internet Service Node (ISN) product.

Audience

This document is intended for Call Center managers, ISN system managers, ICM/NAM system managers, VoIP technical experts, and IVR application developers. Readers of this manual should already have a general understanding of the NAM product, as discussed in the *Cisco Network Applications Manager (NAM) Product Description*. Readers should be familiar with general ICM installation and setup procedures.

Organization

The manual is divided into the following chapters.

Chapter	Description
Chapter 1, "Introduction to ISN"	Introduces the ISN components and how they interact with the NAM/ICM
Chapter 2, "Using NAM/ICM with the ISN IVR Solution"	Discusses NAM/ICM configuration and script editing
Chapter 3, "Prompt Recording and Distribution"	Provides information about ISN media file handling and details about the system media files distributed with ISN Version 2.0.
Chapter 4, "Voice Browser Administration"	Gives an overview of the ISN Voice Browser and instructions for using the VB Admin tool and commands.
Chapter 5, "Application Server Administration"	Provides an overview of the ISN Application Server and instructions for using the Application Administrator tool.

Chapter	Description
Chapter 6, "Node Manager and ICM Service Control"	Describes how ISN uses ICM Node Manager and ICM Service Control.
Chapter 7, "Alarm Handling and Logging"	Gives an overview of the Standalone Distributed Diagnostics and Services Network (SDDSN) and introduces ISN logging and error reporting.
Chapter 8, "VoIP Configuration"	Describes inbound and outbound routing.
Appendix A, "Troubleshooting"	Provides troubleshooting information for the ISN and the Cisco products it interacts with.
Appendix B, "Transferring and Queuing Calls with ISN"	Contains additional information about transferring and queuing calls with ISN.
Appendix C, "ISN Deployment"	Provides background information and check-off lists for the various deployment options available for ISN.
Appendix D, "Configuring Cisco Content Services Switch (CSS) for Use with ISN"	Outlines the general approach and configuration specifics for using Cisco Content Services Switch with ISN deployments.

Conventions

This manual uses the following conventions:

Format	Example
Boldface type is used for user entries, keys, buttons, and folder and submenu names.	Choose **Script > Call Type Manager**.
Italic type indicates one of the following: • A newly introduced term • For emphasis • A generic syntax item that you must replace with a specific value • A title of a publication	• A *skill group* is a collection of agents who share similar skills. • *Do not* use the numerical naming convention that is used in the predefined templates (for example, **persvc01**). • IF (*condition*, *true-value*, *false-value*) • For more information, see the *Cisco ICM Software Database Schema Handbook*.
An arrow (>) indicates an item from a pull-down menu.	The Save command from the File menu is referenced as **File > Save**.

Other Publications

For additional information about Cisco Intelligent Contact Management (ICM) software, see the Cisco web site listing ICM documentation.

Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

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

You can access the Cisco website at this URL:

http://www.cisco.com

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

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We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com, which includes the Cisco Technical Assistance Center (TAC) Website, as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from the Cisco TAC website. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC website, including TAC tools and utilities.

Cisco.com

Cisco.com offers a suite of interactive, networked services that let you access Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

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Technical Assistance Center

The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC website and the Cisco TAC Escalation Center. The avenue of support that you choose depends on the priority of the problem and the conditions stated in service contracts, when applicable.

We categorize Cisco TAC inquiries according to urgency:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Cisco TAC Website

You can use the Cisco TAC website to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC website, go to this URL:

http://www.cisco.com/tac

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC website. Some services on the Cisco TAC website require a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

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

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC website, you can open a case online at this URL:

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

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC website so that you can describe the situation in your own words and attach any necessary files.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

Obtaining Additional Publications and Information

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

- The *Cisco Product Catalog* describes the networking products offered by Cisco Systems as well as ordering and customer support services. Access the *Cisco Product Catalog* at this URL:

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

- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: *Internetworking Terms and Acronyms Dictionary, Internetworking Technology Handbook, Internetworking Troubleshooting Guide,* and the *Internetworking Design Guide.* For current Cisco Press titles and other information, go to Cisco Press online at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco monthly periodical that provides industry professionals with the latest information about the field of networking. You can access *Packet* magazine at this URL:

  http://www.cisco.com/en/US/about/ac123/ac114/about_cisco_packet_magazine.html

- *iQ Magazine* is the Cisco monthly periodical that provides business leaders and decision makers with the latest information about the networking industry. You can access *iQ Magazine* at this URL:

  http://business.cisco.com/prod/tree.taf%3fasset_id=44699&public_view=true&kbns=1.html

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

  http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html

- Training—Cisco offers world-class networking training, with current offerings in network training listed at this URL:

  http://www.cisco.com/en/US/learning/le31/learning_recommended_training_list.html

Introduction to ISN

This chapter introduces the ISN components and how they interact with the NAM/ICM. It includes:

- A brief overview of the ISN and its IVR functional models.
- A Sample ICM Script.
- A description of how NAM/ICM and the ISN exchange information.

Note This chapter contains important information for IVR application developers. It also may be of interest to Call Center Managers, ISN System Managers, and ICM/NAM System Managers.

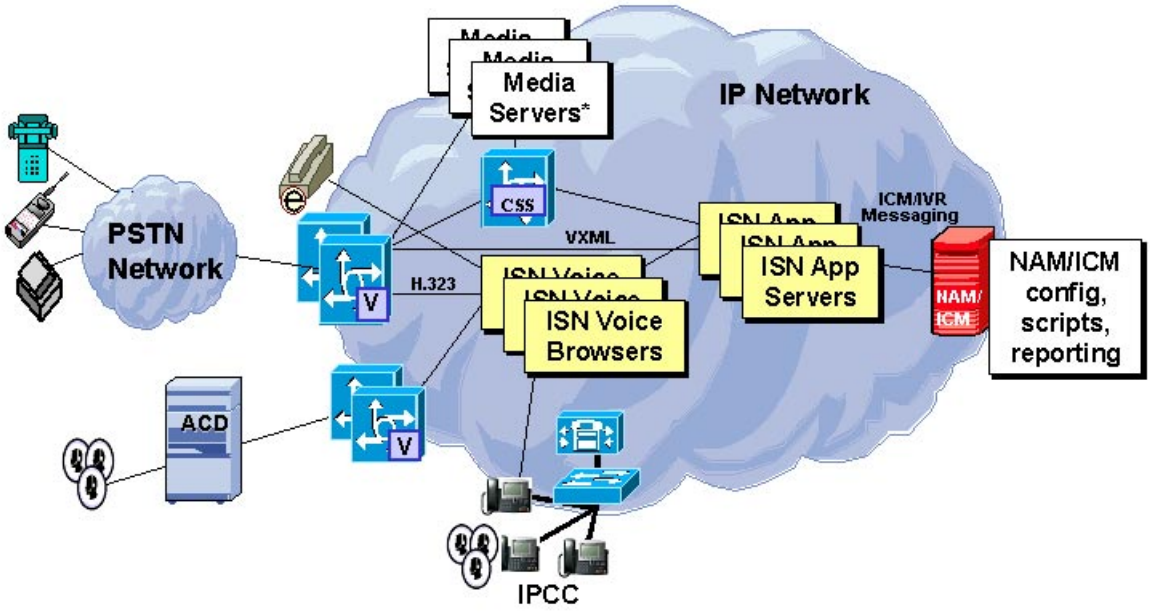
ISN: A Brief Overview

The Cisco *Internet Service Node* (ISN) is an Internet Protocol (IP)-capable Interactive Voice Response (IVR) platform.

Figure 1-1 shows a Voice Over IP (VoIP) ISN system. The ISN components—centered in the "cloud"—consist of the following:

- **Application Server**. A Web Server application which interprets messages from the Cisco ICM software and generates VXML documents that it uses to communicate with the Voice Browser. (For more information about the Application Server, see Chapter 5, "Application Server Administration.")
- **Voice Browser**. Processes PSTN and IP telephone calls, converts the voice signals into events for processing by the Application Server, and acts upon VXML commands received from the Application Server. (For more information about the Voice Browser, see Chapter 4, "Voice Browser Administration.")
- **Media Server**. An off-the-shelf component—or set of components— which administers the media files that contain messages and prompts callers will hear. The Media Server uses standard Web access methods. (For more information about the Media Server, see Chapter 3, "Prompt Recording and Distribution.")

Figure 1-1 A VoIP ISN-based System



*Media Servers: ASR, TTS, HTTP (prerecorded prompts)

Note For a complete description of ISN Version 2.0 feature set, including examples of different call handling scenarios, see the *Cisco Internet Service Node (ISN) Product Description*.

The Cisco *Network Application Manager* (NAM)/*Intelligent Contact Management* (ICM) software uses ICM/IVR messaging technology to direct the ISN's actions and to receive the ISN's responses. The NAM/ICM software and ISN work together to perform such tasks as:

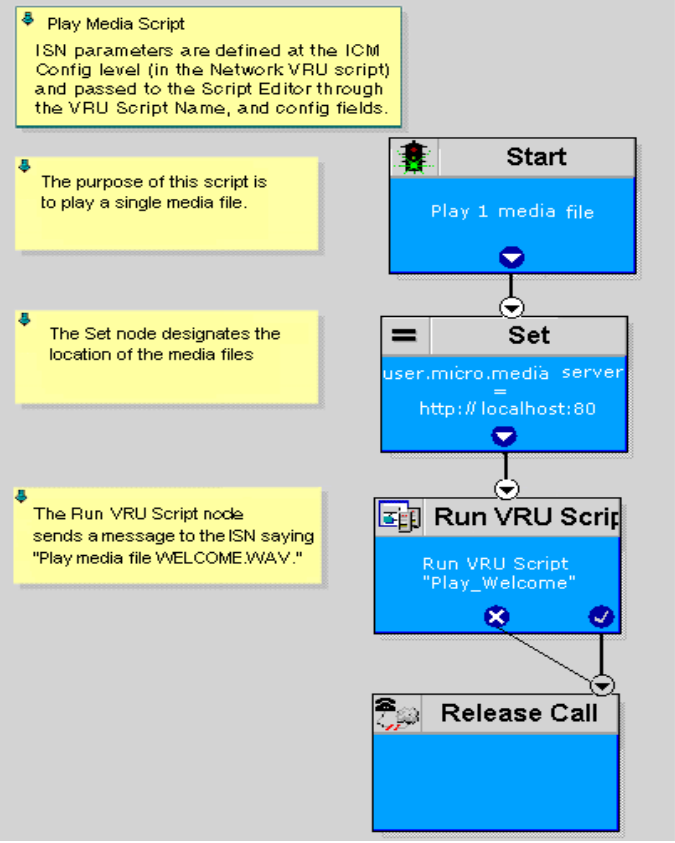
- Playing media—such as a recording stating office hours—to a caller.
- Retrieving caller-entered data, DTMF, or speech.
- Playing back different types of data—such as an account number or balance—to a caller.
- Moving calls to other destinations—for example, forwarding to an agent.

These tasks are driven by instructions that are sent to the ISN from the NAM/ICM.

Example: "Welcome to XYZ Corporation"

Suppose you want to create an ISN script that simply plays a message, "Welcome to XYZ Corporation." From the NAM/ICM's perspective, there is no difference between a script written for a standard "black box" IVR or the ISN, so you can create a script such as the one shown in Figure 1-2.

Figure 1-2 Play Welcome Script



This simple script performs three functions:

- Sends the Run VRU Script request to the ISN.
- Indicates the location of the "Welcome" media file.
- Releases the call.

Note In a "real life" application, any ISN script you create should include error checking to ensure that micro-applications instructions are properly executed. To see examples of more elaborate scripts, turn to Appendix B, "Transferring and Queuing Calls with ISN."

However, there is one important difference between a script written for the ISN and one written for a "black box" IVR: *ISN micro-applications*.

What are Micro-Applications?

Micro-applications are a set of specific IVR functions in the ISN that can be invoked by the ICM software, enabling communication with the caller. There are five ISN micro-applications:

- **Play Media**. Plays a message (.wav file) to the caller.
- **Play Data**. Retrieves data from a storage area and plays it to the caller in a specific format called a *data play back type*.
- **Get Digits**. Plays a media file and retrieves digits from the caller.
- **Menu**. Plays a menu media file and retrieves a single telephone keypad entry from the caller.
- **Get Speech**. Collects ASR or DTMF input after prompting a caller.

Note Each of these micro-applications are described in detail in Chapter 2, "Using NAM/ICM with the ISN IVR Solution."

Micro-applications reside on the ISN's Application Server.The Application Server takes information in the messages sent by the NAM/ICM, interprets it using the micro-applications, and generates VXML code that it sends to the Voice Browser for processing.

Micro-applications also accept HTTP requests from the Voice Browser that the Application Server then processes and sends back to the NAM/ICM using ICM/IVR Service Control tool.

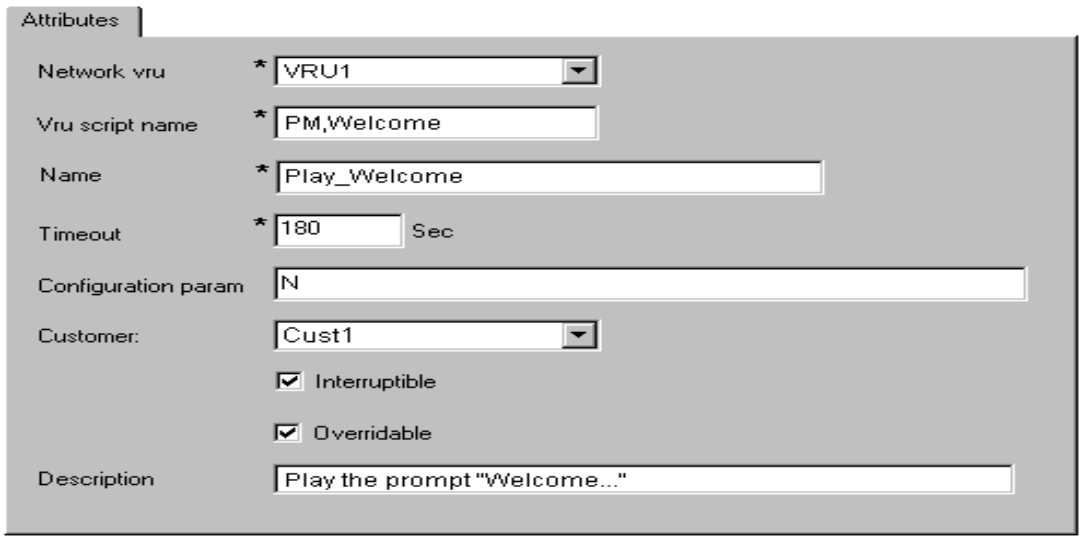
The ICM/ISN Micro-Application Connection

Before the ISN IVR solution can be accessible through the Script Editor's Run VRU Script node, you must first set up the NAM/ICM software with special ISN parameters using the ICM Configuration Manager tool.

Your first step would be to use the ICM Configuration Manager's Network VRU Script window to define the ISN parameters. Figure 1-3 shows a Network VRU Script tool's Attribute tab set up to send the following information to the ISN:

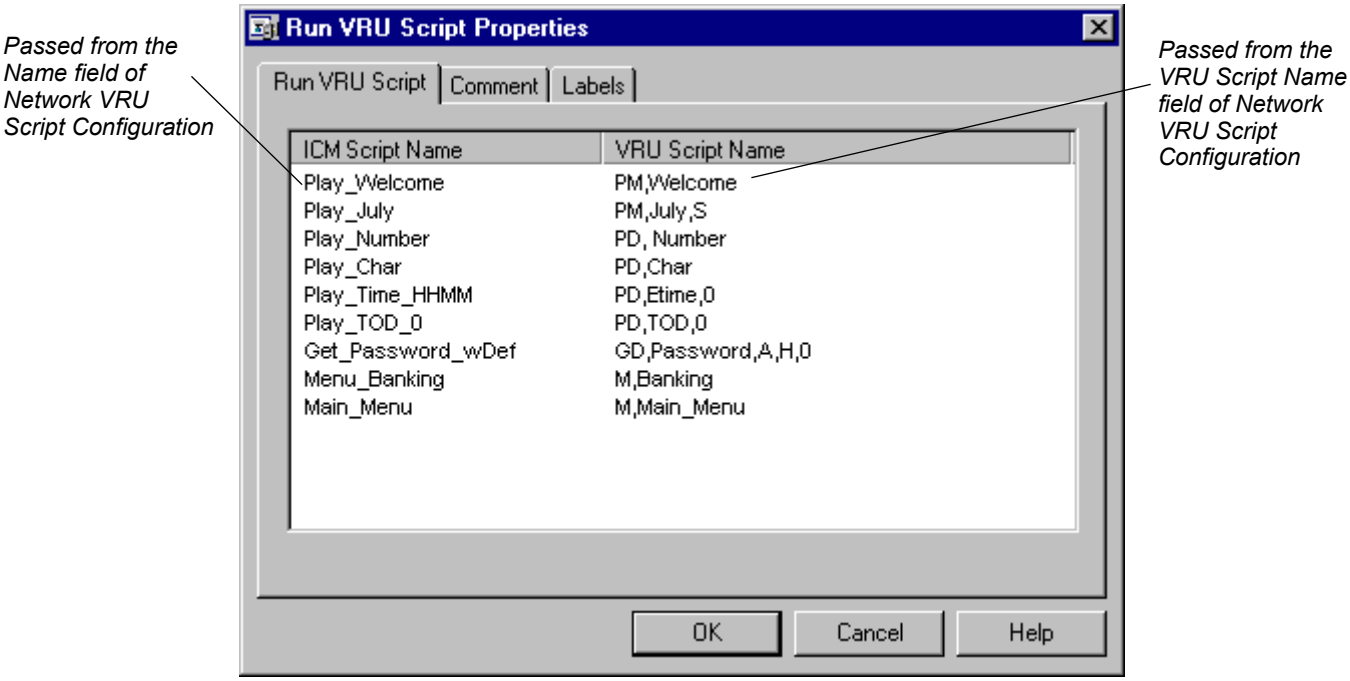
- **PM,Welcome**. (VRU Script Name field.) This means: "Use the instructions in the **Play Media** micro-application to play the **Welcome.wav** media file."
- **N**. (Configuration Param field.) This means: "Do not allow barge-in." (*Barge-in* is when the caller can interrupt message play by entering a digit, causing the script to move to the next prompt.) Defaults are used for all other settings in the VRU Script Name and Configuration Param fields.

Figure 1-3 Network VRU Script settings for Play Welcome



Once the ICM Configuration Manager's settings have been saved, the information is available to the Script Editor. When you place a Run VRU Script node in the Script Editor workspace and open the Properties dialog box, it displays all the script names defined in the system.

Figure 1-4 Run VRU Script Properties



The Run VRU Script node in Figure 1-2 shows that the ICM Script Name **Play_Welcome** was selected.

Information Exchange Between NAM/ICM and ISN

When a NAM/ICM processes a Run VRU Script node, *parameters* are sent to the ISN. These parameters contain instructions about how to interact with a caller, such as:

- What micro-application to use.
- The location of the media files to be played to the caller.
- Timeout settings that should be used during caller digit entry.

Some IVR parameters are passed to the ISN through Expanded Call Context (ECC) variables, described in Chapter 2, "Using NAM/ICM with the ISN IVR Solution." Other parameters are sent in the normal VRU messaging interface (ICM/IVR Service Control Interface).

NAM/ICM Data Handling

In defining scripts, you might specify strings, numbers, or formulas to be sent to the ISN. When passing numbers to the ISN, you should always put quotes around them so that they will be processed as a string. This is especially important if:

- Leading 0's are significant to the data type (times, character), enter the number as a quoted string (example: "031524").
- Trailing 0's after a decimal point are significant to the data type (number, character, currency), enter the number as a quoted string (examples: "42.00" or "42.10").
- The number is very large (example: a number normally expressed through exponential notation).

ISN Error Checking

The ISN uses the **user.microapp.error_code** ECC variable to return information regarding problems encountered while running a script.

ISN tests for the following conditions:

- **Network Error**. Failure of an IP network connection.
- **System Error**. Unexpected failure of an ISN component.
- **Unknown micro-application**. Micro-application name passed from the ICM to the Application Server did not exist on the Application Server.
- **Invalid VRU Script Name format**. VRU Script Name data passed from the ICM to the Application Server does not contain the expected components (micro-application name, media file name, media file type, uniqueness value).
- **Invalid Configuration Param**. Data passed from the ICM to the Application Server is not consistent with what the micro-application requires for processing.
- **Misconfigured ECC variable**. An ECC variable was set to a value the Application Server did not recognize. ECC variable definitions must be the same in ICM and ISN.
- **Unavailable Media file.** Media file name passed from the ICM to the Application Server did not exist on the Media Server.
- **Unsupported VXML format**. The VXML Interpreter (that is, Gateway, Voice Browser, or ASR/TTS Engine) did not recognize a VXML format passed from the Application Server.

- **Unsupported VXML element**. The VXML Interpreter (that is, Gateway, Voice Browser, or ASR/TTS Engine) did not recognize a VXML element passed from the Application Server.
- **Invalid variable data**. The variable data passed was not valid for the script type being processed.
- **Reached Maximum Invalid Tries**. Caller was unsuccessful in entering digits during each of the tries allowed by the micro-application. (Only applies to Get Digits, Menu, and Get Speech micro-applications.)
- **Reached Maximum Number Entry Tries**. Caller did not enter digits in response to the prompt for each of the tries allowed by the micro-application. (Only applies to Get Digits and Get Speech micro-applications.)
- **Timed Out**. Caller did not enter digits in response to the prompt in the time allowed by the micro-application.
- **Unsupported locale**. The VXML Interpreter (that is, Gateway, Voice Browser, or ASR/TTS Engine) did not recognize the locale passed from the Application Server.

Note Each ISN micro-application has individualized settings for **user.microapp.error_code.** For more information, see Chapter 2, "Using NAM/ICM with the ISN IVR Solution."

Where to Next?

To get started using the ISN, turn toChapter 2, "Using NAM/ICM with the ISN IVR Solution."

Using NAM/ICM with the ISN IVR Solution

This chapter discusses using NAM/ICM configuration and script editing to access the ISN IVR solution. It includes information about how to:

- Set up the NAM/ICM to interact with the ISN
- Write applications for the ISN

Note This chapter contains important information for IVR application developers. It also may be of interest to Call Center Managers, ISN System Managers, and ICM/NAM System Managers.

Before You Begin

The information in this chapter assumes that you are already familiar with using the NAM/ICM software ICM Configuration Manager and Script Editor tools for call center operations and management.

Tips You should have a copy of the following Cisco ICM software documentation available in *addition* to this manual in order to successfully configure ICM software and use its features in conjunction with ISN: *Cisco ICM Software Configuration Guide* and *Cisco ICM Software Script Editor Guide*.

NAM/ICM Setup

Before you can use NAM/ICM features to access the ISN IVR solution, you must perform some initial setup tasks to enable communication between NAM/ICM and ISN. These setup tasks are determined by ISN deployment model; see Appendix C, "ISN Deployment" for complete setup instructions for each model.

Note For more information about the supported ISN deployment models, see the *Cisco Internet Service Node (ISN) Product Description*.

Writing NAM/ICM Applications for the ISN

Once NAM/ICM-to-ISN initial setup is complete, you can create NAM/ICM applications to access ISN micro-applications. You do this using two ICM software tools:

- Configuration Manager
- Script Editor

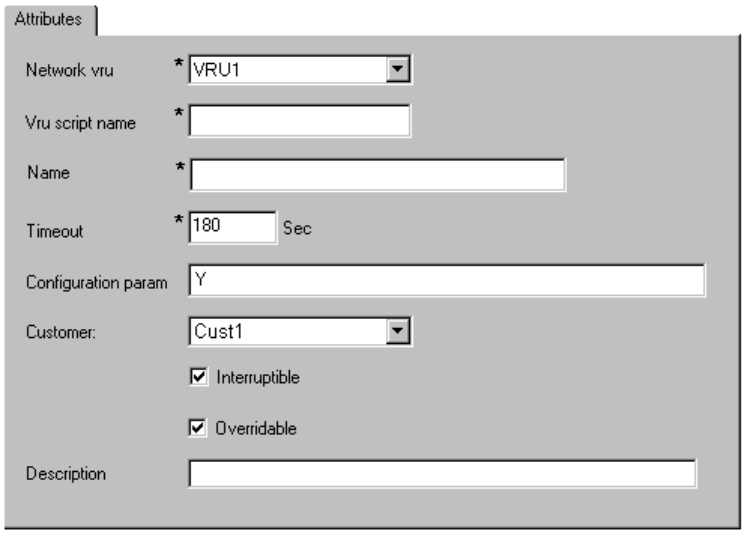
The sections that follow give a brief overview of how to use these tools to access ISN functionality.

How to configure an ISN Network VRU script

Step 1 Within the ICM Configuration Manager, select **Tools > List Tools > Network VRU Script List**.

Step 2 In the Network VRU Script List window, enable the **Add** button by clicking **Retrieve**.

Step 3 Click **Add**. The Attributes property tab is enabled.



Step 4 Complete the Attributes tab as described below.

Caution The format of the strings for the **VRU Script Name** and **Configuration Param** fields are *very specific* and vary for different micro-applications (Play Media, Play Data, Get Digits, Menu, and Get Speech.)

- **Network VRU**. (Drop-down list.) The name of the Network VRU to be associated with the Network VRU script.
- **VRU Script Name**. A **39-character**, comma-delimited string used by the ISN to pass the following parameters to the Application Server:
  - **Micro-application**. The script type. Valid options: PM (Play Media), PD (Play Data), GD (Get Digits), M (Menu), or GS (Get Speech).
  - **Media File Name**. (For PM, GD, M, and GS micro-applications.) Name of the media file to be played or external (customer-defined) VXML to be loaded. Valid options: the name of the file or *null* (that is, nothing is inserted between two of the delimiting commas).

Note A *null* setting (,,) causes the ISN to examine the contents of the **user.microapp.inline_tts** ECC variable. If this ECC variable contains a value, the ISN prompts using TTS. If this ECC variable is empty, no prompt is played.

- **Media Library Type**. (For PM, GD, M, and GS micro-applications.) Flag indicating the location of the media files to be played. Valid options: **A** (Application, the default) and **S** (System).

Note PM has an additional valid option: **V** (external VXML).

- **Data Playback Type**. (For PD, only.) The kind of the data to be returned ("played") to the caller. Valid options: **Number**, **Char** (Character), **Etime** (Elapsed Time), **TOD** (Time of Day), **24TOD** (24-hour Time of Day), **DOW** (Day of Week), **Date**, **Currency**.
- **Uniqueness value**. (Optional.) A string identifying a VRU Script Name as unique.

Note This value is useful for organizing ISN VRU Script Names. For instance, you might want to create two Get_Password scripts with identical VRU Script Name parameters but different Configuration Params. The VRU Script Name field setting for one could be: *GD,Password,A,**short*** and the other could be: *GD,Password,A,**1ong***.

Examples are given in Table 2-2, Table 2-4, Table 2-7, Table 2-10, and Table 2-13.

- **Name**. A unique name for the VRU script. ICM software generates a name based on the Network VRU and script names.
- **Timeout**. The number of seconds ICM software should wait for a response after invoking the script. If ICM software does not receive a response from the VRU within this time, it assumes the ISN script has failed.

Caution This setting is designed to detect VRU failures *only*; attempting to use it as a technique for interrupting script processing can lead to unexpected results. Cisco recommends leaving the 180-second default, or lengthening the setting to a duration that is longer than the longest time the script is expected to take

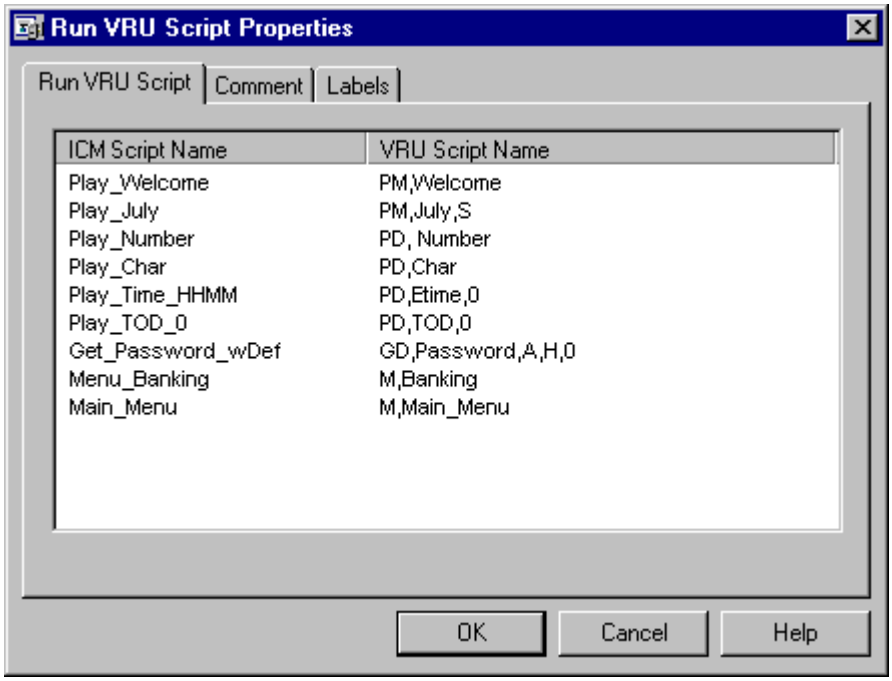
- **Configuration Param**. A string used by the ISN to pass additional parameters to the Application Server. Content of string depends on the micro-application to be accessed. For more information on what to specify in this field, see:
  - "Play Media (PM) Micro-Application" section on page 2-7.
  - "Play Data (PD) Micro-Application" section on page 2-12.
  - "Get Digits (GD) Micro-Application" section on page 2-22.
  - "Menu (M) Micro-Application" section on page 2-31.
  - "Get Speech (GS) Micro-Application" section on page 2-39.
- **Description**. Any additional information about the script.
- **Customer**. (Optional.) A customer associated with the script. For Service Provider solutions, this field is mandatory, due to multiple tenancy solutions (customer-specific data needs to be separated).
- **Interruptible**. (Checkbox.) Whether ICM software can interrupt the script (for example, if a routing target becomes available). Options: Y or N.

- **Overridable**. (Checkbox.) Indicates whether the script can override its own Interruptible attribute. Options: Y or N. [*Not applicable for ISN.*]

Step 5 When finished, click **Save** to apply your changes.

How to specify a Run VRU Script node that accesses an ISN micro-application

Step 1 Within Script Editor, place the **Run VRU Script** object in the workspace, right-click, and open the Properties dialog box.



The Run VRU Script Properties dialog box lists all Network VRU scripts currently configured.

Note The ICM Script Name column reflects the values defined through the Name field in ICM Configuration Manager's Network VRU Script List tool.

Step 2 Select the **ICM Script/VRU Script Name** you want to execute.

Step 3 Optionally, modify the Comments tab.

Step 4 Optionally, modify the Labels tab.

Step 5 When finished, click **OK** to submit the changes and close the dialog box.

ISN Micro-Applications

Note Different Voice Browsers use various parameters differently. This affects how third-party Voice Browsers interact with the ISN micro-applications. For example, although ISN allows timeout parameters to be set to a value in the range of 1 to 99 seconds, a particular Voice Browser only supports a range of 1 to 32 seconds. Another Voice Browser requires a "#" to indicate that digits should be collected before the inter-digit timeout is reached. **Be sure to follow the instructions provided by your third-party vendor.** Also, be sure to test all of your micro-applications before deploying them.

The sections that follow describe the parameters that can be defined through ICM Configuration Manager for each of the five ISN micro-applications.

Keep the following in mind as you configure each Network VRU Script to be used with the ISN:

- Each micro-application *parameter* in fields of the Network VRU Script List's Attributes tab *must* be separated by a comma.
- If a parameter value is not specified, the micro-application uses its default.

Each section concludes with sample ICM Configuration Manager and Script Editor screen captures for the micro-application.

Note For detailed examples of ISN IVR scripts, turn to Appendix B, "Transferring and Queuing Calls with ISN."

How micro-applications use Automatic Speech Recognition (ASR) and Text-to-Speech (TTS)

ISN micro-applications can use ASR in three ways:

- To recognize digits with the Get Digits and Menu micro-applications. The **user.microapp.input_type** ECC variable specifies the collection type. The script writer uses this variable in a Script Editor Set node to allow the caller to input DTMF only (**D**) or both DTMF and Voice (**B**, the default). Regardless of the value of **user.microapp.input_type**, the recognized digit(s) are always returned to the NAM/ICM in the CED variable.
- To recognize data for built-in data types, such as numbers, dates or currency, using digits and/or voice. The **user.microapp.input_type** ECC variable specifies the collection type. The script writer uses this variable in a Set node to allow the caller to input DTMF only (**D**) or DTMF and Voice (**B**, the default). The recognized result is returned to the NAM/ICM in the **user.microapp.input_type** ECC variable.
- The Get Speech micro-application collects non-digit input—words—according to a specified grammar. The grammar to be used is specified either as inline grammar (through the setting in the **user.microapp.grammar_choices** ECC variable) or as an external grammar file (through a text file, the name of which is given in the Network VRU Script's Configuration Param field). The recognized result is returned to the NAM/ICM in the **user.microapp.caller_input** ECC variable.

ISN micro-applications can use TTS for two purposes:

- As an alternative for playing recorded announcement prompts with the Play Media, Get Digits, Menu, and Get Speech micro-applications, using either the contents of the **user.microapp.inline_tts** or an external .vxml file. (For more information, see the "How micro-applications use External VXML" section on page 2-6). The ECC variable is useful if the amount of text is relatively short and simple. The external .vxml file is useful for more lengthy text or text that needs to be changed frequently using tools other than the ICM Script Editor.
- As a method of playing data using the Play Data micro-application. If the **user.microapp.pd_tts** ECC variable contains **Y**, the ISN should use TTS to speak the data (depending on the TTS locale support and capabilities); if **N**, the ISN should use the system recorded announcements to speak the data (depending on ISN Application Server locale support and capabilities).

Note These ECC variables must be set in the ICM script prior to executing the micro-application that they modify.

How micro-applications use External VXML

The Play Media micro-application can be used to render external .vxml, that is, text Voice-XML files. To access the external file, the Media File Component of the Network VRU Script's VRU Script Name field must point to a .vxml file and specify **V** as the Media Library Type parameter.

The external VXML file must contain particular call control catch blocks and must not execute call control, as the ISN and ICM software must be responsible for all call control. (For more information, see the "External VXML File Contents" section on page 2-48.)

Caution Since violation of external VXML file restrictions cannot be enforced and would have serious consequences, this feature is not enabled by default. It must be enabled through the Application Server Administration interface.

Play Media (PM) Micro-Application

The Play Media (PM) micro-application simply plays a message contained in a media file. Use the ICM Configuration Manager's Network VRU Script List tool's Attributes tab to specify parameters.

Note The VRU Script Name and Configuration Param fields are case-sensitive. For example, **PM** is a valid entry; **pm** is not. Enter the values exactly as specified in Table 2-1.

Table 2-1 Play Media Network VRU Script Configuration Parameters

Field Name	Setting	Description and Valid Options
VRU Script Name field	Micro-application	This must be **PM** (Play Media)
	Media File Name	Name of the media file to be played (that is, the prompt file) or the name of the external VXML file. The valid options are: • A file name (for instance, a .wav file) • ***null*** - (default) If this field is left empty, ISN examines the contents of the **user.microapp.inline_tts** ECC variable. If this ECC variable contains a value, the ISN prompts using TTS. If the ECC is empty, no prompt is played.
	Media Library Type	Flag indicating the location of the media files to be played. The valid options are: • **A** - (default) Application • **S** - System • **V** - External VXML
	Uniqueness value	Optional. A string identifying a VRU Script Name as unique.
Configuration Param (see page 2-14)	Barge-in Allowed	Specifies whether barge-in (digit entry to interrupt media playback) is allowed. The valid options are: • **Y** - (default) barge-in allowed • **N** - barge-in not allowed **Note** ISN deals with barge-in as follows: If barge-in **is not** allowed, the Voice Browser/Gateway continues prompt play when a caller starts entering digits and the entered digits are discarded. If barge-in **is** allowed, the Voice Browser/Gateway discontinues prompt play when the caller starts entering digits. (For more information, see the "Type-Ahead Support for ASR" section on page 2-48.) **Note** Any barge-in setting is ignored when using external VXML.

Table 2-2 shows several configuration examples for the Play Media.

Table 2-2 Play Media Configuration Examples

If the VRU Script Name field setting is…	It means….	If the Configuration Param field setting is…	It means….
PM,Welcome	**PM** – Use the Play Media micro-app. **Welcome** – Play the Media file named "Welcome.wav." **Note** If no file extension is specified, .wav is assumed. Accept defaults for remaining settings.	N	Barge-in not allowed.
PM,July,S	**PM** – Use the Play Media micro-app. **July** – Play the Media file named "July.wav." **S** - Use the System Media library.	*null*	Accept default. (Barge-in allowed)
PM,WebSite,,0	**PM** – Use the Play Media micro-app. **Website** – Play the Media file named "Website.wav." **,** (Skipped parameter) – Accept the default (Media Type: Application library) **0** – Uniqueness value.	*null*	Accept default. (Barge-in allowed)
PM,WebSite,,1	**PM** – Use the Play Media micro-app. **Website** – Play the Media file named "Website.wav." **,** (Skipped parameters) – Accept the default (Media Type: A, Application library) **1** – Uniqueness value.	N	Barge-in not allowed.
PM,customer.vxml,V,1	**PM** – Use the Play Media micro-app. **customer.vxml** – Play the external VXML file "customer.vxml." **V** – Use the VXML Media library **1** – Uniqueness value.	**Note** Any barge-in setting is ignored when using external VXML.	
PM	**PM** – Use the Play Media micro-app. **Note** If the **user.microapp.inline_tts** ECC contains a value, the PM micro-application will play its contents (for example, "Hello world").	N	Barge-in not allowed.

Play Media Error Code Settings

Play Media can set **user.microapp.error_code** ECC variable to any of the following Return Status error codes:

1 - (Unused)

2 - Network Error

3 - System Error

4 - (Unused)

5 - Unknown micro-application

6 - Invalid VRU Script Name format

7 - Invalid Configuration Param

8 - Misconfigured ECC variable

9 - Media file does not exist or invalid URL for Media file

10 - Semantic-Runtime Error

11 - Unsupported VXML format

12 - Unsupported VXML element

13 - Variable data is invalid

14 - Location of variable data is empty

21 - Timed out

30 - Unsupported locale

31 - Media Resource Error

32 - General Error

Note **user.microapp.error_code** is always zero, indicating success, if control proceeds out the Checkmark (success) branch of the Run VRU Script node. Usually, if control proceeds out the X (failure) branch, ISN sets this variable to one of the codes listed here. (Your routing should always test the error code after an X branch is taken. It should not automatically assume, for example, that the caller did not enter the expected number of digits.)

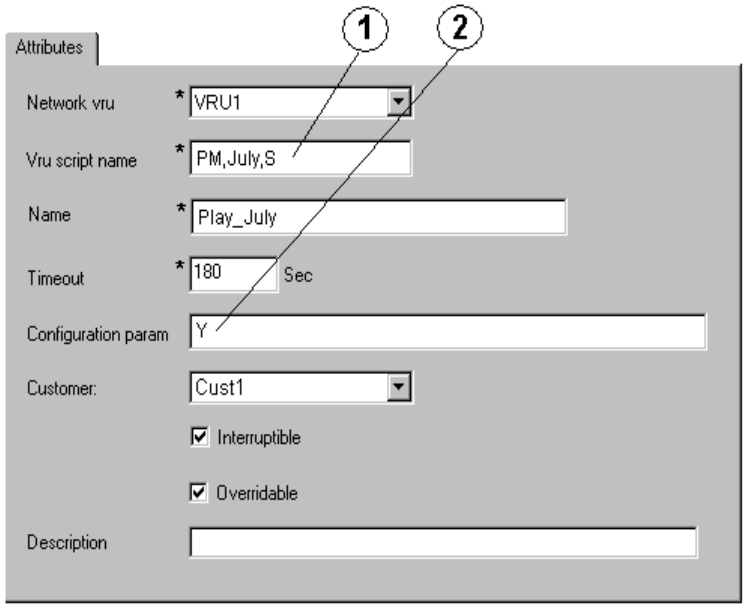
However, if a configuration error, or a network or component failure of some sort, prevents the micro-application from being executed at all, then ISN does not get a chance to set this variable at all. Such cases can be identified by using a Set node to pre-set **user.microapp.error_code** to some known invalid value such as -1, and then to t/est for that value using an If node, following the X branch of the Run VRU Script node

Two classes of problems can prevent the micro-application from being executed at all: (1) inability to route the call to an appropriate ISN Application Server (Advanced Speech deployment model only); (2) mismatch between Network VRU associated with the configured VRU script and Network VRU associated with the ISN that is handling the call. The second case can only be caused by an ICM configuration error, but the first case may also be caused by a temporary network outage or other component failure.

Play Media Example: Play Welcome Message

This example shows sample ICM Configuration Manager and Script Editor screen captures for a Play Media application that simply plays an announcement.

Figure 2-1 Play Media Configuration

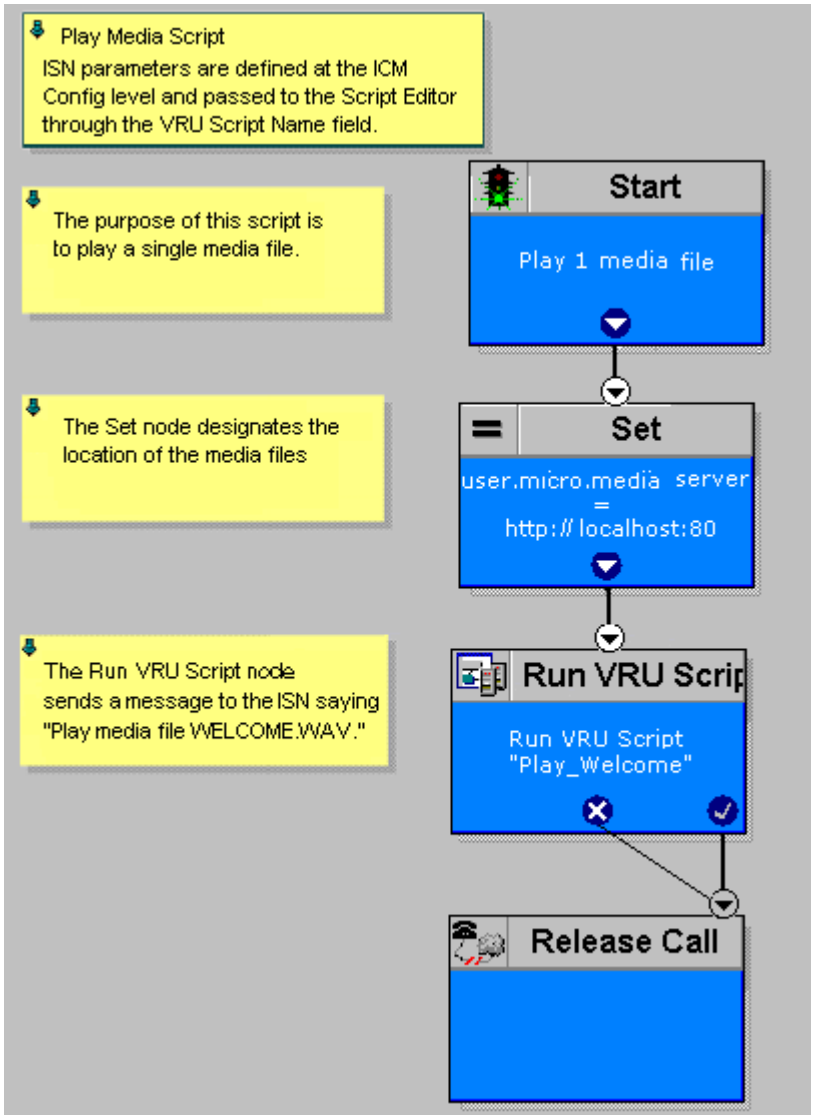


The Network VRU Script List tool's Attribute tab in Figure 2-1 shows:

1. The VRU Script Name field containing three ISN parameters:
   - **PM**. Play Media.
   - **July**. Media File Name.
   - **S**. System Media Library Type.
2. The Configuration Param field containing the following ISN parameter:
   - **Y**. Barge-in allowed.

Figure 2-2 shows the contents of the script:

Figure 2-2 Play Media Script



Play Data (PD) Micro-Application

The Play Data micro-application retrieves data from a storage area and plays it to the caller in a specific format, called a *data play back type*. You use the ICM Configuration Manager's Network VRU Script List tool's Attributes tab to specify parameters.

Note The VRU Script Name and Configuration Param fields are case-sensitive. For example, **PD** is a valid entry; **pd** is not. Enter the values *exactly* as specified in Table 2-3.

Table 2-3 Play Data Network VRU Script Configuration Parameters

Field Name	Setting	Description and Valid Options
VRU Script Name field	Micro-application	This must be **PD** (Play Data).
	Data Playback Type.	The kind of the data to be returned ("played") to the caller. **Note** For more information about each of these playback types – including input format and output examples – turn to Table 2-5 on page 2-15. The valid options are: • **Number** • **Char** (character) • **Date** • **Etime** (elapsed time) • **TOD** (Time of Day) • **24TOD** (24-hour Time of Day) • **DOW** (Day of Week) • **Currency** **Note** 24TOD and DOW data play back types are not supported when using TTS.
	Uniqueness value	Optional. A string identifying a VRU Script Name as unique.
Configuration Params	Location of the data to be played.	The valid options are: • ***null*** (default) - If you leave this option empty, uses the ECC variable user.microapp.play_data. • A **number** representing a Call Peripheral Variable number (for example, a 1 to represent Call.PeripheralVariable1). **Note** For more information on data location, see the "Play Data and Data Storage" section on page 2-14.

Table 2-3 Play Data Network VRU Script Configuration Parameters (continued)

Field Name	Setting	Description and Valid Options
Configuration Param (continued)	Barge-in Allowed	Specifies whether barge-in (digit entry to interrupt media playback) is allowed. The valid options are: • **Y** - (default) barge-in allowed • **N** - barge-in not allowed ISN deals with barge-in as follows: If barge-in **is not** allowed, the Voice Browser/Gateway continues prompt play when a caller starts entering digits and the digits are discarded. If barge-in **is** allowed, the Voice Browser/Gateway discontinues prompt play when the caller starts entering digits. (For more information, see the "Type-Ahead Support for ASR" section on page 2-48.) Barge-in works the same for ASR as DTMF. If the caller speaks during prompt play, the prompt play stops. Unlike DTMF input, ASR caller input is checked against the grammar that is defined. If a match isn't found, an Invalid Entry error is generated and the caller input is deleted. If a caller barges in with ASR during a Play Media or Play Data script, the Invalid Entry error always appears because there is not a grammar specified for these micro-applications. Invalid entry errors are only sent back to the Application Server for Get Digits, Menu or Get Speech micro-applications. **Note** Barge-in is not used when providing external VXML.
	Time Format	Valid only for the time Data Playback types (Etime, TOD, 24TOD). The available formats are: • ***null*** - leave this option empty for non-time formats • **HHMM** - default for time formats • **HHMMSS** • **HHMMAP** - includes am or pm; valid only for TOD

Table 2-4 shows several configuration examples for Play Data.

Table 2-4 Play Data Configuration Examples

If the VRU Script Name field setting is…	It means…	If the Configuration Param field is…	It means…
PD,Number	**PD** – Use the Play Data micro-app. **Number** – Play back the data as a number.	empty	Place the data in the default ECC, user.microapp.play_data, as a number.
PD,Char	**PD** – Use the Play Data micro-app. **Char** –Play back the data as individual characters.	1	**1** – Play the data in Call PeripheralVariable 1 as a character.
PD,Etime,0	**PD** – Use the Play Data micro-app. **Etime** – Play back the data as a Time.	1,,HHMM	**1** – Play the data in Call PeripheralVariable 1 as an elapsed time. **,** – (Skipped parameter) Accept default setting (Y) **HHMM** – Play the time in HHMM format (for example, 8 hours, 30 minutes).
PD,Date	**PD** – Use the Play Data micro-app. **Date** – Play back the data as a Date.	1,N	**1** – Play the data in Call Variable 1 as a date. **N** – No barge-in allowed.
PD,Currency	**PD** – Use the Play Data micro-app. **Currency** – Play back the data as a Currency.	4,N	**4** – Play the data in Call Variable 4 s currency. **N** – No barge-in allowed.
Note To enable Text-to-Speech (TTS) as the data play back source, you would need to need to insert a Set node in the script prior to the Run VRU Script node setting **user.microapp.pd_tts** to **"Y"**.			

Play Data and Data Storage

Some possible sources of the data to be played back:

- Information retrieved from a database look-up.
- Information entered by the caller.

Before this micro-application can be called, you must specify the location of the play back data. You do this with a Script Editor Set node that points to one of the following storage areas:

- One of the standard NAM/ICM Peripheral Variables (PeripheralVariable1 through PeripheralVariables10).
- The **user.microapp.play_data** ECC variable. This is the preferred area for data playback storage. Using this ECC avoids the possibility of overwriting a call variable already being used either by this application or by other components within the system.

Play Back Types for Voice Data

Configuring how voice data is presented to a caller is an important part of setting up your ISN IVR. Table 2-5 provides a complete list of ISN Data Play Back Types, along with sample valid values and formats for the locales supported by ISN Version 2.0 when **not** using TTS:

- **en-us**. English (United States)
- **en-gb**. English (Great Britain)
- **es-mx**. Spanish (Mexico)
- **es-es**. Spanish (Spain)

Locale is selected by setting the **user.microapp.locale** variable.

Note For information about locale support when using TTS, check with your third-party vendor.

Keep in mind that any string of characters typically used in the language may need to be spoken back character by character (this includes special keyboard symbols and numbers). If a particular symbol is not used by a particular language, there is still the possibility that a string containing that symbol will be spelled out with a Play Data with Char data type.

For example, assume that an IVR application in the US (a locale of **en-us**) queries a database for an account owner's name and spells the name back to the caller. If the name pulled from the database was "Hänschen Walther," the media files that would need to be pulled from the Media Server would have been derived from a URL including the **en-us** locale. The symbol **ä** has a decimal value of 228, which is different than **a** with a value of 97. It is the translator's task to record the proper word(s) for each symbol to be supported. For detailed information on character translation, turn to the "System Media Files" section in Chapter 3, "Prompt Recording and Distribution."

Table 2-5 Data Play Back Types

Data Play Back Type	Description	Input Format	Output Examples (When Not Using TTS)
Number	Play the stored data as a number.	-################.###### The leading minus (-) is optional and is played as "minus." The whole number portion of the string can contain a maximum of 15 digits (for a maximum value of 999 trillion, 999 billion, etc.). The decimal point is represented as a period (.) and played as "point." It is optional if there is no floating portion. The floating point portion of the number is optional and can contain a maximum of 6 digits. Trailing zeros are played.	**en-us** and **en-gb** typical spoken form: • -123 = "minus one hundred twenty three" • 35.67 = "thirty five point six seven" • 1234.0 = "one thousand, two hundred, thirty four point zero" **es-mx** and **es-es** typical spoken form: • -120 = "menos ciento veinte" • 10.60 = "diez coma seis cero" • 1,100 = "mil cien"
Char	Play the stored data as individual characters.	All printable American National Standards Institute (ANSI) characters are supported. **Note** Code Page 1252 is ANSI standard. It contains ASCII (characters 0-127) and extended characters from 128 to 255.	**en-us** and **en-gb** typical spoken form: • abc123= "A, B, C, one, two, three" **es-mx** and **es-es** typical spoken form: • abc123 = "A, B, C, uno, dos, tres"

Table 2-5 Data Play Back Types (continued)

Data Play Back Type	Description	Input Format	Output Examples (When Not Using TTS)
Date	Play the stored data as a date.	YYYYMMDD, regardless of locale. **YYYY** options: the range of 1800 through 9999. **MM** options: the range of 01 through 12. **DD** options: the range of 01 through 31. **Note** The software does not validate the date (for example, 20000231 is valid and played accordingly). However, a failure occurs if any bounds are broken (for example, 34 for month).	**en-us** typical spoken form: • MMDDYYYY format: 20000114 = "January fourteenth, two thousand" **en-gb** typical spoken form: • DDMMYYYY format: 20000114 = "Fourteenth of January, two thousand" **es-mx** and **es-es** typical spoken form: • DDMMYYYY format: 20001012 = "el doce de octubre de dos mil" **Note** All spoken forms use the proper grammar for the locale.
Etime (elapsed time)	Play the stored data as an amount of elapsed time.	HHMM or HHMMSS Maximum 99 hours, 59 minutes, 59 seconds Leading zeros are ignored.	**en-us** and **en-gb** typical spoken form: • HHMM format: 0830= "eight hours thirty minutes" • HHMMSS format: 083020= "eight hours, thirty minutes, twenty seconds" **es-mx** and **es-es** typical spoken form: • HHMM format: 0205 = "dos horas cinco minutos" • HHMMSSS format: 020101 = "dos horas un minuto un segundo"

Table 2-5 Data Play Back Types (continued)

Data Play Back Type	Description	Input Format	Output Examples (When Not Using TTS)
TOD (Time of Day)	Play the stored data as a time of day.	HHMM or HHMMSS 24 hour time **HH** options: 00 - 24 **MM** options: 00 - 59 **SS** options: 00 - 59	**en-us** and **en-gb** typical spoken form: • HHMM format: 0800 = “eight o’clock” 0830 = “eight thirty” 1430 = “two thirty” • HHMMSS format: 083020 = “eight thirty and twenty seconds” • HHMMAP format: 1430 = “two thirty p.m.” **es-mx** and **es-es** typical spoken form: • HHMM format: 0100 = “una a.m.” • HHMMAP format: 1203 = “doce y tres p.m.” • HHMMSS format: 242124 = “doce veintiuno a.m.”
24TOD (24-hour Time of Day)	Play the stored data as military time.	HHMM or HHMMSS 24 hour time. **HH** options: 00 - 24 **Note** 24-hour time and military time may have a discrepancy as to valid hours. ISN plays back the value 00 or 24 “as is.” The application developer is free to make alterations to the data passed to the micro-application, if so desired. **MM** options: 00 - 59 **SS** options: 00 - 59 The ISN validates the ranges as stated above. For example, if a time ends in 00 minutes (that is, 2300), one would say “hundred hours” (that is, “twenty-three hundred hours”). The range is 0000 (12 a.m.) through 2459 (after midnight) or 0059, if you prefer. 1300 equals 1 o’clock in the afternoon. **Note** The 24TOD play back type is not supported when using TTS.	**en-us** and **en-gb** typical spoken form: • HHMM format: 0815 = “eight fifteen” 2330 = “twenty three thirty” 2300 = “twenty three hundred hours” • HHMMSS format: 233029 = “twenty three thirty and twenty nine seconds” **es-mx** and **es-es** typical spoken form: • HHMM format: 2121 = “veintiuno veintiuno” 2100 = “veintiún horas” **Note** In Spanish, when a time ends in 00 minutes the spoken form is “hours,” not “hundred hours.” • HHMMSS format: 050505 = “cinco y cinco y cinco segundos”

Table 2-5 Data Play Back Types (continued)

Data Play Back Type	Description	Input Format	Output Examples (When Not Using TTS)
DOW (Day of Week)	Play the stored data as a day of week.	An integer from 1 through 7 (1 = Sunday, 2 = Monday, etc.). **Note** The DOW data play back type is not supported when using TTS.	**en-us** and **en-gb** typical spoken form: • 7 = "Saturday" **es-mx** and **es-es** typical spoken form: • 7 = "Sabado"
Currency	Play the stored data as currency.	Format is [-]15(X)[.2(Y)] where the minus sign is optional as well as the decimal point and the 2 digits after the decimal point. The whole number portion of the string can contain a maximum of 15 digits (for a maximum value of 999 trillion, 999 billion). **Note** No comma delimiters or currency symbols are recognized. Leading and trailing zeros are played. If a number does not have a decimal point, the "cents" portion of the amount will not be spoken. (For example, the spoken form for the input **100** is "one hundred and zero cents." The grammar rules apply to the currency, not the locale. **Note** The **user.microapp.currency** ECC variable contains the currency indicator (USD, CAD, EUR, etc.)	**USD** (US dollar) typical spoken form: • 15.05 = "fifteen dollars and five cents" • 3.00 = "three dollars and zero cents" **Note** ISN Version 2.0 uses the USD_dollar.wav and USD_dollars.wav media files; the dollar.wav and dollars.wav used by ISN Version 1.0 are no longer installed. **CAD** (Canadian dollar) typical spoken form: • 15.05 = "fifteen dollars and five cents" • 3.00 = "three dollars and zero cents" **EUR** (Euro dollar) typical spoken form: • 1.10 = "one point one zero euro" **GBP** (Great Britain pound) typical spoken form: • 1.10 = "one pound ten pence" **MXN** (Mexican pesos) typical spoken form: • 1.10 = "one peso and ten centavos" **Note** The default spoken form for a negative amount (for all currency types) is "minus <*amount*>."

Play Data Error Code Settings

Play Data can set **user.microapp.error_code** ECC variable to any of the following Return Status error codes:

1 - (Unused)

2 - Network Error

3 - System Error

4 - (Unused)

5 - Unknown micro-application

6 - Invalid VRU Script Name format

7 - Invalid Configuration Param

8 - Misconfigured ECC Variable

9 - Media file does not exist or invalid URL for Media file

10 - Semantic-Runtime Error

11 - Unsupported VXML format

12 - Unsupported VXML element

13 - Variable data is invalid

14 - Location of variable data is empty

15 - Time format is invalid

16 - Data value out of range

21 - Timed out

30 - Unsupported locale

31 - Media Resource Error

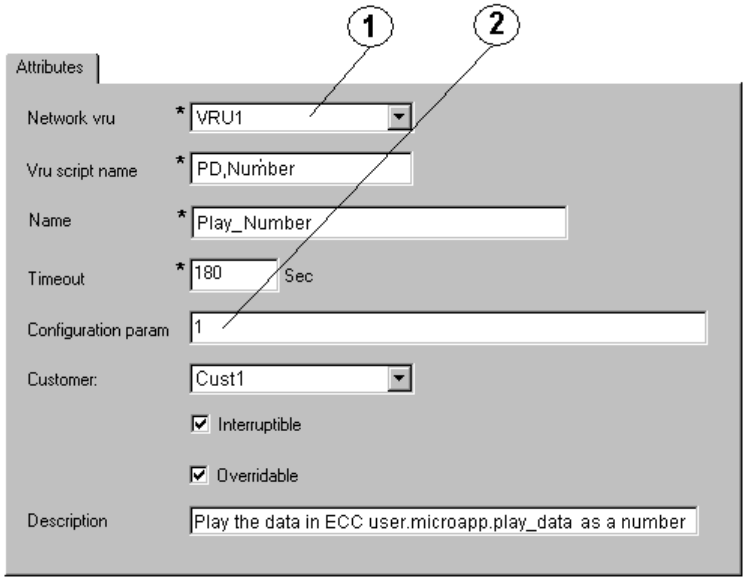
32 - General Error

Note The value in **user.microapp.error_code** ECC is passed from the ISN to the NAM/ICM when the X (failure) branch is taken. See the discussion at the end of the section Play Media Error Code Settings.

Play Data Example: Play Data as Number

This example shows sample ICM Configuration Manager and Script Editor screen captures for a a Play Data application that plays the contents of the user.microapp.play_data ECC in number format.

Figure 2-3 Play Data As Number Configuration

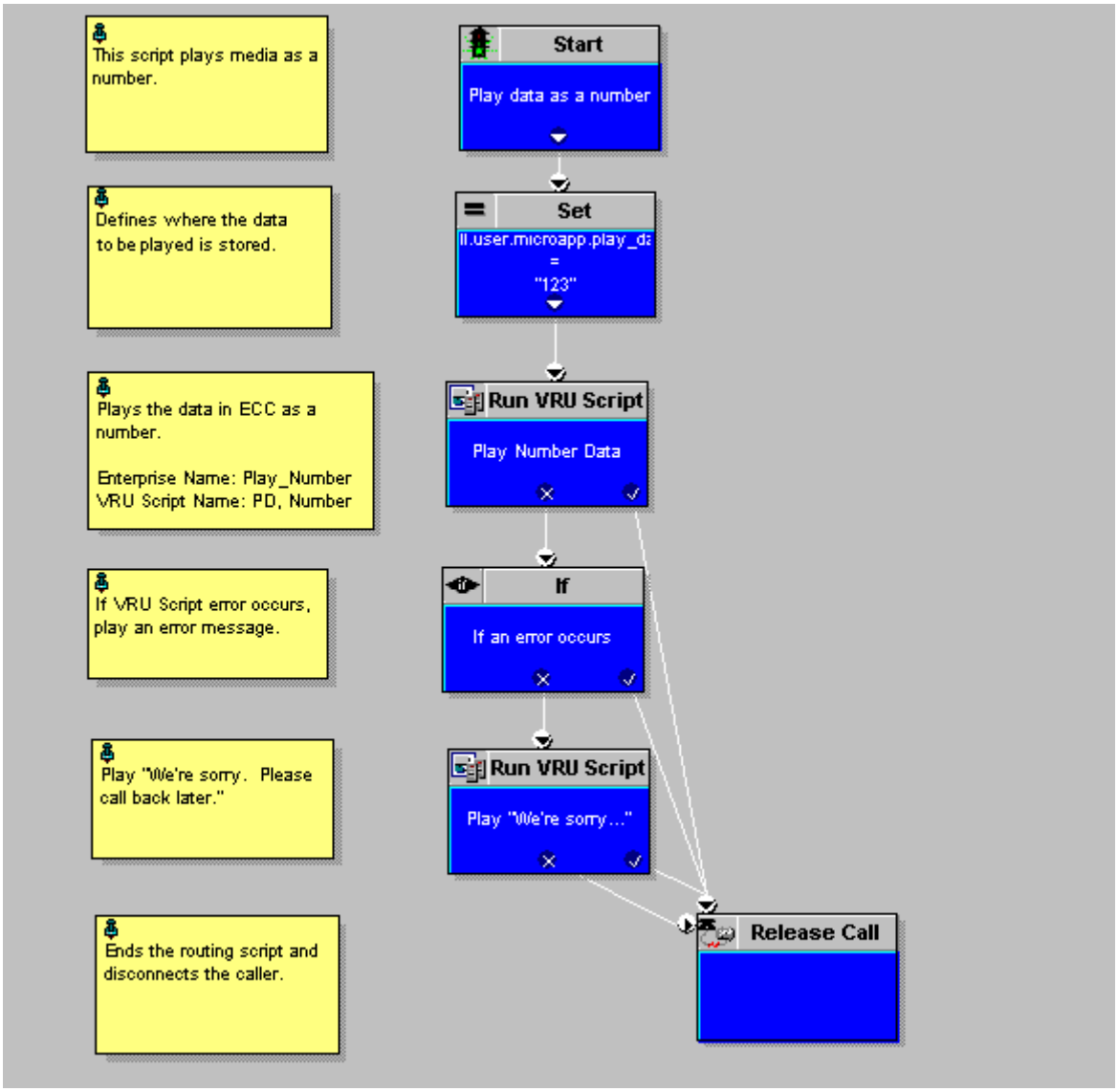


The Network VRU Script List tool's Attribute tab in Figure 2-3 shows:

1. The VRU Script Name field containing two ISN parameters:
   - **PD**. Play Data.
   - **Number**. Data Playback Type.
2. The Configuration Param field containing the value **1**, so the playback data will come from the Call Peripheral variable, Call.PeripheralVariable1.

Figure 2-4 shows the contents of the script:

Figure 2-4 Play Data As Number Script



For example, if user.microapp.play_data referred to in Figure 2-4 contained the value **123**, this number would be played backed “One hundred twenty three.”

Get Digits (GD) Micro-Application

The Get Digits (GD) micro-application plays a media file and retrieves digits. You could use Get Digits in an application that prompts a caller to enter a password.

The ISN passes the retrieved digits back to the NAM/ICM for further processing using the Caller-Entered Digits (CED) field in the ICM/IVR Messaging interface. (This is available in the ICM script through the variable Call.CallerEnteredDigits.)

Use the ICM Configuration Manager's Network VRU Script List tool's Attribute tab to specify parameters.

Note The VRU Script Name and Configuration Param fields are case-sensitive. For example, **GD** is a valid entry; **gd** is not. Enter the values exactly as specified in Table 2-6.

Table 2-6 Get Digits Network VRU Script Configuration Parameters

Field Name	Setting	Description and Valid Options
VRU Script Name	Micro-application	This must be **GD** (Get Digits).
	Media File Name	Name of the media file or external VXML to be played (that is, the prompt file). The valid options are: • A file name (for instance, a .wav file) • ***null*** - (default) If this field is empty, ISN examines the contents of the **user.microapp.inline_tts** ECC variable. If this ECC variable contains a value, the ISN prompts using TTS. If the ECC is empty, no prompt is played.
	Media Library Type	Flag indicating the location of the media files to be played. The valid options are: • **A** - (default) Application • **S** - System **Note** This value is ignored if using TTS.
	Uniqueness value	Optional. A string identifying a VRU Script Name as unique.
Configuration Param	Minimum Field Length	Minimum number of digits expected from the caller. The valid options are: **1-32** (the default is 1).
	Maximum Field Length	Maximum number of digits expected from the caller.The valid options are: **1-32** (the default is 1). **Note** For information about Maximum Field Length and the DTMF Termination Key, see the Note in the "Get Digits and Digit Entry Completion" section on page 2-27.

Table 2-6 Get Digits Network VRU Script Configuration Parameters (continued)

Field Name	Setting	Description and Valid Options
Configuration Param (continued)	Barge-in Allowed	Specifies whether barge-in (digit entry to interrupt media playback) is allowed. The valid options are: • **Y** - (default) barge-in allowed • **N** - barge-in not allowed **Note** ISN deals with barge-in as follows: If barge-in **is not** allowed, the Voice Browser/Gateway continues prompt play when a caller starts entering digits. If barge-in **is** allowed, the Voice Browser/Gateway discontinues prompt play when the caller starts entering digits. (For more information, see the "Type-Ahead Support for ASR" section on page 2-48.)
	Inter-digit Timeout	The number of seconds the caller is allowed between entering digits. If exceeded, the system times-out.The valid options are: **1-99** (the default is 3). **Note** This value is ignored if using ASR.
	No Entry Timeout	The number of seconds a caller is allowed to begin entering digits. If exceeded, the system times-out.The valid options are: **0-99** (the default is 5).
	Number of No Entry Tries	Number of times the ISN repeats the "Get Digits" cycle when the caller does not enter any data after the prompt has been played. (Total includes the first cycle.) The valid options are: **1-9** (the default is 3).
	Number of Invalid Tries	Number of times the ISN repeats the "Get digits" cycle when the caller enters invalid data. (Total includes the first cycle.) The valid options are: **1-9** (the default is 3).
	Timeout Message Override	The valid options are: • **Y** - override the system default with a pre-recorded Application Media Library file • **N** - (default) do not override the system default **Note** This value is ignored if using TTS.
	Invalid Entry Message Override	The valid options are: • **Y** - override the system default with a pre-recorded Application Media Library file • **N** - (default) do not override the system default **Note** This value is ignored if using TTS.
	Note For more information about Timeout and Invalid Entry Messages, see System Media Files in Chapter 3, "Prompt Recording and Distribution."	

Table 2-6 Get Digits Network VRU Script Configuration Parameters (continued)

Field Name	Setting	Description and Valid Options
Configuration Param (continued)	DTMF Termination Key	A single character that, when entered by the caller, indicates digit entry is complete. The valid options are: • **0-9**, ***** (asterisk), **#** (pound sign, the default), **N** (No termination key) **Note** For information about Maximum Field Length and the DTMF Termination Key, see the Note in the "Get Digits and Digit Entry Completion" section on page 2-27. **Note** This value is ignored if using ASR.
	Incomplete Timeout	The amount of time after a caller stops speaking to generate an invalid entry error because the caller input does not match the defined grammar. The valid options are: **0-99** (the default is 3). **Note** This value is ignored when not using ASR. If the value is set to 0, the Application Server treats the NoEntry Timeout as NoError.

Table 2-7 shows several configuration examples for Get Digits for an application that prompts using .wav files and retrieves input through DTMF:

Table 2-7 Get Digits Configuration Examples

If the VRU Script Name field setting is…	It means…	If the Configuration Param field setting is…	It means…
GD,Password,A,0	**GD** –Use the Get Digits micro-app. **Password** – Play the Media file named "Password.wav." **A** – Application Media Library. **0** – Uniqueness value.	6,12	**6** – Minimum field length. **12** – Maximum field length. Accept defaults for all other settings.
GD,Password,A,1	**GD** –Use the Get Digits micro-app. **Password** - Play the Media file named "Password.wav." **A** - Application Media Library. **1** – Uniqueness value.	6,12,N,3,5,2,2,N,Y,#	**6** – Minimum field length **12** – Maximum field length **N** – No barge-in allowed. **3** – Inter-digit Timeout (seconds) **5** – No Entry Timeout (seconds) **2** – Number of no entry tries **2** – Number of invalid tries **N** – Timeout Msg Override **Y**– Invalid Entry Msg Override **#** – DTMF Termination key

Table 2-7 Get Digits Configuration Examples (continued)

If the VRU Script Name field setting is…	It means…	If the Configuration Param field setting is…	It means…
Note The two examples above both play the Password.wav file ("Please enter your password followed by the pound sign.") and collect digits. They differ in that the first example accepts most of the default settings available through the Configuration Param field; the second field does not.			
GD,ssn	**GD** – Use the Get Digits micro-app. **ssn** – Play the Media file named "ssn.wav."	9,9	**9** – Minimum field length. **9** – Maximum field length. Accept defaults for all other settings.
GD	**GD** –Use the Get Digits micro-app. Since no Media field settings appear after **GD**, the ISN examines the contents of the **user.microapp.inline_tts** ECC variable. If this ECC variable contains a value—for example, "What is your account number?" — the ISN prompts using TTS. **Note** If the **user.microapp.inline_tts** is empty, no prompt is played. In turn, if the **user.microapp.input_type** ECC variable is **D**, the ISN will be set to process any DTMF input the customer supplies.	6,12,N	**6** – Minimum field length. **12** – Maximum field length. **N** – No barge-in allowed. Accept defaults for all other settings.
Note Type-ahead can only be used with the Get Digits micro-application when **user.microapp.input_type** is set to **D**. For more information, see the "Type-Ahead Support for ASR" section on page 2-48.			

Table 2-8 shows several configuration examples for Get Digits for an ASR/TTS application:

Table 2-8 Get Digits Configuration Examples

If …	It means…	And, if...	It means…
The **user.microapp.inline_tts** ECC variable contains "What is your account number?" *and* **user.microapp.input_type** contains: **D** (DTMF) *and* The VRU Script Name field contains: **GD**	Use the Get Digits micro-app to play the contents of the ECC variable and collect DTMF input.	The Configuration Param field contains: **6,12,N,3,5,2,2,N,Y,#**	**6** – Minimum field length **12** – Maximum field length **N** – No barge-in allowed. **3** – Inter-digit Timeout (seconds) **5** – No Entry Timeout (seconds) **2** – Number of no entry tries **2** – Number of invalid tries **N** – Timeout Msg Override **Y**– Invalid Entry Msg Override **#** – DTMF Termination key
The **user.microapp.inline_tts** ECC variable contains "What is your account number?" *and* **user.microapp.input_type** contains: **B** (the default, both DTMF and voice) *and* The VRU Script Name field contains: **GD**	Use the Get Digits micro-app to play the contents of the ECC variable and collect either voice or DTMF input.	The Configuration Param field contains: **6,12,N,,5,2,2,,,,4**	**6** – Minimum field length **12** – Maximum field length **N** – No barge-in allowed. **,,,,** – Accept timeouts for Inter-digit Timeout (seconds), No Entry Timeout (seconds), Number of no entry tries, Number of invalid tries, Timeout Msg Override, Invalid Entry Msg Override, DTMF Termination key **4** – Incomplete timeout
The **user.microapp.inline_tts** ECC variable contains "What is your account number?" *and* **user.microapp.input_type** contains: **B** (the default, both DTMF and voice) *and* The VRU Script Name field contains: **GD**	Use the Get Digits micro-app to play the contents of the ECC variable and collect DTMF or voice input.	6,12,N	**6** – Minimum field length **12** – Maximum field length **N** – No barge-in allowed Accept defaults for all other settings.
Note Type-ahead can *only* be used with the Get Digits micro-application when **user.microapp.input_type** is set to **D**. For more information, see the "Type-Ahead Support for ASR" section on page 2-48.			

Get Digits and Digit Entry Completion

The ISN tests GD digit entry input against several conditions to determine whether digit entry is complete. The ISN considers digit entry to be complete if the caller enters any of the following:

- The maximum allowable number of digits (when terminator key is not used).
- The maximum number of digits, excluding a terminator key (when terminator key is used).
- Less than the maximum number of digits, followed by the terminator key.
- Less than the maximum number of digits and exceeding the inter-digit timeout.
- Nothing and reaching the no entry timeout.

Caution It is important that you set up your NAM/ICM script to test for all the scenarios mentioned below.

If digit-entry input is complete

After digit-entry input is complete, the ISN validates the digit string to determine if it is >= (greater than or equal to) the minimum length and <= (less than or equal to) the maxi mum length.

Note In variable-length data entry, the Maximum Field Length value does not accommodate the termination key. For example, if a GD micro-application is configured to accept a password that is between 6 and 12 digits long and digit-entry completion is indicated through a termination key (or a timeout), the Minimum Field Length setting should be **6**, the Maximum Field Length setting should be **12**, and the DTMF Termination Key should be defined as a single character.

Before passing the result back to the Application Server, the Voice Browser would discard the termination key (that is, only the password digits will be included in the CED returned to ICM software).

In this example, if the 13th digit is entered without reaching the interdigit timeout and the 13th digit *is not* the terminator key, a NOMATCH event (same as inter-digit timeout) occurs to clear the CED buffer on the Voice Browser.

After validating the digit string, the ISN does the following:

- If the string is valid, the ISN stores the digit string (not including the terminator key) in the Call.CallerEnteredDigits variable, exits the node through the Checkmark (success) branch, and returns control to ICM software.
- If the string is not valid, the ISN considers it an invalid entry and does the following:
  - If the Number of Invalid Entry Tries value *has not* been reached, the ISN plays an error message and re-plays the original prompt.
  - If the Number of Invalid Entry Tries value *has* been reached, the ISN stores the last-entered digit string in the Call.CallerEnteredDigits variable, exits the node through the X (failure) branch, sets the **user.microapp.error_code** ECC variable to **16** (Reached Maximum Invalid Tries), and returns control to ICM software.

If No Entry Timeout occurs

If the caller does not enter input and No Entry Timeout period is exceeded, the following happens:

- If the Number of No Entry Tries value *has not* been reached, the ISN plays the "no entry" error message and re-plays the original prompt.
- If the Number of No Entry Tries value *has* been reached, the ISN exits the node through the X (failure) branch, sets the Call.CallerEnteredDigits variable to NULL, the **user.microapp.error_code** ECC variable to **17** (Reached Maximum No Entry Tries), and returns control to ICM software.

Get Digits Error Code Settings

Get Digits can set **user.microapp.error_code** ECC variable to any of the following Return Status error codes:

1 - (Unused)

2 - Network Error

3 - System Error

4 - (Unused)

5 - Unknown micro-application

6 - Invalid VRU Script Name format

7 - Invalid Configuration Param

8 - Misconfigured ECC Variable

9 - Media file does not exist or invalid URL for Media file

10 - Semantic-Runtime Error

11 - Unsupported VXML format

12 - Unsupported VXML element

16 - Reached Maximum Invalid Tries

17 - Reached Maximum No Entry Tries

21 - Timed out

30 - Unsupported locale

31 - Media Resource Error

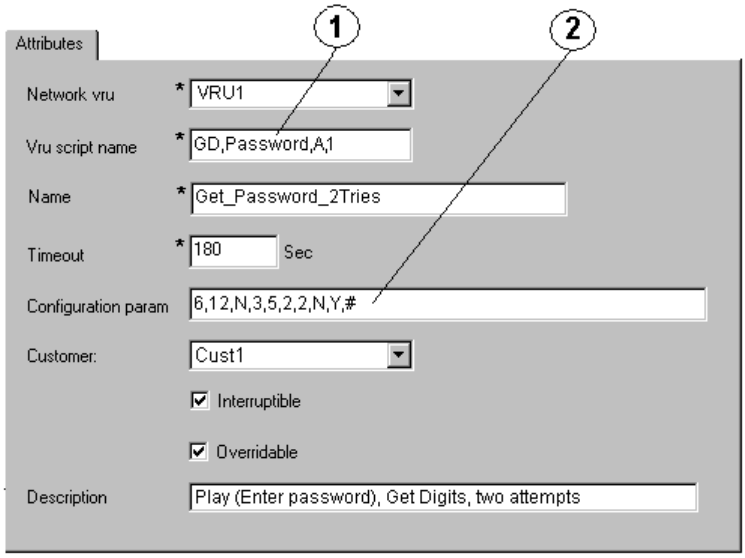
32 - General Error

Note The value in **user.microapp.error_code** ECC is passed from the ISN to the NAM/ICM when the X (failure) branch is taken. See the discussion at the end of the section Play Media Error Code Settings.

Get Digits Example: Get Password

This example shows sample ICM Configuration Manager and Script Editor screen captures for a Get Digits application that plays a prompt requesting a password, retrieves any caller-entered digits, and allows two no-entry tries and two invalid attempts.

Figure 2-5 Get Digits in Two Attempts Configuration

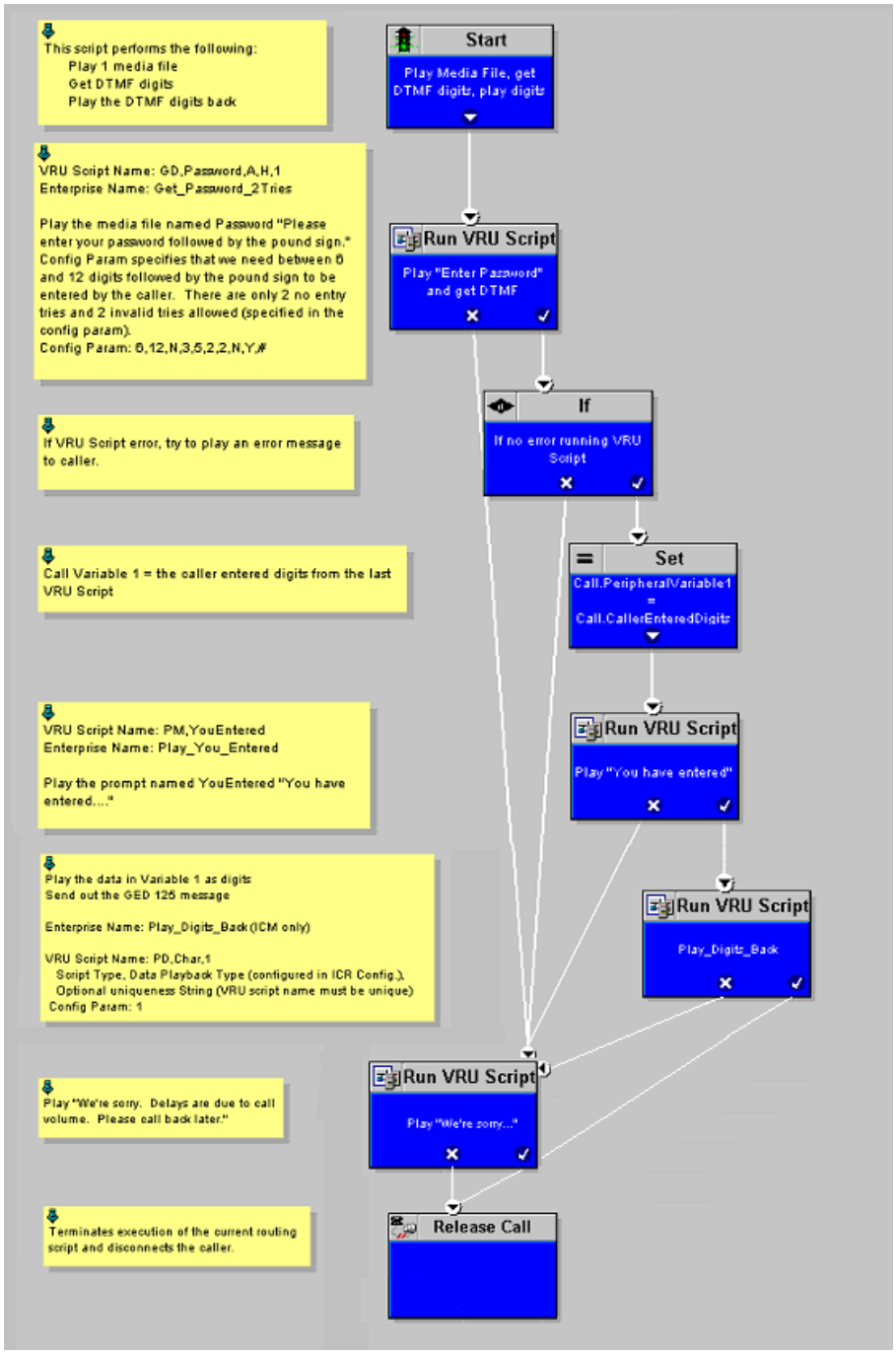


The Network VRU Script List tool's Attribute tab in Figure 2-5 shows:

1. The VRU Script Name field containing five ISN parameters:
   - **GD**. Get Digits
   - **Password**. Media File Name
   - **A**. Media Type, App Specific
   - **1**. The uniqueness string value
2. The Configuration Param field containing the following ISN parameters:
   - **6**. Minimum Field Length
   - **12**. Maximum Field Length
   - **N**. Barge-in not allowed
   - **3**. Inter-digit Timeout (seconds)
   - **5**. No Entry Timeout (seconds)
   - **2**. Number of no entry tries
   - **2**. Number of invalid tries
   - **N**. Timeout Msg Override
   - **Y**. Invalid Entry Msg Override
   - **#**. DTMF Termination Key

Figure 2-6 shows the contents of the script:

Figure 2-6 Get Digits Script



Menu (M) Micro-Application

This micro-application plays a menu media file and retrieves a defined digit. (Menu is similar to the Get Digit micro-application except that it only accepts one digit, which it checks for validity.)

The ISN passes the retrieved digit back to the NAM/ICM for further processing using the Caller-Entered Digits (CED) field in the ICM/IVR Messaging interface.

Use the ICM Configuration Manager's Network VRU Script List tool's Attribute tab to specify parameters.

Note The VRU Script Name and Configuration Param fields are case-sensitive. For example, **M** is a valid entry; **m** is not. Enter the values exactly as specified in Table 2-9.

Table 2-9 Menu Network VRU Script Configuration Parameters

Field Name	Setting	Description
VRU Script Name field	Micro-application	This must be **M** (Menu).
	Media File Name	Name of the media file or external VXML to be played (that is, the prompt file). The valid options are: • A file name (for instance, a .wav file) • ***null*** - (default) If this field is empty, ISN examines the contents of the **user.microapp.inline_tts** ECC variable. If this ECC variable contains a value, the ISN prompts using TTS. If the ECC is empty, no prompt is played.
	Media Library Type	Flag indicating the location of the media files to be played. The valid options are: • **A** - (default) Application • **S** - System
	Uniqueness value	Optional. A string identifying a VRU Script Name as unique.
Configuration Param	A list of **menu choices**.	The valid options are: • **0-9** • **#** (pound sign) • * (asterisk) Formats allowed include: • Individual options delimited by a / (forward slash) • Ranges delimited by a - (hyphen) with no space)

Table 2-9 Menu Network VRU Script Configuration Parameters (continued)

Field Name	Setting	Description
Configuration Param (continued)	Barge-in Allowed	Specifies whether barge-in (digit entry to interrupt media playback) is allowed. The valid options are: • **Y** - (default) barge-in allowed • **N** - barge-in not allowed **Note** ISN deals with barge-in as follows: If barge-in **is not** allowed, the Voice Browser/Gateway continues prompt play when a caller starts entering digits. If barge-in **is** allowed, the Voice Browser/Gateway discontinues prompt play when the caller starts entering digits. (For more information, see the "Type-Ahead Support for ASR" section on page 2-48.)
	No Entry Timeout	The number of seconds a caller is allowed to begin entering digits. If exceeded, the system times-out.The valid options are: **0-99** (the default is 5).
	Number of No Entry Tries	Number of times the ISN repeats the prompt cycle when the caller does not enter any data after the prompt has been played. (Total includes the first cycle.) The valid options are: **1-9** (the default is 3).
	Number of Invalid Tries	Number of times the ISN repeats the prompt cycle when the caller enters invalid data. (Total includes the first cycle.) The valid options are: **1-9** (the default is 3).
	Timeout Message Override	The valid options are: • **Y** - override the system default with a pre-recorded Application Media Library file • **N** - (default) do not override the system default
	Invalid Entry Message Override	The valid options are: • **Y** - override the system default with a pre-recorded Application Media Library file • **N** - (default) do not override the system default
	Note For more information about Timeout and Invalid Entry Messages, see System Media Files in Chapter 3, "Prompt Recording and Distribution."	

Table 2-10 shows several configuration examples for Menu when input type is DTMF

Table 2-10 Menu Configuration Examples

If the VRU Script Name field setting is…	It means…	If the Config Param setting is...	It means…
M,Banking	**M** – Use the Menu micro-app. **Banking** – Play the Media file named "Banking.wav." **Note** This file might contain a message such as: "For Checking, press 1. For Savings, press 2. For Money Market, press 3."	1-3	**1-3** – Accept numbers 1, 2, 3. Accept all other defaults (No Entry Timeout, Number of no entry tries, Number of invalid tries, Timeout Msg Override, Invalid Entry Msg Override).
M,Main_Menu	**M** – Use the Menu micro-app. **Main_Menu** – Play the Media file called "Main_Menu.wav." **Note** This file might contain a message such as: "For information or transactions on checking, press 1. For savings or club accounts, press 2. For other information, press 0. If you know your party's extension, press 9."	0-2/9,,4,2,2	**0-2/9** – Accept numbers 0, 1, 2, and 9. , (Skipped parameter) – Accept the default barge-in setting (Y). **4** – No Entry Timeout value (in seconds). **2** – Number of no entry tries allowed. **2** – Number of invalid tries allowed. Accept all other defaults (Timeout Msg Override, Invalid Entry Msg Override)

Table 2-10 shows several configuration examples for Menu is used in an ASR/TTS application:

Table 2-11 Menus Configuration Examples

If …	It means…	And, if...	It means…
The **user.microapp.inline_tts** ECC variable contains "Press 1 for Sales and 2 for Support." *and* **user.microapp.input_type** contains: **D** (DTMF) *and* The VRU Script Name field contains: **M**	Use the Menu micro-app to play the contents of the **user.microapp.inline_tts** ECC variable and collect DTMF input.	The Configuration Param field contains: **1-2,Y,4,3**	**1-2** – Accept the DTMF digits 1 and 2. **Y** – Barge-in allowed. **4** – No Entry Timeout value (in seconds). **3**– Number of no entry tries allowed.
The **user.microapp.input_type** ECC variable contains: **D** (DTMF) *and* The VRU Script Name field contains: **M,SalesService,A**	Use the Menu micro-app to play the media file named "SalesService.wav" (which is located in the Application Media library) and collect DTMF input.	The Configuration Param field contains: **1-2,N,4,3,2,Y,Y**	**1-2** – Accept the numbers 1 and 2. **N** – No barge-in allowed. **4** – No Entry Timeout value (in seconds). **3**– Number of no entry tries allowed. **2** – Number of invalid tries allowed. **Y**– Allow Timeout Msg Override. **Y** – Allow Invalid Entry Msg Override).
The **user.microapp.inline_tts** ECC variable contains "Press or Say 1 for Sales and 2 for Support." *and* **user.microapp.input_type** contains: **B** (the default, both DTMF and voice) *and* The VRU Script Name field contains: **M**	Use the Menu micro-app to play the contents of the **user.microapp.inline_tts** ECC variable and collect either DTMF or voice input.	The Configuration Param field contains: **1-2,Y,4,3**	**1-2** – Accept the DTMF digits 1 and 2. **Y** – Barge-in allowed. **4** – No Entry Timeout value (in seconds). **3**– Number of no entry tries allowed.

Table 2-11 Menus Configuration Examples (continued)

If …	It means…	And, if…	It means…
The **user.microapp.inline_tts** ECC variable contains "Press 1 for Sales and 2 for Support." *and* **user.microapp.input_type** contains: **B** (the default, both DTMF and voice) *and* The VRU Script Name field contains: **M**	Use the Menu micro-app to play the contents of the **user.microapp.inline_tts** ECC variable and collect DTMF or voice input.	The Configuration Param field contains: **1-2,Y,4,3**	**1-2** – Accept the DTMF digits 1 and 2. **Y** – Barge-in allowed. **4** – No Entry Timeout value (in seconds). **3**– Number of no entry tries allowed.
Note Type-ahead can *only* be used with the Menu micro-application when **user.microapp.input_type** is set to **D**. For more information, see the "Type-Ahead Support for ASR" section on page 2-48.			

Menu and Digit Entry Completion

The ISN tests Menu digit entry input against two conditions to determine whether digit entry is complete:

- If a caller enters a digit, the ISN checks whether the digit is within the set of valid digits for this menu.
- If a caller *does not* enter a digit, the ISN checks whether the No Entry Timeout value has been reached.

Caution It is important that you set up your NAM/ICM script to test for all the scenarios mentioned below.

If digit-entry is complete

After a caller enters a digit, the ISN validates the digit against the list of valid menu options that were defined through ICM Configuration Manager. Then the ISN does the following:

- If the digit is valid, the ISN stores the digit in the Call.CallerEnteredDigits variable, exits the node through the Checkmark (success) branch, and returns control to ICM software.
- If the digit is not valid, the ISN considers it an invalid entry and does the following:
  - If the Number of Invalid Entry Tries value *has not* been reached, the ISN plays the "invalid message" file and re-plays the menu prompt.
  - If the Number of Invalid Entry Tries value *has* been reached, the ISN stores the last-entered invalid digit in the Call.CallerEnteredDigits variable, exits the node through the X (failure) branch, sets the **user.microapp.error_code** ECC variable to **16** (Reached Maximum Invalid Tries), and returns control to ICM software.

If No Entry Timeout occurs

If the caller does not enter a digit within the No Entry Timeout period:

- If the Number of No Entry Tries value *has not* been reached, the ISN plays the "no entry" error message and re-plays the menu prompt.
- If the Number of No Entry Tries value *has* been reached, the ISN exits the node through the X (failure) branch, sets the Call.CallerEnteredDigits variable to NULL, the **user.microapp.error_code** ECC variable to **17** (Reached Maximum No Entry Tries), and returns control to ICM software.

Menu Error Code Settings

Menu can set **user.microapp.error_code** ECC variable to any of the following Return Status error codes:

1 - (Unused)

2 - Network Error

3 - System Error

4 - (Unused)

5 - Unknown micro-application

6 - Invalid VRU Script Name format

7 - Invalid Configuration Param

8 - Misconfigured ECC Variable

9 - Media file does not exist or invalid URL for Media file

10 - Semantic-Runtime Error

11 - Unsupported VXML format

12 - Unsupported VXML element

16 - Reached Maximum Invalid Tries

17 - Reached Maximum No Entry Tries

21 - Timed out

30 - Unsupported Locale

31 - Media Resource Error

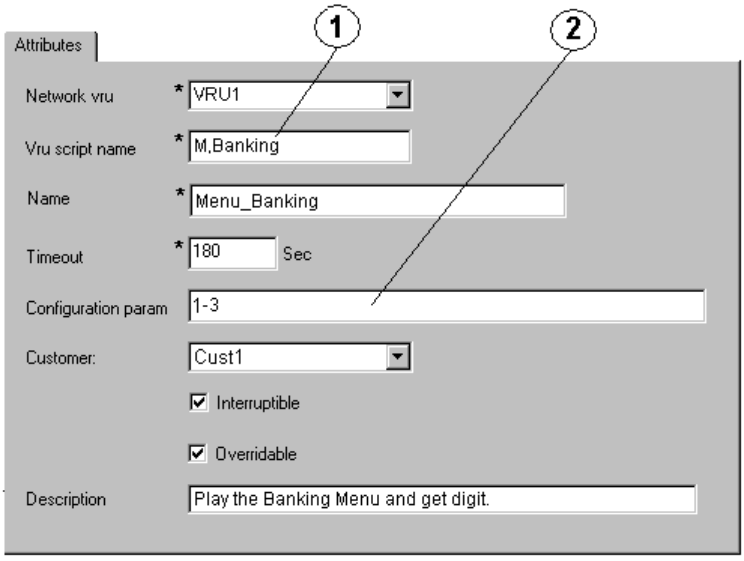
32 - General Error

Note The value in **user.microapp.error_code** ECC is passed from the ISN to the NAM/ICM when the X (failure) branch is taken. See the discussion at the end of the section Play Media Error Code Settings.

Menu Example: Bank Menu Options

This example shows sample ICM Configuration Manager and Script Editor screen captures for a Menu application that plays a prompt presenting a menu ("For Checking, press 1. For Savings, press 2. For Money Market, press 3."), retrieves any caller-entered digits, and allows three no-entry tries and three invalid attempts (the defaults).

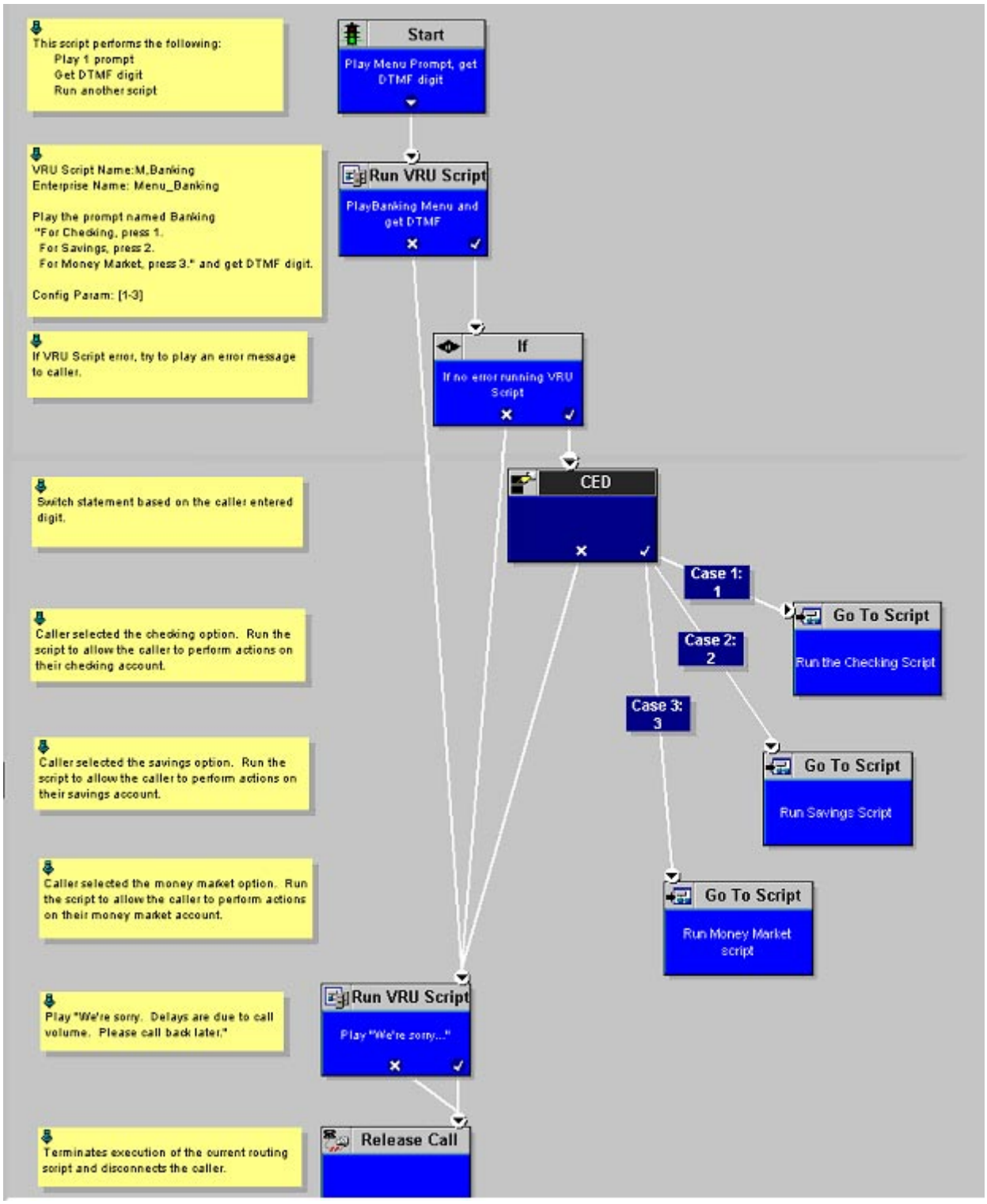
Figure 2-7 Bank Menu Configuration



The Network VRU Script List tool's Attribute tab in Figure 2-7 shows:

1. The VRU Script Name field containing two ISN parameters:
   - **M**. Menu
   - **Banking**. Media File name
2. The Configuration Param field containing the following ISN parameters:
   - **1-3**. The numbers. 1, 2, and 3 are valid options

Figure 2-8 Menu



Get Speech (GS) Micro-Application

The Get Speech (GS) micro-application collects input that is not digits after prompting a caller. The prompt can be generated by a media file or a TTS source.

The ISN passes the input back to the NAM/ICM for further processing using the **user.microapp.caller_input** ECC variable.

Use the ICM Configuration Manager's Network VRU Script List tool's Attribute tab to specify parameters.

Note The VRU Script Name and Configuration Param fields are case-sensitive. For example, **GS** is a valid entry; **gs** is not. Enter the values exactly as specified in Table 2-6.

Get Speech and Grammar Specification

There are three ways to specify a grammar in the Get Speech micro-application:

- Include a **Type of Data to Collect** setting in the Get Speech Configuration Param field for built-in grammars such as dates and numbers. If the "Type of Data to Collect" setting is specified, the other grammar options will not be used by the Application Server. Conversely, if you do not specify a "Type of Data to Collect" setting, then you must include either a built-in or external grammar.
- Include an external grammar file name in the Get Speech Configuration Param field's "External Grammar File Name" setting.
- Include a list of inline grammar choices in the **user.microapp.grammar_choices** ECC variable. These grammar choices will only be used if a "Type of Data to Collect" or "External Grammar File Name" setting is *not* specified.

Note One of these grammar options *must* be used for each micro-application. If no grammar option is specified, an Invalid Config Param error will be sent back to ICM software.

Note If you are using an external grammar, be sure to follow the instructions provided by your third-party vendor.

For details on writing an external grammar file, see the "External VXML File Contents" section on page 2-48.

Table 2-12 Get Speech Network VRU Script Configuration Parameters

Field Name	Setting	Description and Valid Options
VRU Script Name	Micro-application	This must be **GS** (Get Speech).
	Media File Name	Name of the media file or external VXML to be played (that is, the prompt file). The valid options are: • A file name (for instance, a.wav file) • ***null*** - (default) If this field is empty, ISN examines the contents of the **user.microapp.inline_tts** ECC variable. If this ECC variable contains a value, the ISN prompts using TTS. If the ECC is empty, no prompt is played.
	Media Library Type	Flag indicating the location of the media files to be played. The valid options are: • **A** - (default) Application • **S** - System **Note** This value is ignored if using TTS.
	Uniqueness value	Optional. A string identifying a VRU Script Name as unique.
Configuration Param	Type of Data to Collect	The type of data to collect. The valid options are: • ***null*** - (default) Leave this option empty if you will be specifying an External Grammar File Name setting. • **boolean** - Affirmative and negative phrases appropriate to the current locale. • **date** - Phrases that specify a date, including a month, days and year. • **currency** - Phrases that specify a currency amount. • **number** - Phrases that specify numbers. (For example, "one hundred twenty-three.") • **time** - Phrases that specify a time, including hours and minutes. **Note** For information about the format of the currency data returned to ICM software in the **user.microapp.caller_input** ECC variable, see the "Get Speech Data Format" section on page 2-44.
	External Grammar File Name	The name of the grammar file that holds the grammar definition for the ASR. The valid options are: • ***null*** - (default) Leaving this option empty implies that an inline grammar, as given in the Type of Data to Collect setting, will be used. • A grammar file name. The Gateway retrieves the grammar file from a Web Server using HTTP.
	Note For more information about the "Type of Data to Collect" and "External Grammar" settings, see "Get Speech and Grammar Specification" section on page 2-39	

Table 2-12 Get Speech Network VRU Script Configuration Parameters (continued)

Field Name	Setting	Description and Valid Options
Configuration Param (continued)	Barge-in Allowed	Specifies whether barge-in (digit entry to interrupt media playback) is allowed. The valid options are: • **Y** - (default) barge-in allowed • **N** - barge-in not allowed **Note** ISN deals with barge-in as follows: If barge-in **is not** allowed, the Voice Browser/Gateway continues prompt play when a caller starts entering input. If barge-in **is** allowed, the Voice Browser/Gateway discontinues prompt play when the caller starts entering input. (For more information, see the "Type-Ahead Support for ASR" section on page 2-48.)
	No Entry Timeout	The number of seconds a caller is allowed to begin entering digits. If exceeded, the system times-out. The valid options are: **0-99** (the default is 5).
	Number of No Entry Tries	Number of times the ISN repeats the "Get Speech" cycle when the caller does not enter any data after the prompt has been played. (Total includes the first cycle.) The valid options are: **1-9** (the default is 3).
	Number of Invalid Tries	Number of times the ISN repeats the "Get Speech" cycle when the caller enters invalid data. (Total includes the first cycle.) The valid options are: **1-9** (the default is 3).
	Timeout Message Override	The valid options are: • **Y** - override the system default with a pre-recorded Application Media Library file • **N** - (default) do not override the system default **Note** This value is ignored if using TTS.
	Invalid Entry Message Override	The valid options are: • **Y** - override the system default with a pre-recorded Application Media Library file • **N** - (default) do not override the system default **Note** This value is ignored if using TTS.
	Note For more information about Timeout and Invalid Entry Messages, see System Media Files in Chapter 3, "Prompt Recording and Distribution."	
	Incomplete Timeout	The amount of time after a caller stops speaking to generate an invalid entry error because the caller input does not match the defined grammar. The valid options are: **0-99** (the default is 3). **Note** This value is ignored when not using ASR. If the value is set to 0, the Application Server treats the NoEntry Timeout as NoError.

Table 2-7 shows several configuration examples for Get Speech.

Table 2-13 Get Speech Configuration Examples

If …	It means…	And, if…	It means…
The **user.microapp.inline_tts** ECC variable contains "What is your account value" *and* **user.microapp.input_type** contains: **B** (the default, both DTMF and voice) *and* The VRU Script Name field contains: **GS**	Use the Get Speech micro-app to play the contents of the **user.microapp.inline_tts** ECC variable and collect account balance in voice or DTMF input, which it passes in the **user.microapp.caller_input** ECC variable.	The Configuration Param field contains: **Currency,,N,5,2,1**	**Currency** – Collect a string of data in currency format **,** – Accept the default External Grammar File Name setting (empty). **Note** You accept the default because you are specifying a Type of Data to Collect parameter (Currency). **N** – No barge-in allowed. **5** – No Entry Timeout (seconds) **2** – Number of no entry tries **1** – Number of invalid tries

Table 2-13 Get Speech Configuration Examples (continued)

If …	It means…	And, if…	It means…
The **user.microapp.inline_tts** ECC variable contains "What department do you wish to speak to" *and* **user.microapp.input_type** contains: **B** (the default, both DTMF and voice) *and* **user.microapp.grammar_choices** contains **Sales/Customer Service/Help Desk** *and* The VRU Script Name field contains: **GS,Department,A**	Use the Get Speech micro-app play the contents of the **user.microapp.inline_tts** ECC variable and collect the answer, which will be passed in either voice or DTMF format in the **user.microapp.caller_input** ECC variable.	The Configuration Param field contains: **,,N**	**,** – Accept the default Type of Data to Collect parameter (empty) **Note** You accept the default Type of Data to Collect parameter because you are specifying a value in the External Grammar File Name parameter. **,** – Accept the default External Grammar File Name setting (empty) and use the grammar in the **user.microapp.grammar_choices** ECC variable **Note** This is an inline grammar example. Each option in the list of choices specified in the **user.grammar_choices** ECC must be delimited by a forward slash (/). **N** – No barge-in allowed.
The **user.microapp.inline_tts** ECC variable contains "What is your name" *and* **user.microapp.input_type** contains: **B** (the default, both DTMF and voice) *and* **user.microapp.media_server** contains **http://grammars.com** *and* **user.microapp.app_media_lib** contains **Boston** *and* The VRU Script Name field contains: **GS,YourName,A**	Use the Get Speech micro-app play the contents of the **user.microapp.inline_tts** ECC variable and collect the answer, which will be passed in either voice or DTMF format in the **user.microapp.caller_input** ECC variable.	The Configuration Param field contains: **,customers.grxml, N**	**,** – Accept the default Type of Data to Collect parameter (empty) **Note** You accept the default Type of Data to Collect parameter because you are specifying a value in the External Grammar File Name setting parameter. **customers.grxml** – Use the grammar in this file **Note** This is an external grammar file example. For details on writing an external grammar file, see the "External VXML File Contents" section on page 2-48. **N** – No barge-in allowed.

Get Speech and DTMF Input Collection

Contrary to its name, the Get Speech micro-application can also be used to collect DTMF input. For certain grammars, the caller could type a number, time, or currency rather than saying it.

Although the *Get Digits* micro-application is capable of providing the same type of functionality, it does not allow for validation at collection time. If a caller inputs **2 5 0 0** in response to a Get Speech prompt prompting the caller to enter a time, the Get Speech micro-application would detect that "twenty-five hundred hours" is an invalid entry. With the Get Digits micro-application, this kind of validation would need to be done using additional Script Editor nodes.

Note The caller cannot mix DTMF and speech in a single input, even if both are enabled. Once he starts talking, he cannot key-in characters, and vice versa.

Table 2-14 lists the rules associated with using DTMF collection in the Get Speech micro-application.

Table 2-14 DTMF Rules for Get Speech

Type of Data To Collect (as specified in the Config Params	Allows DTMF Input?	DTMF Rules[1]*
boolean	Yes	Valid DTMF inputs are: **1** (Yes) and **2** (No).
date	Yes	Valid DTMF inputs are: four digits for the year, followed by two digits for the month, and two digits for the day.*
currency	Yes	For DTMF input, the * (asterisk) key represents the decimal point.*
number	Yes	Valid DTMF input includes positive numbers entered using digits and the * (asterisk) key to represent a decimal point.
time	Yes	Since is no DTMF convention for specifying AM/PM, in the case of DTMF input, the result will always end with **h** or **?**.
External Grammars	No	
Inline Grammars	No	

1. Source: Voice Extensible Markup Language (VoiceXML) Version 2.0, W3C Working Draft, 23 October 2001, This Version: http://www.w3.org/TR/2001/WD-voicexml20-20011023

Note Regardless of the collection type (that is, "voice" or "DTMF"), caller input from Get Speech is always written to the **user.microapp.caller_input** ECC variable.

Get Speech Data Format

The data type determines the format of the information returned to ICM software in the **user.microapp.caller_input** ECC variable:

- **Boolean**. Returned to ICM software as "true" or "false."

- **Date**. Returned to ICM software as a fixed-length date string with the format *yyyymmdd* where *yyyy* is the year, *mm* is the month, and *dd* is the day.
- **Currency**. Returned to ICM software as a string with the format *UUUmmm.mm* or *mmm.mm*, where *UUU* is the three-character currency indicator (for example, USD), and *mmm.mm* is the currency amount with a decimal point.

Note Whether *UUU* is used depends both on the ASR capabilities and on whether the caller said it unambiguously (for example, "dollar" and "peso" are ambiguous).

- **Number**.Returned to ICM software as a string of digits from 0 to 9 which can optionally include a decimal point and/or a plus or minus sign as a prefix to indicate that the numbers ia a positive or negative number.
- **Time**. Returned to ICM software as a five-character string in the format *hhmmx*, where *hh* is hours, *mm* is minutes and *x* is one of the following:
  - **a** - AM
  - **p** - PM
  - *?* - unknown/ambiguous

Get Speech and Entry Completion

The ASR Engine tests Get Speech input entry against two conditions to determine whether entry is complete:

- If a caller enters input, the ASR Engine checks whether the input is within the set of valid grammar for this script.
- If a caller *does not* enter input, the ASR Engine checks whether the No Entry Timeout value has been reached.

Caution It is important that you set up your NAM/ICM script to test for all the scenarios mentioned below.

If input entry is complete

After a caller enters input, the ASR Engine validates the input against the valid grammar set that was defined using the Set node to define the **user.microapp.grammar_choices** ECC variable. Then the ISN does the following:

- If the input is valid, the ISN stores the input in the **user.microapp.caller_input** ECC variable, exits the node through the Checkmark (success) branch, and returns control to ICM software.
- If the input is not valid, the ISN considers it an invalid entry and does the following:
  - If the Number of Invalid Entry Tries value *has not* been reached, the ISN plays the "invalid message" file and re-plays the menu prompt.
  - If the Number of Invalid Entry Tries value *has* been reached, the ISN stores the last-entered invalid digit in the Call.CallerEnteredDigits variable, exits the node through the X (failure) branch, sets the **user.microapp.error_code** ECC variable to **16** (Reached Maximum Invalid Tries), and returns control to ICM software.

If No Entry Timeout occurs

If the caller does not enter input within the No Entry Timeout period:

- If the Number of No Entry Tries value *has not* been reached, the ISN plays the "no entry" error message and re-plays the prompt.
- If the Number of No Entry Tries value *has* been reached, the ISN exits the node through the X (failure) branch, sets the **user.microapp.caller_input** ECC variable to NULL, the **user.microapp.error_code** ECC variable to **17** (Reached Maximum No Entry Tries), and returns control to ICM software.

Get Speech Error Code Settings

Get Speech can set **user.microapp.error_code** ECC variable to any of the following Return Status error codes:

1 - (Unused)

2 - Network Error

3 - System Error

4 - (Unused)

5 - Unknown micro-application

6 - Invalid VRU Script Name format

7 - Invalid Configuration Param

8 - Misconfigured ECC Variable

9 - Media file does not exist or invalid URL for Media file

16 - Reached Maximum Invalid Tries

17 - Reached Maximum No Entry Tries

21 - Timed out

30 - Unsupported Locale

31 - Media Resource Error

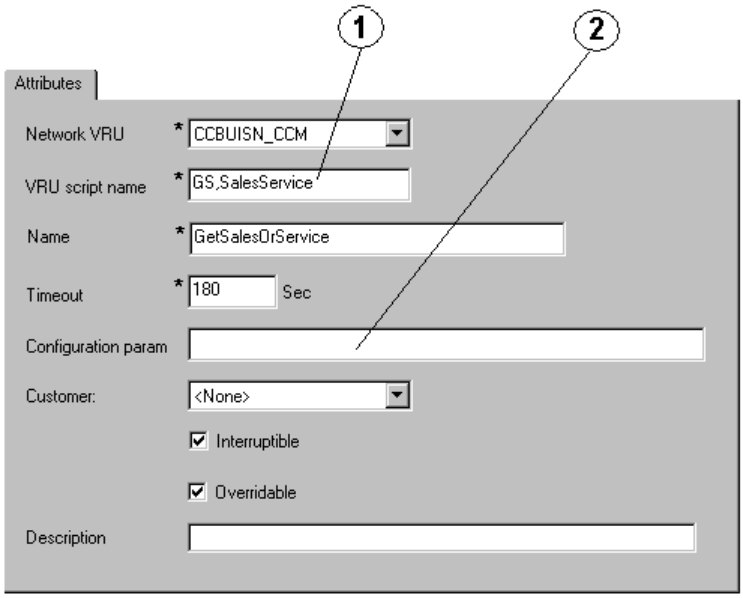
32 - General Error

Note The value in **user.microapp.error_code** ECC is passed from the ISN to the NAM/ICM when the X (failure) branch is taken. See the discussion at the end of the section Play Media Error Code Settings.

Get Speech Example: "Do you want Sales or Service?"

This example shows sample ICM Configuration Manager and Script Editor screen captures for a Get Speech application that plays a prompt that presents a menu ("For Sales, say "Sales." For Service, say "Service"), retrieves ASR input and places it in the **user.microapp.user_input** ECC variable, and runs another script. (The second script that is run is determined by the ASR input.)

Figure 2-9 Get Speech Configuration

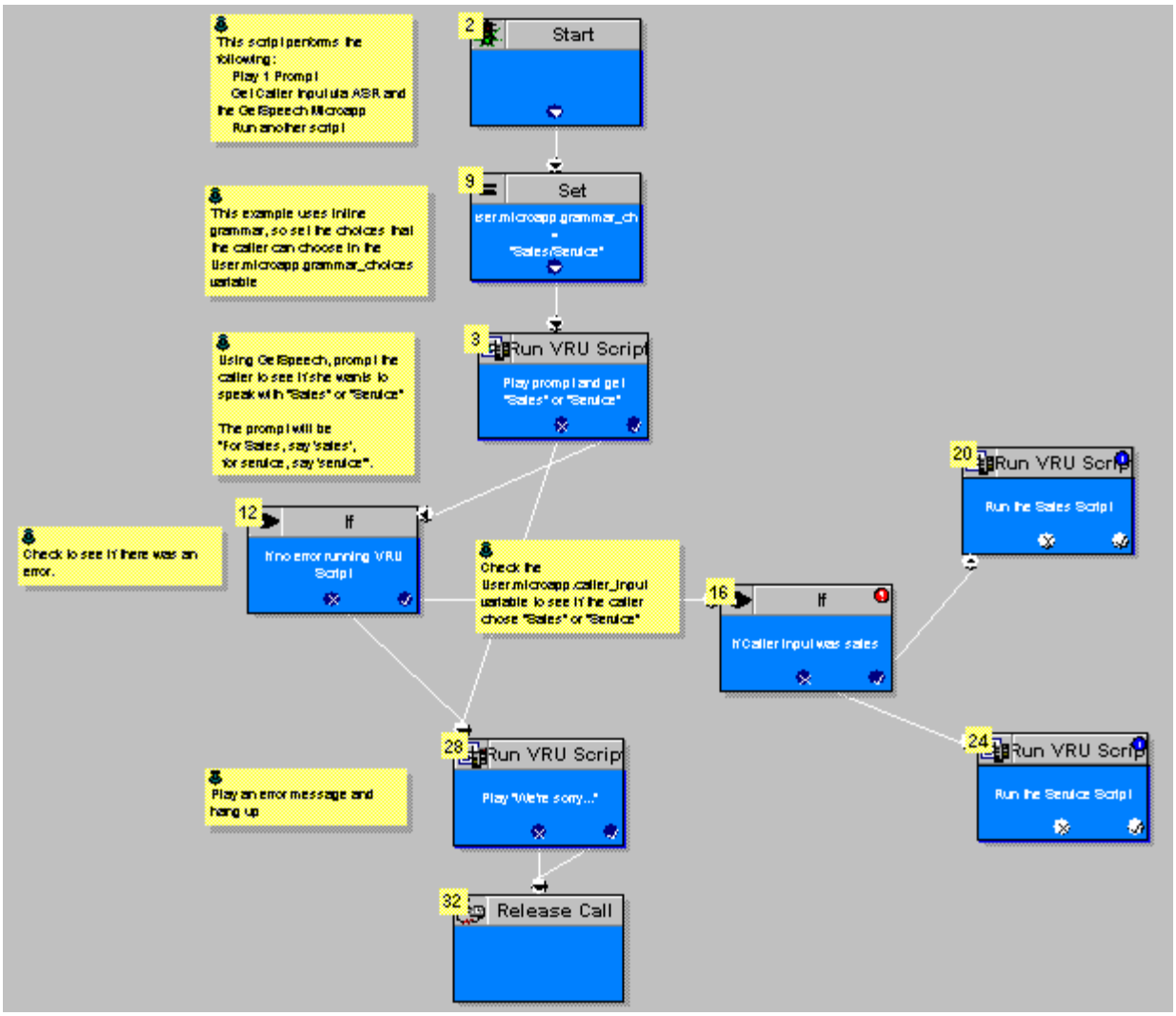


The Network VRU Script List tool's Attribute tab in Figure 2-5 shows:

1. The VRU Script Name field containing the following ISN parameters:
   - **GS**. Get Speech
   - **SalesService**. Media File name
2. The Configuration Param field is empty; the ISN applies the defaults for parameters set through this field.

Figure 2-6 shows the contents of the script:

Figure 2-10 Get Speech Script



Type-Ahead Support for ASR

Type-ahead support for ASR is only supported for DTMF under the following conditions:

- When the ISN Voice Browser is the client.
- When the Gateway is the client and input type is set to **D**.

External VXML File Contents

An external VXML file must follow the following rules:

- It must not use the **<Goto>**, **<submit>**, **<subdialog>**, **<transfer>**, or **<exit>** elements.
- It must have **<return>** elements at all exit points in the document.

- It must check for all error events and the “telephone.disconnect.hangup” event. Each event handler must have a **<return>** element that makes use of the “event” attribute.
- If the “Id” attribute of the **<form>** element is used, it must exactly match the name of the external name defined in the Play Media VRU Script name.

Example 2-1 illustrates the contents of a VXML document that follows these rules.

Note Example 2-1assumes that the VRU Script Name value is **PM,CustomerVXML,V**.

Example 2-1 External VXML Document

```
<?xml version="2.0" encoding="iso-8859-1"?>
<vxml version="2.0">

<form id="CustomerVXML" scope="dialog">

<block>
<prompt bargein="true">
    <audio src="http://webserver.com/myapp/Hello_World.wav" />
</prompt>

</block>

<catch event="error.badfetch">
<return event="error.badfetch"/>
</catch>

<catch event="error.semantic">
<return event="error.semantic"/>
</catch>

<catch event = "error.unsupported.format">
<return event="error.unsupported.format"/>
</catch>

<catch event = "error.unsupported.element">
<return event="error.unsupported.element"/>
</catch>

<catch event="telephone.disconnect.hangup">
<return event="telephone.disconnect.hangup"/>
```

```
</catch>

<catch event="error">
<return event="error"/>
</catch>

<block>
<return/>
</block>
</form>
</vxml>
```

Note For a complete explanation of VXML file grammar format, see http://www.w3.org/TR/speech-grammar/. Also, consult the user documentation for your ASR Server for a list of supported grammar elements.

Example 2-2 illustrates another external grammar file that might be used to prompt callers for the state that they live in.

Example 2-2 External VXML Document

```
<?xml version = 1.0 ?>

<grammar version= 1.0 root= action xml:lang= en-us >

<rule id= action scope= public >

<one-of>

<item> California </item>

<item> Arizona </item>

<item> Connecticut </item>

</one-of>

</rule>

</grammar>
```

After a caller responds with the name of the state she lives in, the ASR Engine determines if the caller said **California**, **Arizona**, or **Connecticut**. If the caller said the name of one of these states, the text listed in the **<item>** element will be passed to the Application Server—and, in turn—ICM software. If a caller responds with a name not included in this list, an invalid entry error is returned to the Application Server.

Prompt Recording and Distribution

This chapter provides:

- Information about ISN media file handling.
- Details about the System Media Files distributed with ISN Version 2.0.

Note This chapter contains important information for IVR application developers. It also may be of interest to Call Center Managers, ISN System Managers, and ICM/NAM System Managers.

Media File Overview

This section presents a brief overview of how ISN performs media file handling. It includes information about:

- What the Media Server is.
- The media file names and types ISN supports.
- How to specify the address of a media file.
- Locale syntax backward compatibility.

Media Server

In ISN, the Media Server is a computer or set of computers, which "serve" the media files that contain messages and prompts that callers will hear. There are two types of Media Servers defined in ISN according to the mechanism where the media file is accessed:

1. File Media Server: Media Files are located on the same machine as the ISN Voice Browser and accessed by the ISN Voice Browser using File protocol.
2. HTTP Media Server: Media Files are located on a remote Web server and accessed by both ISN and the Non-ISN Voice Browser using HTTP protocol. This type of Media Server uses standard Web access methods.

There is no artificial limit on the number of prompts; these pages will be limited only by file system capacity.

Note To maximize ISN performance, do not install the HTTP Media Server on the same machine as the ISN Voice Browser and Application Server.

Tools for prompt creation are off-the-shelf, such as Cool Edit Pro by Syntrillium Software Corporation (http://www.syntrillium.com), and Vox Studio (http://www.xentec.be).

Note It is the customer's responsibility to select the tool, select a voice talent, record the system and application media files in the supported locales, format and encoding, and contact the person who is responsible for the media files on the Media Server(s).

Media File Names and Types

A *media file name* is specified in the ICM VRU Script Configuration and used in the Run VRU Script request for the Play Media, Get Digits, Menu, and Get Speech (in non-TTS applications) micro-applications. The media file naming convention allows alpha-numeric characters with the underbar character as a separator. (Spaces or hyphens are not allowed.) This naming convention provides a mechanism for an "understandable" naming convention as opposed to numeric media file names typically used by stand-alone VRUs.

Caution The ISN includes a library of media files/prompts for individual digits, months (referenced internally by ISN software for a Play Data script type request), and default error messages, etc. **Creation of a *full set of media/prompts for each locale* referenced by the ISN customer is the responsibility of the customer's Media Administrator.**

For specific comments on the Voice Browser critical media file, see the section System Media File Error Messages.

The *media file types* ISN supports are Mu-Law 8-bit .wav files and A-law 8-bit .wav files. Media files specified with an extension will be used "as is," for example, **hello.xxx**. (The default file extension is .wav.)

Caution Any unexpected (and unsupported) type of media file encountered will generate the logging of an error and a result code of False will be returned to the ICM along with the ECC **user.microapp.error_code** set appropriately. From the caller's perspective, nothing was played, however it is the Script Editor developer's responsibility to write the script to handle this error condition.

Locations of Media Files on Hard Disk

Figure 3-1 displays the location of the media file when using File://../MediaFiles. The ISN installation will create the folder "MediaFiles" with a sample set of English system media files, if the component "System Media File" is checked.

Figure 3-1 Location of Media File When Using File://../MediaFiles

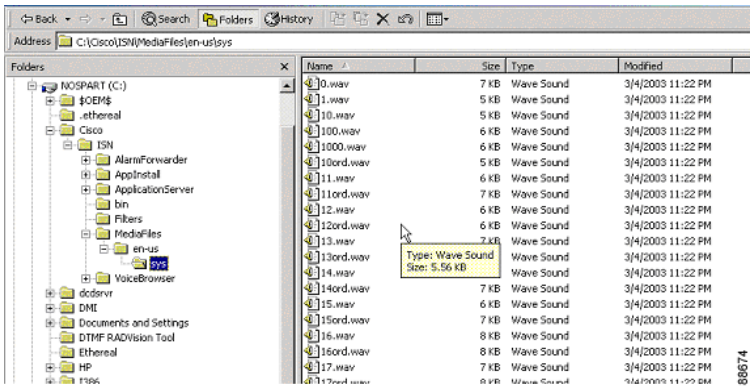
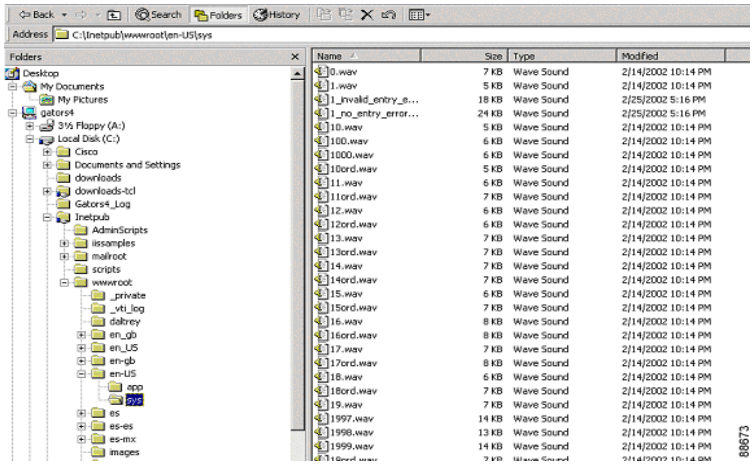


Figure 3-2 displays the location of the media files when using HTTP protocol. Windows Internet Information server (IIS) is used as an example of the Web server.

Figure 3-2 Location of Media File When Using HTTP Protocol



Media File Address

The address for media files that reside on the Media Server(s) is generated by the ISN. The ICM provides information about the file location or base URL address in the ICM/IVR messages it passes when the Run VRU Script node is executed. The ICM/IVR messages include ECC variables for: locale, media server set address, as well as optional system and application library name overrides. (For details about the ICM/IVR messages passed to the ISN, see Chapter 2, “Using NAM/ICM with the ISN IVR Solution.”)

The Table 3-1 summarizes the data that combines to form the address of the media file:

Table 3-1 Media File Address Components

Parameter	Location of Data	Description	Examples
Media Server Set	ECC variable: user.microapp.media_server **Default**: file://../MediaFiles **Note** You must insert two periods after the double slash (//).	File location or base URL for the Media Server. When the Media Server URL is the DNS name and the DNS Server is configured to return multiple IP addresses for a host name, the ISN will attempt to get the media files from each Media Server IP address in sequence with the priority given to those on the subnet. When using the Media Server set for external grammars or external VXML, if the Media Server URL is the DNS name with multiple IP addresses for the hostname, it is the ASR Engine's responsibility to decide which machine to retrieve the grammar file from.	File location example: **file://../MediaFiles** Base URL example: **http://www.machine1.com/dir1/ dirs/cust1** **Note** By convention, the service provider may include their customers' name at the end of the Media Server set.
Locale	ECC variable: user.microapp.locale **Default**: en-us	This field is a combination of language and country with a default of en-us for English spoken in the United States.	en-us
Note In ISN Version 2.0, the supported locales are: **en-us** (English, United States) and **en-gb** (English, United Kingdom), **es-es** (Spanish, Spain), and **es-mx** (Spanish, Mexico). The locale defines the grammar of a Play Data script type. If a date is to be played with a locale of **en-gb** (English, United Kingdom), the date would be played in the order of day, month, then year; for **en-us**, it is month, day, year.			
Media Library Type	The Media Library Type value passed from the VRU Script Name field. Valid options are: **A** - Application prompt library. **S** - System prompt library. **V** - External VXML. **Default**: A	The media library (directory) for the prompt is either the application prompt library defined by ECC variable user.microapp.app_media_lib (default "app") or the system prompt library defined by ECC variable user.microapp.sys_media_lib (default "sys"). **Note** When the Media Library Type is **V** (external VXML), the VXML file will reside in the Application Prompt Library.	**A** (user.microapp.app_media_ lib= app_banking)

Table 3-1 Media File Address Components (continued)

Parameter	Location of Data	Description	Examples
Media File Name	The Media File Name value passed from the VRU Script Name field. Valid options are the name of the .wav file to be played, or external VXML file name, or <*blank*>, which translates to playing no media. This file name will be ignored if TTS is being used (that is, if the **user.microapp.inline_tts** ECC variable contains a value.) **Default**: none	Name of media file or external VXML file to be played.	Main_menu
Note There are four possible reasons for using <*blank*> as the Media File Name: (1) For Get Digits, a prompt may not be necessary, (2) the customer may want to have a "placeholder" in the script for playing a prompt which may or may not be there (that is, an emergency conditions message), (3) change the value of barge-in to indicate a buffer flush, and (4) TTS is being used and this field is ignored.			
Media File Name Type	If not given as part of the Media File Name, the type is .wav	Type of media file to be played.	.wav

Based on the examples shown in Table 3-1, two valid addresses for the Media File might be:

- **http://www.machine1.com/dir1/dirs/cust1/en-us/app_banking/main_menu.wav**
- **file://../MediaFiles/en-us/sys/main_menu.wav**

Locale Backward Compatibility

In ISN Version 2.0, the locale string values have been changed to be compatible with current industry nomenclature:

- **en_US** has changed to **en-us**. That is, "**en** *underscore* **US**" (upper case) has changed to "**en** *hyphen* **us**" (lower case).
- **en_GB** has changed to **en-gb**. That is, "**en** *underscore* **GB**" (upper case) has change to **"en** *hyphen* **gb**" (lower case).

ISN 2.0 will be backwards-compatible with existing ISN 1.0 scripts.

- **en_US** and **en-us** both map to U.S. English in the Application Server for use by the Application Server's internal grammar.
- **en_GB** and **en-gb** both map to U.K. English in the Application Server for use by the Application Server's internal grammar.
- The base URL for media prompts will use the locale that is specified, without making modifications. For example, if the locale is set to **EN_US**, the base URL will contain **EN_US**. if the locale is set to **XX**, the base URL will contain **XX**.

If you still want to use the ISN Version 1.0 default locale directory (for example, **en_US**), you will need to explicitly set it. When you upgrade to ISN 2.0, only the new files are installed under the ISN 2.0 default locale directory, **en-u**s.You want to have all your system prompts under one directory and all your application prompts and, optionally, external VXML in another directory. Use the **user.microapp.locale** ECC variable to set the locale directory you want to use, such as **en_US**.

Note You do not need to set the **user.microapp.locale** ECC variable if you used the default **en-us**. Also, remember that all locale values are case-sensitive.

System Media Files

This section contains tables describing the System Media Files used by ISN Version 2.0.

Note It is the **Customer/Media Administrator's** responsibility to record all the system prompts for all the locales.

Table 3-2 lists the System Media File information for cardinal numbers.

Note If you intend on using the **es-es** and/or **es-mx** locales, you must record the system prompts noted in the tables below by an **es** in the Language Usage column or as not supplied as part of the ISN installation. The only characters denoted as **es** that are provided with the installation are punctuation, such as upside down question marks and exclamation points.

Table 3-2 System Media Files, Cardinal Numbers

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			point	point	Number
			minus	minus	Number
0	48	All	0	zero	All except DOW
1	49	All	1	one (masculine version), uno (es-mx and es-es)	All except DOW
1	49	es	1_N	Un (neutral)	Time, elapsed time
1	49	es	1_F	Una (for time with 1 hour)	Time
2	50	All	2	two	All except DOW
3	51	All	3	three	All except DOW
4	52	All	4	four	All except DOW
5	53	All	5	five	All except DOW
6	54	All	6	six	All except DOW
7	55	All	7	seven	All except DOW
8	56	All	8	eight	All except DOW
9	57	All	9	nine	All except DOW
			10	ten	All except Char and DOW
			11	eleven	Same for the rest of all the numbers

Table 3-2 System Media Files, Cardinal Numbers (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			12	twelve	
			13	thirteen	
			14	fourteen	
			15	fifteen	
			16	sixteen	
			17	seventeen	
			18	eighteen	
			19	nineteen	
			20	twenty	
			21	twenty-one	
		es	21_N	veintiún	Time
		es	21_F	veintiuna	Elapsed time with hours
			22	twenty-two	
			23	twenty-three	
			24	twenty-four	
			25	twenty-five	
			26	twenty-six	
			27	twenty-seven	
			28	twenty-eight	
			29	twenty-nine	
			30	thirty	
			31	thirty-one	
		es	31_N	treinta y un	Time
		es	31_F	treinta y una	Elapsed time with hours
			32	thirty-two	
			33	thirty-three	
			34	thirty-four	
			35	thirty-five	
			36	thirty-six	
			37	thirty-seven	
			38	thirty-eight	
			39	thirty-nine	
			40	forty	
			41	forty-one	
		es	41_N	cuarenta y un	Time

Table 3-2 System Media Files, Cardinal Numbers (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
		es	41_F	cuarenta y una	Elapsed time with hours
			42	forty-two	
			43	forty-three	
			44	forty-four	
			45	forty-five	
			46	forty-six	
			47	forty-seven	
			48	forty-eight	
			49	forty-nine	
			50	fifty	
			51	fifty-one	
		es	51_N	cincuenta y un	Time
		es	51_F	cincuenta y una	Elapsed time with hours
			52	fifty-two	
			53	fifty-three	
			54	fifty-four	
			55	fifty-five	
			56	fifty-six	
			57	fifty-seven	
			58	fifty-eight	
			59	fifty-nine	
			60	sixty	
			61	sixty-one	
		es	61_N	sesenta y un	All except Char and DOW
			62	sixty-two	
			63	sixty-three	
			64	sixty-four	
			65	sixty-five	
			66	sixty-six	
			67	sixty-seven	
			68	sixty-eight	
			69	sixty-nine	
			70	seventy	
			71	seventy-one	
		es	71_N	setenta y un	Time

Table 3-2 System Media Files, Cardinal Numbers (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			72	seventy-two	
			73	seventy-three	
			74	seventy-four	
			75	seventy-five	
			76	seventy-six	
			77	seventy-seven	
			78	seventy-eight	
			79	seventy-nine	
			80	eighty	
			81	eighty-one	
		es	81_N	ochenta y un	Time
			82	eighty-two	
			83	eighty-three	
			84	eighty-four	
			85	eighty-five	
			86	eighty-six	
			87	eighty-seven	
			88	eighty-eight	
			89	eighty-nine	
			90	ninety	
			91	ninety-one	
		es	91_N	noventa y un	Time
			92	ninety-two	
			93	ninety-three	
			94	ninety-four	
			95	ninety-five	
			96	ninety-six	
			97	ninety-seven	
			98	ninety-eight	
			99	ninety-nine	
		es	500_es	quinientos	Number,Date,Currency
		es	700_es	setecientos	Number,Date,Currency
		es	900_es	novecientos	Number,Date,Currency
			oh	oh	24TOD, Date
			hundred	hundred	Number,24TOD,Date,Currency

Table 3-2 System Media Files, Cardinal Numbers (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
		es	hundred_es1	ciento	Number,Date,Currency
		es	hundred_es2	cientos	Number,Date,Currency
			thousand	thousand	Number,Date,Currency
			million	million	Number,Currency
		es	million_es	millones	Number,Currency
			billion	billion	Number,Currency
			trillion	trillion	Number,Currency
		es	trillion_es	billones	Number,Currency

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Table 3-3 lists the System Media File information for ordinal numbers.

Note If ordinal system prompts are to be used in a script for a purpose other than dates, they should be recorded as application prompts with the true ordinal values.

Table 3-3 System Media Files, Ordinal Numbers

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			1ord	first	Date
			2ord	second	Date for all the ordinal numbers
			3ord	third	
			4ord	fourth	
			5ord	fifth	
			6ord	sixth	
			7ord	seventh	
			8ord	eighth	
			9ord	ninth	
			10ord	tenth	
			11ord	eleventh	
			12ord	twelfth	
			13ord	thirteenth	
			14ord	fourteenth	
			15ord	fifteenth	
			16ord	sixteenth	
			17ord	seventeenth	
			18ord	eighteenth	

Table 3-3 System Media Files, Ordinal Numbers (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			19ord	nineteenth	
			20ord	twentieth	
			21ord	twenty-first	
			22ord	twenty-second	
			23ord	twenty-third	
			24ord	twenty-fourth	
			25ord	twenty-fifth	
			26ord	twenty-sixth	
			27ord	twenty-seventh	
			28ord	twenty-eighth	
			29ord	twenty-ninth	
			30ord	thirtieth	
			31ord	thirty-first	

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Table 3-4 lists the System Media File information for measurement.

Table 3-4 System Media Files, Measurement

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
½	189	All	one_half	one half	Char
¼	188	All	one_quarter	one quarter	Char
¾	190	All	three_quarters	three quarters	Char

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Table 3-5 lists the System Media File information for letter values.

Table 3-5 System Media Files, Letter

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
A,a	65,97	All	a	A	Char
B,b	66,98	All	b	B	Char
C,c	67,99	All	c	C	Char
D,d	68,100	All	d	D	Char
E,e	69,101	All	e	E	Char
F,f	70,102	All	f	F	Char

Table 3-5 System Media Files, Letter (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
G,g	71,103	All	g	G	Char
H,h	72,104	All	h	H	Char
I,I	73,105	All	i	i	Char
J,j	74,106	All	j	J	Char
K,k	75,107	All	k	K	Char
L,l	76,108	All	l	L	Char
M,m	77,109	All	m	M	Char
N,n	78,110	All	n	N	Char
O,o	79,111	All	o	O	Char
P,p	80,112	All	p	P	Char
Q,q	81,113	All	q	Q	Char
R,r	82,114	All	r	R	Char
S,s	83,115	All	s	S	Char
T,t	84,116	All	t	T	Char
U,u	85,117	All	u	U	Char
V,v	86,118	All	v	V	Char
W,w	87,119	All	w	W	Char
X,x	88,120	All	x	X	Char
Y,y	89,121	All	y	Y	Char
Z,z	90,122	All	z	Z	Char
Œ, œ	140,156		oe_140_156	Ligature OE	Char
À,à	192,224		a_192_224	A grave	Char
Á, á	193,225	es	a_193_225	A acute	Char
Â, â	194,226		a_194_226	A circumflex	Char
Ã, ã	195,227		a_195_227	A tilde	Char
Ä, ä	196,228		a_196_228	A umlaut	Char
Å, å	197,229		a_197_229	A with ring above	Char
Æ, æ	198,230		ae_198_230	Ligature AE	Char
Ç, ç	199,231	es	c_199_231	C cedilla	Char
È, è	200,232		e_200_232	E grave	Char
É, é	201,233	es	e_201_233	E acute	Char
Ê, ê	202,234		e_202_234	E circumflex	Char
Ë, ë	203,235		e_203_235	E umlaut	Char
Ì, ì	204,236		i_204_236	I grave	Char

Table 3-5 System Media Files, Letter (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
Í. í	205,237	es	i_205	I acute	Char
Î, î	206,238		i_206	I circumflex	Char
Ï, ï	207,239		i_207	I umlaut	Char
Ð	208		char_208	character 208	Char
Ñ, ñ	209,241	es	n_209_241	N tilde	Char
É, é	201,233		e_201_233	E acute	Char
Ê, ê	202,234		e_202_234	E circumflex	Char
Ë, ë	203,235		e_203_235	E umlaut	Char
ð	240		char_240	character 240	Char
Ò, ò	210,242		o_210_242	O grave	Char
Ó, ó	211,243	es	o_211_243	O acute	Char
Ô, ô	212,244		o_212_244	O circumflex	Char
Õ, õ	213,245		o_213_245	O tilde	Char
Ö, ö	214,246		o_214_246	O umlaut	Char
×	215	All	multiply	multiplication sign	Char
Ø, ø	216,248		o_216_248	oh stroke	Char
Ù, ù	217,249		u_217_249	U grave	Char
Ú, ú	218,250		u_218_250	U acute	Char
Û, û	219,251		u_219_251	U circumflex	Char
Ü, ü	220,252		u_220_252	U umlaut	Char
Ý, ý	221,253		y_221_253	Y acute	Char
Þ	222		char_222	character 222	Char
ß	223		ss	double s	Char
÷	247	All	divide	division sign	Char
þ	254		char_254	character 254	Char
Ÿ,ÿ	159,255		y_159_255	character 159 or 255	Char

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Table 3-6 lists the System Media File information for month values.

Table 3-6 System Media Files, Month

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			January	January (es = January of)	Date
			February	February (es = February of)	Date

Table 3-6 System Media Files, Month (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			March	March (es = March of)	Date
			April	April (es = April of)	Date
			May	May (es = May of)	Date
			June	June (es = June of)	Date
			July	July (es = July of)	Date
			August	August (es = August of)	Date
			September	September (es = September of)	Date
			October	October (es = October of)	Date
			November	November (es = November of)	Date
			December	December (es = December of)	Date

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Table 3-7 lists the System Media File information for day values.

Table 3-7 System Media Files, Day

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			Sunday	Sunday	DOW
			Monday	Monday	DOW
			Tuesday	Tuesday	DOW
			Wednesday	Wednesday	DOW
			Thursday	Thursday	DOW
			Friday	Friday	DOW
			Saturday	Saturday	DOW

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Table 3-8 lists the System Media File information for time values.

Table 3-8 System Media Files, Time

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			hour	hour	Etime,*24TOD per locale*,*TOD perlocale*
			hours	hours	Etime,24TOD,TOD per locale
			minute	minute	Etime
			minutes	minutes	Etime
			second	second	Etime,24TOD
			seconds	seconds	Etime24TOD
			on	on	per locale(unused for en-us)
			at	at	per locale(unused for en-us)
			am	a.m.	TOD
			pm	p.m.	TOD
			oclock	oclock	TOD

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Table 3-9 lists the System Media File information for currency values.

Note The customer's Media Administrator may prefer to replace the contents of "currency_minus" (for the negative amount) and "currency_and" (the latter can even be changed to contain silence).

Table 3-9 System Media Files, Currency

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
		All	currency_ minus	minus	Currency
		All	currency_and	and	Currency
$	36	All	USD_dollar	dollar	Currency
			Note ISN Version 2.0 uses the USD_dollar.wav and USD_dollars.wav media files; the dollar.wav and dollars.wav used by ISN Version 1.0 are no longer installed.		
$	36	All	CAD_dollar	dollar	Currency
		All	USD_dollars	dollars	Currency
		All	CAD_dollars	dollars	Currency
¢	162	All	cent	cent	Currency
		All	cents	cents	Currency
		All	euro	euro	Currency

Table 3-9 System Media Files, Currency (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
Pound symbol	163	All	GBP_pound	pound	Currency
		All	GBP_pounds	pounds	Currency
		All	penny	penny	Currency
		All	pence	pence	Currency
		All	MXN_peso	peso	Currency
		All	MXN_pesos	pesos	Currency
		All	centavo	centavo	Currency
		All	centavos	centavos	Currency

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Table 3-10 lists the System Media File information for gaps of silence and miscellaneous phrases.

Table 3-10 System Media Files, Silence and Miscellaneous Phrases

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
			silence_.1_ sec	(.1 second of silence)	Used for pauses where needed
			silence_.25_ sec	(.25 second of silence)	Used for pauses where needed
			silence_.5_ sec	(.5 second of silence)	Used for pauses where needed
			silence__ sec	(1 second of silence)	Used for pauses where needed
			and	and	Etime,TOD,25TOD

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Table 3-11 lists the System Media File information for ANSI Characters.

Table 3-11 System Media Files, ANSI Characters

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
	32		space	space	Char
!	33		exclamation_ mark	exclamation mark	Char
"	34		double_ quote	double quote	Char
#	35		pound	pound	Char
%	37		percent	percent	Char

Table 3-11 System Media Files, ANSI Characters (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
&	38		ampersand	ampersand	Char
'	39		apostrophe	apostrophe	Char
(	40		open_ parenthesis	open parenthesis	Char
)	41		close_ parenthesis	close parenthesis	Char
*	42		asterisk	asterisk	Char
+	43		plus	plus	Char
,	44		comma	comma	Char
-	45		hyphen	hyphen	Char
.	46		period	period	Char
/	47		slash	slash	Char
:	58		colon	colon	Char
;	59		semicolon	semicolon	Char
<	60		less_than	less than	Char
=	61		equal	equal	Char
>	62		greater_than	greater than	Char
?	63		question_ mark	question mark	Char
@	64		at_symbol	at	Char
[	91		left_square_ bracket	left square bracket	Char
\	92		backslash	backslash	Char
]	93		right_square _bracket	right square bracket	Char
^	94		caret	caret	Char
_	95		underscore	underscore	Char
`	96		single_quote	single quote	Char
{	123		open_brace	open brace	Char
|	124		pipe	pipe	Char
}	125		close_brace	close brace	Char
~	126		tilde	tilde	Char
,	130		char_130	low single quote	Char
f	131		char_131	F with hook	Char
„	132		char_132	low double quote	Char
…	133		ellipsis	ellipsis	Char

Table 3-11 System Media Files, ANSI Characters (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
†	134		char_134	character 134	Char
‡	135		char_135	character 135	Char
ˆ	136		char_136	character 136	Char
‰	137		per_mille	per mille	Char
Š	138		char_138	character 138	Char
‹	139		left_pointing _angle	left pointing angle	Char
‘	145		left_single_ quote	left single quote	Char
’	146		right_single_ quote	right single quote	Char
“	147		left_double_ quote	left double quote	Char
”	148		right_double _quote	right double quote	Char
•	149		bullet	bullet	Char
	150		en_dash	en dash	Char
–	151		em_dash	em dash	Char
˜	152		small_tilde	small tilde	Char
™	153		trade_mark	trade mark	Char
š	154		char_154	character 154	Char
›	155		char_155	character 155	Char
¡	161	es	exclamation_ mark_ inverted	inverted exclamation mark	Char
¤	164		char_164	character 164	Char
¦	166		broken_pipe	broken pipe	Char
§	167		section	section	Char
¨	168		char_168	character 168	Char
©	169		copyright	copyright	Char
ª	170		char_170	character 170	Char
«	171		left_double_ angle_ quote	left double angle quote	Char
¬	172		not	not	Char
-	173		char_173	character 173	Char
®	174		registered	registered	Char
¯	175		char_175	character 175	Char

Table 3-11 System Media Files, ANSI Characters (continued)

Symbol (where applicable)	Decimal Value[1]	Language Usage	Media File Name	Media File Content	Data Play Back Types / When Media File Is Used
°	176		degree	degree	Char
±	177		plus_minus	plus or minus	Char
²	178		superscript_ 2	superscript two	Char
³	179		superscript_ 3	superscript three	Char
´	180		acute_accent	acute accent	Char
µ	181		micro	micro	Char
¶	182		paragraph	paragraph	Char
·	183		middle_dot	middle dot	Char
¸	184		cedilla	cedilla	Char
¹	185		superscript_ 1	superscript one	Char
º	186		char_186	character 186	Char
»	187		right_double _angle_ quote	right double angle quote	Char
¿	191	es	question_ mark_ inverted	inverted question mark	Char

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System Media File Error Messages

Three error messages are included with the System Media files:

- **Critical media**. Message played when system problem exists and the Voice Browser cannot process the call. (Example content for **en-us**: "We are currently experiencing technical difficulties with the site, please try again later and we can serve you much better.") The critical media file is NOT located on the media server, but is instead located on the Voice Browser.
  - **ISN Voice Browser**. Critical_Error_Alaw.wav and Critical_Error_Ulaw.wav under /Cisco/ISN/VoiceBrowser.
  - **Non-ISN Voice Browser**. Error.wav in each configuration folder under /Cisco/ISN/ApplicationServer/Downloads.

Note You must record the "override" prompts to replace the critical media files, save them with the hard-coded names, and place them in their original locations.

- **no_entry_error**. Message played when the caller does not respond to a menu prompt. (Example content for en-us: "Please make a selection.") The original prompt is then repeated.
- **invalid_entry_error**. Message played when the caller enters an incorrect response to a menu prompt. (Example content for en-us: "Your entry is invalid.") The original prompt is then repeated.

These files are shared by all applications.

If a dialogue needs to be altered for a specific Get Digits or Menu request in the ICM script, override flags can be set in the Network VRU Script Configuration Parameters.

Note Override flags are available for the Get Digits and Menu micro-applications, only. For more information, see Chapter 2, "Using NAM/ICM with the ISN IVR Solution."

You must record the "override" prompts, save them with the hard coded names <*prompt name*>_no_entry_error.wav and <*prompt_name*>_invalid_entry_error.wav, and place them with other application-specific media files in the Application Media library.

Note This override will not work when there is not a specific file name used (for instance, when ISN is using the TTS feature).

Voice Browser Administration

This chapter provides the following:

- An overview of the ISN Voice Browser.
- Instructions for using the VB Admin tool.
- Descriptions of each of the VB Admin commands.

Note The primary audience for this chapter is ISN System Managers.

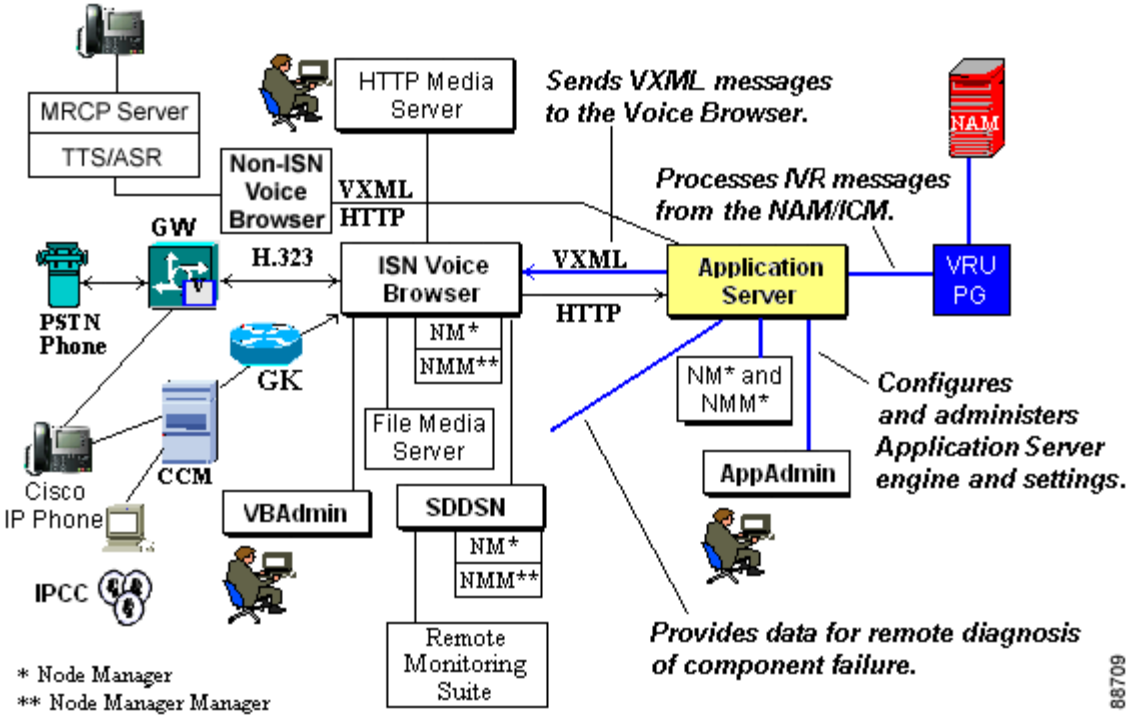
Voice Browser Overview

The Voice Browser serves several key roles in the ISN architecture. It:

- Functions as the initial VoIP end-point for voice contacts.
- Coordinates the delivery of messages and prompts to a caller from the Media Server.
- Sends HTTP requests to the Applications Server.
- Processes VXML messages from the Application Server.

Figure 4-1 illustrates these functions.

Figure 4-1 Roles of the Voice Browser



On its *incoming call* side, the Voice Browser processes call and control signals from PSTN calls entering the system at a Cisco Gateway. (The Gateway converts them into H.323 messages before forwarding them to the Voice Browser.)

Once in control of the call, the Voice Browser converts the voice signals into events to be processed by a web server known as the *Applications Server*. The Voice Browser connects to the Applications Server through a pre-defined URL address. (For more information, see the "How does the Voice Browser connect to an Application Server?" section below.)

The Voice Browser remains in the call control path until the call's logical completion. (The Applications Server never directly controls a telephone call.)

On its *outgoing* side, the Voice Browser acts upon VXML commands received from the Application Server. The VXML commands contain instructions for:

- Transferring the telephone call.
- Delivering recorded messages and prompts.
- Processing user responses to the prompts.

How does the Voice Browser connect to an Application Server?

The Voice Browser needs to know an Application Server to send requests to; ISN installation sets the default Application Server address to **localhost:8000/servlet/isn**.

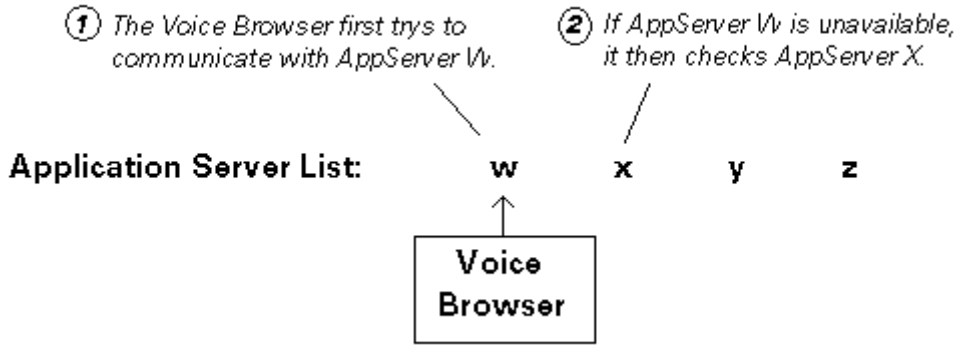
Note The Voice Browser configuration tool can be used to modify the list as needed. If the Application Server list changes, the first Application Server on the new list will be used.

There is one Application Server list for all calls. As shown in Figure 4-2, the Voice Browser selects an Application Server as follows:

1. When the Voice Browser starts up, it attempts to connect with the first Application Server in the list, AppServer W.
2. If AppServer W does not respond, the Voice Browser will go to the next Application Server in the list, AppServer X.
3. If the Voice Browser can communicate with Application Server AppServer X, the next call is handled by that Application Server.

Note If a call arrives and AppServers X, Y, and Z do not respond, the Voice Browser goes back to the beginning of the list and tries the Application Servers up to the original starting point (that is, AppServer W). If the Voice Browser tries all Application Servers and there is no response, an alarm is generated. The Voice Browser takes itself out of service and refuses calls. It will continue to communicate with each of the Application Servers and, when one of them is available, goes back in service.

Figure 4-2 Application Server



If the Application Server list changes, the first Application Server on the new list will be used. The change will be used for new calls only.

Out of Band Communications

The Voice Browser has two types of connections to the Application Server:

- One initiated by the Voice Browser for "normal" call steps such as playing media.
- Another initiated by the Application Server for processing information asynchronous to the normal call steps, for example, for transferring a queued call.

This later form of communication is referred to as *out of band*.

The Voice Browser Media File

The Voice Browser has one media file. This file contains a prompt to be played to a caller in case of a critical error where the ISN system cannot properly play information to the caller through the normal routes (that is, through the Application Server).

The name and location of this .wav file is one of the following:

<*target directory*>**\Critical_Error_Alaw.wav**

<*target directory*>**\Critical_Error_Ulaw.wav**

where <target directory> is the path specified during installation, typically **C:\Cisco\ISN\VoiceBrowser**.

The customer should record the appropriate message for their installation and replace the placeholder one which was installed with the product—keeping the placeholder's name and codec. The file should be either the A-law or u-law encoded file, depending on the encoding used in the system and configured in the Voice Browser. (For more information, see Chapter 3, "Prompt Recording and Distribution.")

After the Voice Browser plays the message, it disconnects the call.

VB Admin Tool

The Voice Browser includes a configuration and administration tool—called **VB Admin**—to help you keep track of the Voice Browser's interactions with the components described in the previous section. This tool provides a command line interface (CLI) you can use to:

- Gather statistics.
- Modify configuration settings.
- View system metrics and status.
- Control the Voice Browser.

Note In order for the VB Admin tool to function, the Voice Browser must be running.

Since there are often many Voice Browsers in network installations, VB Admin can be run locally or remotely, or redirected to monitor a different Voice Browser. VB Admin can also accept a script as input, enabling you to execute a command or set of commands on a set of Voice Browsers.

The sections that follow describe the VB Admin tool, its commands, and how to use them.

VB Admin Command Syntax

There are two types of VB Admin commands: *Show* commands let you view the configuration settings; *Set* commands let you change the settings. The syntax for the VB Admin commands is:

***show<Parameter>*[/? | /help]**

***set<Parameter>*[<*NewValue*> | /? | /help]**

where:

- ***show<Parameter>*** or ***set<Parameter>*** is the command, for example, **ShowGateKeeper** or **SetAppServerNumTries**.
- ***NewValue*—**only used with Set commands —is the new setting for the parameter.
- **/?** and **/help** are two options for accessing VB Admin Online Help.

Note ***NewValue*** must be enclosed in quotes *only* if you are defining multiple settings for a parameter using one command. For example, to define one Application Server Name, you would enter: **SetAppServerList AS_Lowell** (no quotes). To define *three* Application Server Names at one time, you would enter: **SetAppServerList "AS_Lowell AS_Salem AS_SanJose"** (with quotes).

After you enter a "Show" or "Set" command, VB Admin responds with messages that fall into one of the following types:

- **Informational/Online Help**. Examples: "***AppServerNumTries*** is currently ***3***." "Valid values: 256 character string."
- **Confirmational**. Example: "***AppServerNumTries*** has been changed from ***3*** to ***5***."
- **Error**. Example: "Entered value needs to be a positive integer."

The first two message types are described in the Command tables in the "Using VB Admin" section. Error messages are described in "VB Admin Error Handling".

VB Admin Online Help

When you enter **/?** or **/help** after a valid command, VB Admin displays Help text consisting of:

- A description of the command, including any default setting and when changes to configuration take effect.
- The syntax of the command.

Table 4-1 shows some Online Help examples.

Table 4-1 VB Admin Online Help Examples

Command	Help Message
ShowAppServerNumTries /?	Maximum number of times the Voice Browser will try to connect to the Application Server before failing and reporting an error. ShowAppServerNumTries [/? | /help] SetAppServerNumTries [<NewValue> | /? | /help]
SetTraceMask /help	For use by Technical Support, only. Default: 101003HEX Changes to this value take effect immediately. (System shutdown and startup unnecessary.) ShowTraceMask [/? | /help] SetTraceMask [<NewValue> | /? | /help]

Note To obtain an alphabetical list of *all* commands supported by VB Admin, enter **mhelp** at the VB Admin CLI prompt.

Using VB Admin

This section describes how to use the VB Admin CLI tool.

How to use the VB Admin tool locally

Note In order for the VB Admin tool to function, the Voice Browser must be running.

Step 1 Select **Start > Programs > Cisco Internet Service Node > Voice Browser > VB Admin**. A window containing a command line prompt (>>>>) appears.

Step 2 Enter a **show<*Parameter*>** or **set<*Parameter*>** command you want to execute.

Note VB Admin commands are not case-sensitive.

Step 3 When finished using VB Admin, enter **q**. The VB Admin window closes.

How to use the VB Admin tool remotely

You can use VB Admin to access a remote machine by changing the pointer to the VB machine.

Step 1 At the DOS prompt, enter the command:

vbadmin <*VB machinename*>

Step 2 Enter a **show<*Parameter*>** or **set<*Parameter*>** command you want to execute.

Note VB Admin must be installed on any machine you want to access remotely.

The sections that follow describe the VB Admin commands by category.

VB Admin Configuration Commands

Table 4-2 VB Admin Configuration Commands

Show and Set Command Syntax	Description
ShowAppServerList [/? | /help] SetAppServerList [<*List of AppServer base URLs, delimited by spaces*> | /? | /help] *(Shorthand commands: sASList, SetASList)*	List of base URLs of Application Servers for the Voice Browser, delimited by spaces and the entire list enclosed in quotes. The syntax for the base URL is: **<AppServer>:<Port>/servlet/isn** where: <*AppServer*> is the hostname or IP address of the machine that is running the Application Server. (Default: localhost.) <*Port*> is the port number the Application Server is listening on. (Default: 8000.) */servlet/isn* is a fixed string that you **must** append to each name in the AppServerList. **Note** A colon (:) must separate the <AppServer> and <Port> values. In addition, it is strongly suggested that you use the default Port number and treat "servlet/isn" as a fixed string. Making changes to these value can render an Application Server unusable. IP Address and DNS name may be used in configuring the base URL portion of an Application Server. However, the ISN cannot currently support more than one IP address per DNS name, so you must have a one-to-one correspondence between a DNS name and IP address for each Application Server. When defining multiple ***List of AppServer base URLs*** settings, enclose them in quotes (for example: **SetASList "AS_Boston:8000/servlet/isn AS_SanJose:8000/servlet/isn"**). Changes to this value take effect immediately. (System shutdown and startup unnecessary.) **Note** For more information, see "How does the Voice Browser connect to an Application Server?"on page 4-3.
ShowAppServerNumTries [/? | /help] SetAppServerNumTries [<NewValue> | /? | /help] *(Shorthand commands: sASTries, SetASTries)*	Maximum number of times the Voice Browser will try to connect to the Application Server before failing and reporting an error. Default: 3 System shutdown and startup necessary for changes to take effect.
ShowAppServerTimeout [/? | /help] SetAppServerTimeout [<NewValue> | /? | /help] *(Shorthand commands: sASTimeout, SetASTimeout)*	Number of seconds the Voice Browser should wait for a response from the Application Server before timing out and generating an error. **Note** This setting **must** be greater than the Application Server's Server Timeout setting. (For information about setting Server Timeout, see Chapter 5, "Application Server Administration.") Default: 7 seconds System shutdown and startup necessary for changes to take effect.

Table 4-2 VB Admin Configuration Commands (continued)

Show and Set Command Syntax	Description
ShowCalledPartyTimeout [/? | /help] SetCalledPartyTimeout [<NewValue> | /? | /help] *(Shorthand commands: sCPT, SetCPT)*	Length of time in seconds to wait for additional instructions from the ICM after the Called Party (that is, agent) hangs up. If no instructions are received, the Voice Browser disconnects the caller. Default: 2 System shutdown and startup necessary for changes to take effect.
ShowCodec [/? | /help] SetCodec [g711Ulaw64k | g711Alaw64k | /? | /help] *(Shorthand command: sCodec)*	Type of codec and rate used in the Voice Browser when communicating with another VoIP endpoint. Default: g711Ulaw64k **Note** All H.245 channel signalling and RTP streams are based on the codec setting. The Voice Browser will only accept the prompt files with the same encoding as the codec setting. If instructed to play an audio file with a different encoding, the prompt will not be played and an error will be generated. System shutdown and startup necessary for changes to take effect
ShowGatekeeper [/? | /help] SetGateKeeper [<NewValue> | /? | /help] *(Shorthand commands: SGK, SetGK)*	IP address for the Gatekeeper serving the Voice Browser. A value of "none" or no value means the Gatekeeper is not being used (which means calls cannot be transferred). Valid values: IP address or "none" Default: none (or no value) System shutdown and startup necessary for changes to take effect.
ShowH323ID [/? | /help] SetH323ID [<NewValue> | /? | /help] *(Shorthand command: sH323ID)*	This value defines a unique identification for this H323 endpoint in a H323 network. This is the IP address of the machine by convention. Only needed if using the IP transfer feature and a gatekeeper. Valid values: 256 character string Default: Local IP address System shutdown and startup necessary for changes to take effect.
ShowMaxIVRPorts [/? | /help] SetMaxIVRPorts [<NewValue> | /? | /help] *(Shorthand command: sMaxIVRPorts)*	Maximum number of calls in the Voice Browser which are allowed to receive IVR treatment at any given time. If the number of calls exceed the MaxIVRPorts value, additional calls arriving at the Voice Browser will be rejected. **Note** Even when a Gateway is acting as the IVR—as can be the case in an ISN Comprehensive deployment—you still need a small number of IVR ports on the Voice Browser, based on the incoming calls per second and subsequent transfers. Use the Max IVR Ports listing in the Voice Browser Total Statistics log to help make decisions regarding IVR port sizing. Default: 50 System shutdown and startup necessary for changes to take effect.

Table 4-2 VB Admin Configuration Commands (continued)

Show and Set Command Syntax	Description
ShowMaxTotalCalls [/? | /help] SetMaxTotalCalls [<NewValue> | /? | /help] *(Shorthand command: sMaxTotalCalls)*	Maximum total number of calls allowed in the Voice Browser. Default: 135 System shutdown and startup necessary for changes to take effect.
ShowMediaServerTimeout [/? | /help] SetMediaServerTimeout [<NewValue> | /? | /help] *(Shorthand command: sMSTime)*	Number of seconds the Voice Browser should wait for a response from the Media Server before timing out and reporting an error. The Voice Browser will attempt to get the media file from all the IP addresses in sequence resolved by the DNS server for the Media Server URL. The timeout value is for every IP address resolved by DNS server for the media server URL. Default: 10 System shutdown and startup necessary for changes to take effect.
ShowMediaServerTries [/? | /help] SetMediaServerTries [<NewValue> | /? | /help] *(Shorthand commands: sMSTries, setMSTries)*	Maximum number of retries the Voice Browser will attempt (in addition to the original attempt) in trying to connect to the media server before failing and reporting an error. The Voice Browser will attempt to retry every IP address resolved by the DNS server for the Media Server URL. The MediaServerTries is the number of retries for each IP address resolved by the DNS server. Voice Browser does all the tries on each media server before moving to the next media server. Default: 1 System shutdown and startup necessary for changes to take effect.
ShowNewCallOnly [/? | /help] SetNewCallOnly [<on | off> | /? | /help] *(Shorthand commands: sNco, setNco)*	Determines whether a call will be restarted from the beginning if there is a NAM/ICM or Application Server problem during the course of the call. Set this value to "on" to restart calls. (Because pre-routed calls cannot be restarted, turning this setting on means that you do not expect any pre-routed calls to come to this Voice Browser, i.e., only new calls arrive at this Voice Browser.) **Note** Do not set this value to "on" if you expect any pre-routed calls to come to this Voice Browser. The ISN cannot restart pre-routed calls. Default: off Valid Values: on, off Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowNumOutOfBand [/? | /help] SetNumOutOfBand [<NewValue> | /? | /help] *(Shorthand commands: sOutofBand, SetOutofBand)*	Number of connections the Voice Browser should reserve per Application Server for performing out of band communications, such as transferring a queued call. Default: 3 System shutdown and startup necessary for changes to take effect.

Table 4-2 VB Admin Configuration Commands (continued)

Show and Set Command Syntax	Description
ShowNMRestartTimer [/? /help] SetNMRestartTimer [value /? /help]	Number of seconds the Node Manager waits to restart the Voice Browser if it isn't operating properly. Delaying the restart gives transferred calls ample time to terminate conversations normally. Default: 1800 seconds System shutdown and startup necessary for changes to take effect.
ShowOutOfBandConsecFails [/? | /help] SetOutOfBandConsecFails [<NewValue> |/? | /help] *(Shorthand commands: sOBFail, SetOBFail)*	Maximum number of consecutive times the Voice Browser can try to connect to the out of band channels before failing and reporting an error. Default: 3 System shutdown and startup necessary for changes to take effect.
ShowOutOfBandTimeout [/? | /help] SetOutOfBandTimeout [<NewValue> | /? | /help] *(Shorthand commands: sOBTime, SetOBTime)*	Number of seconds the Voice Browser should wait to connect to out of band Channels before failing and reporting an error. Default: 60 seconds **Note** There is a relationship between this setting and the Application Server's Heart Beat Timeout setting. The Heart Beat Timeout should be *two times* the OutOfBandTimeout setting. (For information about setting Heart Beat Timeout, see Chapter 5, "Application Server Administration.") System shutdown and startup necessary for changes to take effect.
ShowRAIMaxThreshold [/? | /help] SetRAIMaxThreshold [<NewValue> | /? | /help] *(Shorthand commands: sRaiMax, SetRaiMax)*	(H.323 Stack). A percentage of MaxInCalls. If the number of active incoming calls exceeds (RAIMaxThreshold/100)*MaxTotalCalls or exceeds (RAIMaxThreshold/100)*maxIVRports - (currentTransferedCalls * (takebackPercentage/100)), an RAI indicator instructs the Gatekeeper to stop routing further incoming calls to this Voice Browser. Valid values: 0 - 100 Default: 80 **Note** RaiMinThreshold must be less than RaiMaxThreshold. Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowRAIMinThreshold [/? | /help] SetRAIMinThreshold [<NewValue> | /? | /help] *(Shorthand commands: sRaiMin, SetRaiMin)*	(H.323 Stack). A percentage. If the number of active incoming calls drops below (RAIMinThreshold/100)*MaxTotalCalls or (RAIMinThreshold/100)*maxIVRports - (currentTransferedCalls * (takebackPercentage/100)), an RAI indicator instructs the Gatekeeper to start routing incoming calls to this Voice Browser. Valid values: 0 - 100 Default: 70 **Note** RaiMinThreshold must be less than RaiMaxThreshold. Changes to this value take effect immediately. (System shutdown and startup unnecessary.)

Table 4-2 VB Admin Configuration Commands (continued)

Show and Set Command Syntax	Description
ShowRNATimeout [/? | /help] SetRNATimeout [<NewValue> | /? | /help] *(Shorthand commands: sRNATimeout)*	Ring-no-answer (RNA) timeout. When transferring a call, the number of seconds the Voice Browser should wait for the called party to answer the call, after it has started ringing, before failing and reporting an error. Valid Values: 15 - 180 Default: 15 seconds System shutdown and startup necessary for changes to take effect.
ShowSDDSNRestartLinkTime [/? | /help] SetSDDSNRestartLinkTime [<NewValue> | /? | /help] *(Shorthand commands: sSDDSNLinkTime, SetSDDSNLinkTime)*	The number of seconds the Voice Browser should wait before attempting to reconnect to SDDSN. Default: 5 Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowSDDSNRetries [/? | /help] SetSDDSNRetries [<NewValue> | /? | /help] *(Shorthand command: sSDDSNRetries)*	The upper limit of geometric growth for the time between retries when both SDDSN instances are having problems. Default: 5 **Note** This means the Voice Browser will retry after 1 minute, then 4 (2*2) minutes, 9 (3*3) minutes, 16 (4*4) minutes, 25 (5*5) minutes. If a default of 5 is being used, all subsequent retry attempts will be spaced 25 minutes apart. (For more information, see "Understanding SDDSN Retry Settings" in Chapter 7, "Alarm Handling and Logging.") Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowSDDSN1Node [/? | /help] SetSDDSN1Node [<NewValue> | /? | /help] *(Shorthand commands: sSDDSN1, SetSDDSN1)*	The host name or IP address of the first SDDSN instance. Use this command to define the host name or IP address of the SDDSN instance. (If there is only one SDDSN in service, set **SDDSN2Node** to the same value as **SDDSN1Node**.) Default: NULL Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowSDDSN1Port [/? | /help] SetSDDSN1Port [<NewValue> | /? | /help] *(Shorthand command: sSDDSN1Port)*	The listening port number for the first SDDSN instance. Use this command if you want to change the listening port number to a value *other* than the default. Default: 40080 Changes to this value take effect immediately. (System shutdown and startup unnecessary.)

Table 4-2 VB Admin Configuration Commands (continued)

Show and Set Command Syntax	Description
ShowSDDSN2Node [/? | /help] SetSDDSN2Node [<NewValue> | /? | /help] *(Shorthand commands: sSDDSN2, SetSDDSN2)*	The host name or IP address of the second SDDSN instance. (If there is only one SDDSN in service, SDDSN2Node should be set to the same node as SDDSN1Node.) Use this command to define the host name or IP address of the SDDSN instance. (If there is only one SDDSN in service, set **SDDSN2Node** to the same value as **SDDSN1Node**.) Default: NULL Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowSDDSN2Port [/? | /help] SetSDDSN2Port [<NewValue> | /? | /help] *(Shorthand command: sSDDSN2Port)*	The listening port number for the second SDDSN instance. Use this command if you want to change the listening port number to a value *other* than the default. Default: 40080 Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowSDDSNLastNode [/? | /help] *(Shorthand command: sSDDSNLastNode)*	**Read-only parameter**. Indicates the last node where a successful connection was made: 1 - SDDSN1 2 - SDDSN2
ShowSDDSNTimeout [/? | /help] SetSDDSNTimeout [<NewValue> | /? | /help] *(Shorthand command: sSDDSNTimeout)*	Number of seconds the Voice Browser should wait for the initial message from SDDSN after a connection has been established before failing and reporting an error. Default: 5 Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowSetupCallingNum [/? | /help] SetSetupCallingNum [CLI|DNIS /? /help]	Controls whether the Dialed Number (DNIS) or Calling Line Identification (CLI) is used as the Calling Party Number in VoIP messages during IP Call Transfer. When this value is set to “CLI”, CLI (if present) will be passed in the Calling Party Number parameter of the Setup message during IP Transfer; when set to “DNIS”, DNIS will be passed. Valid Values: CLI, DNIS Default: CLI Changes to this value take effect immediately. (System shutdown and startup unnecessary.)

Table 4-2 VB Admin Configuration Commands (continued)

Show and Set Command Syntax	Description
ShowTakebackPercentage [/? | /help] SetTakebackPercentage [<NewValue> | /? | /help] *(Shorthand commands: sTakePct, SetTakePct)*	Percentage of currently transferred calls for which IVR ports should be reserved for queuing or other IVR treatment. Default: 0 (zero) Changes to this value take effect immediately. (System shutdown and startup unnecessary.) For example, if the MaxIVRPorts setting is **100**, MaxTotalCalls is **300**, and TakebackPercentage is **10**, it would mean the following: • If no calls are currently transferred, the Voice Browser would accept up to 100 calls IVR. • If 50 calls are currently transferred, the Voice Browser would accept up to 95 calls IVR (then there would be 145 total calls and the Voice Browser would stop accepting new ones). • If 200 calls currently transferred, the Voice Browser would accept up to 80 IVR (then there would be 280 total calls and the Voice Browser would stop accepting new ones). • At 300 calls, the Voice Browser would still have room for 70 IVR but would stop taking calls, anyway, because the total number of calls would have been reached.
ShowTechPrefix [/? | /help] SetTechPrefix [<NewValue> | /? | /help] *(Shorthand command: sTechPrefix)*	Controls a prefix required for inbound call routing. The value must match the tech-prefix value of the Gateway dial-peer(s) that route to this Voice Browser and the tech-prefix value in the Gatekeeper. Default: 2# System shutdown and startup necessary for changes to take effect.
ShowTransferCLI [/? | /help] SetTransferCLI [<on | off> | /? | /help] *(Shorthand command: sTransferCLI)*	Controls whether the Dialed Number (DNIS) or Calling Line Identification (CLI) is used as the source address in VoIP messages during IP Call Transfer. When this value is set to "on," the CLI (if present) will be passed in the SrcInfo parameter of the ARQ message during IP Transfer; when set to "off," the DNIS will be passed. Valid Values: on, off Default: off Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowVbRestartTimer [/? /help] SetVbRestartTimer [value /? /help]	Number of seconds the Voice Browser should wait to restart itself if it isn't operating properly. Delaying the restart gives transferred calls ample time to terminate conversations normally. Default: 1800 seconds Changes to this default take effect immediately.

Note The Voice Browser has two types of connections to the Application Server: one initiated by the Voice Browser for normal call steps, such as playing media, and one where the Application Server is supplying the processing information asynchronous to the normal call steps, for example, for transferring a queued or already-transferred call. The later form of communication is referred to as "out of band."

VB Admin Logging Commands

For more information about logging, see Chapter 7, "Alarm Handling and Logging."

Table 4-3 VB Admin Logging Commands

Show and Set Command Syntax	Description
ShowCallTrace [/? | /help] SetCallTrace [<on | off> | /? | /help] *(Shorthand command: sCallTrace)*	When "on," the Voice Browser logs basic call detail information to the console and log files. Valid Values: on, off Default: off Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowInterfaceTrace [/? | /help] SetInterfaceTrace [<on | off> | /? | /help] *(Shorthand command: sIntTrace, setIntTrace)*	When "on," the Voice Browser logs interface details to the console and log files. Valid Values: on, off Default: off Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowTraceMask [/? | /help] SetTraceMask [<NewValue> | /? | /help] *(Shorthand command: sTraceMask)*	For use by Technical Support, only. Default: 101003HEX Changes to this value take effect immediately. (System shutdown and startup unnecessary.)

VB Admin Metric and Control Commands

The Voice Browser keeps track of significant events and measurements; these metrics are logged at regular intervals and can be displayed on demand. Measurements of latency for particular actions (retrieving a voice file, for instance), are counted for the interval in which they complete, as opposed to the interval in which they start.

Most VB Admin Metric commands are display-only (that is, in **show<*Parameter*>** syntax).

Note For information on how Voice Browser metrics are logged, see "Voice Browser Logging and Metrics" in Chapter 7, "Alarm Handling and Logging."

Table 4-4 VB Admin Metric and Control Commands

Command Syntax	Description
DisconnectCall [<LocalID> | /? | /help] *(Shorthand command: DisCall)*	Disconnects the call identified by Local ID from the active call list (after confirmation).
ShowActiveCalls [/? | /help]	Displays the following information about each call active in the Voice Browser: • Local ID • Unique Call ID • Creation Time • State • Duration • DNIS • ANI • Last Application Server the call accessed • Last Media Server the call accessed
ShowCallHistory [<CallID> | /? | /help] *(Shorthand command: sCallHist)*	For use by Technical Support, only. Can be used to print out a detailed call history of an active call. Either the long or short call id may be entered as the argument. Default: none

Table 4-4 VB Admin Metric and Control Commands (continued)

Command Syntax	Description
ShowIntervalStatistics [/? | /help]	Displays the interval time, and a series of counts, averages and maximums during that interval. The statistics include: • Interval size. • Number of new calls. • Number of calls transferred. • Number of calls rejected (if Voice Browser is out of service). • Number of transfer errors. • Number of prompts not ready - this is the number of times a prompt was playing, and before the end of the prompt was reached, the Voice Browser had to stop playing the prompt because the next part of the file had not yet been received. • Number of prompts not found. • Number of calls using critical media, that is, that were prematurely terminated because of internal errors (in which case a "system error" message is played to the caller). • Number of calls terminated (call may have begun in a previous interval). • Percent of total system CPU used - average, minimum, maximum and standard deviation. • For each Voice Browser, average, minimum, maximum and standard deviation of the latency statistics in processing a new call arrival. • For each Voice Browser, average, minimum, maximum and standard deviation of the latency statistics in processing a successful transfer, measuring the time from when the Voice Browser receives the Transfer command from the Application Server to the time of alerting. • For each Voice Browser, average, minimum, maximum and standard deviation of the latency statistics in processing a successful transfer, measuring the time from alerting to when the called party answers. • For each Application Server, average, minimum, maximum and standard deviation of the latency statistics in communicating with Application Server for call processing requests, and the number of message exchanges (requests to the Application Server from the Voice Browser). **Note** Averages, minimums, maximums and standard deviation statistics are calculated by using current data (occurring within this interval), not rolling averages (occurring over multiple intervals). Call latency is displayed in milliseconds.

Table 4-4 VB Admin Metric and Control Commands (continued)

Command Syntax	Description
ShowLogMeters [/? | /help] SetLogMeters [<on | off> | /? | /help] *(Shorthand command: sLogMeters)*	Controls logging metrics. When "on," the Voice Browser will log metrics to the console and log files at the interval specified by the Message Meter Interval setting. Metrics are always available on demand for the last interval(s). Valid Values: on, off Default: on Changes to this value take effect immediately.
ShowMeterInterval [/? | /help] SetMeterInterval [<NewValue> | /? | /help] *(Shorthand command: sMeterInterval)*	Time interval, in seconds, at which metrics will be calculated. Note that, if logging of metrics is "on," setting the interval to a short time will cause the log files to roll over more quickly. Also, the Meters parameter must be set to "on" to activate logging. Default: 1800 seconds (30 minutes) Changes to this value take effect immediately. (System shutdown and startup unnecessary.)
ShowServiceMode [/? | /help] SetServiceMode [<in | out> | /? | /help] *(Shorthand commands: sServMode, setServMode)*	Controls the processing of calls. When "out" (out of service), the Voice Browser will not accept new calls but will process all existing calls to completion. When "in" (in service), the Voice Browser will accept new calls. Valid Values: in, out Changes to this value take effect immediately. (System shutdown and startup unnecessary.)

Table 4-4 VB Admin Metric and Control Commands (continued)

Command Syntax	Description
ShowSnapshot [/? | /help]	Gives a count of all the calls in progress, and subtotals for the count in each state. The states include: • Waiting for VXML (or for response from Application Server) • Playing Prompt • Waiting for DTMF • Transferred • Disconnecting • Disconnected (caller has been disconnected and software is just finishing up) • New (call has arrived, but processing has not started yet) • IVR Ports in use (a call is in one of two states at any point in time: receiving IVR treatment, or transferred. Time spent in all call setup— H.323 activity plus communications to the ICM—counts as being in the IVR state. Therefore, even though a call may be 'immediately' transferred upon arrival at ISN, there is still a brief period—several seconds—that the call is in the IVR state until the endpoint answers the call. *IVR Ports in use* shows the number of calls in the IVR state at any point in time) • Wait (a transient internal state; calls should never stay in this state any length of time; this number increasing over time indicates a problem) • Other (calls should never be in this state; a catch-all for problem calls) • Internal (for debugging purposes only; shows the total number of calls in the internal call object map in the Voice Browser; includes all active call legs, plus calls that are marked for deletion)

Table 4-4 VB Admin Metric and Control Commands (continued)

Command Syntax	Description
ShowStatus [/? | /help]	Status gives the overall status for the ISN Application Server for the entire time the Voice Browser has been up, including: • Total Calls • Disconnect Disposition (Rejected, Caller Hangup, Called Party Hangup, ICM Release, Critical Media) • Maximum Simultaneous Calls • Maximum IVR Ports • Total Prompts Not Found • Total Transfer Errors (Busy, Ring No Answer, Gatekeeper Problem, Destination Problem, Other) • System Startup Time • System Up Time • Current System State (In Service, Out of Service) • Packets Transmitted
ShowVersion [/? | /help]	Displays release number (2.0) and build number of the software.

VB Admin Error Handling

VB Admin validates configuration commands and settings before accepting them. If a command is not valid, VB Admin displays an error message. Table 4-5 shows some examples of invalid commands and their resulting error messages:

Table 4-5 VB Admin Error Message Examples

Command	Error Message
DoesNotExist	The command is not recognized. Valid commands are show[Parameter], set[Parameter], and Help.
SetAppServerNumTries –7	Entered value needs to be a positive integer.
SetNumCalls	Read only variable.
ShowDoesNotExist	This command does not support the parameter you have entered. Use Help to see a list of parameters.

Note Although VB Admin validates the syntax of the Voice Browser configuration commands, it performs no checks regarding the syntax or existence of values such as IP addresses/DNS names.

CHAPTER 5

Application Server Administration

This chapter provides the following:

- An overview of the ISN Application Server.
- Instructions for using the Application Administrator tool.

Note The primary audience for this chapter is ISN System Managers.

Application Server Overview

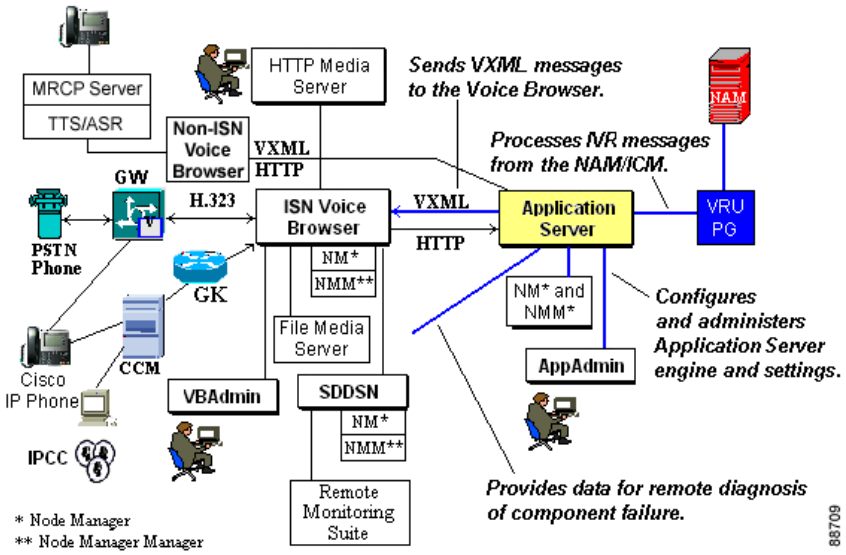
The Application Server is a Web Server application, which interprets messages from Cisco ICM software and generates VXML documents that it uses to communicate with the Voice Browser.

Note ISN 2.0 uses two types of Voice Browsers:

-- ISN Voice Browser (same as ISN 1.0 Voice Browser)
-- Non-ISN Voice Browser; for example, Cisco VXML-enabled Voice Gateway

References to “Voice Browser” in this chapter refer to both types unless explicitly specified.

Figure 5-1 Roles of the Application Server



The Application Server never directly controls a telephone call. The VXML commands it sends to the Voice Browser contain instructions for:

- Transferring the telephone call.

Note Currently, the Non-ISN Voice Browser does not perform asynchronous transfers.

- Delivering recorded messages and prompts.
- Processing user responses to the prompts.
- ASR or TTS treatment.

The sections that follow describe how to administer the Application Server.

Application Server Administration

The **Application Administrator** tool provides a Web browser interface you can use to perform tasks such as:

- Start or Stop Application Server Engine.
- Take the Application Server engine in and out of service.
- Monitor system and call status.
- Configure the engine, DNIS numbers, and log setups.

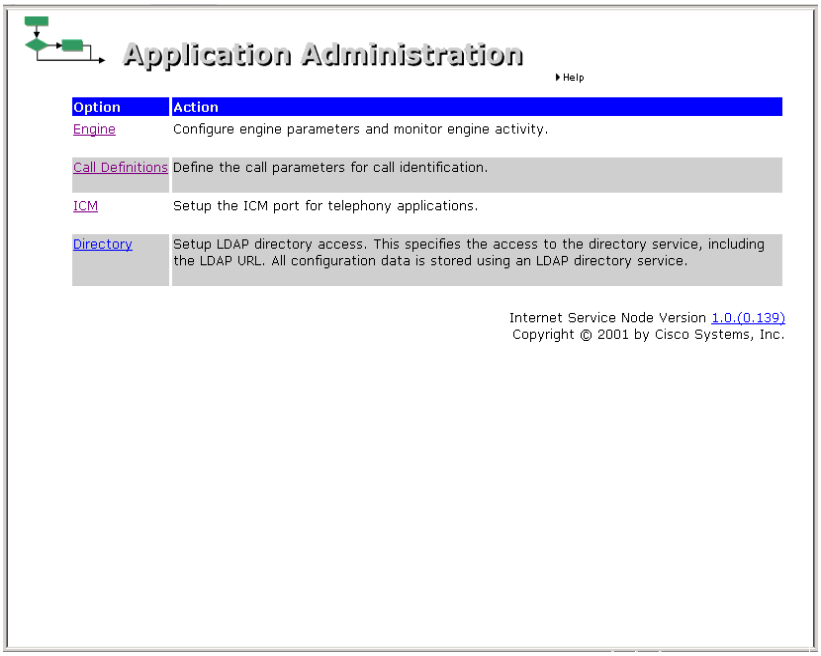
The sections that follow describe how to use this tool.

How to use the Application Administrator tool

Step 1 Do one of the following:

- Select **Start > Programs > Cisco Internet Service Node > Application Server > Application Administrator**.
- Enter **http://<HOSTNAME>/AppAdmin** (where **<HOSTNAME>** is the name of the machine where the Application Server is installed.

The Application Administration Main Page appears.



Use this page to navigate to other Application Administration pages.

Step 2 When finished using the Application Administrator tool, select **File > Close**.

Note You must close the web browser to shut down the Application Administrator tool. The tool runs as a web application under IIS (Internet Information Server). This means that it will not close even if you use Service Control to stop the Application Server.

Engine Administration

This section describes the pages you use to administer the Application Server engine:

- Engine Status page
- Active Calls page
- Call Statistics page
- Diagnostic Information page
- Log Configuration page
- Log Files page

Engine Administration: Engine Status

Use this page to:

- Obtain information about the status of the Application Server Engine and its subsystems.
- Start or Stop the Application Server Engine, or put it Out of Service or Back in Service.
- Link to other Engine Administration pages.

Step 1 From the Application Administration Main Page, click the **Engine** link. The Engine Status page appears.

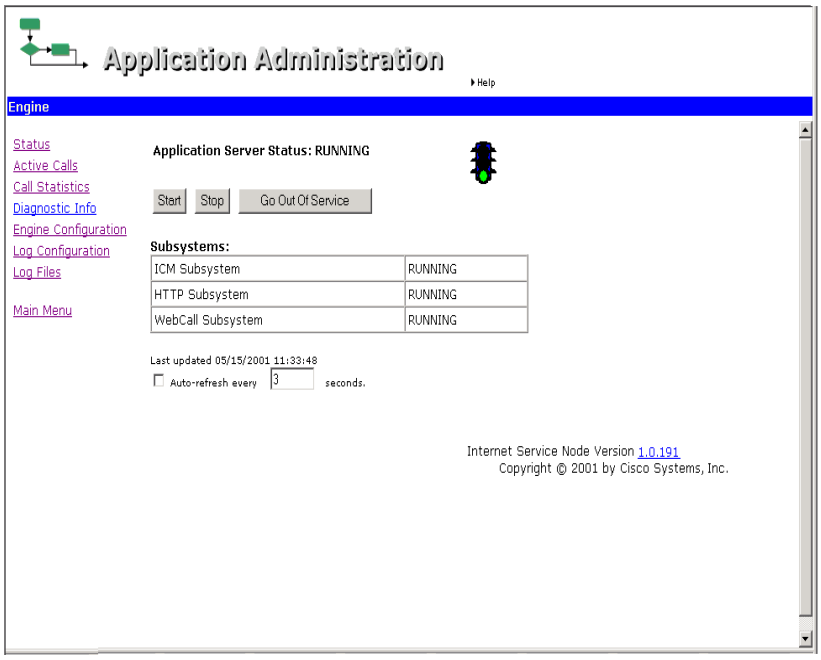


Table 5-1 describes the different Status settings and traffic light icon colors.

Table 5-1 Engine Status Information

Light Color	Status	Description
Red	STOPPED	System not running.
Yellow	STOPPING	System shutting down.
	INITIALIZING	System starting up. (It is not ready to accept calls.)
	GOING OUT OF SERVICE	System not accepting new calls but finishing processing calls currently in system. (After call processing is complete, state changes to OUT OF SERVICE.)
	OUT OF SERVICE	System Out of Service or HTTP is not functioning. System is not accepting calls and has no calls, but is running.
	ICM OFFLINE	Application Server is waiting for a connection from ICM software. It will not accept calls in this state.
	PORTS BUSY	System is fully loaded. It is not accepting new calls but finishing processing calls currently in system.
Green	RUNNING	System running and receiving new calls.

Step 2 Do one of the following:

- Click **Start** to start the Application Server.
- Click **Stop** to stop the Application Server.
- Click **Go Out of Service** to stop accepting calls. The label on the button changes to Go Into Service. Click this button to start accepting calls again.
- Using the checkbox and text field, specify an Auto-refresh setting for the Status page.

Note Whenever you click a button on this page, a confirmation dialog box appears. Click **OK** to continue.

Step 3 When finished, link to another page or select **File > Close** to close the Application Administrator.

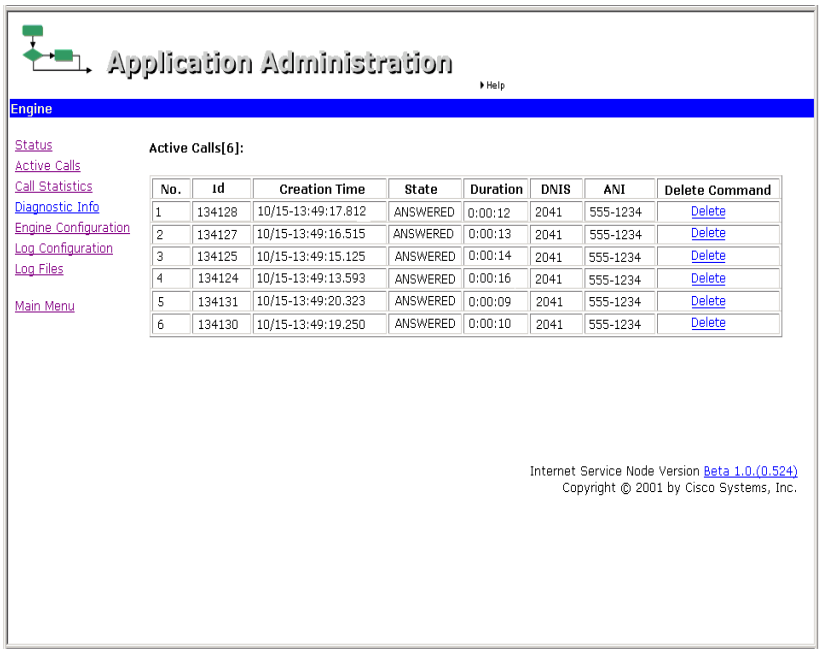
Engine Administration: Active Calls

Use this page to display the following information about each call active in the Application Server.

Note See the "MRCP logging tag" section on page 5-19 for more information about the call ID.

Step 1 From any Engine Administration page, click the **Active Calls** link. The following happens:

- First, a caution message appears. Click **OK** to continue.
- Then, the following information displays for each call active in the Application Server:



Note The ID value matches the Unique Call ID shared with the Voice Browser.

Step 2 To remove a call from service, click its **Delete Command** link.

Step 3 Click **OK** in the confirmation dialog box that appears.

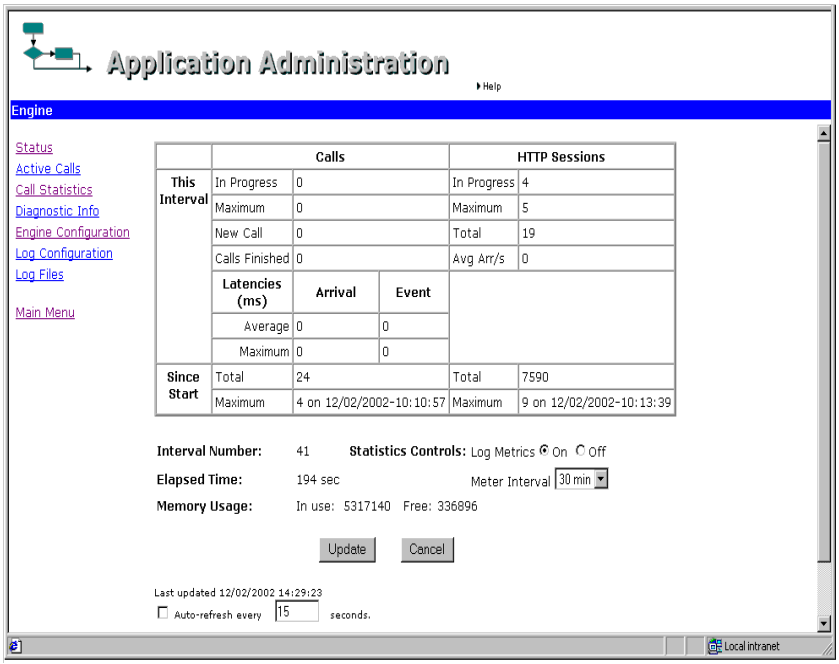
Step 4 When finished, link to another page or select **File > Close** to close the Application Administrator.

Engine Administration: Call Statistics

Use this page to monitor and control the display of statistical information for calls and HTTP transactions:

- During the current interval.
- Since the Application Server engine started.

Step 1 From any Engine Administration page, click the **Call Statistics** link. The Call Statistics page appears.



The top of the page shows statistics logged for calls and HTTP transactions. The bottom of the page contains controls for displaying the statistics.

Table 5-2 describes the statistics contained in each category:

Table 5-2 Call and HTTP Statistics

Category	For Calls	For HTTP Sessions
This Interval	• The number of calls currently in progress. • The maximum number of simultaneous calls handled during the interval. • The number of new calls this interval. • Number of calls that finished this interval. • The average and maximum latency in processing a new call arrival and subsequent call event.	• The number of requests currently in progress. • The maximum number of HTTP requests being processed simultaneously during the interval. • The total number of requests received this interval. • The average number of HTTP requests being processed simultaneously during the interval. **Note** Call latencies are displayed in milliseconds.
Since Start	• The total number of calls that received since server start-up. • The maximum number of simultaneous calls since server start-up.	• The total number of requests received since Server start-up. • The maximum number of HTTP requests being processed simultaneously since Server start-up.

Step 2 Optionally, change the Statistical Controls settings:

- **Log Metrics**. (Radio buttons.) Controls logging of statistics. When "on," the Application Server writes the statistics to the log file in the interval specified by Meter Interval setting. Default: "on".
- **Meter Interval**. Length-of-time interval for logging statistics, in seconds. Default: 1800 seconds (30 mintues).

Note The Log Metrics setting must be "on" to activate logging, but statistics are always available from the Web interface.

Step 3 Do one of the following:

- Click **Update** to change the Statistical Controls information. All changes take effect immediately. (System shutdown and startup unnecessary.)
- Click **Cancel** to cancel any changes and return to the previous page.

Step 4 When finished, link to another page or select **File > Close** to close the Application Administrator.

Engine Administration: Diagnostic Info

Use this page to display information that your support organization can use for troubleshooting system problems.

Note The Diagnostic page is not available unless the Application Server Engine is running.

Step 1 From any Engine Administration page, click the **Diagnostic Info** link. The following happens:

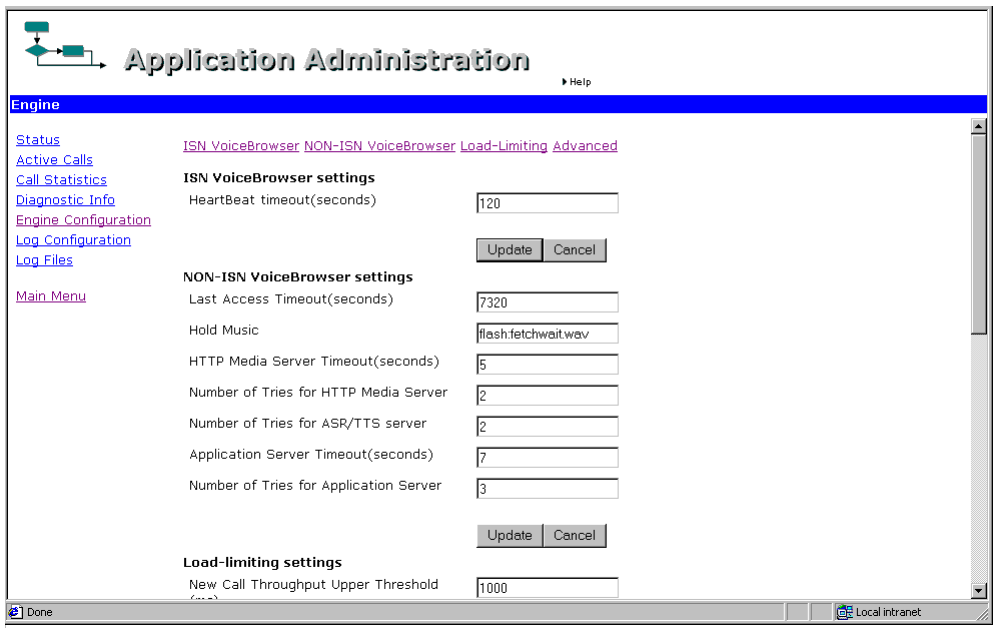
- First, a caution message appears. Click **OK** to continue.
- The Diagnostic Info page appears, displaying the current system status for:
  - Thread groups (system, main, engine, RMI runtime), their Max Priority and size
  - Threads under each thread group
  - System memory
  - System properties

Step 2 When finished, link to another page or select **File > Close** to close the Application Administrator.

Engine Administration: Engine Configuration

Use this page to set up how the Application Server will communicate with the Voice Browser and ICM software.

Step 1 From any Engine Administration page, click the **Engine Configuration** link. The Engine Configuration page appears.



Step 2 Use the **ISN Voice Browser Settings** section to specify the following, clicking **Update** when done:

- **Heart Beat Timeout (seconds)**. (Default:120 seconds.) Used for ISN Comprehensive and ISN Queue and Transfer configurations. Controls how long the Application Server will wait for a heartbeat request from the ISN Voice Browser before timing-out. If this timeout is exceeded, all calls received from that Voice Browser are terminated.

Note This value should be two times the ISN Voice Browser's OutofBandTimeout setting.

Step 3 Use the **Non-ISN Voice Browser Settings** section to specify the following, clicking **Update** when done:

Note The settings in this section are used in ISN Comprehensive and ISN Advanced Speech configurations. The "Gateway" in this section represents a Non-ISN Voice Browser.

- **Last Access Timeout (seconds)**. (Default:7320 seconds.) How long the Application Server will wait for a call request from a Non-ISN Voice Browser before removing that Non-ISN Voice Browser from its current client list. This value must be greater than or equal to the call timeout; this is enforced by the software.
- **Hold Music**. (Default: flash:fetchwait.wav.) Controls where music is retrieved from when a caller is on hold while a non-ISN Voice Browser is retrieving VXML from the Application Server. If left blank, no hold music will be played. (This setting controls call results only. The initial NEW_CALL hold music path is controlled through the fetchaudio property within the bootstrap VXML in flash memory on the Gateway.)
- **HTTP Media Server Timeout**. (Default:5 seconds.) The number of seconds the Gateway should wait to connect to the HTTP Media Server before timing out.
- **Number of Tries for HTTP Media Server**. (Default:2 tries.) Maximum number of times the non-ISN Voice Browser will attempt to connect to an HTTP Media Server to retrieve a single prompt. If the Voice Browser fails after this many attempts, it will try the same number of times to retrieve the media from a backup media server before failing and reporting an error. (The backup media server is defined as **<mediaserver>-backup**.)

Note This backup mechanism is only useful when there is no CSS content switch sitting between the Non-ISN Voice Browser and the HTTP media servers. Otherwise, a CSS, if configured properly, could find a backup media server on the second attempt using the original URL of the prompt. When not using a CSS, in order to achieve failover redundancy, it is necessary to have the backup media server configured in DNS as the **mediaserver** name appended with **-backup**. Also note that if both the primary and backup media servers are down, the call will eventually return an error code to ICM software to indicate media fetch failure.

- **Number of Tries for ASR/TTS Server**. (Default: 2 tries.) Maximum number of times the Gateway will try to connect to an ASR/TTS server. If the Gateway fails to connect this many attempts, it will try the same number of times to connect to a backup ASR/TTS server before failing and reporting an error. (The backup ASR and TTS servers are defined as **asr-<locale>-backup** and **tts-<locale>-backup**.)

Note This backup mechanism is really only useful when there is no CSS content switch sitting between the Gateway and the ASR/TTS servers. Otherwise, a CSS, if configured properly, could find a backup ASR/TTS server on the second attempt using the original server name. When not using a CSS, in order to achieve failover redundancy, it is necessary to have the backup ASR/TTS servers configured in DNS as **asr-<locale>** and **tts-<locale>** appended with **-backup**.

- **Application Server Timeout**. (Default: 7 seconds.) The number of seconds the Gateway should wait to connect to the Application Server before timing out. This timeout should be longer than the server timeout setting on the Application Server. (This setting controls call results only. The initial NEW_CALL timeout from the Gateway to the Application Server is controlled through the fetchtimeout property within the bootstrap VXML in flash memory on the Gateway.)
- **Number of Tries for Application Server**. (Default: 3 tries.) Maximum number of times the Gateway will try to connect to the Application Server before failing and reporting an error. (This setting controls Call Results only. The initial NEW_CALL retry count from the Gateway to the application server is controlled from within the bootstrap VXML in flash memory on the Gateway.)

Step 4 Use the **Load-Limiting Settings** section to specify the following, clicking **Update** when done:

- **New Call Throughput Upper Threshold (ms)**. (Default: 1000 ms.) The average Application Server upper threshold throughput time in milliseconds of processing new calls allowed before the Application Server takes itself out of service. Throughput calculations are done at regular intervals (default is 30 seconds), and this test is done at every interval while in service. The calculation is done with ICM software and network response time excluded, so that the throughput represents the true Application Server's own response time.
- **Call Event Throughput Upper Threshold (ms)**. (Default: 400 ms.) The average Application Server upper threshold throughput time in milliseconds of processing call events allowed before the Application Server takes itself out of service. Throughput calculations are done at regular intervals (default is 30 seconds), and this test is done at every interval while in service. The calculation is done with ICM software and network response time excluded.
- **Call Event Throughput Lower Threshold (ms)**. (Default: 200 ms.) The average Application Server lower threshold throughput time in milliseconds of processing call events required for the Application Server to return to service after exceeding one of the two throughput upper thresholds. Throughput calculations are done at regular intervals (default is 30 seconds), and this test is done at every interval when out of service. The calculation is done with ICM software and network response time excluded.
- **Active Calls Upper Threshold (%)**. (Default: 99 percent.) The maximum percentage of total calls allowed that can be active before the Application Server takes itself out of service. The percentage is calculated with respect to the total number of calls allowed.
- **Active Calls Lower Threshold (%)**. (Default: 97 percent.) If the Application Server has been previously taken out of service due to exceeding "Active Calls upper threshold", and the number of active calls drops below this percentage level, the Application Server is returned to service. The percentage is calculated the same as done for "Active Calls Upper Threshold".

Step 5 Optionally, modify the **Advanced Settings** section, clicking **Update** when done:

Caution In most cases, Advanced Settings never need change. Make changes to this page only if absolutely necessary.

- **Call Timeout**. (Default: 7200 seconds.) How long the Application Server should wait for a response from the Voice Browser before timing-out. This setting should be longer than the longest prompt, transfer or digit collection at a Voice Browser. If the timeout is reached, the call is aborted but no other calls are affected. The only downside to making the number arbitrarily large is that if calls are being stranded, they will not be removed from the Application Server until this timeout is reached.
- **Server Timeout**. (Default: 5 seconds.) A "backup" timeout setting the Server can use if a Port Group Configure timeout setting fails; must be greater than the ICM Timeout setting by at least one second.

Note The Voice Browser's AppServerTimeout setting should be larger than this setting by at least one second. (For information about setting AppServerTimeout, see Chapter 4, "Voice Browser Administration.")

- **ICM Timeout**. (Default: 4.) The number of seconds the Application Server waits for the ICM response for each transaction with ICM software for the call; must be less than the Server Timeout setting.If this timeout is exceeded, the Application Server returns an error to the Voice Browser, which will play the default VXML file and disconnect the call.

Note This setting needs to be long enough to accommodate processing within the Application Server as well as ICM software processing, including any Wait nodes that exist in the ICM script.

- **Alarm Forwarder Port**. (Default: 8163.) Port number required for the Alarm Forwarder process. This must be the same as the port number configured in the Alarm Forwarder.
- **RMI Port Number**. (Default: 1099.) Port number required for an RMI (Java) process.
- **Maximum Number of Executed Steps**. (Default: 1000.) Internal setting to prevent a runaway scenario in case of an internal error.
- **Maximum Number of Concurrent Sessions**. (Default: 425.) Internal work flow setting. This number should be slightly larger than the number of simultaneous calls in the Application Server.

Caution If the maximum number of concurrent sessions is not larger than the number of calls, latencies can rise dramatically.
Also note that the number of ports you define will determine the number of calls that can be processed simultaneously. You should configure about 10 percent more ports than the maximum number of simultaneous calls you expect. The extra ports will enable the system to accommodate any error-related delays in releasing call resources.

- **Allow External VXML**. (Checkbox.) Select this checkbox to allow VXML to be imported from an external HTTP source.

Step 6 Do one of the following:

- Click **Update** to change the Engine Configuration information.

Note The system will displays a message if any of your changes require Application Server reboot before taking effect.

- Click **Cancel** to cancel any changes and return to the previous page.

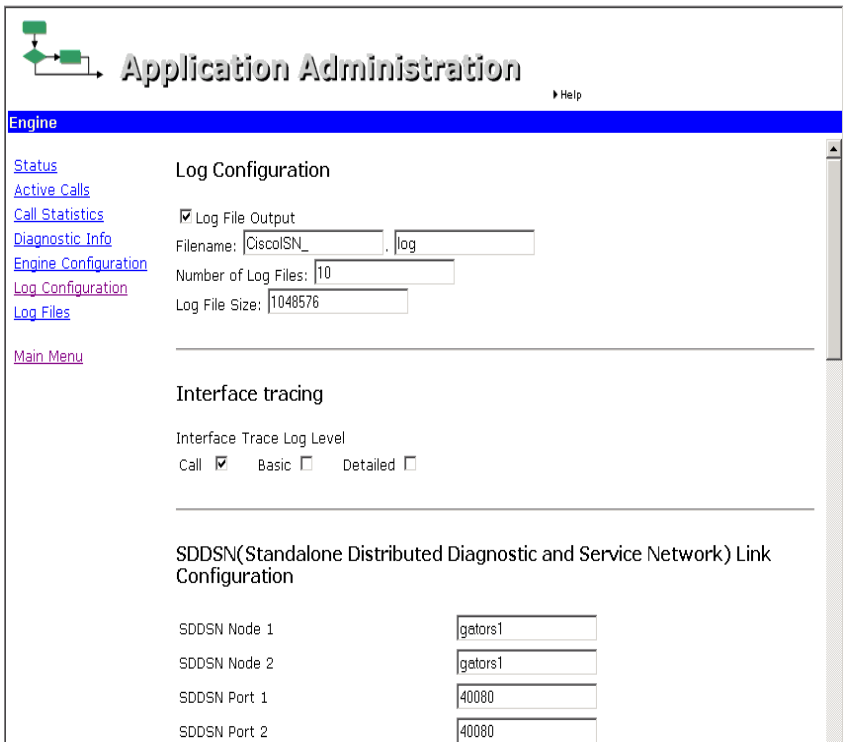
Step 7 When finished, link to another page or select **File > Close** to close the Application Administrator.

Engine Administration: Log Configuration

Use this page to set up how the Application Server will perform error handling and provide information for remote monitoring of the system. Use the SDDSN section of this page to set the host name or IP address of the SDDSN instance and, optionally, to modify the default listening port.

Note For detailed information regarding how the Application Server handles logs files, see Chapter 6, "Node Manager and ICM Service Control."

Step 1 From any Engine Administration page, click the **Log Configuration** link. The Log Configuration page appears.



Step 2 Use the **Log File** section to specify the following:

- **Log File Output**. (Checkbox.) When "on" (checked), the Application Server will produce log files.

  Note It is recommended that the log file output setting always be "on". If "off", errors and statistics will not be logged.

- **File name**. A base file name for the log file and an extension, for example, **CiscoISN_** and **log**.
- **Number of Log files**. (Default: 10.) Maximum number of log files to be retained.
- **Log File Size**. (Default: 1048576.) Maximum size for each log file, in bytes.

Step 3 Use the **Interface Tracing** section to specify how interactions between the Application Server and external interfaces should be logged:

- **Call**. Select to log call-handling information, such as:
  - Call arrival
  - Call disconnection
  - Call transfer
  - Call rejection

Note Call interface tracing **does not** include tracing each step taken by ICM software.

- **Basic**. Select to log basic information—such as message type—regarding the component's interface interactions with other components.
- **Detailed**. Select to log more complete information about the component's interface interactions with other components.

Caution Depending on the call load, using Basic or Detail tracing can severely impact Application Server performance. To get the most out of interface tracing performance, minimize the Application Server console window.

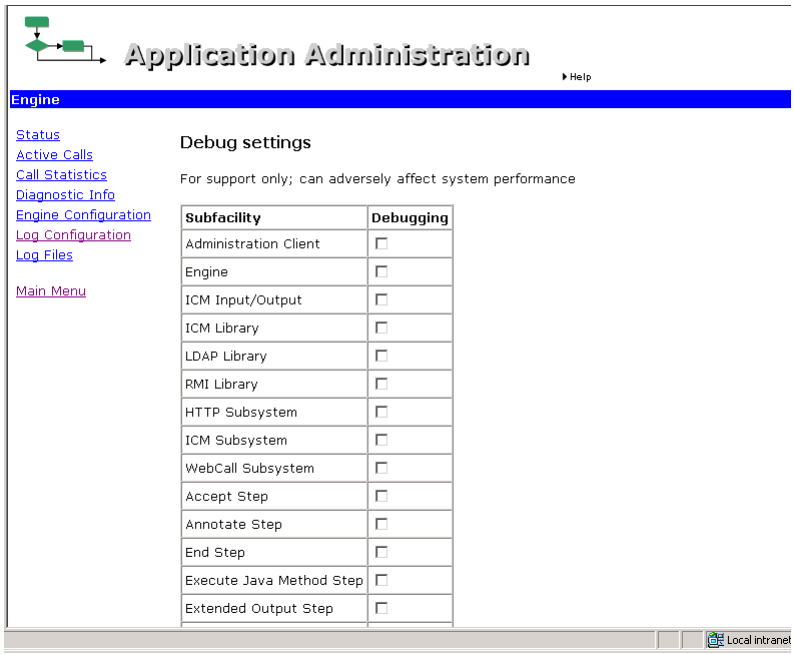
Step 4 Use the **SDDSN** section to specify settings which are needed by the Alarm Forwarder process:

- **SDDSN Node 1**. (Default: no default.) The host name or IP address of the first SDDSN instance.
- **SDDSN Node 2**. (Default: no default.) The host name or IP address of the second SDDSN instance.
- **SDDSN Port 1**. (Default: 40080.) The listening port number for the first SDDSN instance.
- **SDDSN Port 2**. (Default: 40080.) The listening port number for the second SDDSN instance.
- **SDDSN Ascending Retries**. (Default: 5.) The upper limit of geometric growth for the time between retries when both SDDSN instances are having problems.

Note A setting of 5. This means the Application Server will retry after 1 minute, then 4 (2*2) minutes, 9 (3*3) minutes, 16 (4*4) minutes, 25 (5*5) minutes. All subsequent retry attempts will be spaced 25 minutes apart. (For more information, see "Understanding SDDSN Retry Settings" in Chapter 7, "Alarm Handling and Logging.")

- **SDDSN Open Response Timeout (seconds)**. (Default: 5.) Number of seconds the Alarm Forwarder should wait for the initial message from SDDSN after a the connection has been established before failing and reporting an error.
- **SDDSN Restart Links (seconds)**. (Default: 5.) The number of seconds the Alarm Forwarder should wait before attempting to reconnect to SDDSN.

Step 5 Scroll down to the **Debug settings** section of the page.



Step 6 Optionally, use the checkboxes in the **Debugging** column to select the Subfacilities you want traced and reported in the log file.

Note Only turn Debugging "on" when instructed to do so by your support organization, as doing so will affect system performance. They should never be needed but may be used by the support organization to diagnose unforeseen problems.

Step 7 Do one of the following:

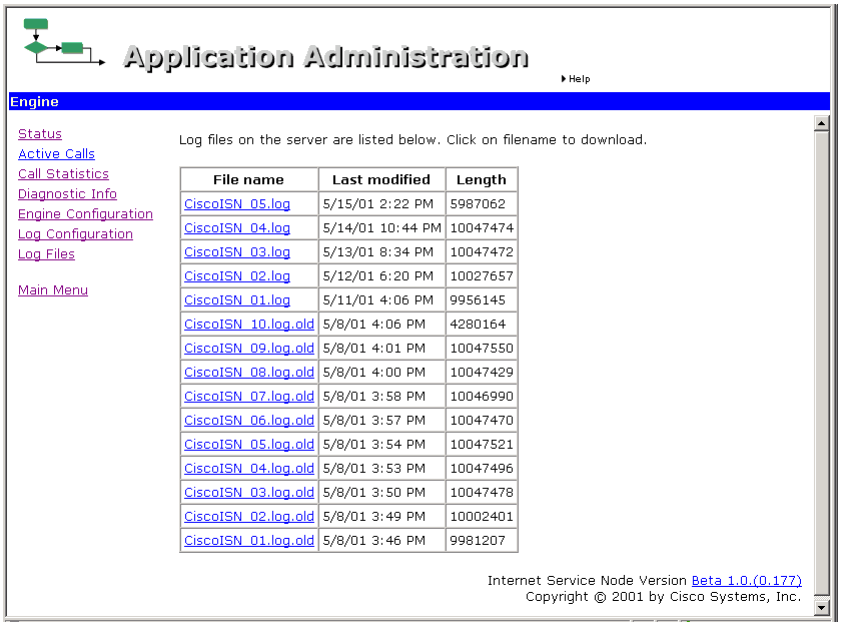
- Click **Update** to change the Log Configuration information. Changes take effect as follows:
  - Changes to active trace level options take effect immediately.
  - Changes to inactive trace level option take effect when the subfacility is used next time.
  - Changes to SDDSN link configuration take effect immediately.
  - Changes to other option take effect when engine is restarted.
- Click **Cancel** to cancel any changes and return to the previous page.

Step 8 When finished, link to another page or select **File > Close** to close the Application Administrator.

Engine Administration: Log Files

Use this page to access Application Server Log files that currently exist.

Step 1 From any Engine Administration page, click the **Log files** link. The Log files page appears, displaying a list of the Application Server Log files that currently exist.



Note File names with the extension **.old** are log files from previous runs. These files will be deleted the next time the Application Server starts, or when the number of log files exceeds the maximum number of log files allowed.

Step 2 Click a **File name** link. The Log file displays in a Browser window.

Step 3 When finished with the Log files page, link to another page or select **File > Close** to close the Application Administrator.

Call Definition Administration

The Application Server's Call Definition Administration pages let you:

- Display the existing Call Definition information.
- Modify port and Dialed Number (DNIS) settings.
- Define the Dialed Number Maximum Length if no Correlation ID Present setting.
- Define the Maximum Number of Calls Allowed setting.

Caution The number of ports you define will determine the number of calls that can be processed *simultaneously*. You should configure about 10 percent more ports than the maximum number of simultaneous calls you expect. The extra ports will enable the system to accommodate any error-related delays in releasing call resources.
The maximum number of concurrent sessions should also be larger than the maximum number of simultaneous calls.

Application Server Group Numbers

The Application Server divides Web-based calls into two groups:

- Calls pre-routed with a Translation Route or Correlation ID, identified as the *ID from ICM* group.
- Calls to be presented to ICM software as a new call, identified as the *New Call* group.

Note *ID for ICM* calls result in a "Request Instructions" message being sent to ICM software, which continues to run the script for the call. *New Call* calls result in a "New Call" message being sent to ICM software and the call being treated as a new call, even if it had been pre-routed by ICM software.

Each group is set up with a trunk group number. The default for the New Call group is **100**; the ID from ICM group is **200**. The Application Server creates virtual port numbers for handling Web calls. These virtual port numbers make it easier to monitor system activity and load. The port numbers must be unique (that is, none can be shared between the two groups). If all the port numbers within a group are in use, no additional calls will be accepted within the group until a port number is freed.

Correlation ID

ICM software might attach a Correlation ID to the Called Party Number (dialed number) when pre-routing a call to the ISN. The Gateway and Voice Browser pass the entire dialed number (with or without a Correlation ID) to the Application Server.

You use the Dialed Number Maximum Length if no Correlation ID Present field on the Call Definitions page to identify whether a number has an appended Correlation ID and, if so, which portion of the number precedes the Correlation ID:

- If a dialed number is longer than this value, then the number has the Correlation ID appended, starting with the digit indicated in the Dialed Number Maximum Length if no Correlation ID Present field. The Application Server places the Correlation ID in a separate field and passes the information to ICM software, which uses it to identify the call.

- If Correlation IDs are not being used for any call in the system, this value is set to 10, the default.

Note ISN does not require DNIS configuration for the Correlation ID.

Translation Route

ICM software might preroute the call using a translation route which defines a temporary DNIS number dedicated for the purpose of identifying the call when the VRU informs ICM software of its arrival. The Application Server must be configured with all the DNIS numbers that will be used for a translation route. A limitation is that each "ID from ICM" call group number must be configured individually.

New Call Group

ISN does not require DNIS configuration for New Calls.

Example

Suppose the Application Server has been set up with the following configuration:

- **Dialed Number Maximum Length if no Correlation ID Present**: 10
- **ID from ICM group phone numbers**: 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 9005551212

Table 5-3 shows how different Dialed Numbers would be processed:

Table 5-3 Dialed Number Processing

Dialed Number of Call Sent to ISN	Message Type Sent to ICM	Dialed Number Sent to ICM	Correlation ID Sent to ICM
90055512129876	Request Instruction	9005551212	9876 (the digits appearing after the Dialed Number Maximum Length of 10)
1003	Request Instruction	1003	Not sent
8005551212	New Call	8005551212	Not sent

The sections that follow describe how configure the Call Definition pages.

MRCP logging tag

The MRCP logging tag is a unique identifier that lets you correlate data records stored on an MRCP Voice Recognition Server with data stored in other application databases. Table 5-3 describes how The MRCP logging tag for ISN functions.

Table 5-4 MRCP Logging Tag

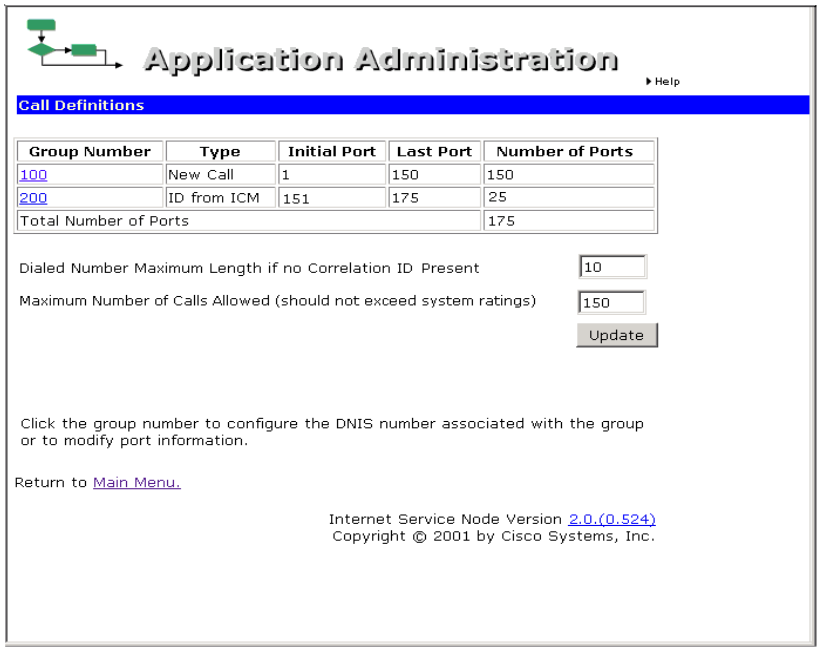
ISN Deployment Model	Call Flow	Comment
ISN Comprehensive	1. A call arrives to an ISN Voice Browser. The Voice Browser extracts the H.323 conference ID from the call data and passes it to the ISN Application Server in the NEW_CALL message. The Application Server sends this identifier to ICM software as the **user.media.id** ECC variable. This ECC variable is then available in the Termination_Call_Variable ICM database table. Sample value: 02194dbf-3a6d-c683-1bf9-5634343434ef 2. The ISN Voice Browser then sends the call to a VXML-enabled Voice Gateway through IP for voice treatment. The Gateway extracts the H.323 conference ID of the call and sends this value to the ISN Application Server. (This is the same value as the conference ID mentioned in Step 1, although formatted differently (02194DBF.3A6DC683.1BF95634.343434EF). The Application Server inserts this value as the MRCP logging tag into the VXML that it returns to the Gateway. The Gateway then sends this value to the recognition server via the MRCP interface. 3. When the script result is returned from the Gateway to the Application Server and passed to ICM software, the logging tag is then available in the Termination_Call_Variable ICM database table. **Note** If the caller hangs up before the first script result is returned from the Gateway to the Application Server, the logging tag from Step 2 will not be stored in ICM software.	The logging tag format described in Step 1 will be available for correlating the logging tag on the ASR server with the ICM database. However, you will need to write a script to compensate for the formatting difference. The logging tag format described in Step 2 will be available for correlating the logging tag on the ASR server with the ICM database *directly* (no reformatting required) except in cases where the caller abandons before the script result is returned to ICM software.
ISN Advanced Speech	1. A call arrives to a VXML-enabled Voice Gateway. The Gateway extracts the unique call identifier of the call and passes it to the ISN Application Server in the NEW_CALL message. The Application Server sends this identifier to ICM software as the **media.resource.id** ECC variable. This ECC variable is then available in the Termination_Call_Variable ICM database table. Sample value: 02194DBF.3A6DC683.1BF95634.343434EF	The logging tag format described in Step 1 will be available for correlating the logging tag on the ASR server with the ICM database *directly* (no reformatting is required).

Call Definition Administration: Call Definitions

Use this page to:

- Display the existing Call Definition information.
- Access pages to configure the port group and set up a DNIS value (ID from ICM only).
- Define the Dialed Number Maximum Length if no Correlation ID Present setting.
- Define the maximum number of calls allowed

Step 1 From the Application Administration Main Page, click the **Call Definitions** link. The Call Definitions page appears.



Step 2 Optionally, click a **Group Number** link to access port group configuration pages. The defaults are:

- **100** (Type: New Call.) Clicking this link accesses the Port Group Configuration (New Call) page. See the "How to modify the New Call Port Group settings" section on page 5-21 for instructions on how to use this page.
- **200** (Type: ID from ICM). Clicking this link accesses the Port Group Configuration (ID from ICM) page. See the "How to modify the ID from ICM Port Group settings" section on page 5-22 for instructions on how to use this page.

Note Each defined Group Number assigns virtual port numbers for handling calls. These virtual port numbers make it easier to monitor system activity and load. Port numbers must be unique (that is, none can be shared between the two groups). If all the port numbers within a group are in use, no additional calls will be accepted within the group until a port number is freed.

Step 3 Optionally, change the Dialed Number Maximum if no Correlation ID Present setting.

Note You can specify a value up to five characters long to represent the maximum *length* of the DNIS allowed before the remaining digits sent as DNIS by the Voice Browser are treated as a Correlation ID. The default is 10, meaning the DNIS can be 10 digits long.

Step 4 Optionally, change the Maximum Number of Calls Allowed setting. This is the maximum number of simultaneous calls allowed in one Application Server, independent of which port group the call is in.

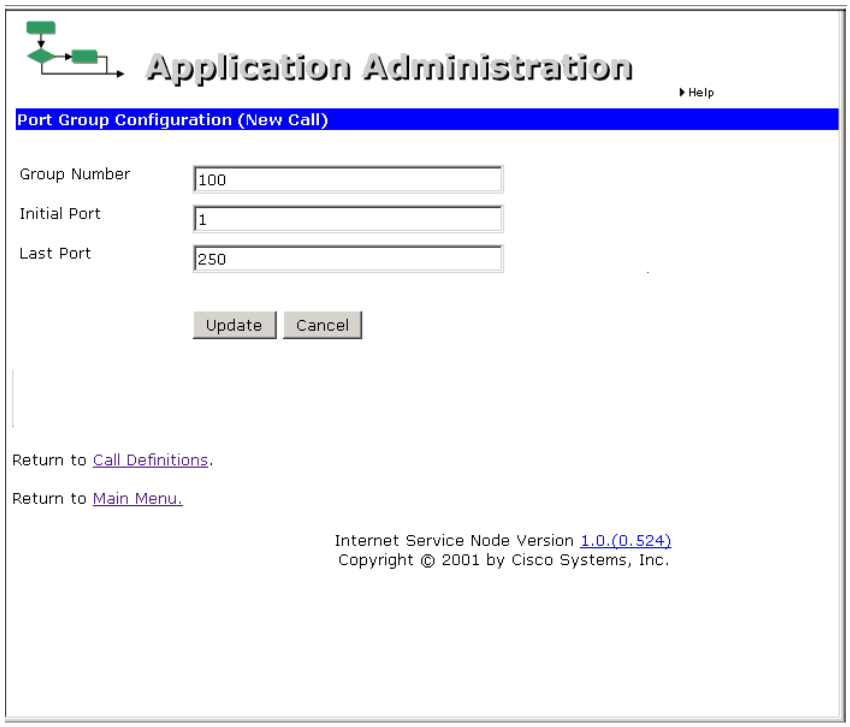
Caution The number of ports you define will determine the number of calls that can be processed *simultaneously*. You should configure about 10 percent more ports than the maximum number of simultaneous calls you expect. The extra ports will enable the system to accommodate any error-related delays in releasing call resources.
The maximum number of concurrent sessions should also be larger than the maximum number of simultaneous calls.

Step 5 Click **Update.**

Step 6 When finished, link to another page or select **File > Close** to close the Application Administrator.

How to modify the New Call Port Group settings

Step 1 Use the Port Group Configuration (New Call) page to modify the **New Call** settings.



- **Group Number**. (Default: 100 for New Call group; 200 for ID from ICM group.) Identifier for the group.

Note While there is no need to change these default settings, making group numbers unique throughout a group of Application Servers can help in troubleshooting.

- **Initial Port**. (Default: No default.) First port in the range of ports configured to handle calls for this group.
- **Last Port**. (Default: No default.) Last port in the range of ports configured to handle calls for this group.

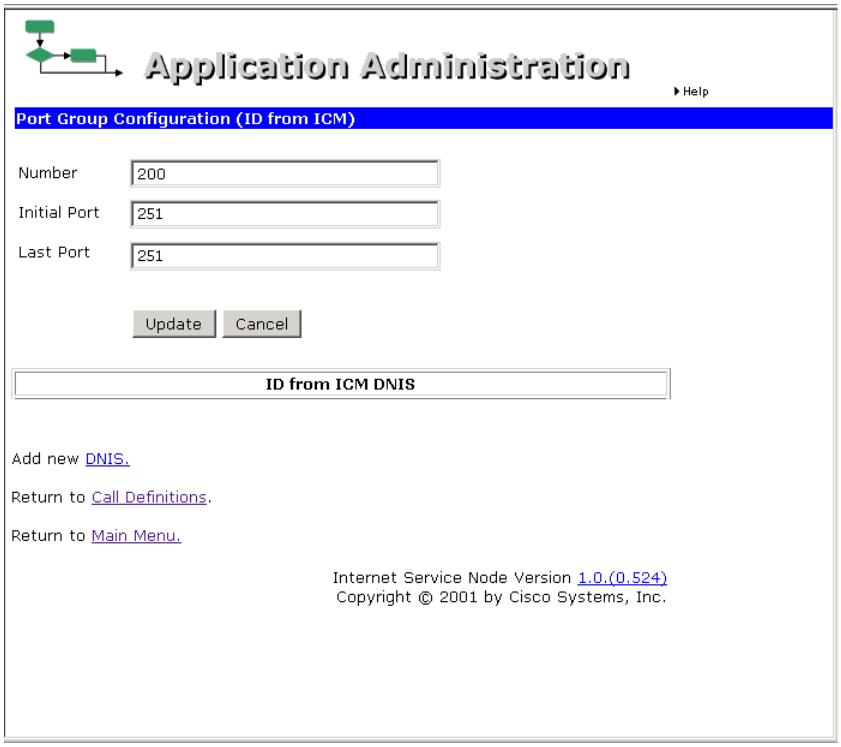
Caution The number of ports you define will determine the number of calls that can be processed *simultaneously*. You should configure about 10 percent more ports than the maximum number of simultaneous calls you expect. The extra ports will enable the system to accommodate any error-related delays in releasing call resources.
The maximum number of concurrent sessions should also be larger than the maximum number of simultaneous calls.

Step 2 Click **Update** to change the port information or **Cancel** to return to the previous page. The Port Group Configuration (New Call) page closes and the Call Definitions page reappears.

Step 3 When finished, link to another page or select **File > Close** to close the Application Administrator.

How to modify the ID from ICM Port Group settings

Step 1 Use the Port Group Configuration (ID from ICM) page to modify the **ID from ICM** settings.



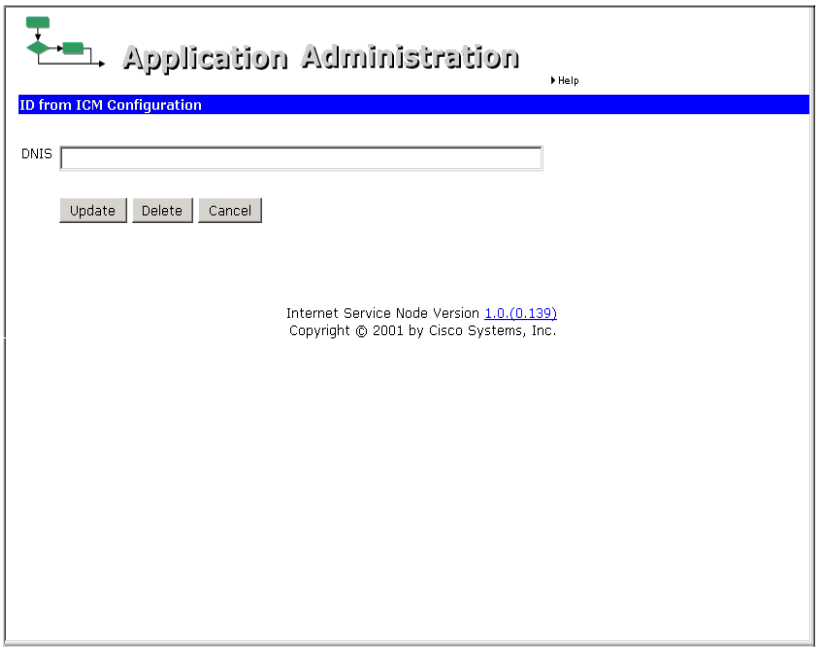
- **Group Number**. (Default: 100 for New Call group; 200 for ID from ICM group.) Group identifier.

Note While there is no need to change these settings, making group numbers unique throughout a group of Application Servers can help in troubleshooting.

- **Initial Port**. (Default: No default.) First port in the range of ports configured to handle calls for this group.
- **Last Port**. (Default: No default.) Last port in the range of ports configured to handle calls for this group.

Caution The number of ports you define will determine the number of calls that can be processed *simultaneously*. You should configure about 10 percent more ports than the maximum number of simultaneous calls you expect. The extra ports will enable the system to accommodate any error-related delays in releasing call resources.
The maximum number of concurrent sessions should also be larger than the maximum number of simultaneous calls.

Step 2 Optionally, click an existing **ID from ICM** value or the **Add New DNIS** link. The ID from ICM Configuration page appears:



Step 3 Define or modify a **DNIS** value. The ISN supports 1-32 *numeric* DNIS characters.

Note This differs from DNIS definition in ICM software, which allows *alphanumeric* characters.

Step 4 Do one of the following:

- Click **Update** to add the DNIS information.
- Click **Delete** to remove the DNIS information.
- Click **Cancel** to cancel any changes.

The ID from ICM Configuration page closes and the Port Group Configuration (ID from ICM) reappears.

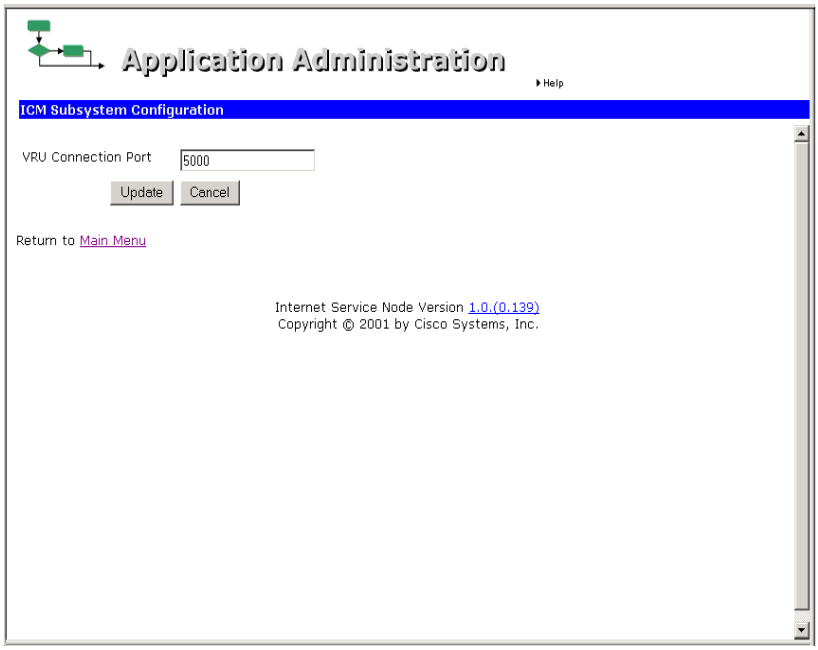
Step 5 Click **Update** to change the port information or **Cancel** to return to the previous page. The Port Group Configuration (ID from ICM) closes and the Call Definitions page reappears.

Step 6 When finished, link to another page or select **File > Close** to close the Application Administrator.

ICM Subsystem Configuration

Use this page to specify the VRU Connection Port Number to be used by both ICM software and the Application Engine.

Step 1 From the Application Administration Main Menu page, click the **ICM** link. The ICM Subsystem Configuration page appears.



Step 2 Specify a VRU Connection Port value. This is the TCP/IP socket number the Application Server will use to receive messages from the Cisco ICM's PIM. (Default: 5000.)

Step 3 Do one of the following:

- Click **Update** to save the ICM Configuration information.
- Click **Cancel** to cancel any changes and return to the previous page.

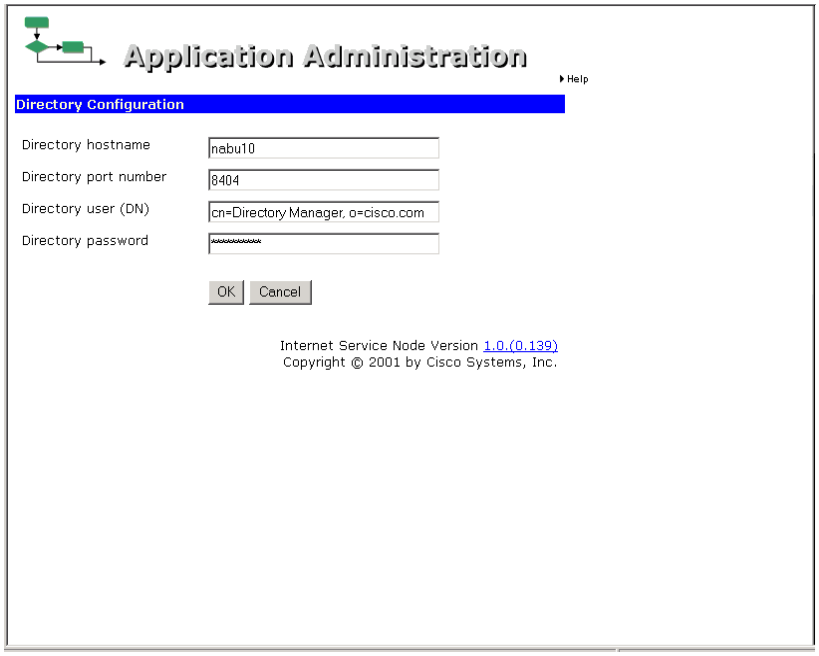
Step 4 When finished, link to another page or select **File > Close** to close the Application Administrator.

Directory Administration

Use this page to set up LDAP directory service access.

Note You should never find it necessary to change these settings.

Step 1 From the Application Administration Main Page, click the Directory link. The Directory Configuration page appears.



Step 2 Specify the following:

- **Directory hostname**. (Default: localhost.) The hostname or IP address of the Cisco IP Telephony Directory Server the current application engine uses.
- **Directory port number**. (Default: 8404.) The port number used to connect to the Cisco IP Telephony Directory.

  Note You only need to change this setting if a conflict arises with this port number. To make changes to the port number, you need to stop the Application Server, make the change, and then restart the Application Server.

- **Directory user (DN)**. (Default: Directory Manager.) The user name (called a distinguished name) on the directory server configured with permission to modify the Cisco IP Telephony Directory tree and object entries.
- **Directory password**. (Default: ciscocisco.) The password that authenticates the distinguished name (DN).

Step 3 Click **OK** to update any changes.

Step 4 When finished, link to another page or select **File > Close** to close the Application Administrator.

Node Manager and ICM Service Control

This chapter describes how ISN uses:

- ICM Node Manager.
- Service Control.

Note The primary audience for this chapter is ISN System Managers.

ICM Node Manager

The Node Manager is a process that runs on each physical node (computer) in the ICM system and manages other ICM processes on that system. The Node Manager is responsible for initializing nodes, monitoring component status, and restarting failed processes. The Node Manager is guided by a configuration file that is stored on each node. The file describes, among other things, which processes must be started, and, if necessary, restarted on the node.

The Application Server and Voice Browser use the same Node Manager interface as the ICM. You can view the states of each node with the ICM Service Control tool.

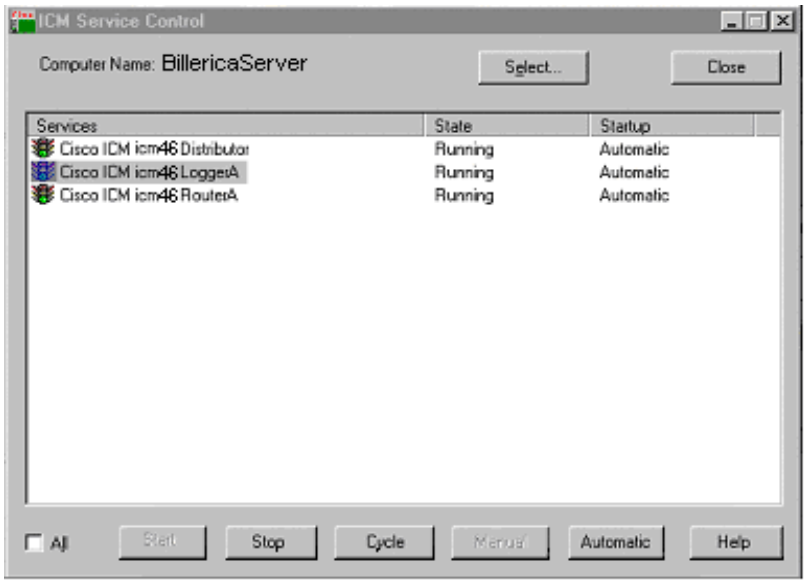
ICM Service Control

ICM Service Control is installed on each ICM Admin Workstation, ICM Logger, ICM Peripheral Gateway, and ISN machine. It allows you to view, start, and stop all Windows services related to all the ICM and ISN software components that have been installed. By enabling the All checkbox, ICM Service Control also provides control over all other Windows services. In addition, the Select button provides control over services running on other machines.

How to use ICM Service Control

Step 1 To start the ICM Service Control tool, do one of the following:

- Double-click the **ICM Service Control** icon in the ICM Software Admin Workstation group.
- Select **Start > Programs > Cisco Internet Service Node > ICM Service Control**.



The ICM Service Control dialog box contains the following:

- **Computer Name**. (Read-only.) Displays the name of the selected computer where Service Control is viewing and controlling services.
- **Select**. (Button.) Accesses the Select Computer dialog box. This option allows you to select a machine and remotely view and control the services on that machine. To select a remote computer, enter the computer name in the text field of the Select Computer dialogue box (or choose it from the list) and click OK.
- **Close**. (Button.) Click this button to exit and close the ICM Service Control tool.

Note All services remain in their current state (running services continue to run) after you close the Service Control tool.

- **Services**. (Column.) Lists the name of the Windows 2000 service. This column also displays a traffic light icon which indicates the state of the service.
- **State**. (Column.) Describes the state of the service. Possible states include:
  - **Stopped**. The service is stopped.
  - **Stop Pending**. ICM Service Control is in the process of stopping the service.
  - **Start Pending**. ICM Service Control is in the process of starting the service.
  - **Running**. Service is running.
- **Startup**. (Column.) Indicates whether the Windows 2000 service is **automatic** (service starts when you turn on the computer) or **manual** (user must start the service).
- **All**. (Checkbox.) If checked, displays all Windows 2000 services on the machine specified in the Computer Name. If not checked, displays only those Windows 2000 services related to ICM software.
- **Start/Start All**. (Button.) Use this button to start a service or services:
  - **Start All**. (The All checkbox is not checked and no services are selected.) Click the Start All button to start all ICM services.

  - **Start**. (The All checkbox is checked.) You can only control one service at a time. Highlight a service and click **Start**.

Note Do not attempt to start multiple customer AW services or switch between customer AW services using Service Control. To properly start and stop AW services, use the AW Select tool.

- **Stop/Stop All**. (Button.) Use this button to stop a selected service or services.
  - **Stop All**. (The All checkbox is not checked and no services are selected.) Click the **Stop All** button to stop all ICM services.
  - **Stop**. (The All checkbox is checked.) You can only control one service at a time. Highlight a service and click **Stop**.

Note The Application Administrator tool runs as a web application under IIS (Internet Information Server). It doesn't get shut down when you stop the Application Server. (For more information about this tool, see Chapter 5, "Application Server Administration.")

- **Cycle**. (Button.) Click this button to stop and restart an active service in a single action.
- **Manual/Automatic**. (Buttons.) These buttons allow you to switch the startup mode of a selected service between manual (user-initiated) and automatic (starts when the computer is turned on).

Step 2 To remotely view and control services on another machine, click **Select**. The Select Computer dialog box appears.

Step 3 Type a computer name or select a name from the list and click OK. The ICM Service Control window reappears, displaying the computer you specified.

Alarm Handling and Logging

This chapter includes:

- An overview of the Standalone Distributed Diagnostics and Services Network (SDDSN), including how to install and configure SDDSN for ISN.
- An introduction to ISN logging and error reporting.
- A discussion of Application Server logging and metrics.
- A discussion of Voice Browser logging and metrics.

Note The primary audience for this chapter is ISN System Managers.

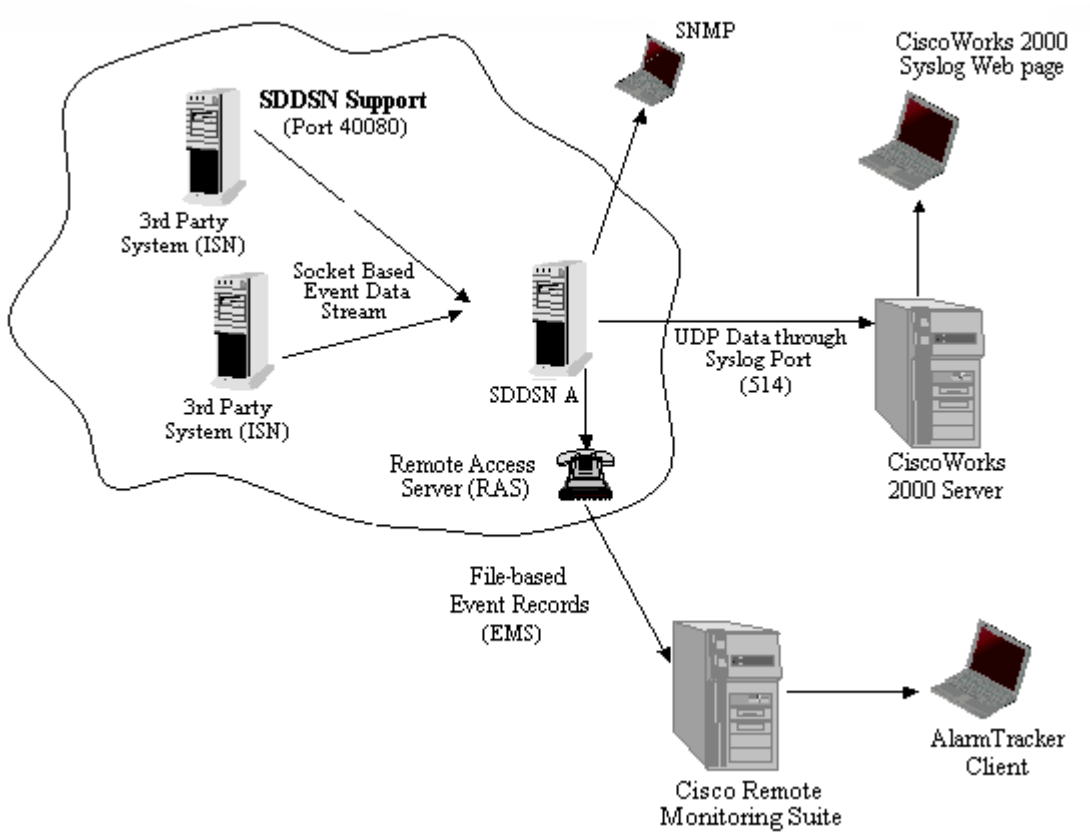
Overview: The Standalone Distributed Diagnostics and Services Network (SDDSN)

The Standalone Distributed Diagnostics and Services Network (SDDSN)—sometimes referred to as the *Mini Logger*—is a component that provides alarm reporting for ISN through a variety of mechanisms:

- SNMP traps.
- CiscoWorks 2000 Syslog, which receives log messages and permits queries on the logs.
- "Phone Home" and NAM/ICM Event Management System (Cisco Remote Monitoring Suite).

Note In an integrated ISN / ICM environment, each product will use its own DDSN mechanism. The ISN has an integrated DDSN.

Figure 7-1 SDDSN Support



The AlarmTracker Client displays alarms from a number of devices which are reporting their alarms through the Remote Monitoring Suite.

Note For more information about the AlarmTracker tool, see *Cisco ICM Software (ISN) AlarmTracker Client User's Guide*.

Installing and Configuring SDDSN for ISN

The SDDSN software—including Node Manager—is included in the ISN installation by clicking the **SDDSN** checkbox on the **Select Components** screen.

Note SDDSN needs to be installed on its own machine—it cannot be co-resident with any other ISN or ICM product. In addition, Cisco Listener and AlarmTracker software needs to be updated with support files for SDDSN. This is done by installing the ISN component **Update External SDDSN Components** on any machine that runs Listener or AlarmTracker.

After ISN is installed, you need to define SDDSN communication settings for each Voice Browser and Application Server your ISN configuration.

- **Setting SDDSN in the Voice Browser.** For more information, see Chapter 4, "VB Admin Configuration Commands."

- **Setting SDDSN in the Application Server.** For more information, see Chapter 5, "Engine Administration: Log Configuration."

Note For more information about VB Admin, see Chapter 4, "Voice Browser Administration." For more information about Application Administration, see Chapter 5, "Application Server Administration."

Understanding SDDSN Retry Settings

Another SDDSN setting that may need to be configured on the Application Server and Voice Browser is *SDDSN Ascending Retries*. This setting relates to how the components communicate with instances.

SDDSN can have two instances for redundancy. When the Voice Browser and Application Server report alarms to SDDSN, they try one instance and—if unable to connect—then the second SDDSN instance. Each time the retry timer expires, the Voice Browser or Application Server attempts to connect again.

The retries follow a geometric growth for the time between retries. For the Voice Browser, the upper time limit for retries is defined through the **SetAscendRetries** command; for the Application Server, this limit is defined through the **SDDSN Ascending Retries** field on the Engine Administration's Log Configuration page.

In both cases, a the default value is **5**. This means, when both SDDSN instances are having problems, the Voice Browser/Application Server will retry after 1 minute, then 4 (2*2) minutes, 9 (3*3) minutes, 16 (4*4) minutes, then 25 (5*5) minutes. Since the default value is 5, all *subsequent* retry attempts will be spaced 25 minutes apart.

For example if you changed **SetAscendRetries** command/**SDDSN Ascending Retries** field to **4**, the Voice Browser/Application Server will retry after 1 minute, 4 minutes, 9 minutes, 16 minutes and every *16* minutes—the upper limit of 4*4—thereafter.

Event Management System (EMS)

The NAM/ICM Event Management System (EMS) logs events from processes throughout the system and stores the event data. For example, a typical EMS event might record that a system component has been disconnected.

The EMS also saves events from individual processes, such as the Voice Browser or Application Server, in per-process log files on the local computer. These files document events for a specific process running on that specific computer.

EMS funnels error messages and log entries into a log file ending with the suffix **.ems**. This is a file of Event Source Records (ESRs). The ESR are the readable strings themselves; to view the events, you must use the dumplog utility.

Note Instructions for using the dumplog utility are given later in this chapter.

Simple Network Management Protocol (SNMP) and the Management Information Base (MIB)

The Simple Network Management Protocol (SNMP) is the language for communication between a managing system running a network management application (such as HP Open View) and a managed system running an agent (which for ISN would be SDDSN). Between them they share the concept of a Management Information Base (MIB) that defines the information that the agent can make available to the manager.

MIBs and an agent are commonly provided in networked systems to allow remote observation and control using management applications on other systems.

ISN's Voice Browser and Application Server generate messages that are sent to SDDSN. SDDSN then generates the SNMP traps that are presented to the managing system.

MIB File

The Management Information Base (MIB) defines all the information about a managed system that a manager can view or modify. The MIB is located on the managed system and can consist of standard and proprietary portions. The agent and manager each have their own view of the MIB:

- The agent presents the contents of the MIB and knows how to retrieve that information.
- The manager might use a MIB description to know what to expect in a given MIB and might store that information in a translation that it prefers.

The **Isnlarms.mib** file is provided for third party software interpretation of the SNMP traps. The **Isnlarms.mib** file is a text file in standard MIB format and is installed on the Voice Browser and Application Server target machine in the directory **<***destination location***>\bin**. (For example, **C:\Cisco\ISN\bin**.)

The ISN MIB specifies a number of alarms. Each alarm must include the six variables shown in Table 7-1:

Table 7-1 ISN MIB Variables

Variable	Description	Valid Setting
Originating Node	The name of the node (computer) within the ISN that originated this alarm.	String with maximum size of 32 characters
Node Type	The type of ISN node that originated this alarm.	0 - unknown 1 - Voice Browser 2 - Application Server
Originating Process	The name of the process that originated this alarm.	String with maximum size of 32 characters

Table 7-1 ISN MIB Variables (continued)

Variable	Description	Valid Setting
Severity	The severity of this alarm.	1 - fatal 2 - major 3 - minor 4 - informational 5 - debug 6 - restoral
Timestamp	The ISN time at which the alarm originated.	In the format YYYMMDD HH:MM:SS (24 hour time)
Alarm Event Text	The full text of the ISN event that generated this alarm.	For more information, see "Alarm Message Text" below.

Other variables may appear in the ISN MIB.

Alarm Message Text

Alarm message text has the following format:

Alarm Class

Trap ISN can generate for the alarm to SDDSN

Event ID

Alarm Text (%# gets replaced with optional parameters)

Alarm Help text

Alarm severity

Some alarm classes can generate multiple traps, as show in the example below:

Example 7-1 Sample Alarm Traps for the Voice Browser Status Alarm Class

```
CLASS_VOICEBROWSER_STATUS
      TRAP_VB_RUNNING
            EMSG_VB_RUNNING
                  Voice Browser %1<VB name or IP address> is running.
                        Voice Browser %1<VB name or IP address> is running.  Call processing is now possible.
                              Severity : Informational
      TRAP_VB_SHUT_DOWN
            EMSG_VB_SHUT_DOWN
                  Voice Browser %1<VB name or IP address> is shut down.
                        The voice browser %1<VB name or IP address> is shut down.  No calls are being
processed by this component.
                              Severity : Informational
```

ISN Logging and Error Reporting

The goal of ISN logging and error reporting is to generate information the system can use to:

- Diagnose a system remotely.
- Automatically report service-affecting events.

As described in the previous section, SDDSN provides a mechanism for remote diagnosis. Voice Browser and Application Server log files—accessible through the dumplog utility—enable local diagnosis.

The sections that follow describe:

- Log and trace levels available to the ISN.
- The different methods the Voice Browser and Application Server ISN components use to handle logging and error reporting tasks.

Caution You should closely monitor the size of your ISN log files. If they consume too much disk space then the ISN will not function properly.

Trace Message Levels

Log files provide trace messages. Trace levels are defined during ISN installation and configuration. Some trace messages—such as catastrophic and service-effecting events—will always be logged, regardless of the current trace level settings.

Table 7-2 describes the different message levels.

Table 7-2 Trace Message Levels

Message Purpose	Message Level	Description
Messages intended to help diagnose problems caused by configuration or network errors.	Informational	Includes messages such as: • Version number at startup • Initialization messages • Administrative actions including: – Registry changes – Configuration changes – Shutdown and in/out of service requests
	Error	Includes messages such as: • Alarm set/clear – Events that "Phone Home," create a trap, and go to Cisco Works 2000 logs. (Alarm SETs are logged in the Operating System Event Log.) • Events that are not alarms: – Application errors (that is, errors in the customer application). – Inability to complete ICM requests successfully (the Gatekeeper can't look up a number, called party doesn't answer, busy, etc.). – Malformed VXML. – Retries. – Recoverable internal errors.
	Basic Call Detail	Includes messages about: • Call arrival • Call disconnect • Call transfer • Call rejection
Messages intended solely for use by your support organization or Cisco software developers to diagnose problems which may be software bugs.	Component-Level Call Detail	For use by Cisco Engineering, only.
	Debug	For use by Cisco Engineering, only.

In the Application Server, the error-level messages are further subdivided:

- ALERT - Error condition is not recoverable. Results in loss of service or shutdown.
- FATAL - Error condition is not recoverable. Results in loss of service.
- ERROR - Error condition is not recoverable. Results in loss of service.
- WARNING - Recovered from error condition. Does not result in loss of service.

In addition, Application Server debug messages are logged as DEBUGGING level messages and tracing messages are logged as NOTIFICATION level messages.

Application Server Logging and Metrics

The *Application Server* has several levels of logging. These settings are turned on/off through the Application Administration Web pages.

Some logging is controlled by the user; some logging–such as entries related to error conditions–is always reported.

Controlling Application Server Logging

You use the Application Administrator tool's Log Configuration page to define:

- Whether or not the Application Server should produce log files. (It is recommended that the Log File Output setting always be "on." If it is set to "off," errors and statistics will not be logged.)
- A file name for the log file, consisting of a base and its extension.
- The maximum number of log files to be retained. (The default is 10.)
- The maximum size for each log file, in bytes. (The default is 1048576.)

The Application Server uses the *file name* and *maximum number of log files* settings to form a list of log file names. For example, if the base of the file name is **CiscoISN_**, its extension is **log**, and the maximum number log files setting is **10**, the Application log file list would consist of the following:

CiscoISN_01.log
CiscoISN_02.log
CiscoISN_03.log
CiscoISN_04.log
CiscoISN_05.log
CiscoISN_06.log
CiscoISN_07.log
CiscoISN_08.log
CiscoISN_09.log
CiscoISN_10.log

If you restart the Application Server or exceed the maximum number of files allowed, the Application Server renames the existing logs with the extension **old** (**CiscoISN_01.log.old**, etc.) and resumes logging to the first file in the list (**CiscoISN_01.log**).

How to configure Application Server log files

Step 1 From any Engine Administration page, click the **Log Configuration** link. The Log Configuration page appears.

Step 2 Use the **Log File** section to specify the following:

- **Log File Output**. (Checkbox.) When "on" (checked), the Application Server will produce log files.

Note It is recommended that the log file output setting always be "on." If "off," errors and statistics will not be logged.

- **File name**. A base file name for the log file and an extension, for example, **CiscoISN_** and **log**.
- **Number of Log files**. (Default: 10.) Maximum number of log files to be retained.
- **Log File Size**. (Default: 1048576.) Maximum size for each log file, in bytes.

Step 3 Use the **Interface Tracing** section to specify the level of how interactions between the Application Server and external interfaces should be logged: Call, Basic or Detailed.

Note For a description of each of these levels, see "Application Server Interface Tracing" section on page 7-11.

Step 4 Click **Update** to submit the changes.

Note Accept the defaults for other settings; only turn Debugging "on" when instructed to do so by your support organization. (When Debug is "on," it can affect system performance>)

Application Server Metrics

The Application Server calculates metrics internally for significant events and measurements. These metrics are logged at intervals. The interval is configurable and defaults to 30 minutes; any change in its setting will take affect at the end of the current interval.

Note The Application Server metrics counters have been implemented to be *light-weight* so that they will not impact overall system performance. As such, they will generally be accurate most of the time (>99%). However, there are some concurrency scenarios that might temporarily make the metrics results slightly inaccurate (for instance, counters off by 1 for a given interval). If this occurs, the inaccuracy is corrected later when discovered in an interval check. This approach was implemented for performance reasons.

How to view Application Server log files

Step 1 From any Engine Administration page, click the **Log files** link. The Log files page appears, display a list of the Application Server Log files that currently exist.

Step 2 Click a **File name** link. The Log file displays in a Browser window.

Step 3 When finished with the Log files page, link to another page or select **File > Close** to close the Application Administrator.

Example 7-2 shows metric information written to a Application Server log file. The top lines of the log file contain ISN metrics; the final two lines display the ICM metrics. Descriptions of the metric categories follow the example.

Example 7-2 Sample Log File from Application Server

```
16110: Sep 23 19:30:42.250 EDT %ISN-SS_HTTP-6-INFORMATIONAL:
% Sep 23 19:30:42 EDT %ISN metrics -----------------------------------
% Sep 23 19:30:42 EDT % HTTP counts:
% Sep 23 19:30:42 EDT %  Total requests:                90
% Sep 23 19:30:42 EDT %  Requests in progress:          1
% Sep 23 19:30:42 EDT %  Maximum requests:              2
% Sep 23 19:30:42 EDT % Call counts:
% Sep 23 19:30:42 EDT %  New calls:                     0
% Sep 23 19:30:42 EDT %  Calls ended:                   0
% Sep 23 19:30:42 EDT %  Calls in progress:             0
% Sep 23 19:30:42 EDT %  Maximum calls in progress:     0
% Sep 23 19:30:42 EDT % Throughput in milliseconds:
% Sep 23 19:30:42 EDT %  New call roundtrip average (ms):          0
% Sep 23 19:30:42 EDT %  New call throughput average (ms):0
% Sep 23 19:30:42 EDT %  New call GED average(ms):0
% Sep 23 19:30:42 EDT %  New call roundtrip maximum (ms):          0
% Sep 23 19:30:42 EDT %  New call GED maximum (ms):0
% Sep 23 19:30:42 EDT %  Call event roundtrip average (ms):        0
% Sep 23 19:30:42 EDT %  Call event throughput average (ms):0
% Sep 23 19:30:42 EDT %  Call event GED average(ms):0
% Sep 23 19:30:42 EDT %  Call event roundtrip maximum (ms):        0
% Sep 23 19:30:42 EDT %  Call event GED maximum(ms):0
% Sep 23 19:30:42 EDT %  Node manager ping average (ms): 0
% Sep 23 19:30:42 EDT %  Node manager ping maximum (ms): 0
% Sep 23 19:30:42 EDT
% Sep 23 19:30:42 EDT %  Interval 18 result at Mon Sep 23 19:30:42 EDT 2002
% Sep 23 19:30:42 EDT %  Object memory in use, bytes:    2685272
% Sep 23 19:30:42 EDT %  Object memory free, bytes:      555248
% Sep 23 19:30:42 EDT %  System up 9:30:00

1580: Jun 22 01:11:04.859 EDT %ISN-LIB_ICM-6-INFORMATIONAL:ICM Metrics: ---
% Jun 22 01:11:04 EDT %  ICM Messages in interval:    10
% Jun 22 01:11:04 EDT %  Interval size, seconds:      305.0
% Jun 22 01:11:04 EDT %  ICM messages since startup:  73
```

Application Server log files report the following metrics:

- HTTP request activity:
  - Number of total requests received this interval
  - Number of requests currently in progress
  - Maximum number of simultaneous requests seen during this interval
- Calls:
  - Number of new calls this interval.
  - Number of calls ended this interval.
  - Number of calls in progress at snapshot.
  - Maximum number of simultaneous calls handled during this interval.
- Throughput:
  - **New call roundtrip average**. Average number of milliseconds a new call took from the time it reached the Application Server to the time it returned from the Application Server, including ICM and network time.
  - **New call throughput average**. Average number of milliseconds a new call spent in the Application Server itself, *excluding* ICM and network time.

  - **New call GED average**. Average number of milliseconds a new call spent waiting in the Application Server for the ICM, including network time.
  - **New call GED maximum**. Maximum number of milliseconds a new call took waiting in the Application Server for the ICM, including network time.
  - **New call roundtrip maximum**. Maximum number of milliseconds a new call took from the time it reached the Application Server to the time it returned from the Application Server, including ICM and network time.
  - **Call event roundtrip average**. Average number of milliseconds a call event took from the time it reached the Application Server to the time it returned from the Application Server, including ICM and network time.
  - **Call event throughput average**. Average number of milliseconds a call event spent in the Application Server, *excluding* ICM and network time.
  - **Call event GED average**. Average number of milliseconds a call event spent waiting in the Application Server for the ICM, including network time.
  - **Call event roundtrip maximum**. Maximum number of milliseconds a call event took from the time it reached the Application Server to the time it returned from Application Server, including ICM and network time.
  - **Call event GED maximum**. Maximum number of milliseconds a call event took waiting in the Application Server for the ICM, including network time.

Note Averages and Maximums are calculated by using current averages (average of calls within this interval), not rolling averages (average of calls within a few intervals). Calculated numbers in the throughput section are sometimes independent of each other, an may not always be added together to achieve uniform results. For example, the **New call roundtrip average** does not always exactly match the sum of the **New call throughput average** and the **New call GED average**.

- Metrics interval number (for example, "The *Nth* metrics interval logged").
- How long the system has been running (for example, "Uptime").
- Metrics for the ICM/IVR subsystem:
  - Number of ICM messages.
  - Number of seconds in the ICM metrics interval.
  - Number of ICM messages since startup.

Application Server Interface Tracing

In the Application Server, interface tracing tracks the external interfaces to a component. This tracing is useful for troubleshooting solution-level problems. (It is not meant for tracing information *within* a component, which is a debugging effort.)

Interface tracing messages are logged as NOTIFICATION level messages. There are three levels of interface tracing:

- **Call**. Logs call-handling information. This includes any information about:
  - Call arrival
  - Call disconnection

  - Call transfer
  - Call rejection

Note Call interface tracing **does not** include tracing each step taken by the ICM.

- **Basic**. Logs the basic information—such as message type—regarding the component's interface interactions with other components.
- **Detailed**. Logs more complete information about the component's interface interactions with other components.

Table 7-3 provides detailed descriptions of basic and detailed interface tracing.

Table 7-3 Application Server's Basic and Detailed Interface Tracing

Basic Interface Tracing	Detailed Interface Tracing
The HTTP subsystem logs each type of message it sends or receives.	The Application Server's HTTP subsystem logs each URL it receives from a Voice Browser and the entire VXML it sends.
The ICM/IVR subsystem logs each ICM/IVR message it sends or receives.	The ICM/IVR subsystem logs each ICM/IVR message it sends and receives, including information such as ECC variables.

Note Detailed interface tracing is not available for the Voice Browser for ISN Version 2.0.

Voice Browser Logging and Metrics

The Voice Browser calculates metrics internally for significant events and measurements. These metrics are logged at intervals and/or display on demand. (The interval is configurable.) Measurements for particular actions (for example, retrieving a voice file), are counted within the interval in which the action completes.

Controlling Voice Browser Logging and Tracing

You use the following VB Admin commands to control whether metrics are logged and the time interval of reporting the periodic metrics:

- **SetCallTrace**. When "on," the Voice Browser logs basic call detail information to the console and log files.
- **SetInterfaceTrace**. When "on," the Voice Browser logs interface details to the console and log files.
- **SetTraceMask**. For use by Technical Support, only.

Note For more information on using these commands to configure the Voice Browser log settings, see Chapter 4, "Voice Browser Administration."

Viewing Voice Browser Logs

Each Voice Browser log begins with the prefix **VB_**, ends with the file extension .**ems**, and includes the date and time the log was created. The log file name syntax is:

VB_YYMMDD_HHMMSS.ems

For example, the following is the name for a log file is for the Voice Browser process created on February 8, 2001 at 9:48:39 A.M.

VB_010208_094839.ems

Note The timestamp on a log file is in 24-hour format. For example, 3:00 P.M. is indicated as 15:00; 9:00 A.M is indicated as 09:00.

You view the Voice Browser log files by using the dumplog.exe utility. The dumplog.exe command reads the file, formats the event data, and writes the formatted data to the workstation screen.

Note You can also redirect output to a file. For a complete list of dumplog utility features and options, see the *Cisco ICM Software Administrator Guide*.

How to view Voice Browser log files

Step 1 Open a DOS Command Prompt window.

Step 2 Change to the <*Drive Letter*>:\<*Targetdir*>\VoiceBrowser\logfiles directory, where:

- <*Drive Letter*> is the drive location of the logfiles directory, for example, **G**.

Note To access dumplog from a remote machine, you must first map the drive on the target machine so that you can point dumplog to the appropriate directory.

- <*Targetdir*>is the location of the base ISN directory, for example, **Cisco\ISN**.

Step 3 Enter the dumplog command using the following syntax:

dumplog /if <*filename*>

where ***<filename>*** is the log file that you want to view (for example, **VB_010208_094839.ems**). The log information displays.

Step 4 When finished, close the DOS Command Prompt window.

Example 7-3 shows the contents of a Voice Browser Log file. Descriptions of each file section follow the example.

Example 7-3 Sample Voice Browser Log File (VB Process)

```
-------Voice Browser Interval Statistics-------
19:44:34:234 VoiceBrowser-VB Trace: Calls:
19:44:34:234 VoiceBrowser-VB Trace:   Interval Statistics:
19:44:34:250 VoiceBrowser-VB Trace:       Interval size:                        180
19:44:34:265 VoiceBrowser-VB Trace:       New calls this interval:              519
19:44:34:265 VoiceBrowser-VB Trace:       Max call arrival per second:          5.2
19:44:34:281 VoiceBrowser-VB Trace:       Calls transferred this interval:      738
19:44:34:296 VoiceBrowser-VB Trace:       Max IP Transfer per second:           5.2
19:44:34:296 VoiceBrowser-VB Trace:       Calls rejected this interval:         0
19:44:34:312 VoiceBrowser-VB Trace:       Transfers not completed this interval: 0
19:44:34:312 VoiceBrowser-VB Trace:       Prompts not found this interval:      0
19:44:34:328 VoiceBrowser-VB Trace:       Calls using critical media:           0
19:44:34:328 VoiceBrowser-VB Trace:       Calls finished this interval:         522
19:44:34:343 VoiceBrowser-VB Trace:       Avg New Call Latency (ms):            308
19:44:34:343 VoiceBrowser-VB Trace:       Max New Call Latency (ms):            671
19:44:34:359 VoiceBrowser-VB Trace:       Min New Call Latency (ms):            156
19:44:34:359 VoiceBrowser-VB Trace:       Std Dev. New Call Latency:            96
19:44:34:375 VoiceBrowser-VB Trace:       Avg Transfer Time to Alert(ms):       208
19:44:34:375 VoiceBrowser-VB Trace:       Max Transfer Time to Alert(ms):       3235
19:44:34:390 VoiceBrowser-VB Trace:       Min Transfer Time to Alert(ms):       156
19:44:34:390 VoiceBrowser-VB Trace:       Std Dev. Transfer Time to Alert:      132
19:44:34:406 VoiceBrowser-VB Trace:       Avg Transfer Time to Answer (ms):     713
19:44:34:406 VoiceBrowser-VB Trace:       Max Transfer Time to Answer (ms):     2235
19:44:34:421 VoiceBrowser-VB Trace:       Min Transfer Time to Answer (ms):     78
19:44:34:421 VoiceBrowser-VB Trace:       Std Dev. Transfer Time to Answer:     337
19:44:34:437 VoiceBrowser-VB Trace:       Avg CPU Usage (percent):              22
19:44:34:437 VoiceBrowser-VB Trace:       Max CPU Usage (percent):              31
19:44:34:453 VoiceBrowser-VB Trace:       Min CPU Usage (percent):              15
19:44:34:453 VoiceBrowser-VB Trace:       Std Dev. CPU Usage(theta):            4
19:44:34:468 VoiceBrowser-VB Trace:   -Application Server: boxer:8000
19:44:34:468 VoiceBrowser-VB Trace:       Avg Call Event Latency (ms):          254
19:44:34:484 VoiceBrowser-VB Trace:       Max Call Event Latency (ms):          547
19:44:34:484 VoiceBrowser-VB Trace:       Min Call Event Latency (ms):          125
19:44:34:500 VoiceBrowser-VB Trace:       Standard Deviation(theta):            87
19:44:34:500 VoiceBrowser-VB Trace:       Number of Call Events:                519
19:44:34:515 VoiceBrowser-VB Trace:   -Application Server: 10.86.137.27:8000
19:44:34:515 VoiceBrowser-VB Trace:       Avg Call Event Latency (ms):          177
19:44:34:531 VoiceBrowser-VB Trace:       Max Call Event Latency (ms):          672
19:44:34:546 VoiceBrowser-VB Trace:       Min Call Event Latency (ms):          0
19:44:34:546 VoiceBrowser-VB Trace:       Standard Deviation(theta):            76
19:44:34:562 VoiceBrowser-VB Trace:       Number of Call Events:                2626
19:44:34:578 VoiceBrowser-VB Trace:

-------Voice Browser Snapshot Statistics-------
19:44:34:578 VoiceBrowser-VB Trace:   Snapshot Statistics:
19:44:34:593 VoiceBrowser-VB Trace:       Calls In Progress:                    131
19:44:34:609 VoiceBrowser-VB Trace:       Calls Waiting for VXML:               2
19:44:34:625 VoiceBrowser-VB Trace:       Calls Playing Prompts:                16
19:44:34:625 VoiceBrowser-VB Trace:       IVR Ports in use:                     22
19:44:34:640 VoiceBrowser-VB Trace:       Calls Waiting for DTMF:               0
19:44:34:640 VoiceBrowser-VB Trace:       Calls Transferring:                   4
19:44:34:640 VoiceBrowser-VB Trace:       Calls Transferred:                    109
19:44:34:640 VoiceBrowser-VB Trace:       Calls Disconnecting:                  0
19:44:34:640 VoiceBrowser-VB Trace:       Calls Disconnected:                   0
19:44:34:656 VoiceBrowser-VB Trace:       New calls:                            0
19:44:34:656 VoiceBrowser-VB Trace:       Other:                                0
19:44:34:656 VoiceBrowser-VB Trace:       Internal Call count:                  407
19:44:34:671 VoiceBrowser-VB Trace:
```

```
-------Voice Browser Total Statistics-----------
19:44:34:671 VoiceBrowser-VB Trace:   Since Startup:
19:44:34:687 VoiceBrowser-VB Trace:       Total Calls:                          24962
19:44:34:687 VoiceBrowser-VB Trace:         Disconnect Disposition:
19:44:34:703 VoiceBrowser-VB Trace:           Rejected:                         0
19:44:34:703 VoiceBrowser-VB Trace:           Caller Hangup:                    24828
19:44:34:703 VoiceBrowser-VB Trace:           Called Party Hangup:              1
19:44:34:718 VoiceBrowser-VB Trace:           ICM Release:                      3
19:44:34:718 VoiceBrowser-VB Trace:           Critical Media:                   0
19:44:34:718 VoiceBrowser-VB Trace:       Max Simultaneous Calls:               149
19:44:34:734 VoiceBrowser-VB Trace:       Max IVR Ports:                        53
19:44:34:734 VoiceBrowser-VB Trace:       Total prompts not found:              0
19:44:34:734 VoiceBrowser-VB Trace:       Total transfers not completed:        1
19:44:34:750 VoiceBrowser-VB Trace:          Busy:                              0
19:44:34:750 VoiceBrowser-VB Trace:          Ring-no-answer:                    0
19:44:34:765 VoiceBrowser-VB Trace:          Gatekeeper problem:                0
19:44:34:765 VoiceBrowser-VB Trace:          Destination problem:               1
19:44:34:765 VoiceBrowser-VB Trace:          Other:                             0
19:44:34:781 VoiceBrowser-VB Trace:       System Startup Time:                  Feb 24 2003, 17:17:36
19:44:34:781 VoiceBrowser-VB Trace:       System UpTime:                        0 Days, 02 Hours, 26
Minutes, 58 Seconds
19:44:34:796 VoiceBrowser-VB Trace:       Current State:                        In Service
19:44:34:796 VoiceBrowser-VB Trace:       Packets Transmitted(approx):          9.097e+006
19:44:34:796 VoiceBrowser-VB Trace:

--------- Current Alarms ---------
19:44:34:812 VoiceBrowser-VB Trace:   None
```

Voice Browser Log Contents

There are four sections in the Voice Browser log file:

- Interval Statistics
- Snapshot Statistics
- Total Statistics
- Current Alarms

Each section is described below.

Interval Statistics

The **Interval Statistics** section of the log file contains a series of counts, averages, and maximums during a specific interval.

Note Averages, Minimums and Maximums, and Standard Deviations are calculated by using current data (that is, the average of calls within this interval), not rolling averages (that is, the average of calls over several intervals).

Statistics generated include:

- Interval Size.
- Maximum call arrival per second.
- Number of new calls this interval.
- Number of calls transferred this interval.

- Max IP Transfer per second.
- Number of calls rejected (calls are rejected when the Voice Browser is out of service).
- Number of transfer errors this interval.
- Number of prompts not found this interval.
- Number of calls using critical media. This is the number of calls that were prematurely terminated because of internal errors. In this case, a "system error" message is played to the caller.
- Calls finished this interval this interval (even if they began during a previous interval).
- Average, Maximum, and Minimum latencies, and Standard Deviation in processing new calls. This does not include the "ring wait" time of the caller. It only measures the latency from the time the Voice Browser recognizes the incoming call to the time the first voice prompt is played to the caller. The gateway and/or switch will have average latencies for the amount of time is spent waiting for the Voice Browser to pick up the call.
- Average, Maximum, and Minimum latencies, and Standard Deviation in processing transfers, measuring the time *from when the Voice Browser receives the Transfer command from the Application Server to the time of alerting*.
- Average, Maximum, and Minimum latencies, and Standard Deviation in processing transfers, measuring the time *from alerting to when the called party answers*.
- Average, Maximum, and Minimum CPU Usage (in percent) and Standard Deviation (theta).

Note These transfer measurements are taken regardless of whether the called party sits behind a Voice Gateway or Call Manager. In addition, if a transfer is not successfully established (for example, if the called party does not answer or is busy) the call will not be included in the latency statistics.)

- For each Application Server:
  - The Average, Maximum, and Minimum Event Latencies, and the Standard Deviation in communicating with the Application Server for call processing requests.
  - The number of call events. A call event is defined as a request to the Application Server from the Voice Browser.

Note When the Application Server is a DNS hostname, it represents a new call event. The hostname will show up only when a hostname has been given in the list of Application Servers. This latency will always be slightly less than the New Call latency discussed above because it measures **only** the time spent in making the request to the Application Server. It does not include the extra processing overhead in the Voice Browser for preparing the request. When the Application Server listed is an IP address, it represents all subsequent call events in the call.

- For each Media Server (when available):
  - The Average, Maximum, and Minimum time to retrieve prompt files expressed in bytes per millisecond.
  - The number of prompts ("files") retrieved.

Snapshot

The **Snapshot** section of the log file contains a count of all calls in progress, with subtotals for each call state. Call states include:

- Calls in Progress.
- Calls Waiting for VXML (or response from the Application Server).
- Calls Playing Prompts.
- IVR Ports in use.
- Calls Waiting for DTMF.
- Calls Transferring.
- Calls Transferred.
- Calls Disconnecting.
- Calls Disconnected (calls that have disconnected but software processing is not complete).
- New Calls (calls that have arrived, but treatment has not started).
- Internal Call Count.
- Other.

These last two states are important for troubleshooting:

- Calls should not stay in the Calls in a Waiting State for very long. If you see the number in this state increasing over time, it indicates that a problem is occurring.
- Calls should *never* be in the "Other" state. The state exists solely as a "catch-all" for problem calls.

Total Statistics

The **Total Statistics** section of the log file contains cumulative statistics since the time the Voice Browser was started. This section includes information regarding:

- The number of Total Calls, including their Disconnect Disposition:
  - **Rejected**. If a call comes to the Voice Browser that is Out Of Service or has reached maximum capacity, the call is rejected. If alternate endpoints have been set up in the Gatekeeper or Gateway dial-peers, these rejected calls will be re-directed to an alternate Voice Browser.
  - **Caller Hangup**. This counter is incremented when the *caller* initiates the hangup.
  - **Called Party Hangup**. This counter is incremented if the *called* party hangs up first during an IP transfer.
  - **ICM Release**. This counter is incremented when the call is disconnected by the Voice Browser as a result of a RELEASE instruction from the ICM. For example, it could be incremented in the event of a Transfer Error, as the Voice Browser reports back an error to ICM and then ICM sends a RELEASE instruction.
  - **Critical Media**. The total number of calls which terminated abnormally and played the "system error" message.

Note Disconnect Disposition reasons are mutually exclusive. For example, if critical media is played to the caller and the caller hangs up while listening to the message, this is considered a "critical media disconnect," not a caller hangup. When no calls are going through the Voice Browser, Total Calls should equal the total number of calls listed under Disconnect Disposition. While calls are in progress, however, this will not be the case, since Total Calls is incremented when the call first arrives, but Disconnect Disposition is not incremented until the call is terminated.

- Maximum simultaneous calls.
- Total Prompts not found.
- Total transfers not completed. The total number of transfers that have not completed since startup. The errors are sorted into the following categories:
  - Busy.
  - Ring no answer.
  - Gatekeeper problem. (The Gatekeeper was unable to resolve the label for the transfer.)
  - Destination problem. (The destination–that is, the Gateway or Call Manager–rejected the call.)
  - Other
- System Startup time. Clock time that the Voice Browser started.
- System UpTime. Number of hours/minutes/seconds that the Voice Browser has been running.
- Current State. Either In Service or Out of Service
- Packets transmitted. Total number of RTP packets that have been transmitted since the Voice Browser was started.

Current Alarms

Error conditions that the Voice Browser is reporting.

ISN Anti-Virus Guidelines

The following general guidelines are recommended for using anti-virus products with the ISN:

- For on-access scanning, exclude the following Cisco log files:
  - \Cisco\ISN\ApplicationServer*.log
  - \Cisco\ISN\ApplicationServer\logfiles*.ems
  - \Cisco\ISN\AlarmForwarder\logfiles*.ems
  - \Cisco\ISN\VoiceBrowser\logfiles*.ems

Note \Cisco\ISN is the *default* target directory, however, the ISN target directory might have been changed to a different location during installation.

- For on-access scanning, files need not be scanned when being read from local disks, as long as the entire set of local files has been previously scanned when written.

- Scheduled local disk scans are resource-intensive and might impact performance. If required, they should be run during "maintenance time," when there is little-to-no call activity. If calls must be handled during this time window, then the scan priority setting should be as low as possible.

Note These guidelines have been tested using the anti-virus product "NetShield for Windows NT and Windows 2000 4.5" from Networks Associates.

Table 7-4 shows settings you might make using NetShield AntiVirus Console.

Table 7-4 Sample Anti-Virus Settings

Task	Properties Tab	Suggested Settings
Scan > Properties	Detection	The Outbound files (that is, files being read) need not be checked.
	Exclusions	On both the Voice Browser and Application Server, the File, folder or drive to exclude: ***.ems**, plus the following: • Include subfolders: Off • Inbound: On • Outbound: On On the Application Server, only, the File, folder or drive to exclude: ***.log**, plus the following: • Include subfolders: Off • Inbound: On • Outbound: On
Scan > Local Drives (scheduled scan)	Advanced	• Scan priority: Low (if no maintenance time window exists) • Schedule tab: (maintenance time window)

VoIP Configuration

This chapter contains information about VoIP configuration for:

- Using ISN and IP Phones with Cisco Call Manager.
- Inbound routing.
- Outbound routing.

It also describes some limitations that exist in the ISN Version 2.0 Voice Browser concerning interaction with VoIP endpoints.

For an overview of how the ISN uses Voice over IP Routing, see the *Cisco Internet Service Node (ISN) Product Description*.

Note Audience: Call Center Managers, ISN System Managers, VoIP Technical Experts, ICM/NAM System Managers.

Using ISN and IP Phones with Cisco Call Manager

The ISN can route calls to Cisco IP Phones, using the signaling services of the Cisco Call Manager (CCM), which acts as an H.323 Gateway for the IP Phones.

Note ISN Version 2.0 supports inbound calls to ISN from IP Phones in all three of the deployment models. But see ISN Endpoint Limitations, page 8-14.

While the CCM is similar in some respects to Voice Gateways such as the AS5300, there are also significant differences. For ISN purposes, the most noteworthy difference is that the CCM does *not* support DNS lookups. Thus, when no Gatekeeper is present, all call routing configuration is performed on the CCM.

For ISN to connect to IP Phones through CCM, certain configuration rules must be followed. Specifically, the ISN Voice Browsers must be defined as *Gateways* on CCM, which enables CCM to receive *multiple* calls from the Voice Browsers.

How to define a Voice Browser as a Gateway

The ISN Voice Browsers must be defined as *Gateways* on CCM, which allows CCM to receive *multiple* calls from the Voice Browsers.

Step 1 Logon to the Cisco Call Manager Admin Page.

Step 2 Select **Device > Gateway**.

Step 3 Click **Find**. CCM lists the Gateways that are currently registered.

Step 4 If your Voice Browser is not listed, click **Add A New Gateway** and specify the following:

- **Gateway Type**. H.323 Gateway.
- **Device Protocol**. H.225.

Step 5 Click **Next**.

Step 6 Specify the following:

- **Device Name**. Voice Browser IP address.
- **Description**. Voice Browser IP address (or other identifying text).
- **Device Pool**. Default.
- **Calling Party**. Originator.
- **Presentation Bit**. Allowed.
- **Gatekeeper Name**. IP address of Gatekeeper.

Step 7 Click **Insert**.

Inbound Call Routing

At the highest level, ISN inbound call routing on an H.323 IP network is determined by the absence or presence of an H.323 Gatekeeper.

The choice of whether to use a Gatekeeper is typically determined by the network's size and/or complexity. In general:

- Smaller/simpler networks consisting of 100 or less H.323 endpoints can function without using a Gatekeeper.
- Larger, more complex networks often require a Gatekeeper to consolidate routing information.

Gatekeepers can provide additional services such as bandwidth control, and permit access to advanced routing servers such as Cisco's NAM/ICM.

Note A Gatekeeper is required for outbound routing **from** the ISN, **except** in Advanced Speech mode. H.323 protocol states that when a Gatekeeper is used, it must be used for all routing in its zone (that is, for inbound calls as well), but this rule is often ignored in practice.

If a Gatekeeper *is not* required, then the Gateways should be configured with *multiple* dial-peers for each dialed number requiring ISN treatment. Multiple dial-peers can provide nearest ISN node routing and failover routing. The dial-peers can either be explicit IP Addresses or Domain Names (which provide additional flexibility).

If a Gatekeeper *is required*, then *multiple* Voice Browser targets should be configured on the Gatekeeper for each dialed number requiring ISN treatment. The Gatekeeper updates its target lists with real time information, which reduces the risk that a Gatekeeper will route the inbound call to an unavailable Voice Browser.

Note To offset the remaining risk, the Gatekeeper should be configured with a list of alternate endpoints for each Voice Browser. While the Gatekeeper does not currently update its alternate endpoint lists with real time information, the alternate endpoint functionality is nonetheless useful to provide an extra layer of redundancy.

Finally, if nearest ISN node routing is desired when a Gatekeeper is present, the network can be divided into separate H.323 zones.

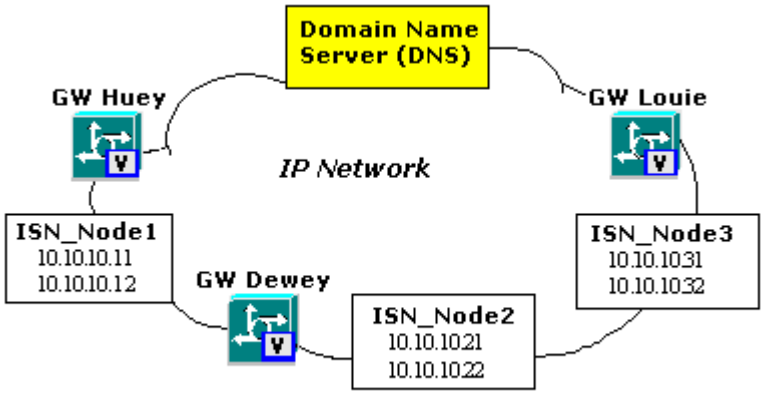
Inbound Call Routing—Without Gatekeeper

When no Gatekeeper is present, Inbound call routing to the ISN is controlled by dial plan information configured at each H.323 originating endpoint. The sections that follow assume that these originating endpoints are H.323 Gateways.

Gateway Examples

Figure 8-1 shows an H.323 network with three AS5300 Voice Gateways (Huey, Dewey, and Louie), three proximate ISN nodes, and a Domain Name Server (DNS). Each ISN node contains ***two*** Voice Browsers with the IP addresses shown:

Figure 8-1 Inbound Call Routing, No Gatekeeper



In this example, calls to several toll free numbers {800-555-0020 through 0029} require ISN treatment before they are routed to their final destination. To enhance performance, we wish the Gateways to first route ISN calls to Voice Browsers in the *nearest* ISN node. For failover purposes, if the nearest ISN node is unavailable, we wish the Gateways to route ISN calls to Voice Browsers in an alternate ISN node.

There are different ways to accomplish this. We illustrate two of them here, using Gateways Huey and Dewey:

Gateway Huey

Gateway Huey is configured to default route all dialed numbers *not* defined as dial-peers to the PSTN. Huey's dial-peer Session Targets are *IP Addresses*, configured as shown in Example 8-1.

Note In this example, it is assumed that ISN_Node1 supports g711 ulaw and ISN_Node2 and ISN_Node3 support g711 alaw.

Example 8-1 Inbound Call Routing Gateway Huey Configuration

Note In all occurrences of "voice-class codec 1" the actual values are adjustable to your needs.

```
voice-class codec 1                          *\ Defines the class (applies to all dial-peers) \*
    codec preference 1 g711ulaw
    codec preference 2 g711alaw
    codec preference 3 g729r8

dial-peer voice 1 voip
    voice-class codec 1
    destination-pattern 800-555-002.          *\ The "." is a wildcard \*
    session target ipv4: 10.10.10.11
    dtmf-relay rtp-nte h245-signal h245-alphanumeric
    preference 0
    no vad (comprehensive IVR mode only)

dial-peer voice 2 voip
    voice-class codec 1
    destination-pattern 800-555-002.          *\ The "." is a wildcard \*
    session target ipv4: 10.10.10.12
    dtmf-relay rtp-nte h245-signal h245-alphanumeric
    preference 0
    no vad (comprehensive IVR mode only)

dial-peer voice 3 voip
    voice-class codec 1
    destination-pattern 800-555-002.          *\ The "." is a wildcard \*
    session target ipv4: 10.10.10.21
    dtmf-relay rtp-nte h245-signal h245-alphanumeric
    preference 1
    no vad (comprehensive IVR mode only)

dial-peer voice 4 voip
    voice-class codec 1
    destination-pattern 800-555-002.          *\ The "." is a wildcard \*
    session target ipv4: 10.10.10.31
    dtmf-relay rtp-nte h245-signal h245-alphanumeric
    preference 2
```

no vad (comprehensive IVR mode only)

Calls to numbers *not* in the above list of dial-peers will be routed by Gateway Huey to the PSTN.

If a call is received for 800-555-0020 through 0029, Huey will first attempt to route the call to one of the two Voice Browsers in ISN_1, since they have the lowest preference value (0). This will be done in random fashion over successive calls. If none of the Voice Browsers in ISN_1 respond properly, Huey will then attempt to route the call to the next lowest preference value (1), which is a Voice Browser in ISN_2. Failing that, Huey will attempt to route the call to a Voice Browser in ISN_3.

Note A similar set of dial-peers would be needed for *each* additional phone number (or contiguous range of numbers) requiring routing in this fashion.

Gateway Dewey

Gateway Dewey is also configured to default route all dialed numbers *not* defined as dial-peers to the PSTN. However, Dewey's dial-peer Session Targets are Domain Names, configured as show in Example 8-2.

Example 8-2 Inbound Call Routing Gateway Dewey Configuration

Note In all occurrences of "voice-class codec 1" the actual values are adjustable to your needs.

```
voice-class codec 1                          *\ Defines the class (applies to all dial-peers) \*
    codec preference 1 g711ulaw
    codec preference 2 g711alaw
    codec preference 3 g729r8

dial-peer voice 1 voip
    voice-class codec 1
    destination-pattern 800-555-002.          *\ The "." is a wildcard \*
    session target dns: isn_2@cisco.com
    dtmf-relay rtp-nte h245-signal h245-alphanumeric
    preference 0
    no vad (comprehensive IVR mode only)

dial-peer voice 2 voip
    voice-class codec 1
    destination-pattern 800-555-002.          *\ The "." is a wildcard \*
    session target dns: isn2_backups@cisco.com
    dtmf-relay rtp-nte h245-signal h245-alphanumeric
    preference 1
    no vad (comprehensive IVR mode only)
```

Calls to numbers not in the list of dial-peers will be routed by Gateway Dewey to the PSTN.

If a call is received for 800-555-0020 through 0029, Gateway Dewey will first perform a DNS lookup on the Domain Name "isn_2@cisco.com." In this example, the DNS will map this domain name to 10.10.10.21 and 10.10.10.22, which will cause Dewey to route the call to a Voice Browser in ISN_2. However, if ISN_2 does not respond properly, Dewey will then perform a DNS lookup on the Domain Name "isn2_backups@cisco.com." In this example, the DNS will map this domain name to 10.10.10.11 and 10.10.10.31, which will cause Dewey to route the call to a Voice Browser in ISN_1 or a VB in ISN_3.

Inbound Call Routing—With Gatekeeper

When a Gatekeeper is present, Inbound call routing to the ISN is controlled by information kept at one or more H.323 Gatekeepers. H.323 enforces the concept of *zones*, where a single *logical* Gatekeeper (which may be one or more actual Gatekeepers) is responsible for routing control within its zone.

For ease of illustration, we will initially assume that all the ISN nodes reside within the same H.323 zone, the "ISN Zone."

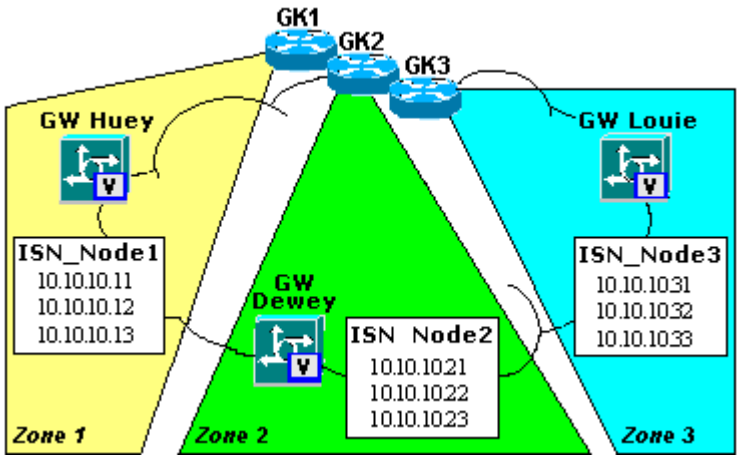
Gatekeeper Configuration Example

Figure 8-2 shows the ISN nodes and Gateways separated into three different H.323 zones:

- ISN_1 and GW Huey are assigned to Zone 1, which is controlled by GK_1.
- ISN_2 and GW Dewey are assigned to Zone 2, which is controlled by GK_2.
- ISN_3 and GW Louie are assigned to Zone 3, which is controlled by GK_3.

Each ISN node contains *three* Voice Browsers, with the IP addresses shown. As with the "Gateway Examples" section, it is assumed that each of the Voice Browsers have registered with its Gatekeeper, and that the Gateways are configured—for details, see "Gateway Configuration" section on page 8-8—to perform RAS lookups in their Gatekeeper for incoming calls.

Figure 8-2 Inbound Call Routing, With Gatekeepers



Each Gatekeeper is configured with the complete list of supported numbers, which only point to Voice Browsers at the ISN node in its zone. Each Gatekeeper is also configured with alternate endpoint information for each Voice Browser, with each Voice Browser indicating *two* alternate endpoints from its own ISN node, as shown in Example 8-3.

Example 8-3 Inbound Call Routing GK_1 Configuration

```
zone local gk_1 cisco.com 10.10.10.00            *\ Must include GK IP address \*
    gw-type-prefix 1#* default-technology         *\ Default for calls rec'd with no tech-prefix\*
    zone prefix gk_1 8005550010 gw-pri 10 isn_1vb1@cisco.com isn_1vb2@cisco.com
    endpoint alt-ep h323id isn_1vb1 10.10.10.12
```

endpoint alt-ep h323id isn_1vb1 10.10.10.13
endpoint alt-ep h323id isn_1vb2 10.10.10.11
endpoint alt-ep h323id isn_1vb2 10.10.10.13

The two Voice Browsers in the zone prefix command have equal priorities (pri 10), so under normal circumstances the GK will route all calls randomly between vb1 and vb2. For the purpose of our example, however, GK_1 knows that vb1 (at ISN_1) is completely Out-of-Service.

Each of the Gateways queries its own Gatekeeper for Inbound calls, so if Gateway Huey receives a call for 800-555-0010, it will query GK_1 for routing information, using the number 2#8005550010. Since vb1 is Out-of-Service, GK_1 will return the IP Address of vb2 to Huey, as the target endpoint. In the same response message (an H.323 ACF message) GK_1 will also pass the IP Addresses of vb2's Alternate Endpoints (which in this example are vb1 and vb3 at ISN_1). Huey will first attempt to route the call to vb2. If for some reason vb2 fails to respond to the call setup, Huey will try the alternate endpoints in turn, until it receives a response. Huey will pass the number 2#8005550010 to the Voice Browsers during call setup, which will in turn strip off the tech prefix 2#.

Caution When defining a zone prefix, it strongly suggested that you use the "*" wildcard, rather than the "..." wildcard pattern to avoid zone prefix conflicts within the Gatekeeper.

ISN Voice Browser Configuration

The Gatekeeper processes Voice Browser registration as follows:

- **RRQ registration**. ISN Voice Browsers register with the ISN Zone Gatekeeper through the H.323 Registration Request (RRQ) message. As part of RRQ registration, each Voice Browser sends its name (for example, "isn_1vb1@cisco.com") and IP address.
- **IP Addresses for Alternate Endpoints**. The Gatekeeper allows each registering endpoint to send a list of IP Addresses for its alternate endpoints. This registration list is merged with any alternate endpoint information statically configured on the Gatekeeper.

Note This feature is not supported by ISN Version 2.0.

- **Supported Numbers**. The Gatekeeper allows each endpoint to register with a list of E.164 numbers it supports, but it is recommended that the Voice Browsers *don't* do this. The reason for this is that multiple Voice Browsers can support the dialed numbers, but the Gatekeeper does not permit multiple endpoints to register with the same number.
- **Technology Prefi***x*. Each ISN Voice Browser is automatically registered with its Gatekeeper with the Tech Prefix 2#. The Voice Browser's software is shipped with the tech-prefix 2# pre configured. If necessary, this number may be changed using the VB Admin's **SetTechPrefix** command.

Gateway Configuration

Since a Gatekeeper is present in the configuration, the Gateway's role can be minimized. It is recommended that the Gateways be configured to always query the Gatekeeper for routing information. This can be done using a wildcard dial-peer, as shown in Example 8-4.

Example 8-4 Inbound Call Routing Gateway Configuration

Note In all occurrences of "voice-class codec 1" the actual values are adjustable to your needs.

```
dial-peer voice 1 voip
    voice-class codec 1
    destination-pattern 888800...          *\ The wildcard pattern\*
    session target ras
    dtmf-relay rtp-nte h245-signal h245-alphanumeric
    preference 0
    no vad (comprehensive IVR mode only)
    tech-prefix 2#
```

Gateways not in the ISN zone must be configured to query their own zone Gatekeeper for routing information. The originating Gatekeeper will discover the ISN Zone Gatekeeper through the H.323 Location Request (LRQ) message. The ISN Zone Gatekeeper will determine proper routing, which will be returned to the originating Gateway (via the originating Gatekeeper).

Call Transfers and Outbound Routing

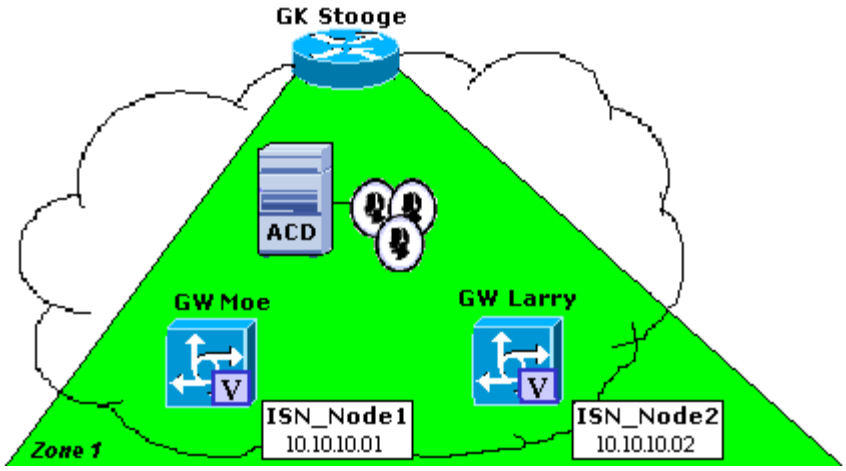
This section examines *initial* call transfer from the ISN, specifically, how the NAM/ICM, ISN, Gatekeeper, and Voice Gateways work together to perform H.323-based call transfer.

Note Subsequent call transfers (such as agent initiated transfers), being similar to the examples described below, are not discussed separately. One important difference, however, is that the **Call.NetworkTransferEnabled** variable must be set to 1 in each script that contains network transfer instructions.

IP Transfer Example (ACD Routing)

The ISN uses a Gatekeeper to determine the correct VoIP endpoint to transfer calls to when it uses the IP mode. In Figure 8-3, our endpoints are two AS5300 Voice Gateways, *Moe* and *Larry*, which provide redundant access to a call center ACD. Moe has the IP address 10.10.10.1, while Larry has the IP address 10.10.10.2. For simplicity's sake, we assume the Gateways and the ISN are in the same H.323 zone, controlled by Gatekeeper *Stooge*.

Figure 8-3 IP Transfer Routing



In this example, the ACD uses a numbering plan in the format **xxxxyyzzzz**, where:

- **xxxx** is a location code (8888 for the ACD in our example)
- **yy** is the destination trunk group on the ACD
- **zzzz** is the DNIS (Dialed Number Identification Service), identifying an ACD agent skill group, service, extension, etc.

The ISN initiates the transfer using all these digits:

- The Gatekeeper uses the **xxxx** digits to determine a destination Gateway.
- The Gateway uses the **yy** digits to determine the correct ACD trunk group.
- The Gateway outpulses the **zzzz** digits to the proper ACD trunk group, which uses them to connect the call to an agent.

Since the ACD numbering plan is simple and well-known, we specify the routing information—including Alternate Endpoint instructions—directly on the Gatekeeper, instead of having the Gateways pass the information during Gatekeeper registration. (In fact, since Moe and Larry support the *same* set of numbers, the Gatekeeper would not even allow them to jointly register with those same numbers).

Caution In cases where an agent is reserved on the ICM, it is strongly recommended that the outbound alternate endpoint functionality **not** be used when the ISN routes the call to the agent. This will prevent the unacceptable condition where the agent reserve timer expires before the call arrives, allowing a different call to reach the agent that does not match the call data previously sent to the agent by the ICM software. Router requery is the preferred method.

Gatekeeper Stooge is configured as shown in Example 8-5.

Example 8-5 Gatekeeper Stooge Configuration

```
zone local gk-stooge cisco.com 10.10.10.00      *\ Must include GK IP address
    gw-type-prefix 1# default-technology
                                        * \ Default for calls received with no tech-prefix indicated.
```

```
zone prefix gk-stooge 8888* gw-pri 10 gwMoe@cisco.com gwLarry@cisco.com
                                * \ GK to route calls with leading digits 8888 to either
                                * \ GW Moe or GW Larry with equal priority.

endpoint alt-ep h323id gwMoe@cisco.com 10.10.10.02
                                * \ Defines GW Larry as GW Moe's alternate endpoint

endpoint alt-ep h323id gwLarry@cisco.com 10.10.10.01
                                  * \ Defines GW Moe as GW Larry's alternate endpoint
```

Gateways Moe and Larry are configured as shown in Example 8-6.

Note The Gatekeeper does take endpoint availability into account when it chooses the Destination Endpoint. However, it does not take it into account when selecting the destination's alternate endpoints.

Example 8-6 Gateways Moe and Larry Configuration

```
dial-peer voice 1 pots
    * / GW to route calls with leading digits 888800 to GW voice port 0:1
    * / (T1/E1 controller # :D Channel), with highest preference (0)
    destination-pattern 888800….
    port 0:1
    preference 0      *\ 0 is the default

dial-peer voice 2 pots
    * \ Defines backup voice port (0:2) for same digits
    destination-pattern 888800….
    port 0:2
    preference 1

dial-peer voice 3 pots
    * \ Routes calls with different yy digits (01) to a different GW voice port (1:1).
    * \ (This is how the GW differentiates the ACD trunk groups.)
    destination-pattern 888801….
    port 1:1
    preference 0

dial-peer voice 4 pots
    * \ Defines backup voice port (1:2) for the same trunk group
    destination-pattern 888801….
    port 1:2
    preference 1

dial-peer voice 5 pots
    * \ Routes calls to a third trunk group
    destination-pattern 888802….
    port 2:1
    preference 0
```

```
dial-peer voice 6 pots
    * \ Backup voice port for third trunk group
    destination-pattern 888802….
    port 2:2
    preference 1

h323-gateway voip tech-prefix 1#   * \ Registers the GW with the GK with the tech-prefix 1#
```

To define the codec to be used during the transfer:

```
dial-peer voice <some label> voip
    incoming called-number 888800….

    codec g729r8
```

Note If necessary, more dial-peers may be added for additional destination patterns.

Label Definition for Outpulse Transfer

Labels for ISN calls which will require outpulse transfer mode must be pre-pended with the characters **DTMF**. By configuring the target label with the form **DTMFnnnnn** (where **nnnnn** are the digits to outpulse) the ISN will send the digits to the ingress endpoint for outpulsing.

For example, to use the AT&T Transfer Connect feature to transfer the call to the number “4441234” the label would be configured as **DTMF*84441234**.

Note In outpulse transfer mode, the ISN will send whatever digits are in the label to the Gateway for outpulsing. It is the customer’s responsibility to confirm interoperability with the target switch.

Codec Support

There is a codec used for IVR prompting in ISN and a codec used for transfers (actually it is possible, though not likely, that a different codec could be used by each transfer during the life of a call). As depicted in the examples above, the ingress gateway dial-peer was configured for all possible codecs that may be used in the life of the call (in this case we limited it to g711alaw, g711ulaw and g729r8).

Codec Support differs somewhat between ISN Queue and Transfer mode and ISN Comprehensive mode.

Queue and Transfer: All prompts are played by the ISN Voice Browser. Therefore, it is the ISN Voice Browser itself which defines the IVR codec through the SetCodec CLI command. It is the egress gateway dial-peer that defines the codec that will be used during the transfer. In our example above, we chose g729r8.

Comprehensive: In this mode, no prompts are played by the Voice Browser. Instead, the Voice Browser transfers the call to a VXML-enabled voice gateway which provides IVR treatment which may in the form of prerecorded prompts or ASR/TTS. In this case it is always the egress dial-peer that determines both prompt codec and transfer codec. If using ASR/TTS, the codec **must** be g711ulaw for IVR treatment. The transfer codec may be anything.

Miscellaneous Gateway Configuration Tasks

Configuring the Ethernet Connections

To insure call survivability for transfers when the ISN Voice Browser dies, place this configuration element on all gateways in the ISN solution (applies to ISN Queue and Transfer and ISN Comprehensive modes only):

```
interface FastEthernetN
    keepalive 1800
```

OR (if you do not have FastEthernet)

```
interface EthernetN
    keepalive 1800
```

To optimize Ethernet traffic:

```
ip cef

interface FastEthernetN
    ip route-cache
    ip route-cache same-interface
```

OR (if you do not have FastEthernet)

```
ip cef

interface EthernetN
    ip route-cache
    ip route-cache same-interface
```

Aiding Troubleshooting and Debugging

To aid Cisco troubleshooting and debugging:

debug vxml puts (leave this setting on at all times)

```
service timestamps debug datetime msec localtime

logging buffered 2000000 debugging
```

Additional Gateway Files

For ISN Comprehensive and ISN Advanced Speech, depending on the ISN configuration being used, it may be necessary to copy files from your ISN Application Server machine to the gateway(s). Use the following table to determine which files need to be copied. Examine the first three columns for the combination of features that you are using in your ISN. Copy all files from the folder specified in the fourth column from your ISN Application Server machine to flash memory on your gateways. Refer to the "copy" CLI command in the gateway documentation for instructions on how to copy files to your gateways. Typically, you would first copy these files to a tftp or ftp server, then login to the gateways and copy the files from the tftp or ftp server. IMPORTANT: DO NOT rename the destination files on the gateway when copying.

What the columns below mean:

Voice Browser: You use an ISN Voice Browser when the ISN is used to queue calls or provide call transfer after an agent has answered the call.

CSS: A CSS can be used to provide enhanced failover and load-balancing capabilities between the Voice Gateways and the ASR/TTS servers, HTTP media servers, and ISN application servers. Note that when a CSS is used, it must be used for ALL of the afore-mentioned servers. You cannot, for example, use it for ASR servers but not ISN servers.

Call Restart: The Call Restart feature will restart the call in the event of an ISN application server failure mid-call. The restarted call will appear to the ICM as just another new call. Note that the Call Restart feature can only be used when the ISN is a type 5 or type 6 VRU or when the ISN is the main routing client for the call. In configurations where a call is pre-routed by a NIC to an ISN (ISN is a type 2, 3, 7 or 8 VRU), the restart feature can not be used.

Table 8-1 Files to be Copied from ISN Application Server to Gateway(s)

Voice Browser	CSS	Call Restart	Copy all files from folder:
Yes	Yes	Yes	<basedir>/ApplicationServer/Downloads/VB-CSS-CallRestart
Yes	Yes	No	<basedir>/ApplicationServer/Downloads/VB-CSS-noCallRestart
Yes	No	Yes	<basedir>/ApplicationServer/Downloads/VB-noCSS-CallRestart
Yes	No	No	<basedir>/ApplicationServer/Downloads/VB-noCSS-noCallRestart
No	Yes	Yes	<basedir>/ApplicationServer/Downloads/noVB-CSS-CallRestart
No	Yes	No	<basedir>/ApplicationServer/Downloads/noVB-CSS-noCallRestart
No	No	Yes	<basedir>/ApplicationServer/Downloads/noVB-noCSS-CallRestart
No	No	No	<basedir>/ApplicationServer/Downloads/noVB-noCSS-noCallRestart

IP Transfer Example (IPCC Routing)

An IP transfer to an IPCC agent is very similar to an IP transfer to an ACD (TDM) agent with the following exceptions:

- The egress Gateway for this case is a Call Manager. In the Gatekeeper, the agent extensions are configured to point to the Call Manager's IP address.
- When Call Manager receives the new call, it uses the "Skinny protocol" to connect to the agent at an IP phone. The voice channels are then connected from the ingress Gateway to the IP phone.

ISN Endpoint Limitations

Table 8-2 lists endpoint limitations of the ISN 2.0 Voice Browser.

Table 8-2 ISN Endpoint Limitations

Limitation	Description
Gatekeeper single point failure.	If a Gatekeeper fails and no hot standby is configured, the following features of call routing will be affected: • If Gatekeeper is used for inbound call routing, it is not clear which Voice Browser would route the call to. • No switch transfers will succeed.
Registering to different H.323 zones on a single Gatekeeper is not implemented.	The Voice Browser is lacking a parameter that would permit it to register into different zone on the same physical Gatekeeper box.
Outbound Alternate Endpoint functionality not fully supported when transferring to agents reserved by ICM.	The agent reserve timer can expire before the call arrives, allowing a different call to reach the agent that does not match the call data previously sent to the agent by the ICM software. Use the router requery feature instead.
DTMF originating from an IP Phone is not supported for Comprehensive IVR Mode.	DTMF input in Comprehensive IVR mode requires the dtmf-relay capability of rtp-nte when the DTMF must be passed to the ASR recognition server for processing. Call Manager and IP phones do not support rtp-nte.
IP Phone cannot transfer in VoIP network in Advanced Speech IVR mode.	Because this version of the IOS does not support IP to IP transfers, it is only possible for a caller originating from an IP Phone to perform a transfer back to the TDM network.
G711ulaw is required codec when doing ASR/TTS.	The ASR/TTS vendors currently only support g711ulaw for voice recognition and synthesis.

Troubleshooting

This appendix contains troubleshooting information for the ISN and the Cisco products it interacts with.

Note Audience: ISN System Managers, VoIP Technical Experts, ICM/NAM System Managers.

Table A-1 summarizes the symptoms discussed in this appendix and points to where to find information for possible solutions:

Table A-1 Troubleshooting Table of Contents

Category	Symptom	See page
Application Server	Window 2000 Application Log fills up	Page A-4
	Application Server will not start correctly after IP Address is changed	Page A-5
	Callers hear critical error message	Page A-5
	"ISN does not support transfer to audio file" error in log	Page A-5
	Cannot start Application Server	Page A-5
	"Invalid ICM VRU Script Configuration Parameter" error message	Page A-6
	Unable to open the DOS command window or other applications	Page A-6

	The following error appears frequently in the App Server log:
	`"%ISN-SS_HTTP-4-WARNING:Retrying ASR Server. Last tried`
	`BACKUP asr-en-US-backup. primary tried:0, backup tried:1"`
		Page A-6

Table A-1 Troubleshooting Table of Contents (continued)

Category	Symptom	See page
Voice Browser	Windows 2000 Application Log fills up	Page A-7
	Voice Browser is not running; no console window present	Page A-7
	"Voice Browser to Application Server Connection Unsuccessful" alarm	Page A-7
	Voice Browser fails to retrieve a media file	Page A-8
	Callers hear critical error message	Page A-8
	Calls are rejected by the ISN Voice Browser	Page A-9
	Error code 9 is returned from a Micro-application request node	Page A-9
	Error code 32 is returned from a Micro-application request node	Page A-10
	Error message in the Voice Browser logs states "INFO: No gatekeeper configured.	Page A-10
	Error message in the Voice Browser logs states "ERROR: Voice Browser must be registered with Gatekeeper to perform IP transfers" during a call.	Page A-10
	An error message in the Voice Browser logs states "unexpected event for the gatekeeper registration.	Page A-10
	A prompt file from Media Server didn't run.	Page A-11
Audio	Numerical data is not playing the expected format or Application Server is reporting a "Variable Data is invalid" error	Page A-12
	One-Way Audio on a Voice Gateway after IP Transfer	Page A-12
	Caller does not hear prompted or an expected event does not take place	Page A-13
	Caller hears nothing; ICM and Application Server do not detect any problems	Page A-13
	Speech recognition fails	Page A-13
	Speech and DTMF keystroke recognition seem to take a long time to complete, and initial words or keystrokes are missed	Page A-13
	With Nuance Vocalizer TTS, Caller hears, "Sorry, Sound Bank Card is not Available" when non-English text is being played	Page A-13
	Cannot Play Announcements on 5300 IOS GW.	Page A-14

Table A-1 Troubleshooting Table of Contents (continued)

Category	Symptom	See page
Transfer and Connect	Taking a call back for IVR treatment or network transfer does not work	Page A-14
	The call could transfer from Agent 1 to Agent 2, but not from Agent 2 to Agent 3.	Page A-14
	The caller does not hear a prompt or an expected event does not take place	Page A-14
	Switch transfer is not going to the Gateway defined in the Gatekeeper zone prefix command	Page A-15
	An Agent cannot transfer calls back to the ISN or to another Agent.	Page A-15
Establishing Calls	When a call is IP transferred, the caller is disconnected	Page A-16
	Calls do not get established to the Voice Browser; “H.225 port 1720 required” message appears in Voice Browser Log	Page A-17
	A call placed from an analog phone on an FXS port does not appear to trigger the **new_call.vxml** application	Page A-17
	Calls are dropped when a caller tries to invoke supplementary services like Call Hold, consult or conference.	Page A-17
	An error message in the VB logs states: “ERROR: Supplementary service invoked by Caller. This feature is not supported.”	Page A-17
	Calls are dropped when trying to transfer the call the in “Queue and Transfer” deployment model.	Page A-18
	The call is disconnected when attempting to get VRU Treatment in the “Comprehensive” deployment model.	Page A-18
	The call is disconnected during IP transfer and the Gatekeeper is configured on ISN Voice Browser.	Page A-18
	The call is disconnected when you attempt to get VRU treatment in a “comprehensive” deployment model and Gatekeeper is configured on ISN Voice Browser	Page A-18

Table A-1 Troubleshooting Table of Contents (continued)

Category	Symptom	See page
ICM	Call might not go through the ISN so a prompt will not be played; an error warning message appear in the Application Server log	Page A-19
	When an agent becomes available during prompt play in a Queue to Skill Group script, the transfer never happens.	Page A-19
	The ICM script fails on a Run VRU script node; no failure is indicated in the Application Server log.	Page A-19
	In a NAM/CICM environment, an ICM timeout occurs;no error is indicated in the Application Server or Voice Browser logs.	Page A-19
	The contents of an ECC Variable configured in Script Editor are truncated after passing through the Application Server.	Page A-20
	A new call arriving at the ISN receives a default route label from the ICM.	Page A-20
Call Manager	.asp errors occur on the Call Manager; Call Manager does not function normally	Page A-21
	Problems with IP transfer	Page A-21
IP Phone	One-way audio occurs after IP transfer	Page A-23

Application Server

Table A-2 describes how to resolve problems you might encounter with the Application Server interface.

Table A-2 Application Server Troubleshooting

Symptom	Possible Cause and Solution	
Windows 2000 Application Log fills up. Clearing the log only remedies this temporarily.	*Possible Cause:*	Event log settings are not set to roll over.
	Possible Solution:	Change the Event setting so that the Application Log rolls over by doing the following: 1. Select **Start > Programs > Administrative Tools > Event Viewer.** 2. Right-click **Application Log** and select Properties from the menu. 3. Select the **Overwrite events as needed** option. 4. Click **Apply** and **OK**.
	Possible Cause:	Some unnecessary protocols might have been installed. For example, NetBEUI has been known to fill the event log.
	Possible Solution:	Uninstall protocols that are not necessary in this application.

Table A-2 Application Server Troubleshooting (continued)

Symptom	Possible Cause and Solution	
After changing the IP Address of the Application Server machine, the Application Server will not start correctly.	*Possible Cause:*	Information is not registered with Windows 2000 Services.
	Possible Solution:	Do the following: 1. Select **Start > Programs > Administrative Tools > Services.** 2. Stop and start the DC Directory Service. 3. Stop and start the IIS service.
Callers hear critical error media and "Dialogue Failure Event" errors appear in the Application Server log files.	*Possible Cause:*	If a call reaches the end of ICM script processing without being queued or released, the ICM sends a "Dialogue Failure Event" message to the Application Server. The Application Server, in turn, sends an error message to the Voice Browser.
	Possible Solution:	The author of the script must ensure that each path in the script should end with one of the following Script Editor nodes: Release, Label, Skill Group, or Queue to Skill Group.
"ISN-SS_TEL-3_ERROR: ISN does not support transfer to audio file" error appears in the Application Server log file.	*Possible Cause:*	The ISN script on the NAM/ICM includes a Busy or Ring node.
	Possible Solution:	ISN Version 2.0 does not support the Busy or Ring nodes; remove them from the script.
Cannot start Application Server with error message "5:May 30 11:46:30.403 EDT %ISN-ENG-3-Error in initializing RMI Manager: com.cisco.wfapi.WFException:Failed to start RMI Server:java.rmi.server.ExportException:Port already in use:1099; nested exception is: java.net.BindException:Address in use"	*Possible Cause:*	ISN uses 1099 as the default RMI port for the communication between Application Administration and the Application Server Engine. If this port is used by other application, ISN will not be able to start up. Possible reasons include: • The port is used by the operating system for other purposes, such as a Mapped Network Drive to another machine. • The port is used by another application, such as the Voice Browser or Messenger, which is given the port to use by the Windows 2000 operating system from the ephemeral port range (ports which are not designated as "well known" and, thus, available for use).
	Possible Solution:	If the application using ISN default RMI port 1009 is not necessary, such as Messenger, you need to shut down the application and restart it *after* starting ISN. If the application must be run on the same server as the Application Server, and if it cannot be configured to avoid the use of port 1099, change the RMI port number configured at the Application Server. If the Cisco ISN Application Server Service is running, shut it down. Then change the RMI port in Application Administration to another available TCP port in the range 1024-64000 and restart the service. **Note** You can enter **netstat -a** in a DOS command window to view the list of currently in-use TCP ports; choose a port number not in that list. By changing the RMI port, on the Application Administration Engine Status page, you will see the yellow traffic light appear with the UNAVAILABLE state temporarily before all subsystems states change to the RUNNING state.

Table A-2 Application Server Troubleshooting (continued)

Symptom	Possible Cause and Solution	
An error similar to the following is seen in the Application Server log: "83320:Oct 02 18:03:48.429 EDT %ISN-STEP_ PARSEINPUT-4-WARNING :Invalid ICM VRU Script Configuration Parameter :103404660020957405"	*Possible Cause:*	There might be a problem with how the ECC variables are defined through Configure ICM or the Script Editor's Set node.
	Possible Solution:	Verify all ECC variable configuration information: length, spelling, what values are specified through Set nodes, etc. **Note** Remember that the word grammar ends with an **ar**.
Unable to open the DOS command window or other applications	*Possible Cause:*	The number of ISN ports is set too high for the rated capacity of the ISN Voice Browser
	Possible Solution:	Make sure the following configuration settings do not exceed the maximum capacity of your ISN Voice Browser machine. In ISN Voice Browser: • Check **ShowMaxTotalCalls** in VBAdmin. • In ISN Application Server (if the Application Server resides on the same machine as ISN Voice Browser), select **Engine Configuration > Advanced Settings > Max Number of Concurrent Sessions**. • Select **Call Definitions > Maximum Number of Calls**. • Select **Call Definitions > Total Number of Ports**.
The following error appears frequently in the App Server log: `"%ISN-SS_HTTP-4-WARNING:Retrying ASR Server. Last tried BACKUP asr-en-US-backup. primary tried:0, backup tried:1"`	*Possible Cause:*	Missing parameters in the **nuance-resources.txt** file.
	Possible Solution:	If you are using Nuance speech recognition to recognize DTMF digits, be sure the following parameters are in your **nuance-resources.txt** file on the recognition server machine: `dtmf.SuppressNotifications=FALSE`

Voice Browser

Table A-3 describes how to resolve problems you might encounter with the Voice Browser interface.

Table A-3 Voice Browser Troubleshooting

Symptom	Possible Cause and Solution	
Windows 2000 Application Log fills up. Clearing the log only remedies this temporarily.	*Possible Cause:*	Event log settings are not set to roll over.
	Possible Solution:	Change the Event setting so that the Application Log rolls over by doing the following: 1. Select **Start > Programs > Administrative Tools > Event Viewer.** 2. Right-click **Application Log** and select Properties from the menu. 3. Select the **Overwrite events as needed** option. 4. Click **Apply** and **OK**.
	Possible Cause:	Some unnecessary protocols might have been installed. For example, NetBEUI has been known to fill the event log.
	Possible Solution:	Uninstall protocols that are not required by this application.
The Voice Browser does not appear to be running and no Voice Browser console window is present. Attempts to run VBAdmin generate a "Failure to Connect" error message, followed by termination of VBAdmin.	*Possible Cause:*	The Voice Browser *service* has started, meaning the Node Manager is running, however, the Voice Browser *program* itself is not running. The Voice Browser might not be able to start because of a bad registry setting.
	Possible Solution:	Check the latest Voice Browser EMS logs for problems with a registry entry.
The "Voice Browser to Application Server Connection Unsuccessful" alarm is generated twice for a given Application Server. One alarm references the Application Server by hostname; the other references the IP Address.	*Possible Cause:*	Depending on the configuration, the Voice Browser contacts the Application Server both by hostname and IP Address.
	Possible Solution:	Each of the alarms will be cleared independently when the Voice Browser successfully contacts the Application Server.

Table A-3 Voice Browser Troubleshooting (continued)

Symptom	Possible Cause and Solution	
Voice Browser fails to retrieve a media file even though the correct filepath is used.	*Possible Cause:*	The IUSR_*ComputerName* Internet User Account is disabled. IIS requires this account to be enabled for anonymous user to access Internet Service.
	Possible Solution:	Enable IUSR_*ComputerName* in the User Management window: 1. On your Windows Desktop, right-click on My Computer. 2. Select **Manage**. 3. Expand the Explorer tree, **System Tools > Local Users and Groups > Users**. 4. Select the User you want to enable. 5. In the Properties dialog box, make sure that the "Account is disabled" option **is not** checked. 6. Click **Apply** and **OK**.
Callers hear the critical error message.	*Possible Cause:*	The Voice Browser is unable to connect to an Application Server for call treatment.
	Possible Solution:	Do the following: 1. In VBAdmin, enter **ShowStatus**. 2. Locate the Current State status. If the Current State **is not** In Service, all calls will hear critical media errors; use the **SetServiceMode** command to place the Voice Browser In Service. 3. If the Voice Browser Current State **is** In Service, look at the Voice Browser log files for clues. For example, check that the Voice Browser is connecting to the Application Server that you would expect it to. 4. In Application Administration, use the Engine Status page to check if the Application Server that you are connecting to is In Service.
	Possible Cause:	The ICM is returning an error to the Application Server for the call.
	Possible Solution:	Do the following: 1. From any Engine Administration page in Application Administration, click the **Log files** link. The Log files page appears, displaying a list of the Application Server Log files that currently exist. 2. Click a **File name** link to open the log in a Browser window. 3. Examine the log. If the ICM is returning an error to the Application Server, an error message will appear. 4. If an ICM error appears in the log file, look at the ICM script and configuration for more information.

Table A-3 Voice Browser Troubleshooting (continued)

Symptom	Possible Cause and Solution	
Calls are rejected by the ISN Voice Browser	*Possible Cause:*	Even though a call may be immediately transferred upon arrival at ISN, there is a brief period (a few seconds) that the call is in IVR state until the endpoint answers the call. So, even if all calls appear to transfer immediately, you still need an adequate value set for MaxIVRPorts to handle those few seconds of IVR state for each call. When a new call arrives at the ISN Voice Browser, it looks to see whether it can admit that calls based on how many IVR ports are in use and how many total calls there are. If the new call makes either of those values exceed the Max limits, the call is rejected.
	Possible Solution:	Perform the following solution: 1. Determine the capacity of the ISN Voice Browser, based on the installed hardware, software version, software licenses and call flows. 2. Check **ShowMaxIVRPorts** and **ShowMaxTotalCalls** from the VBAdmin interface for the current settings. 3. Use the **showStatistics** option from VBAdmin if the problem is currently present. If not, check the log interval statistics "Calls in Progress" and "IVR Ports in use" for the period during which the problem occurred. If that data is not available, check the log statistics since startup: "Max Simultaneous Calls" and "Max IVR Ports". 4. Determine whether the IVR port max setting is high enough to handle the maximum number of calls that may be receiving IVR treatment. Remember that even a call that is immediately transferred, as in ISN Comprehensive Mode, will be in the IVR state for a few seconds. 5. Determine whether the results indicate that the maximum number of calls allowed is high enough to handle the number of calls. 6. If there are not enough IVR Ports and there is additional capacity rated for the equipment, increase the MaxTotalCalls by using SetMaxTotalCalls. 7. If there are not enough IVR ports and/or not enough calls allowed and there is no additional capacity on the ISN Voice Browser, you must add an additional Voice Browser.
Error code 9 is returned from a Micro-application request node	*Possible Cause:*	Error code 9 usually means that a media file could not be read. However, if you are using external VXML, it may also indicate a format error in that VXML document.
	Possible Solution:	Verify and correct the external VXML document. Voice Browsers sometimes differ from one another in their interpretation of the standards or in their level of support for various tags and attributes. Check the Voice Gateway documentation to ensure that the document you provide matches their specifications.

Table A-3 Voice Browser Troubleshooting (continued)

Symptom	Possible Cause and Solution	
Error code 32 is returned from a Micro-application request node	*Possible Cause:*	Error code 32 usually means that the TTS service was unable to perform a request due to resource limitations. However, it may also indicate that an unsupported locale was specified.
	Possible Solution:	Verify that the locale is spelled correctly, and that it is supported by your TTS service provider. Also be sure that the necessary TTS language package is installed, if required by your service provider.
Error message in the Voice Browser logs states "INFO: No gatekeeper configured. The Voice Browser cannot perform IP Transfers" during startup.	*Possible Cause:*	The ISN Voice Browser is not successfully registered with the H.323 Gatekeeper.
Error message in the Voice Browser logs states "ERROR: Voice Browser must be registered with Gatekeeper to perform IP transfers" during a call.	*Possible Solution:*	Follow these steps: 1. Set the gatekeeper from the VBAdmin using "setGK <Gatekeeper IP address>." Restart the ISN Voice Browser after changing the H.323 gatekeeper. 2. Verify that ISN Voice Browser is successfully registered with H.323 Gatekeeper using the following command in Gatekeeper: "show gatekeeper endpoints." You should see an entry of the ISN Voice Browser IP address in the "Gatekeeper endpoint Registration" table. 3. Verify that the ISN Voice Browser reports a successful registration confirm from the H.323 Gatekeeper during startup. The following messages in ISN Voice Browser logs indicate the successful registration of ISN Voice Browser with H.323 Gatekeeper: – INFO: Gatekeeper configured is 10.86.137.125 – INFO: cmEvRASConfirm:: RegistrationConfirm received from H.323 GK
An error message in the Voice Browser logs states "unexpected event for the gatekeeper registration. Please make sure H.323 Gatekeeper is up and running."	*Possible Cause:*	The configured H.323 Gatekeeper is not running or Gatekeeper is configured incorrect.
	Possible Solution:	Follow these steps: 1. Make sure the H.323 Gatekeeper is running on the IP address configured in the ISN Voice Browser. Verify that the correct IP address (and not host name) of H.323 Gatekeeper is configured in the ISN Voice Browser by using the "sGK" command from Voice Browser Admin. 2. Verify that the IP network connectivity between the ISN Voice Browser and H.323 Gatekeeper.

Table A-3 Voice Browser Troubleshooting (continued)

Symptom	Possible Cause and Solution	
A prompt file from Media Server didn't run. Other symptoms of this issue may include: • There is an error message in the Voice Browser logs stating "Invalid encoding." • There is an error message in the Voice Browser logs stating "ERROR: Audio file had a bad header." • There is an error message in the Voice Browser logs that states "ERROR: Payload type in audio file doesn't match the payload supported by the Voice Browser."	*Possible Cause*	Codec mismatch between the Voice Browser configured codec and Audio file codec.
	Possible Solution:	Follow these steps: 1. Convert the prompt file codec to the Voice Browser configured codec (g711Alaw64K or g711Ulaw64K). 2. Verify that the ISN Voice Browser codec is using the "sCodec" command from VBAdmin and check the prompt file properties to verify that codec matches the VB configured codec.
	Possible Cause:	The audio file is not a valid .wav file.
	Possible Solution:	Re-record or convert the audio file in standard .wav format.

Audio

Table A-4 describes how to resolve problems you might encounter with the audio interface.

Table A-4 Audio Troubleshooting

Symptom	Possible Cause and Solution	
Numeric data is not playing in the expected format or Application Server is reporting a "Variable Data is Invalid" error.	*Possible Cause:*	The ICM script might be: • Truncating values with leading 0's or 0's after decimals. • Rounding values.
	Possible Solution:	Put quotes around numbers in a Script Editor Set node so they will be processed as a string. This is especially important if: • Leading 0's are present (example: dates). • Trailing 0's are present after a decimal point (example: currency). • The number is very large (example: a number normally expressed through exponential notation).
One-Way Audio on a AS5350 or AS 5400 Voice Gateway after an IP Transfer.	*Possible Cause:*	One-way audio after a remote H.323 device sends the VoIP-Gateway a HOLD or TRANSFER message.
	Possible Solution:	Disable the **voice-fastpath** command on the Gateway, using the syntax: **no voice-fastpath disable** **Note** This command is enabled by default and the syntax is hidden.
	Possible Cause:	The Gateway and Call Manager are in different subnets and no IP route defined in the Gateway.
	Possible Solution:	Ping from the Gateway to the Call Manager and also from the Call Manager to the Gateway. If there is a problem with pinging, add an IP route for the different subnet in the Gateway. For example, specify the command **ip route 0.0.0.0 0.0.0.0 10.86.137.1** where 10.86.137.1 is the default routing gateway for the Gateway. This command enables routing to all subnets. After entering this command, ping again; you should be able to listen to the two-way voice.

Table A-4 Audio Troubleshooting (continued)

Symptom	Possible Cause and Solution	
When a call is made, the caller does not hear a prompt or an expected event (such as a transfer) does not take place.	*Possible Cause:*	There has been a misconfiguration on the ICM.
	Possible Solution:	Do the following: 1. In Configure ICM, under Network VRU Scripts, note the Network VRU for the Network VRU script in the ICM Run VRU Script node. 2. In Configure ICM, under Labels for the Network VRU that is running the ICM Script, click Set Target, click Network VRU and select the Network VRU noted in Step 1. **Note** When using VRU Types 2 or 5, try running Call Tracer.
	Possible Cause:	An error has occurred in the ISN.
	Possible Solution:	Do the following: 1. Use Monitor mode in the ICM Script Editor to see if the call is following the expected path (that is, it does not travel through an X branch). 2. Check the Application Server and Voice Browser logs to see what the error or warning messages have been generated.
Caller hears nothing; however, ICM and Application Server logs do not indicate any problems.	*Possible Cause:*	There may be a problem with explicitly appending a .**wav** extension to the Network VRU Script Name.
	Possible Solution:	In Configure ICM, remove the .**wav** extension from the Network VRU Script name. For example, if the name is **PM,welcome.wav**, change it to **PM,welcome**.
Speech Recognition fails, and the user.microapp.error_code ECC variable is 31, 32 or 33.	*Possible Cause:*	Some type of ASR/TTS issue exists.
	Possible Solution:	Do the following: 1. Check to make sure the ASR/TTS is running. If they are not, start the services. 2. Check to make sure the host names that connect the gateway to ASR/TTS are configured properly. If they aren't, configure them appropriately. If these procedures don't work, contact your ASR/TTS vendor.
Speech and DTMF keystroke recognition seem to take a long time to complete, and initial words or keystrokes are missed	*Possible Cause:*	Using M, GD or GS Micro-applications with input_type set to 'B' (both)
	Possible Solution:	Virus scanning can severely degrade recognition speed if you have it running in your recognition servers. Check with your recognition service provider for their recommendations on how to configure virus scanning for maximum protection and minimum performance impact.
With Nuance Vocalizer TTS, Caller hears, "Sorry, Sound Bank Card is not Available" when non-English text is being played	*Possible Cause:*	This is a problem with Vocalizer 1.0 only. It means that a locale was selected whose language pack has not been installed in the Vocalizer server.
	Possible Solution:	Install the proper Nuance Vocalizer language pack.

Table A-4 Audio Troubleshooting (continued)

Symptom	Possible Cause and Solution	
Cannot Play Announcements on 5300 IOS GW.	*Possible Cause:*	Incorrect VCWARE version on 5300 IOS GW.
	Possible Solution:	Upgrade the VCWARE version on 5300 IOS GW. The minimum VCWARE version requirement can be found using the following commands on 5300 GW: “sh vfc 1 v v” and “sh vfc 2 v v” for both slots on 5300 to get VCWARE version.

Transfer and Connect

Table A-5 describes how to resolve problems you might encounter during call transfer or connection.

Table A-5 Transfer and Connect Troubleshooting

Symptom	Possible Cause and Solution	
Taking a call back for IVR treatment or a subsequent network transfer does not work.	*Possible Cause:*	The VRU PIM that connects to the ISN is not set to Type 5.
	Possible Solution:	In ICM Configuration Manager, Network VRU Explorer, change the Type to **5**. **Note** For more information, see Chapter 2, “Using NAM/ICM with the ISN IVR Solution.”
	Possible Cause:	The ICM script does not include a Set node setting the **Call.NetworkTransferEnabled** variable to **1**.
	Possible Solution:	In any script that might perform VRU Network Transfer or Takeback for IVR treatment, add a Set node at the beginning of the script setting the **Call.NetworkTransferEnabled** variable to **1**. **Note** For more information on Network Transfer, see Appendix B, “Transferring and Queuing Calls with ISN.”
The call could transfer from Agent 1 to Agent 2, but not from Agent 2 to Agent.	*Possible Cause:*	The second ICM script does not include a Set node setting the **Call.NetworkTransferEnabled** variable to **1**.
	Possible Solution:	In the second ICM script, add a Set node at the beginning of the script setting the **Call.NetworkTransferEnabled** variable to **1**. **Note** The **NetworkTransferEnabled** variable exists for *future* network transfers, not for the current script. The first script (to Agent 1) had the flag set so the Router knew that it had to do the extra work that would allow Agent 1 to do a Network Transfer. The second script (from Agent 1 to Agent 2) did not have the variable set so the Router did not do the extra work needed to allow a Network Transfer from Agent 2 to any other destination.
When a call is made, the caller does not hear a prompt or an expected event (such as a transfer) does not take place.	*Possible Cause:*	An error has occurred in the ISN.
	Possible Solution:	Do the following: 1. Use Monitor mode in the ICM Script Editor to see if the call is following the expected path (that is, it does not travel through an X branch). 2. Check the Application Server and Voice Browser logs to see what the error or warning messages have been generated.

Table A-5 Transfer and Connect Troubleshooting (continued)

Symptom	Possible Cause and Solution	
Switch Transfer is not going to the Gateway defined in the Gatekeeper zone prefix command.	*Possible Cause:*	The IP address of the outbound Gateway, which is registered with a DNS name, is used in the zone prefix.
	Possible Solution:	Use the same name of the outbound Gateway in zone prefix. To verify the outbound Gatekeeper priority list, do the following: 1. Enter the **show gatekeeper gw-type-prefix** command in the Gatekeeper CLI. 2. Enter the "show gatekeeper end" command in the gatekeeper CLI and verify that H323 ID used by egress gateway/endpoint to register with gatekeeper is used in the "Zone prefix" configuration of gatekeeper.
Agent cannot transfer calls back to the ISN or to another agent.	*Possible Cause:*	The CCM's SingleStepTransferViaRedirect setting is incorrect. Other symptoms: The OPCTest list indicates that the initial call has not cleared; the Agent Desktop displays the initial call.
	Possible Solution:	In the CCM, modify the SingleStepTransferViaRedirect setting to **1**. **Note** For more information, see the IPCC documentation.

Establishing calls

Table A-6 describes how to resolve problems you might encounter in establishing calls.

Table A-6 Call Troubleshooting

Symptom	Possible Cause and Solution	
When a call is IP Transferred, the caller is disconnected.	*Possible Cause:*	Gateway and Gatekeeper cannot find each other on the network.
	Possible Solution:	Make sure that the Gateway can ping the Gatekeeper and vice versa: **ping <gk ip address> from gw** **ping <gw ip address> from gk** Make sure that Gateway and Gatekeeper can resolve each other's names to IP address.
	Possible Cause:	Configuration on the Gateway might be incorrect.
	Possible Solution:	Check the following: 1. There is a **gateway** command in the Gateway configuration. 2. The following commands exist in the Gateway "interface FastEthernet0" configuration section: **interface FastEthernet0** **h323-gateway voip interface** **h323-gateway voip id <gk id> ipaddr <gk ip address> 1719** **h323-gateway voip h323-id <gw host name or ip address>** **h323-gateway voip tech-prefix 1#** 3. Turn on debug in the Gateway with the following commands: **debug h225 asn1** **debug cch323 ras** **term mon** If the Gateway is configured properly, it should send a RAS message to register with Gatekeeper. **Note** Turn off debug in the Gateway using the following command: **no debug all**

Table A-6 Call Troubleshooting (continued)

Symptom	Possible Cause and Solution	
Calls don't get established to Voice Browser and message "ERROR: radMain: H.225 port 1720 required for Voice Browser is in use by some other application" appears in Voice Browser logs.	*Possible Cause:*	There might be conflicts for both the Voice Browser and the Application Server with the Cisco Call Manager or any application that uses port 1720. H.323 protocol says that all H.323 applications (like H.323 Gateway and H.323 terminals) have to listen on port 1720 to get incoming calls. Thus in theory, you cannot have a Voice Browser and Call Manager on the same machine because both of them will try to occupy port 1720. The one, which starts first, will occupy port 1720 and the other application will not work as expected. Some possible symptoms on the Voice Browser are: • No trace messages are generated for calls (even if callflow and interface tracing are enabled), but you know the Gateway dial peers have been configured properly. • If you just rebooted the PC, one call might get through while the Call Manager is starting, but then no more calls will go through after the Call Manager is running.
	Possible Solution:	Put the Voice Browser and/or Application Server and Cisco Call Manager on separate machines.
A call placed from an analog phone on an FXS port does not appear to trigger the **new_call.vxml** application.	*Possible Cause:*	There is no **application session** command defined on the POTS dial-peer for the telephone's voice port. **Note** This command is necessary to enable phones on FXS ports to run a VXML script.
	Possible Solution:	On the POTS dial-peer, model your configuration after the following: **dial-peer voice 1000 pots** **application session** **destination-pattern 12016881000** **port 1/0/0**
Calls are dropped when a caller tries to invoke supplementary services like Call Hold, consult or conference.	*Possible Cause:*	Caller is trying to invoke supplementary services like Call Hold, consult or conference. This is an unsupported feature.
An error message in the VB logs states: "ERROR: Supplementary service invoked by Caller. This feature is not supported."	*Possible Solution:*	On CCM 3.3 (with supported ISN version), turn on MTP (Media Termination Point) for the ISN Voice Browser defined as an H.323 gateway.

Table A-6 Call Troubleshooting (continued)

Symptom	Possible Cause and Solution	
Calls are dropped when trying to transfer the call the in "Queue and Transfer" deployment model.	*Possible Cause:*	The ISN Voice Browser is not successfully registered with the H.323 Gatekeeper.
The call is disconnected when attempting to get VRU Treatment in the "Comprehensive" deployment model.	*Possible Solution:*	Follow these steps: 1. Set the gatekeeper from the VBAdmin using "setGK <Gatekeeper IP address>." Restart the ISN Voice Browser after changing the H.323 gatekeeper. 2. Verify that ISN Voice Browser is successfully registered with H.323 Gatekeeper using the following command in Gatekeeper: "show gatekeeper endpoints." You should see an entry of the ISN Voice Browser IP address in the "Gatekeeper endpoint Registration" table. 3. Verify that the ISN Voice Browser reports a successful registration confirm from the H.323 Gatekeeper during startup. The following messages in ISN Voice Browser logs indicate the successful registration of ISN Voice Browser with H.323 Gatekeeper: – INFO: Gatekeeper configured is 10.86.137.125 – INFO: cmEvRASConfirm:: RegistrationConfirm received from H.323 GK
The call is disconnected during IP transfer and the Gatekeeper is configured on ISN Voice Browser.	*Possible Cause:*	The configured H.323 Gatekeeper is not running or Gatekeeper is configured incorrect.
The call is disconnected when you attempt to get VRU treatment in a "comprehensive" deployment model and Gatekeeper is configured on ISN Voice Browser	*Possible Solution:*	Follow these steps: 1. Make sure the H.323 Gatekeeper is running on the IP address configured in the ISN Voice Browser. Verify that the correct IP address (and not host name) of H.323 Gatekeeper is configured in the ISN Voice Browser by using the "sGK" command from Voice Browser Admin. 2. Verify that the IP network connectivity between the ISN Voice Browser and H.323 Gatekeeper.

ICM

Table A-7 describes how to resolve problems you might encounter in ICM/ISN interface.

Table A-7 ICM Troubleshooting

Symptom	Possible Cause and Solution	
The call might not go through the ISN, so a prompt will not be played. An error or warning message might appear in the Application Server log. Error messages will appear on the PIM console, such as: 23:28:38Trace: VRU APPICATION ERROR: Assigning the tag 7 to the non-existing ECC variable "user.microapp.error_code".	*Possible Cause:*	The ECC Variable is not configured on the ICM and/or NAM software, or the defined length is not the same on both devices.
	Possible Solution:	Add the identical ECC variable definition to the ICM and/or NAM.
When an agent becomes available during prompt-play in a Queue to Skill Group script, the transfer never happens.	*Possible Cause:*	The Interruptible checkbox in a Network VRU Script configuration is **not** checked. (This is the default setting). The ICM software will not interrupt a VRU script to perform a transfer if this feature is not enabled.
	Possible Solution:	Select the Interruptible checkbox on all Network VRU script nodes that might be run while a caller is waiting in queue for an agent.
Note Before attempting to diagnose this problem, activate call tracing on the ISN. **1.** Turn on call tracing on the Application Server using the Application Administrator webpage. **2.** Turn on call tracing on the Voice Browser using the VBAdmin tool. **3.** Run another test call. If you **do not** see a transfer request coming from the ICM to the Application Server, the problem could be the "Interruptible" setting, as described above. If you **do** see a transfer request coming from the ICM to the Application Server, the problem could be in the transfer connection; see Table A-5 for a possible solution.		
The ICM script fails on a Run VRU Script node and there is no indication of a failure in the Application Server log.	*Possible Cause:*	The Dialed Number, Network VRU Script or Network VRU might be associated with the wrong Customer.
	Possible Solution:	Use Configure ICM to ensure that the: • Dialed Number and Network VRU Script are associated with the correct Customer. • Customer is associated with the correct Network VRU.
In a NAM/CICM environment, an ICM timeout occurs and there is no indication of an error in the Application Server or Voice Browser logs.	*Possible Cause:*	If the time to retrieve the first script request (or connect) takes longer than the NAM's remote ICM timeouts (system information; Application Gateway; Remote ICM; Timeouts), then the default routing occurs.
	Possible Solution:	Either decrease delays (such as those specified through Wait nodes in the CICM script) or increase the NAM Remote ICM timeouts.

Table A-7 ICM Troubleshooting (continued)

Symptom	Possible Cause and Solution	
The contents of an ECC Variable configured in Script Editor are truncated after passing through the Application Server. For example, the Text-To-Speech (TTS) text that is spoken to the caller is not the complete text that was configured. Another example of this behavior is where there are media fetch failures and the URL to the media file is only a subset of the expected URL.	*Possible Cause:*	The cause of this problem may be that the length of the ECC Variable value that was set in Script Editor is longer than the maximum length of the ECC Variable configured at setup time.
	Possible Solution:	The solution is to make the maximum length of the ECC Variables longer. This is done using the ICM Configuration Manager. If you do alter the maximum length of ECC Variables, you need to restart the Application Server after making the change. **Note**: In a NAM/ICM environment, the length needs to be identical on all NAM and ICM or the variable does not pass.
A new call arriving at the ISN receives a default route label from the ICM. You do not see an Application Server or Voice Browser error for this type of ICM timeout.	*Possible Cause:*	The ICM is taking a long time to handle new call requests.
	Possible Solution:	Ensure there are no wait nodes in the ICM script prior to the Run VRU Script node. For more information, see the *Cisco ICM Software Scripting and Media Routing Guide*.

Call Manager

Table A-8 describes how to resolve problems you might encounter with the Call Manager/ISN interface.

Table A-8 Call Manager Troubleshooting

Symptom	Possible Cause and Solution	
.asp errors occur on the Call Manager and the Call Manager does not function normally.	*Possible Cause:*	If you installed an Application Server on the same machine as the Call Manager, and then you *uninstalled* the Application Server, some files the Call Manager needs might have been deleted.
	Possible Solution:	Reinstall Call Manager.
Problem with IP Transfer.	*Possible Cause:*	Cisco Call Manager in not registered with the Gatekeeper because the Gatekeeper information in Call Manager is incorrect.
	Possible Solution:	Change the Gatekeeper host name used during configuration to an IP address.
	Possible Cause:	Cisco Call Manager in not registered with Gatekeeper because the **Reset** and **Restart** buttons was not clicked after the Gatekeeper information was updated.
	Possible Solution:	Do the following: 1. In ccmadmin, select **Device > Gatekeeper**. 2. Add the Gatekeeper Device Information and select **gateway** as the Terminal Type. 3. Click **Update**, then **Reset Gatekeeper**. 4. Finally click, **Reset** to apply the changes.
	Possible Cause:	Cisco Call Manager in not registered with Gatekeeper because a Gatekeeper registration port is not explicitly configured in Gatekeeper.
	Possible Solution:	Do the following: 1. Check the Gatekeeper configuration to verify that port 1719 is explicitly defined for the local Gatekeeper zone. For example: **zone local gk1 cisco.com 10.86.137.146** ***1719*****.** 2. Verify the Call Manager registration in Gatekeeper by entering the **show gatekeeper endpoints** command in the Gatekeeper CLI.

Table A-8 Call Manager Troubleshooting (continued)

Symptom	Possible Cause and Solution	
Problem with IP Transfer. *(continued)*	*Possible Cause:*	The Voice Browser is not registered with the Gatekeeper.
	Possible Solution:	If the Voice Browser displays the message: "ERROR: Voice Browser must be registered with Gatekeeper to do IP transfers," do the following: 1. In VBAdmin, enter **SetGateKeeper** <*NewValue*> (where <*NewValue*> is the Gatekeeper IP address.) 2. Restart the ISN Voice Browser. **Note** For more information about the **SetGateKeeper** command, see Chapter 4, "Voice Browser Administration.")
	Possible Cause:	If the Call Manager is an egress Gateway, the Voice Browser is not defined as a Gateway in the Call Manager configuration.
	Possible Solution:	If the Voice Browser displays the message: "ERROR: IP Transfer - Destination endpoint at IP Address <*number1*> refused connection for phone number <*number2*> with reason code Unreachable Destination" (where: <*number1*> is the Call Manager IP address and <*number2*> is the label where you want the call to be transferred), do the following: 1. In ccmadmin on the Call Manager machine, select **Device > Gateway**. 2. Click **Find** and verify that there is an entry appears configuring the Voice Browser as a H.323 Gateway.
	Possible Cause:	The call is getting routed elsewhere.
	Possible Solution:	If the Voice Browser displays the message: "ERROR: IP Transfer - Destination endpoint at IP Address <*number1*> refused connection for phone number <*number2*> with reason code Unreachable Destination" (where <*number1*> is not the Call Manager IP address that's expected and <*number2*> is the label where you want the call to be transferred), then there is a problem with Gatekeeper routing. Do the following: 1. From the Gatekeeper CLI, enter **show gatekeeper gw-type-prefix** and examine the Gatekeeper routing table.

IP Phone

Table A-9 describes how to resolve problems you might encounter with the IP Phone interface.

Table A-9 IP Phone Troubleshooting

Symptom	Possible Cause and Solution	
One-way audio after IP Transfer.	*Possible Cause:*	Configuration information is missing in IOS Gateways.
	Possible Solution:	Please refer the following document from CCO: http://www.cisco.com/en/US/tech/tk652/tk698/technologies_tech_note09186a008009484b.shtml

Transferring and Queuing Calls with ISN

This appendix provides information additional information about transferring and queuing calls with ISN. It includes:

- An outline of the transfer types available to the ISN.
- Information about how ISN uses ICM labels in transferring calls.
- Examples of several ISN call transfer scripts.

Note Audience: ISN System Managers, VoIP Technical Experts, ICM/NAM System Managers.

IVRs from the NAM/ICM's Perspective

Essentially, the NAM/ICM categorizes IVRs into one of two types:

- **Intelligent Peripheral IVRs**, where—under NAM/ICM control—the carrier network routes calls to the IVR and then removes calls from the IVR for delivery to agents. With Intelligent Peripheral IVRs, once the IVR's prompting or queuing treatment has been completed, the IVR typically has no further role to play for that call.
- **Service Node IVRs**, where—following prompting/queuing treatment—the IVR initiates call delivery to agents, who are under NAM/ICM control. When functioning as a Service Node IVR, the ISN can stay involved with a call even after it has been transferred to another VoIP endpoint.

The ISN can act as either IVR type. However, to be able to access all the benefits of the ISN functionality, you should deploy the ISN as a Service Node IVR.

Note For complete information about the deployment options available for ISN., see Appendix C, "ISN Deployment."

Transferring Calls with ISN

Table B-1 describes the transfer types available to the ISN.

Table B-1 Transfer Types

Type of Transfer	Description	Notes
TDM Network Transfer (traditional take back and transfer)	Executes a PSTN transfer. The NAM/ICM sends a "transfer" command through the network NIC instead of issuing a label to the ISN. This method does not directly involve the ISN since the transfer messages are sent through the NIC to the PSTN.)	Valid for ISN deployed as an Intelligent Peripheral IVR. The call must have been pre-routed by the NAM/ISN, so it can store the network call ID and use it to send the transfer command to the NIC.
IP Transfer (call delivery within the VoIP network)	Executes a "move" within the VoIP network, with the option of first providing IVR treatment to the caller. The ISN uses VoIP to switch the incoming call to an IP-based destination, where the destination may be the actual agent (on an IP Phone) or a Gateway that passes the call to the agent on a traditional telephone (usually behind an ACD/PBX). A Gatekeeper is required for this type of transfer to resolve the NAM/ICM routing label into an IP address for the ISN to communicate with to route the call.	Valid for ISN deployed as a Service Node IVR. The call must be translation routed to a peripheral target (agent on TDM ACD) or be sent to a device target (IPCC agent) in order for the agent to request a subsequent transfer.
Outpulse Transfer	Executes a PSTN transfer from within the VoIP network. The ISN sends DTMF signals to a carrier network through the ingress Gateway, then the carrier network disconnects the call from the Gateway—and the ISN—and delivers it to the agent.	Valid for ISN deployed as a Service Node IVR.
IPCC Local Transfer	Executes a transfer within the VoIP network using the Cisco Call Manager.	Valid for ISN deployed as a Service Node IVR. The CCM is responsible for performing the transfer.

Transferring Calls with the Select Node

An ICM script can use a combination of a Select node and ECC variables to perform a transfer within ISN. The label includes information to indicate the type of transfer to be performed as well as the number (or representation of the number) to use for the destination. The Application Server then forwards this information to the Voice Browser.

Since the transfer is happening as a result of a Select node, there is no way for the ICM or ISN's software to check if the customer label and associated variable is valid or not. Therefore, if the transfer cannot occur, no matter what the reason, the call flow diverts to the Select node error branch.

Label Definition

Labels are part of the ICM configuration. The ICM determines which label to send and includes it in the request to transfer the caller. Then, for IP transfers, the ISN does a Gatekeeper look-up on the label from ICM to determine the IP address of the called party.

Note For more information on this process, see Chapter 8, "VoIP Configuration."

There are some caveats regarding label definition for use with the ISN:

- For requery and network transfer to work, you must define "dummy" VRU labels, even if the ISN is the main routing client. In addition, in a NAM/CICM configuration, these labels must be defined identically on both the NAM and CICM.
- A limitation of the ISN software is that you cannot use NAM/ICM feature of substitution variables (such as %1).

  Labels for ISN calls which will require outpulse transfer mode must be pre-pended with the characters **DTMF**. By configuring the target label with the form **DTMFnnnnn** (where **nnnnn** are the digits to outpulse) the ISN will send the digits to the ingress endpoint for outpulsing. (Conversely, a label **not** intended for outpulse transfer mode use **cannot** begin with **DTMF**.)

  For example, to use the AT&T Transfer Connect feature to transfer the call to the number "4441234" the label would be configured as **DTMF*84441234**.

  Note In outpulse transfer mode, the ISN will send whatever digits are in the label to the Gateway for outpulsing. It is the customer's responsibility to confirm interoperability with the target switch.

Script Examples

The remainder of this appendix provides examples of ISN call transfer scripts.

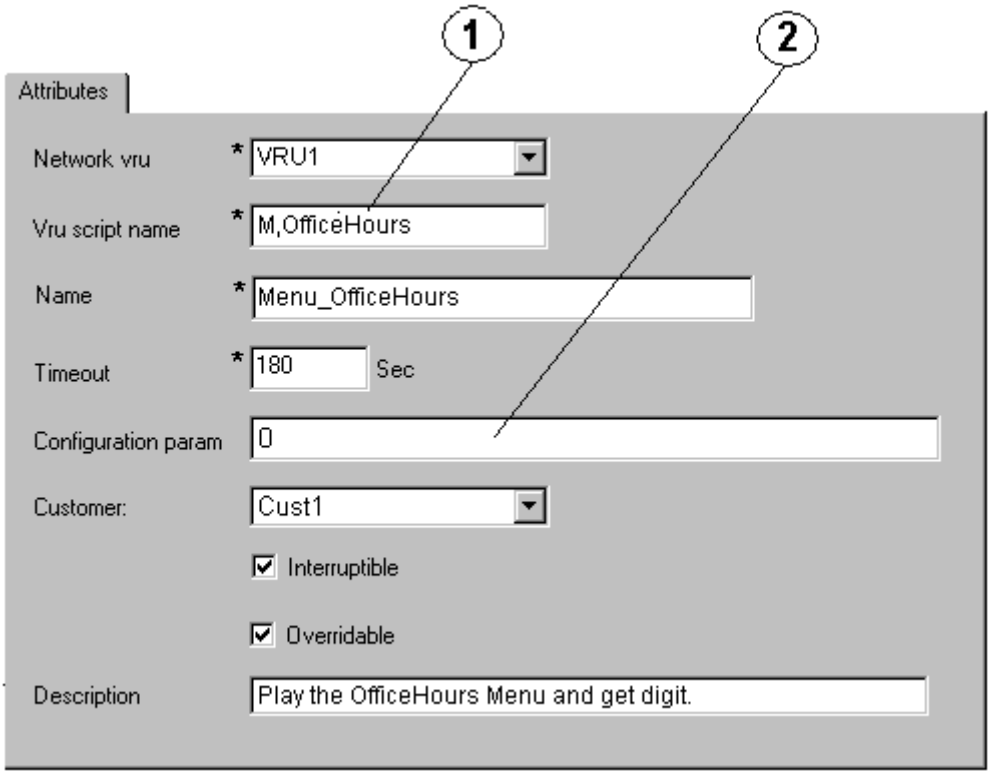
Note A limitation of the ISN software is that the Script Editor Busy and Ring nodes are not supported.

Example: Transfer to a Label

This example shows sample ICM Configuration Manager and Script Editor screen captures for a Menu application that plays a prompt presenting a menu ("Our office hours are between 8 AM and 6 PM. If you would like to talk to a customer service representative, press 0 at any time.") and then does the following:

- If the call presses 0, collects the digit, and then routes and queues the call.
- If the caller does not press 0, releases the call.

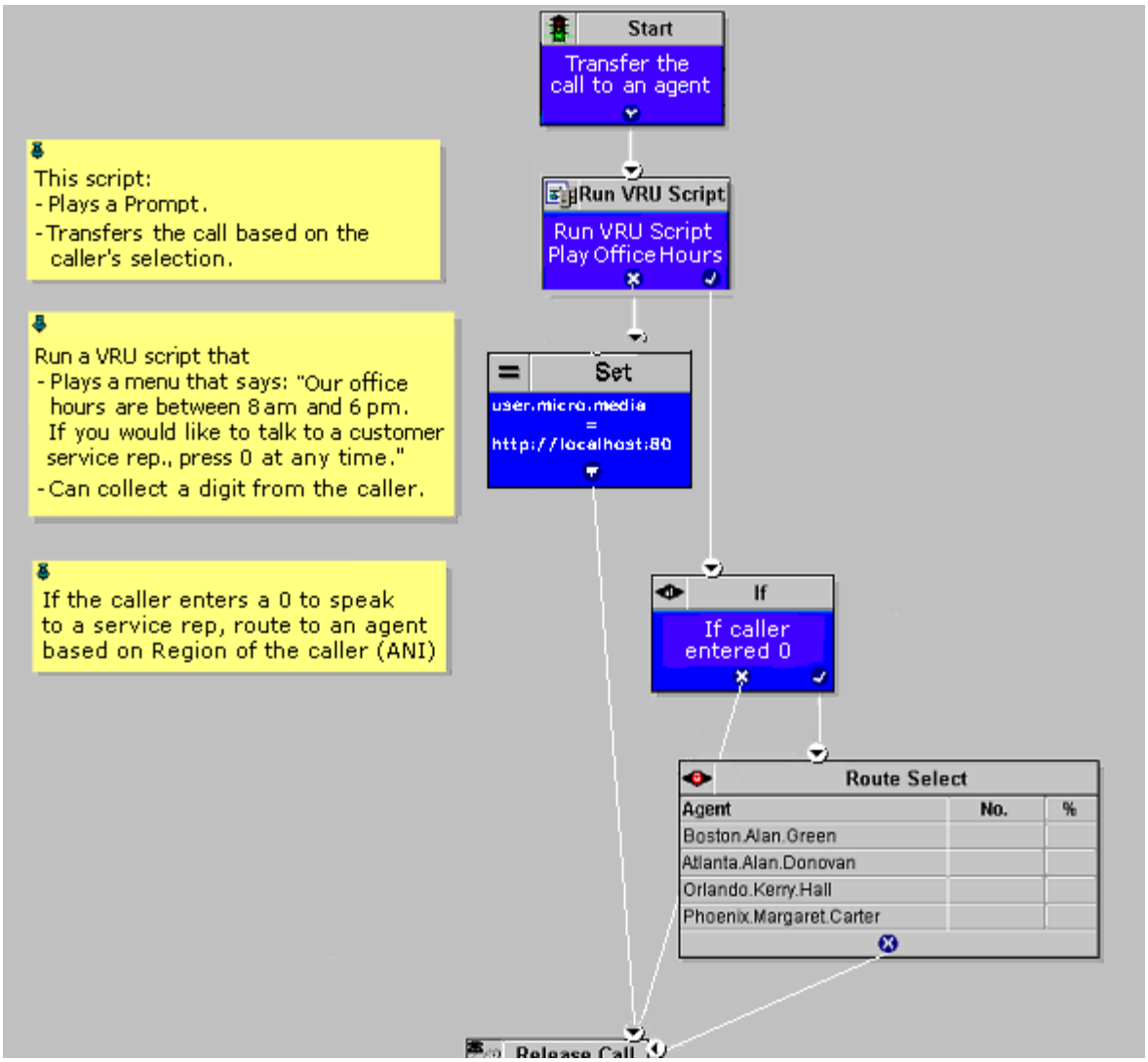
Figure B-1 Office Hours Menu Configuration



The Network VRU Script List tool's Attribute tab in Figure B-1 shows:

1. The VRU Script Name field contains two ISN parameters:
   - **M**. Menu
   - **OfficeHours**. Media File name
2. The Config Params field contains the following ISN parameter:
   - **0**. The number 0 is the only valid option.

Figure B-2 Transfer

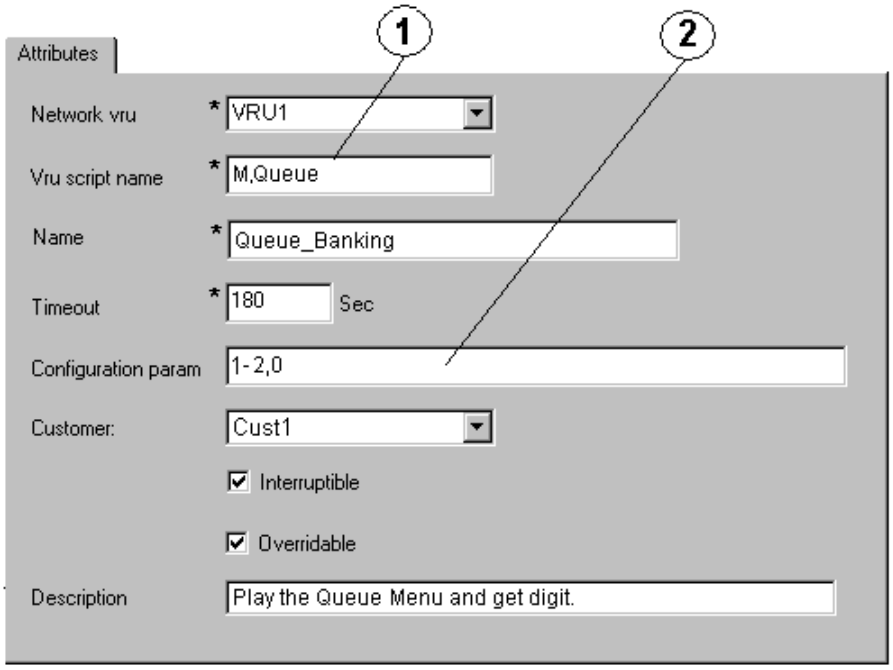


Example: Queue and Transfer to a Skill Group

The ICM can queue a call to an agent group and instruct the ISN to entertain the caller with IVR scripting using the Run VRU Script and other nodes. When the resource becomes available, the ICM tells the ISN to cancel the original request, the ISN then confirms the cancel request, the ICM sends the label for the destination, and the ISN or network will transfer the call to a freed-up agent.

This example shows sample ICM Configuration Manager and Script Editor screen captures for a Menu application that plays a prompt presenting a menu ("For Checking, press 1. For Savings, press 2. To speak to a customer service representative, press 0."), retrieves any caller-entered digits, then routes and queues the call.

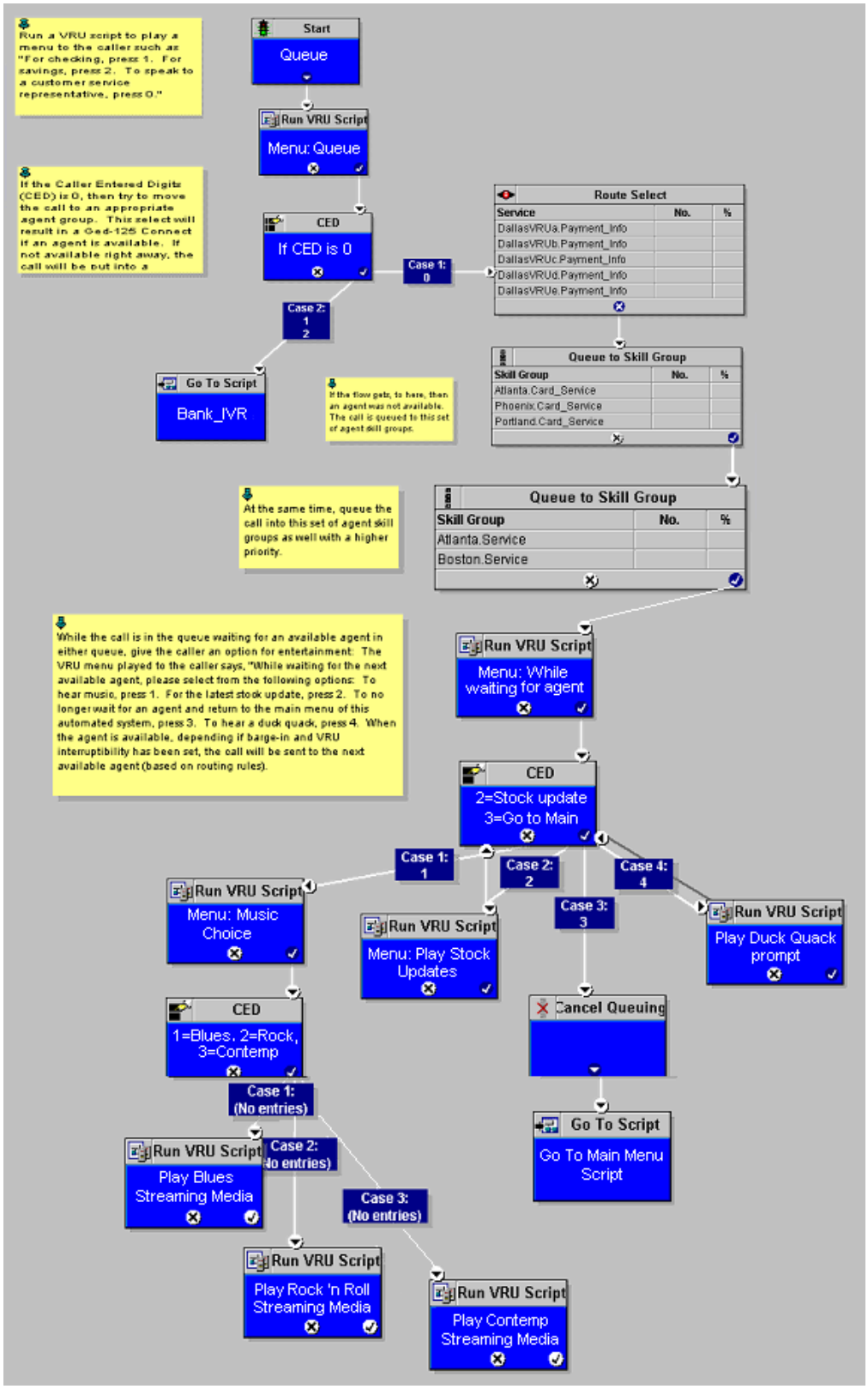
Figure B-3 Queue Menu Configuration



The Network VRU Script List tool's Attribute tab in Figure B-3 shows:

1. The VRU Script Name field containing two ISN parameters:
   - **M**. Menu
   - **Queue**. Media File name
2. The Configuration Param field containing the following ISN parameters:
   - **1-2,0**. The numbers. 1, 2, and 0 are valid options

Figure B-4 Queue



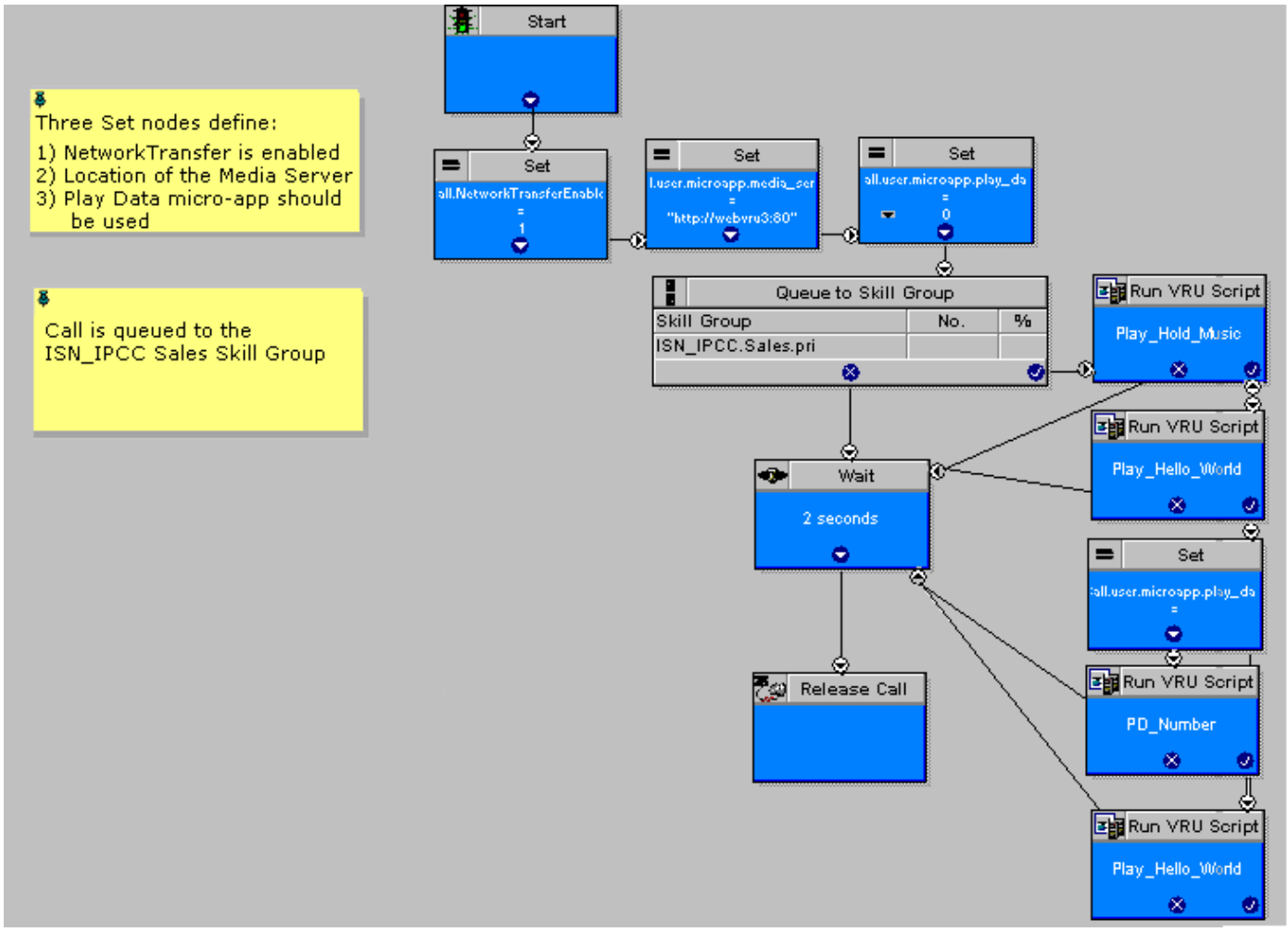
Example: Network Transfer Script

ISN provides capabilities to transfer calls to another destination after they have been answered by an agent. These capabilities are referred to as Network Transfer. The Network Transfer feature does not require any special installation on the part of ISN. The feature is disabled by default for all PG types except Enterprise Agent (EA).

To change the Network Transfer setting, do the following:

- Use the Script Editor's Set node to specify the **Call.NetworkTransferEnabled** variable. If you set this variable to 1, Network Transfer is enabled; if you set it to 0, Network Transfer is not enabled.
- In EA PG setups where the EA is behind a PBX, use the Network Transfer Preferred checkbox on the PG Explorer's Routing Client tab. If this box is "checked," Network Transfer is enabled; if "unchecked," Network Transfer is not enabled.

Figure B-5 Network Transfer Script



Configuring IPCC Re-route On No Answer for ISN

This section describes how to use the Re-route On No Answer function when using ISN as a queue point for IPCC.

Summary

When using IPCC with ISN as a queuing point and routing client, Re-route On No Answer needs to be configured differently than when using it with IP-IVR. The difference is caused by the fact that when using IP-IVR the call control is with CallManager whereas, with ISN, the call control is with ISN.

Re-route On No Answer Operation for IPCC with IP-IVR

The Re-route On No Answer function ensures that when an agent does not answer a call – for example, because he walked away from his desk without making himself Not Ready – the call is taken away after ringing for a configurable number of seconds, is presented to another agent or put back in queue, and the agent is put in Not Ready state.

This function is implemented by setting a Re-route On No Answer timeout in the agent desk settings. When the call has been ringing for the configured number of seconds, the CallManager PG will make the agent unavailable and send a post-route request to ICM software using a dialed number that is also configured in the Agent Desk Settings. A routing script is executed that determines a new destination for the call. This can be another agent, or the script can put the call back in a queue. When using Re-route On No Answer with IP-IVR, ICM software responds back to CallManager with the new destination for the call. CallManager is responsible for sending the call to the right destination (IP-IVR for queuing or new agent).

Re-route On No Answer Operation with ISN

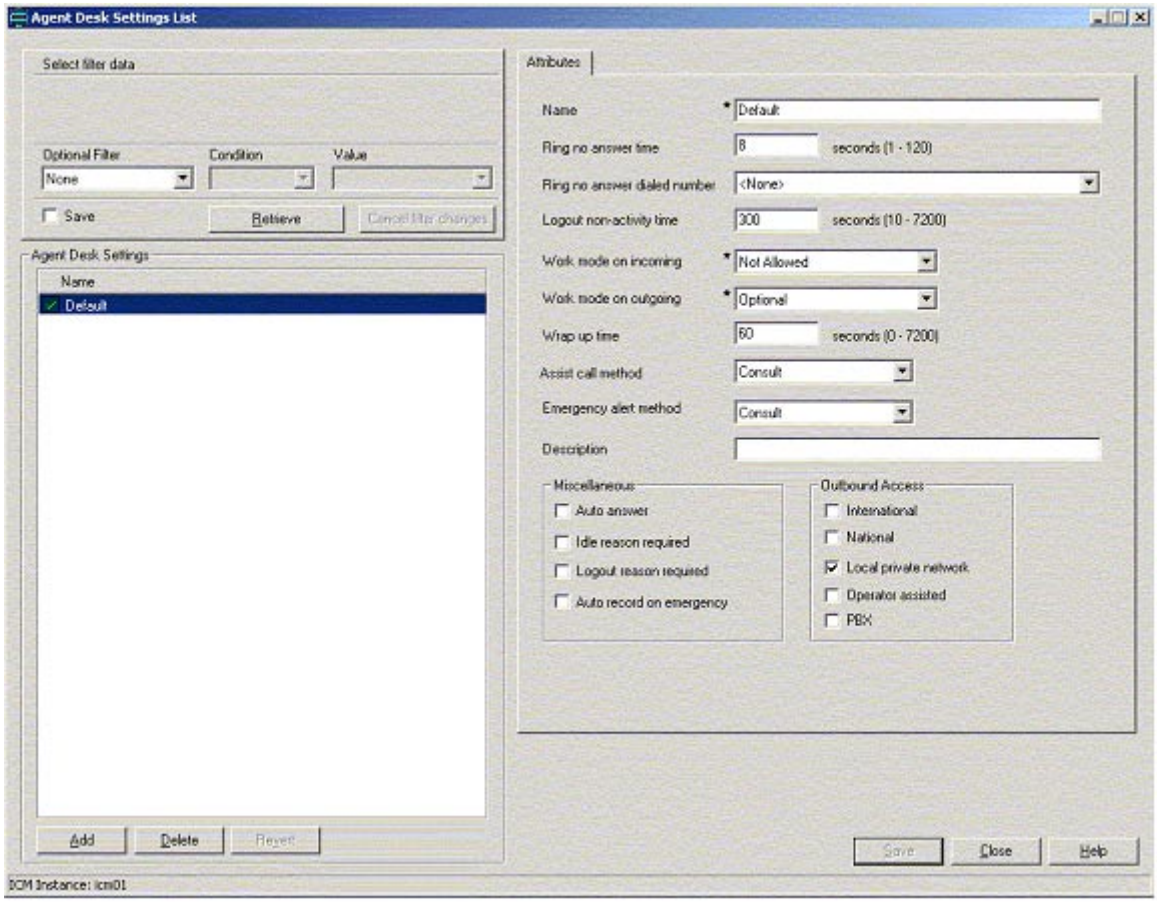
When using IPCC with ISN, CallManager does not control the queuing platform (ISN) and can therefore not send the call back to ISN for re-queuing. Instead, ISN controls the call and needs to take action.

The solution is to use the Re-route On No Answer function only to make the agent unavailable when he does not answer the call, and to use the ICM Router Requery function to take the call away from the non-answering agent.

Re-route On No Answer Agent Desk Settings Configuration

The Agent Desk Settings configuration need to have a ‘ring no answer time’ set, but should NOT have a ‘ring no answer dialed number’ set. The timeout should be set to the maximum time you want to allow the agent to answer a call, for example, 2 rings = 8 seconds. This timer should be set shorter than the no answer timeout for router requery (see below).

Figure B-6 Agent Desk Settings Configuration



This will cause the agent to be made unavailable after the Re-route On No Answer timer expires, but will not invoke the Re-route On No Answer mechanism to re-route the call.

Router Requery Configuration

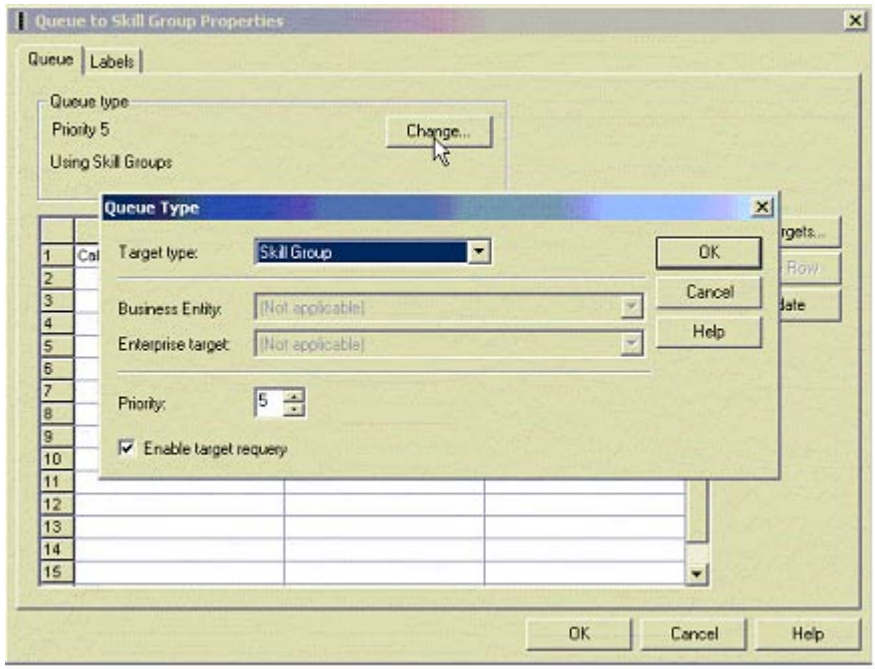
Router Requery is triggered by the routing client (ISN) when a No Answer timer expires (a different timer than the Re-route On No Answer timer).

- The No Answer timer for Router Requery is not controlled by ICM, but by the switching fabric, which is ISN in this case. ISN 1.0 has a fixed No Answer timer of 15s. ISN 2.0's Voice Browser has a configurable No Answer timer, called RNATimeout (with a default value of 15s). It can be set using the VB Admin tool. When using ISN 2.0, set RNATimeout to the desired number of seconds that the agent phone should ring before being taken away. This would probably be less than 15 seconds (4 rings), perhaps 10s. In any case, this timeout **must be longer than the Re-route On No Answer timeout** set in the Agent Desk Settings.
- Enable Requery on the node in the script that selects the first agent. Depending on the type of node used, the Requery mechanism will select a new target from the available agents or will require additional scripting. The *Cisco ICM Software Scripting and Media Routing Guide* describes how Requery works for the different nodes.

In most cases IPCC will use the Queue node. The Queue node requires additional scripting to handle the requeuing of the call in front of the queue. The script example below provides a standard way of handling this.

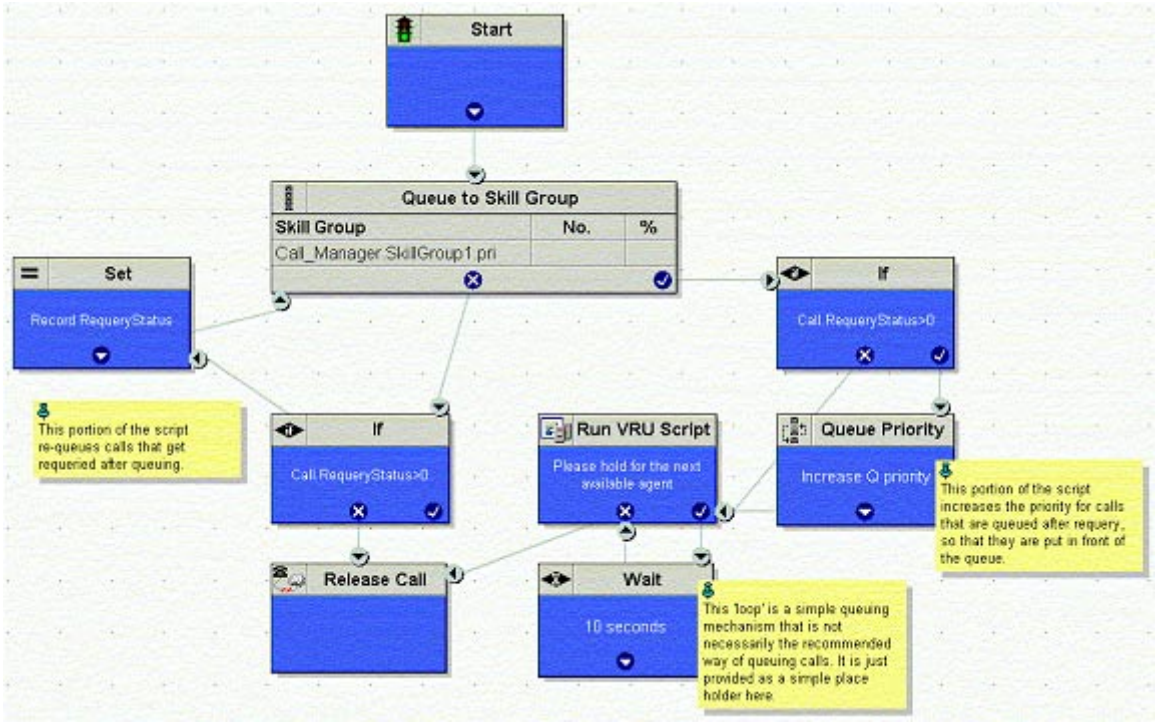
The Queue node selects the longest available agent from the skill groups configured, if there is an available agent. If there is no available agent, it queues the call with a priority set in the node (see screen shot below) and continues down the success exit of the node. When an agent becomes available, ICM always selects the longest queued call from the ones with the highest priority. When the Queue node connects the call to an agent and the agent does not answer the call, the ISN Ring-No-Answer timeout will expire, causing the Requery mechanism to kick in.

Figure B-7 Queue to Skill Group Properties



When this happens, the script immediately continues through the failure exit of the Queue node with the Requery Status variable set to ‘No Answer’ (= 3). The typical treatment is to put the call back into the same queue but with a higher priority than all other calls, since the call needs to go in the front of the queue, not the back.

Figure B-8 Sample Script for Re-Route on NoAnswer



In this script, when the Queue node selects an agent that does not answer the call, the script exits through the failure exit (X) of the Queue node. The If node tests the RequeryStatus variable. If it has value of greater than zero, this is a requery call, and the script re-queues the call. In the example above it also sets a flag using a call variable for reporting purposes (see below). Assuming that there are no agents available, the Queue node immediately exits through the success exit (Checkmark). The If node checks to see if this is a requeried call. If so, it increases the Queue Priority of the call so that it will be handled before any other calls in queue. It then enters the normal wait loop with RunScripts.

The call flow is as follows:

- Script connects call to agent by sending connect message to ISN (with requery enabled).
- Agent phone rings.
- After the Re-route On No Answer timeout expires, ICM makes the agent unavailable. The agent state does not actually change until the call gets taken away from the agent. The agent phone continues to ring and the agent can still pick up the phone (if he does pick up the phone, he will be left in Ready state after the call, even if it was after the Re-route On No Answer timer expired).
- After the ISN VB RNATimeout expires, the VB/AS/PG sends an EventReport=No Answer to the router. The router picks another target according to the routing script and sends the Connect message to ISN. The target might be another agent or it might be a VRU label to requeue the call.
- When the call disappears from the first agent he is put in Not Ready state.

Limitations

The configuration described in this section has the following limitations:

- The disposition of the requeried call is not correctly reported. The Redirect No Answer field in the agent and skill group reports do not show calls that are redirected by this mechanism. Each call that is redirected by this mechanism is counted twice, once as abandoned and once as handled (if the call is finally handled). There are two IPCC TerminationCallDetail records for this call, one for the rerouted call (with CallDisposition 'Abandoned while Ringing', code 3) and one for the handled call with a CallDisposition depending on how the call was finally handled. The scripting example above shows how a Peripheral Call Variable can be used to mark and count calls Requeried because of no answer. A custom reporting template can be written to report on this data.
- *CSCma21967 - Network Transfer fails when Requery is enabled.* This bug is fixed in ICM 4.6.3 and 5.0. There is currently no fix available for 4.6.2. When an agent has answered a call and initiates a blind transfer, an ICM script selects the destination for the call. If the script node that selects a destination for the transferred call has requery enabled, the transfer fails when it is a network transfer. This means that the Re-route On No Answer mechanism described here cannot be used for calls that are being network transferred to another agent. However, it does not affect the use of Router Requery by ISN as recommended above.

ISN Deployment

This appendix provides the detailed deployment information required for the deployment models supported by ISN Version 2.0.

This appendix **includes** information for (or pointers to information for) configuring the Gateway, Gatekeeper, ICM VRU handling, and ISN Voice Browser and Application Server.

This appendix **does not include**:

- Detailed ICM configuration for configuring agents or writing scripts.
- Complete configuration for every component of the system (for example, the TDM side of the Voice Gateway configuration).
- Configuration steps for all the components as they relate to the ISN deployment models described in the *Cisco Internet Service Node (ISN) Product Description*.

The information in this appendix **assumes** that you are already familiar with:

- Configuring Cisco Gateways and Gatekeepers.
- The ICM Configuration Manager and ICM Script Editor tools for call center operations and management.

Note You should have a copy of the following Cisco ICM software documentation available in *addition* to this manual in order to successfully configure ICM software and use its features in conjunction with ISN: *Cisco ICM Software Configuration Guide* and *Cisco ICM Software ICM Script Editor Guide*.

Before You Begin

In order to use the information in this appendix, you need to know the following:

- The ISN deployment model you will be implementing.

Note For descriptions of the ISN Deployment models, see the *Cisco Internet Service Node (ISN) Product Description*.

- The network topology for your system, including addresses and names of the solution components.
- The failover strategy for Gateways, ISN components, and media servers.
- The strategy for inbound call routing (that is, dial peers versus Gatekeeper).
- The naming resolution system for Gateways (DNS versus configured on the Gateway).
- If using a VRU other than ISN, the VRU trunk group number and number of trunks.
- The locale values to be used for ASR and/or TTS.
- Whether the same set of VRUs are to be used for all cases, or whether that will be determined separately for each customer (dialed number).

Note If all dialed numbers will use the same VRUs, it is easiest to use a default Network VRU, rather than to configure multiple Network VRUs. For more information, see the "Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.

Routing Calls Through the Network to the VRU

For ISN Comprehensive Deployment models and for deployment models with a NIC:

- **Determine the Network Routing Number.** This number is the base for routing calls through the network to the VRU; a correlation ID is appended to this number to transfer calls to a Network VRU through the network.
- **Determine the correlation IDs that will be used for transferring the calls to the VRU through the network.** The range needs to be as large as the number of new call arrivals that might occur during the longest time it takes to get any to the VRU, that is, the time to execute a Send to VRU node. This time needs to include the network delays and the possibility that alternate endpoints are used in the VoIP network. In practice, make sure the number is significantly larger than this to ensure there are always enough. For example, if the time to get to the VRU is 3 seconds and the maximum call arrival rate is 5 cps (instantaneous), 15 would be needed, so specify a value of 100.

For deployments with a Customer VRU and in NAM/CICM environments and for NIC Type 2 or 8 deployments:

- **Determine the translation route pools to use for each VRU.** Determine the labels to be sent to the network to connect the call to the VRU and the corresponding DNIS that will be seen by the VRU. For example, the label for the network might be 18008889999 and the DNIS received by the VRU and sent back to the ICM to identify the call might be 9999.

Naming Schemes

Define naming schemes to be used for ICM PGs, Peripherals and routing clients.

Installation

Before using the information in this appendix, you need to do the following:

- Install the ISN software.
- Install all the solution components.
- Make sure VRU PGs use service control with Service Control Queue Reporting enabled. Also, take note of the VRU Connection Port used for each VRU PG peripheral (PIM).
- Make sure the NIC cards, Voice GW and network components all have the Ethernet interfaces configured with the appropriate speed and setting.

Caution **Do not** use the AUTO setting in NIC cards, Voice Gateway, or network components.

Where to Go from Here?

Instructions for each deployment model follows.

ISN Comprehensive Deployments

This section describes the call flows and provides configuration instructions for the following ISN deployment models:

- ISN Comprehensive Deployment, ICM Enterprise
- ISN Comprehensive Deployment, NAM/CICM

Note The ISN Comprehensive deployment models do not support calls which originate in IP.

ISN Comprehensive Deployment, ICM Enterprise

In this deployment model, the ISN acts as the Switch, transferring the call to the Network VRU (Type 7 flow) and to agents. The ISN Application server is also configured to work with the Voice Gateway to provide VRU treatment, which may include ASR/TTS. In this deployment model, both the Voice Gateway and the Application Server see two calls:

- One for the Switch leg.
- One for the VRU leg.

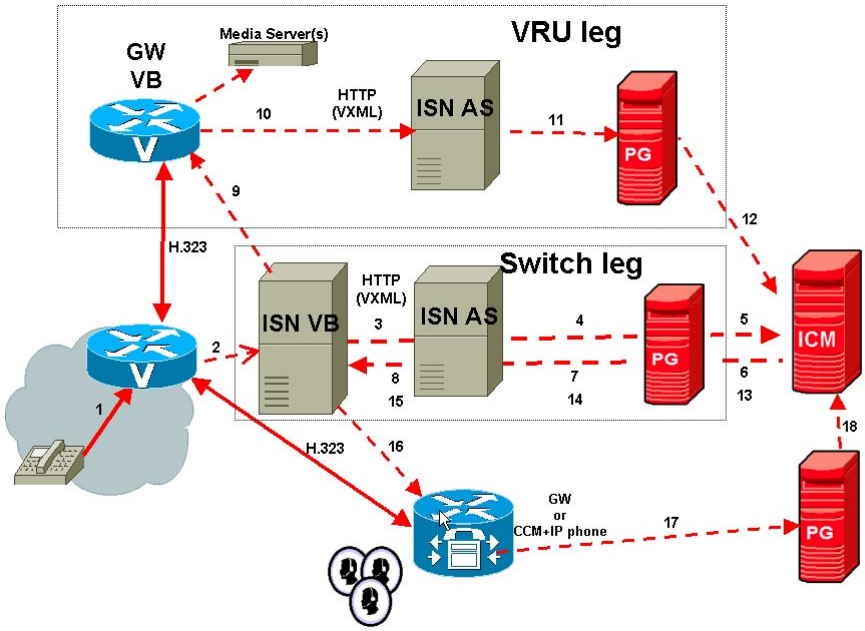
For the **Switch** leg, the Gateway simply provides Gateway capabilities from TDM to VoIP. For the **VRU** leg, the Gateway provides VRU voice treatment.

Figure C-1 shows the call flow for this deployment model.

Note Although Figure C-1 shows two Gateways (one where the call arrives and a separate one for the VRU leg), these could be the same physical Gateway. Similarly, the ISN Application Server and the PG could be the same physical machine.

For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-1 ISN Comprehensive Deployment, ICM Enterprise



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are two Network VRUs:
  - One for the Switch leg (Type 5).
  - One for the VRU leg (Type 7).
- System Information must include correlation ID settings.
- Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU.

Table C-1 contains the configuration instructions for this deployment model.

Table C-1 Configuration Checklist, ISN Comprehensive Deployment, ICM Enterprise

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used to receive the calls from the network (the **Switch** leg): 1. Configure the Gateway inbound routing to send the call over IP to the ISN Voice Browser using dial peers or Gatekeeper lookup. 2. Configure the Ethernet connections.	For more information about **Steps 1** and **2**, see Chapter 8, "VoIP Configuration."
	On the **Gateways** used for the **VRU** leg: 1. Configure the servers and voice application it will use. 2. If a different GW is used for the VRU, configure the Ethernet connections. 3. If a different GW is used for the VRU, copy the bootstrap files from ISN Installation. 4. Configure the characteristics for the VRU leg.	For instructions for **Step 1**, see "Common Gateway Configuration for VRU Leg" section on page C-75. For more information about **Steps 2, 3,** and **4**, see Chapter 8, "VoIP Configuration." For **Step 3**, the files to be copied from the Application Server machine to the Gateway are as follows: • If you are using a content switch for failover, the files are in: <basedir>/ApplicationServer/Downloads/VB-CSS-CallRestart • Otherwise, they are in: <basedir>/ApplicationServer/Downloads/VB-noCSS-CallRestart For **Step 4**: **dial-peer voice <Dial-Peer Number> voip** **application vru-leg** **incoming called-number <Network Routing Number> T** ***\ For example, 8001112222T *** **Dtmf-relay rtp-nte H45-signal h245-alphanumeric** **Codec g711ulaw** **No vad** **Note** These characteristics are for VRU legs requiring ASR and/or TTS treatment. If you have other requirements for DTMF relay, Codecs or VAD settings, you should modify the commands accordingly.
	On the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper. 2. Configure the Gatekeeper to send all the VRU connections to the applicable Gateway.	For instructions for Step 1, see Chapter 8, "VoIP Configuration." For Step 2, include the following: **zone prefix *<GK>* *<Network Routing Number>** gw-priority 10 *<GW address(es)>*** For example: ***zone prefix gk-stooge 8001112222* gw-priority 10 vru1@provider.com vru2@provider.com***

Table C-1 Configuration Checklist, ISN Comprehensive Deployment, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU.	Specify the following: • Type: **5**. • Name: **isnSwitch**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnSwitch** will be assumed.
	On the **ICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the **Switch** leg. 2. Configure a peripheral for each ISN Application Server to be used for a Switch leg connected to each PG.	For each ISN Application Server connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, for example, <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this ISN peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • Select the Enable Post-routing checkbox. On the **Advanced** tab, select the name **isnSwitch** from the Network VRU field drop-down list. **Routing Client** tab: • Name: By convention, use the same name as the peripheral. • Client Type: **VRU**.
	On the **ICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the **VRU Client** leg. 2. Configure a peripheral for each ISN Application Server to be used for a VRU leg connected to each PG. **Note** If the ISN Application Servers to use for the VRU legs are the same as those for the Switch legs, this step as this configuration is already completed. If the PGs are the same but the Application Servers are different, then only the second part of the step needs to be performed.	For each ISN Application Server connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, for example, <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this ISN peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • **Do not** select the Enable Post-routing checkbox.

Table C-1 Configuration Checklist, ISN Comprehensive Deployment, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and labels for each ISN Switch.	Specify the following: • Type: **7**. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for each Application Server that is handling the **Switch** leg: – Label: Network routing number. – Type: **Normal**. – Routing client: Select the routing client configured for that ISN Application Server peripheral from the drop-down list.
	ICM Configuration Manager, **System Information** tool: 1. Define the correlation IDs. 2. Define a default Network VRU.	Specify following in the General section of the **System Information** tool: • Set maximum and minimum correlation ID values. – Minimum correlation ID: Starting number for the correlation ID, for example, 1000. – Maximum correlation ID: Ending number for the correlation ID, for example, 1099. • Define the Default Network VRU: **IsnVRU**.
	On each **ISN Application Server**: 1. Configure the ports for the both legs of the call. 2. Check other settings.	Specify the following: • On the Call Definitions page, set the **Dialed Number Maximum Length if no Correlation ID present** field to the length of the Network Routing Number. • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the ports for both groups according to the licenses purchased, call profiles, and capacity. The “New Calls” group is used for the Switch leg; the “ID for ICM” group is used for the VRU leg. • See Chapter 5, “Application Server Administration” for other settings you might want to adjust from the default values.

Table C-1 Configuration Checklist, ISN Comprehensive Deployment, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Voice Browser**: 1. Configure the Gatekeeper. 2. Configure the capacity. 3. Check other settings.	Specify the following: • **SetGateKeeper <*NewValue*>** Where <*NewValue*> is the IP address for the Gatekeeper serving the Voice Browser. • Configure the total number of calls and IVR ports according to the licenses purchased, call profiles and capacity. (For instructions, see Chapter 4, "Voice Browser Administration".) • See Chapter 4, "Voice Browser Administration" for other settings you might want to adjust from the default values.
	ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts.	Create scripts to be used for IVR treatment and agent transfer. The VRU scripts are associated with the applicable Network VRU, that is, **IsnVRU**. Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU. For more information about creating scripts, see **Chapter 2, "Using NAM/ICM with the ISN IVR Solution."** **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **ICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **ICM**, ICM Configuration Manager: 1. Configure dialed numbers, call types and applicable customers.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **ICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco Content Services Switch (CSS): 1. If necessary, configure the CSS.	For more information, see the Cisco Content Services Switch user documentation.

ISN Comprehensive Deployment, NAM/CICM

In this deployment model, the ISN is deployed at the NAM where it acts as the Switch, transferring the call to the Network VRU (Type 7 flow) and to agents. The ISN Application Server is also configured to work with the Voice Gateway to provide VRU treatment, which may include ASR/TTS. In this deployment model, both the Voice Gateway and the Application Server see two calls:

- One for the Switch leg.
- One for the VRU leg.

For the Switch leg, the Gateway simply provides Gateway capabilities from TDM to VoIP. For the VRU leg, the Gateway provides VRU voice treatment.

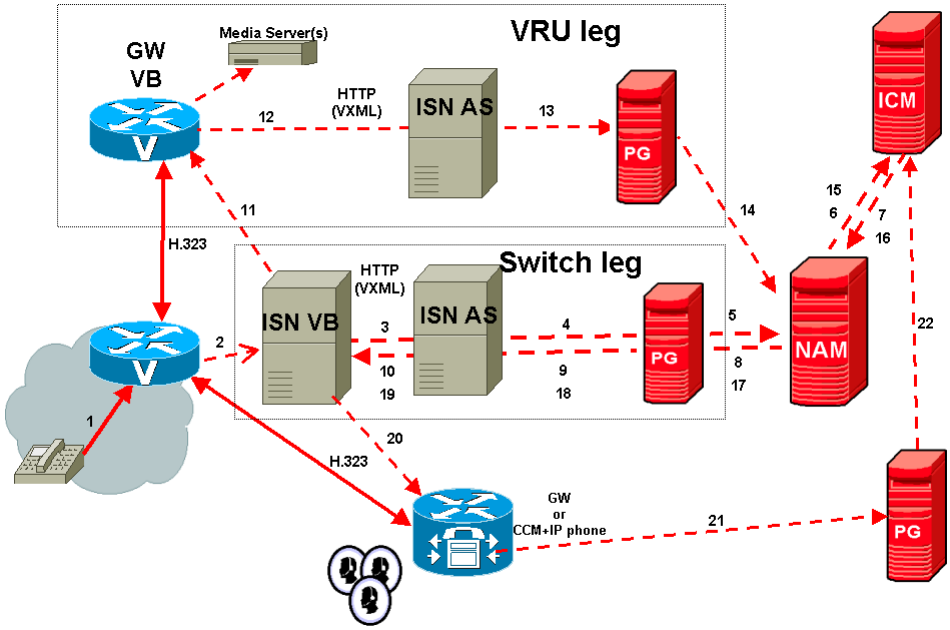
ICM sees these as a single call routed through different peripherals for different purposes.

Figure C-2 shows the call flow for this deployment model.

Note Although Figure C-2 shows two Gateways (one where the call arrives and a separate one for the VRU leg, these could be the same physical Gateway. Similarly, the ISN Application Server and the PG could be the same physical machine.

For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-2 ISN Comprehensive Deployment, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are three Network VRUs:
  - One on the NAM for the Switch leg (Type 5).
  - One for the NAM for the VRU leg (Type 7).

  - One for the CICM for the INCRP connection.
- System Information on the NAM and CICM must include correlation ID settings.
- The Network VRU names (where applicable), correlation ID settings, and the ECC variable configurations must be identical on the NAM and CICM. All Labels must also be duplicated but their routing clients will be different.
- Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU.

Table C-2 contains the configuration instructions for this deployment model.

Table C-2 Configuration Checklist, ISN Comprehensive Deployment, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used to receive the calls from the network (the **Switch** leg): 1. Configure the Gateway inbound routing to send the call over IP to the ISN VB using dial peers or Gatekeeper lookup. 2. Configure the Ethernet connections.	For more information about Steps 1 and 2, see Chapter 8, "VoIP Configuration."
	On the **Gateways** used for the **VRU** leg: 1. Configure the servers and voice application it will use. 2. If a different GW is used for the VRU, configure the Ethernet connections. 3. If a different GW is used for the VRU, copy the bootstrap files from ISN Installation. 4. Configure the characteristics for the VRU leg.	For instructions for **Step 1**, see "Common Gateway Configuration for VRU Leg" section on page C-75. For more information about **Steps 2, 3,** and **4,** see Chapter 8, "VoIP Configuration." For **Step 3**, the files to be copied from the Application Server machine to the Gateway are as follows: • If you are using a content switch for failover, the files are in: <basedir>/ApplicationServer/Downloads/ VB-CSS-CallRestart • Otherwise, they are in: <basedir>/ApplicationServer/Downloads/ VB-noCSS-CallRestart For **Step 4**: **dial-peer voice <Dial-Peer Number> voip** **application vru-leg** **incoming called-number <Network Routing Number> T** *\ For example, 8001112222T * **Dtmf-relay rtp-nte H45-signal h245-alphanumeric** **Codec g711ulaw** **No vad** **Note** These characteristics are for VRU legs requiring ASR and/or TTS treatment. If you have other requirements for DTMF relay, Codecs or VAD settings, you should modify the commands accordingly.

Table C-2 Configuration Checklist, ISN Comprehensive Deployment, NAM/CICM (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper. 2. Configure the Gatekeeper to send all the VRU connections to the applicable Gateway.	For more information and instructions, see Chapter 8, "VoIP Configuration." For Step 2, include the following: **zone prefix <*GK*> <*Network Routing Number*>* gw-priority 10 <*GW address(es)*>** For example: ***zone prefix gk-stooge 8001112222* gw-priority 10 vru1@provider.com vru2@provider.com***
	On the **NAM** and **CICMs**: 1. Configure the Network VRUs and PGs for the Switch leg.	For instructions see "Common NAM/CICM Configuration for ISN Switch Leg" section on page C-77.
	On the **NAM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the **VRU Client** leg. 2. Configure a peripheral for each ISN Application Server to be used for a VRU leg connected to each PG. **Note** If the ISN Application Servers to use for the VRU legs are the same as those for the Switch legs, this step as this configuration is already completed. If the PGs are the same but the Application Servers are different, then only the second part of the step needs to be performed.	For each ISN Application Server connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, for example, <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this ISN peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • **Do not** select the Enable Post-routing checkbox.
	On the **CICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and labels for reaching the NAM.	Specify the following: • Type: **7**. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for routing the calls through the network to the VRU: – Label: The network routing number. – Type: **Normal**. – Routing client: Select the INCRP routing client from the drop-down list. **Note** Make sure the Network VRU label is identical in the NAM and CICM. It is recommended that the Network VRU Name be identical as well to avoid confusion.

Table C-2 Configuration Checklist, ISN Comprehensive Deployment, NAM/CICM (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **NAM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and labels for each ISN Switch.	Specify the following: • Type: **7**. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for each Application Server that is handling the **Switch** leg: – Label: The number to be used as the base for routing calls through the network to the VRU. – Type: **Normal** – Routing client: Select the routing client configured for that ISN Application Server peripheral from the drop-down list. **Note** Make sure the Network VRU label is identical in the NAM and CICM. It is recommended that the Network VRU Name be identical as well to avoid confusion.
	In the **NAM**, ICM Configuration Manager, **System Information** tool: 1. Define the correlation IDs. 2. If there will be Routing Scripts on the NAM, define a default Network VRU.	For Step 1, do the following in the General section of the **System Information** tool: • Set maximum and minimum correlation ID values. – Minimum correlation ID: Starting number for the correlation ID, for example, 1000. – Maximum correlation ID: Ending number for the correlation ID, for example, 1099. For Step 2, do the following in the General section of the **System Information** tool: • Define the Default Network VRU: **IsnVRU**.
	On the **CICM**, ICM Configuration Manager, **System Information** tool: 1. Define a default Network VRU.	For Step 1, do the following in the General section of the **System Information** tool: • Define the Default Network VRU: **IsnVRU**.

Table C-2 Configuration Checklist, ISN Comprehensive Deployment, NAM/CICM (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Application Server**: 1. Configure the ports for the both legs of the call. 2. Check other settings.	Do the following: • On the Call Definitions page, set the **Dialed Number Maximum Length if no Correlation ID present** field to the length of the Network Routing Number. • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the ports for both groups according to the licenses purchased, call profiles, and capacity. The "New Calls" group is used for the Switch leg; the "ID for ICM" group is used for the VRU leg. • See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On each **ISN Voice Browser**: 1. Configure the Gatekeeper. 2. Configure the capacity. 3. Check other settings.	Do the following: • **SetGateKeeper <*NewValue*>** Where <*NewValue*> is the IP address for the Gatekeeper serving the Voice Browser. • Configure the total number of calls and IVR ports according to the licenses purchased, call profiles and capacity. (For instructions, see Chapter 4, "Voice Browser Administration".) • See Chapter 4, "Voice Browser Administration" for other settings you might want to adjust from the default values.
	On the **CICM**, ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts.	Create scripts to be used for IVR treatment and agent transfer. The VRU scripts are associated with the applicable Network VRU, that is, **IsnVRU**. Use the CICM Script Editor's SendToVRU node to connect the call to the Network VRU. For more information about creating scripts, see **Chapter 2, "Using NAM/ICM with the ISN IVR Solution."** **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **ICM**, ICM Configuration Manager: 1. Configure dialed numbers, call types and applicable customers.	For more information, see the *Cisco ICM Software Configuration Guide*.

Table C-2 Configuration Checklist, ISN Comprehensive Deployment, NAM/CICM (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco Content Services Switch (CSS): 1. If necessary, configure the CSS.	For more information, see the Cisco Content Services Switch user documentation.

ISN Queue and Transfer Deployments

This section describes the call flows and provides configuration instructions for the following ISN deployment models:

- ISN Queue and Transfer Deployment, ICM Enterprise
- IISN Queue and Transfer Deployment with "Other" Network VRU, ICM Enterprise
- ISN Queue and Transfer Deployment, NAM/CICM
- ISN Queue and Transfer Deployment with "Other" Network VRU, NAM/CICM
- ISN Queue and Transfer Deployment with "Other" Customer VRU, NAM/ICM

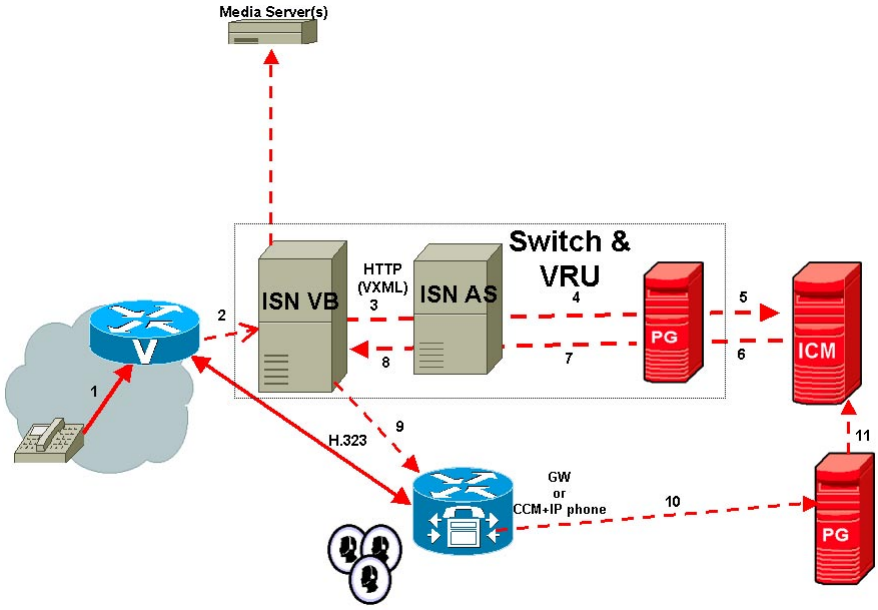
ISN Queue and Transfer Deployment, ICM Enterprise

In this deployment model, the ISN acts as the VRU and as the switch to transfer the call to agents. The ISN Voice Browser provides voice treatment; ASR/TTS processing is not possible.

Figure C-3 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-3 ISN Queue and Transfer Deployment, ICM Enterprise Edition



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are two Network VRUs configured:
  - One for the Switch leg (Type 5).
  - One for the VRU leg (Type 5).

- Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU.

Table C-3 contains the configuration instructions for this deployment model.

Table C-3 Configuration Checklist, ISN Queue and Transfer Deployment, ICM Enterprise

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used to receive the calls from the network (the **Switch** leg): 1. Configure the Gateway inbound routing to send the call over IP to the ISN Voice Browser using dial peers or Gatekeeper lookup. 2. Configure the Ethernet connections.	For more information about **Steps 1,** and **2**, see Chapter 8, "VoIP Configuration."
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the switch function.	Specify the following: • Type: **5**. • Name: **isnSwitch**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnSwitch** will be assumed.
	On the **ICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the ISN. 2. Configure a peripheral for each ISN Application Server connected to each PG.	For each ISN Application Server connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, that is <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this ISN peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • Select the Enable Post-routing checkbox. **Advanced** tab, select the name **isnSwitch** from the Network VRU field drop-down list. **Routing Client** tab: • Name: By convention, this is the same name as the peripheral. • Client Type: **VRU**.

Table C-3 Configuration Checklist, ISN Queue and Transfer Deployment, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU function. 2. Define Labels for each ISN switch.	Specify the following: • Type: **5**. • Name: **isnVRU**. **Note** This name is used by convention; however, any name will do. Although you could use the same Network VRU Name defined earlier in this process (**isnVRU**), defining a separate name here enable the possibility of easily changing deployment models later in the process. • Define one **Label** for each ISN application Server that is handling the Switch leg: – Label: Any number. **Note** Although this label is not used, it must be configured; its value is not meaningful. – Type: **Normal** – Routing client: Select the routing client configured for the ISN Application Server peripheral from the drop-down list.
	ICM Configuration Manager, **System Information** tool: 1. Define a default Network VRU.	In the General section of **System Information** specify the following: • Default Network VRU Name: **IsnVRU**.
	On each **ISN Application Server**: 1. Configure the ports. 2. Check other settings.	Do the following: • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the ports for the "New Calls" group according to the licenses purchased, call profiles, and capacity; the "ID for ICM" group is not used since the switch and VRU functions are handled in the call leg. • See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On each **ISN Voice Browser**: 1. Configure the Gatekeeper. 2. Configure the capacity. 3. Check other settings.	Specify the following: • **SetGateKeeper <*NewValue*>** Where <*NewValue*> is the IP address for the Gatekeeper serving the Voice Browser. • Configure the total number of calls and IVR ports according to the licenses purchased, call profiles and capacity. (For instructions, see Chapter 4, "Voice Browser Administration".) • See Chapter 4, "Voice Browser Administration" for other settings you might want to adjust from the default values.

Table C-3 Configuration Checklist, ISN Queue and Transfer Deployment, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts.	Create scripts to be used for IVR treatment and agent transfer. The VRU scripts are associated with the applicable Network VRU, that is, **IsnVRU**. Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU. For more information about creating scripts, see **Chapter 2, "Using NAM/ICM with the ISN IVR Solution."** **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **ICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **ICM**, ICM Configuration Manager: 1. Configure dialed numbers, call types and applicable customers.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **ICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the **Cisco Content Services Switch** (CSS): 1. If necessary, configure the CSS.	For more information, see the Cisco Content Services Switch user documentation.

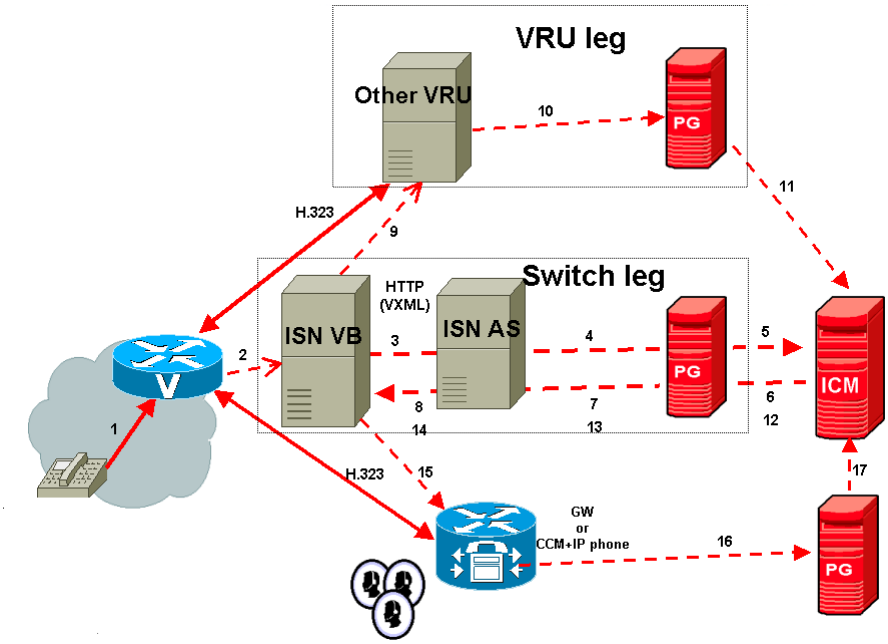
ISN Queue and Transfer Deployment with "Other" Network VRU, ICM Enterprise

In this deployment model, the ISN is used only as the switch to transfer calls to the VRU and agents; all of the VRU treatment at the "other" VRU, that is, a VRU which is not an ISN.

Figure C-4 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-4 ISN Queue and Transfer Deployment with "Other" Network VRU, ICM Enterprise



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are two Network VRUs configured:
  - One for the Switch leg (Type 5).
  - One for the VRU leg (Type 7).
- System Information must specify correlation ID settings.
- Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU.

Table C-4 contains the configuration instructions for this deployment model.

Table C-4 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Network VRU, ICM Enterprise

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used to receive the calls from the network (the **Switch** leg): 1. Configure the Gateway inbound routing to send the call over IP to the ISN Voice Browser using dial peers or Gatekeeper lookup. 2. Configure the Ethernet connections.	For more information about **Steps 1,** and **2** , see Chapter 8, "VoIP Configuration."
	On the **Gatekeeper**: 1. Configure the Gatekeeper to send all the VRU connections to the "other VRU. 2. Register the Gateway.	For more information and instructions, see Chapter 8, "VoIP Configuration." For Step 1, include the following: **zone prefix *<GK>* *<Network Routing Number>** gw-priority 10 *<VRU address(es)>*** For example: ***zone prefix gk-stooge 8001112222* gw-priority 10 vru1@provider.com vru2@provider.com***
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU.	Specify the following: • Type: **5**. • Name: **isnSwitch**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnSwitch** will be assumed.
	On the **ICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the **Switch** leg. 2. Configure a peripheral for each ISN Application Server to be used for a Switch leg connected to each PG.	For each ISN Application Server connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, that is <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this ISN peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • Select the Enable Post-routing checkbox. **Advanced** tab, select the name **isnSwitch** from the Network VRU field drop-down list. **Routing Client** tab: • Name: By convention, use the same name as the peripheral. • Client Type: **VRU**.

Table C-4 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Network VRU, ICM Enterprise

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the **VRU Client** leg. 2. Configure a peripheral for each VRU leg connected to each PG. **Note** If the ISN Application Servers to use for the VRU legs are the same as those for the Switch legs, this step as this configuration is already complete. If the PGs are the same but the Application Servers are different, then only the second part of the step needs to be performed.	For each VRU connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, that is <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this VRU peripheral. • Client Type: **VRU**. • **Do not** select the Enable Post-routing checkbox.
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU and its Labels for the VRU function.	Specify the following: • Type: **7**. • Name: **other_vru**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **other_vru** will be assumed. • Define a **Label** for each ISN Application Server that is handling the Switch leg: – Label: The number to be used as the base for routing calls through the network to the VRU. – Type: **Normal**. – Routing client: Select the routing client configured for the peripheral from the drop-down list.
	ICM Configuration Manager, **System Information** tool: 1. Define the correlation IDs. 2. Define a default Network VRU.	On the **System Information** tab, General section: • Define the Minimum correlation ID: A starting number for the correlation ID, for example, 1000. • Define the Maximum correlation ID: An ending number for the correlation ID, for example, 1099. • Define the Default Network VRU name, **other_vru**.

Table C-4 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Network VRU, ICM Enterprise

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Application Server**: 1. Configure the ports. 2. Check other settings.	Do the following: • On the Call Definitions page, set the **Dialed Number Maximum Length if no Correlation ID present** field to the length of the Network Routing Number. • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the ports for the "New Call" groups according to the licenses purchased and capacity; the "ID from ICM" group is not used since this leg of the call will not go to the "other" VRU. • See Chapter 5, "Application Server Administration" other settings you might want to adjust from the default values.
	On each **ISN Voice Browser**: 1. Configure the Gatekeeper. 2. Configure the capacity. 3. Check other settings.	Specify the following: • **SetGateKeeper <*NewValue*>** Where <*NewValue*> is the IP address for the Gatekeeper serving the Voice Browser. • Configure the total number of calls and IVR ports according to the licenses purchased, call profiles and capacity. (For instructions, see Chapter 4, "Voice Browser Administration".) • See Chapter 4, "Voice Browser Administration" for other settings you might want to adjust from the default values.
	ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts.	Create scripts to be used for IVR treatment and agent transfer. The VRU scripts are associated with the applicable Network VRU, that is, **other_VRU**. Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU. For more information about creating scripts, see **Chapter 2, "Using NAM/ICM with the ISN IVR Solution."** **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **ICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **ICM**, ICM Configuration Manager: 1. Configure dialed numbers, call types and applicable customers.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **ICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the **Cisco Content Services Switch** (CSS): 1. If necessary, configure the CSS.	For more information, see theCisco Content Services Switch user documentation.

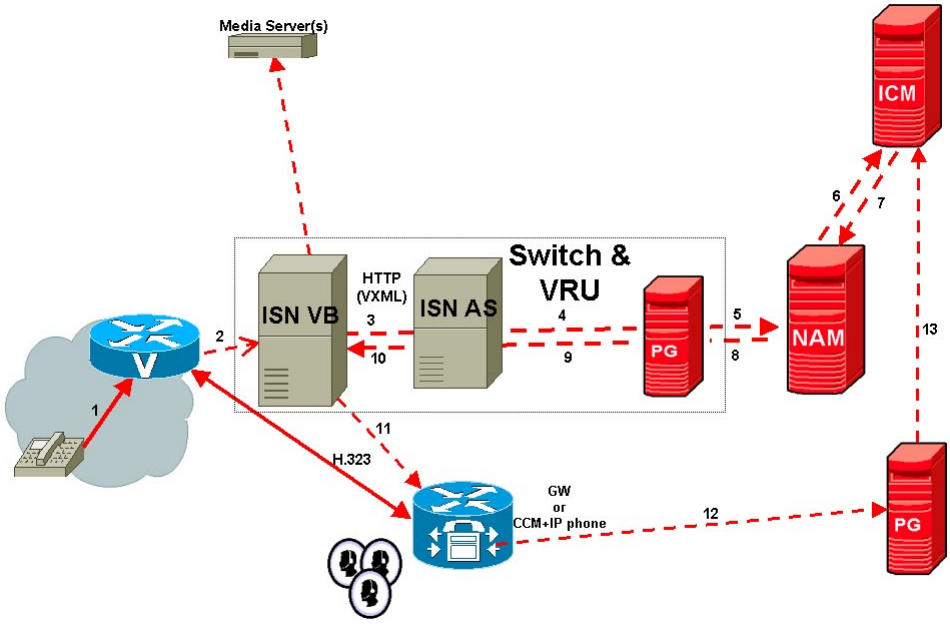
ISN Queue and Transfer Deployment, NAM/CICM

In this deployment model, the ISN is at the NAM. It acts as the VRU and as the Switch to transfer calls to agents. The ISN Voice Browser provides voice treatment; ASR/TTS processing is not possible.

Figure C-5 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-5 ISN Queue and Transfer Deployment, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are three Network VRUs configured:
  - One on the NAM for the Switch leg (Type 5).
  - One for the NAM for the VRU leg (Type 5).
  - One for the CICM for the INCRP connection.
- The Network VRU names (where applicable) and the ECC variable configurations must be identical on the NAM and CICM. All Labels must also be duplicated but their routing clients will be different.
- Use the CICM Script Editor's SendToVRU node to connect the call to the Network VRU.

Table C-5 contains the configuration instructions for this deployment model.

Table C-5 Configuration Checklist, ISN Queue and Transfer Deployment, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used to receive the calls from the network (the **Switch** leg): 1. Configure the Gateway inbound routing to send the call over IP to the ISN Voice Browser using dial peers or Gatekeeper lookup. 2. Configure the Ethernet connections.	For more information about **Steps 1** and **2**, see Chapter 8, "VoIP Configuration."
	On the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper.	For more information and instructions, see Chapter 8, "VoIP Configuration."
	On the **NAM** and **CICMs**: 1. Configure the Network VRUs and PGs for the Switch leg.	For instructions see "Common NAM/CICM Configuration for ISN Switch Leg" section on page C-77.
	On the **NAM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and a Label for each ISN peripheral.	Specify the following: • Type: **5**. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for each ISN peripheral: – Label: Any number. **Note** Although this label is not used, it must be configured, and the **same number** must be used for all ISN peripherals. – Type: **Normal**. – Routing client: Select the routing client configured for that ISN Application Server peripheral from the drop-down list. **Note** Make sure the Network VRU label is identical in the NAM and CICM. It is recommended that the Network VRU Name be identical as well to avoid confusion.

Table C-5 Configuration Checklist, ISN Queue and Transfer Deployment, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and a Label for reaching the NAM.	Specify the following: • Type: **5**. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for the NAM. – Label: Any number. **Note** Although this label is not used, it must be configured, and the **same number** must be used for all ISN peripherals. – Type: **Normal**. – Routing client: Select the INCRP Routing Client from the drop-down list.
	In the **NAM**, ICM Configuration Manager, **System Information** tool: 1. If there will be Routing Scripts on the NAM, define a default Network VRU.	In the General section of the **System Information** tool: • Define the Default Network VRU: **IsnVRU**.
	On the **CICM**, ICM Configuration Manager, **System Information** tool: 1. Define a default Network VRU.	In the General section of the **System Information** tool: • Define the Default Network VRU: **IsnVRU**.
	On each **ISN Application Server**: 1. Configure the ports for the both legs of the call. 2. Check other settings.	Do the following: • Configure the ports for the "New Call" groups according to the licenses purchased and capacity; the "ID from ICM" group is not used since this leg of the call will not go to the "other" VRU. • See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On each **ISN Voice Browser**: 1. Configure the Gatekeeper. 2. Configure the capacity. 3. Check other settings.	Specify the following: • **SetGateKeeper <*NewValue*>** Where <*NewValue*> is the IP address for the Gatekeeper serving the Voice Browser. • Configure the total number of calls and IVR ports according to the licenses purchased, call profiles and capacity. (For instructions, see Chapter 4, "Voice Browser Administration".) • See Chapter 4, "Voice Browser Administration" for other settings you might want to adjust from the default values.

Table C-5 Configuration Checklist, ISN Queue and Transfer Deployment, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM **Script Editor** tool: **1.** Create the VRU scripts and routing script.	Create scripts to be used for IVR treatment and agent transfer. The VRU scripts are associated with the applicable Network VRU, that is, **IsnVRU**. Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU. For more information about creating scripts, see **Chapter 2, "Using NAM/ICM with the ISN IVR Solution."** **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **NAM** and **CICM**, ICM Configuration Manager: **1.** Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **NAM** and **CICM**, ICM Configuration Manager: **1.** Configure dialed numbers, call types and applicable customers.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **NAM** and **CICM**, ICM Configuration Manager: **1.** If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco Content Services Switch (CSS): **1.** If necessary, configure the CSS.	For more information, see the Cisco Content Services Switch user documentation.

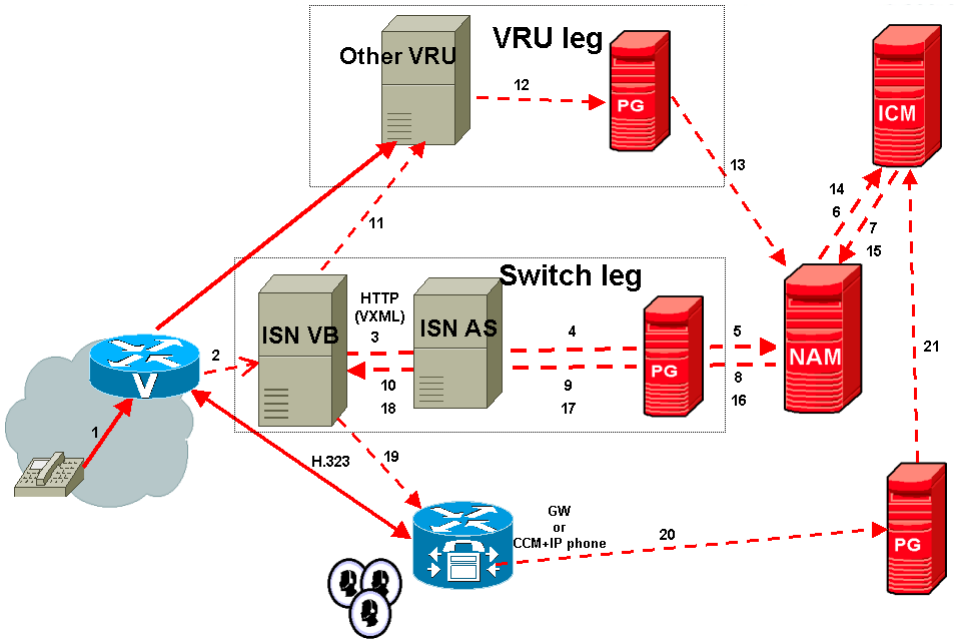
ISN Queue and Transfer Deployment with "Other" Network VRU, NAM/CICM

In this deployment model, the ISN is at the NAM. It acts as the Switch to transfer calls to the Network VRU and agents. The Network VRU (not an ISN) is deployed at the NAM; it is not an ISN, but rather, some other VRU which provides voice treatment.

Figure C-6 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-6 ISN Queue and Transfer Deployment with "Other" Network VRU, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are three Network VRUs configured:
  - One on the NAM for the Switch leg (Type 5).
  - One for the NAM for the VRU leg (Type 7).
  - One for the CICM for the INCRP connection.
- System Information on the NAM and CICM must specify correlation ID settings.
- The Network VRU names (where applicable), correlation IDs, and the ECC variable configurations must be identical on the NAM and CICM. All Labels must also be duplicated but their routing clients will be different.
- Use the CICM Script Editor's SendToVRU node to connect the call to the Network VRU.

Table C-6 contains the configuration instructions for this deployment model.

Table C-6 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Network VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used to receive the calls from the network (the **Switch** leg): 1. Configure the Gateway inbound routing to send the call over IP to the ISN Voice Browser using dial peers or Gatekeeper lookup. 2. Configure the Ethernet connections.	For more information about **Steps 1** and **2**, see Chapter 8, "VoIP Configuration."
	On the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper. 2. Configure the Gatekeeper to send all the VRU connections to the applicable Gateway.	For more information and instructions, see Chapter 8, "VoIP Configuration." For Step 2, include the following: **zone prefix *<GK>* *<Network Routing Number>** gw-priority 10 *<VRU address(es)>*** For example: ***zone prefix gk-stooge 8001112222* gw-priority 10 vru1@provider.com vru2@provider.com***
	On the **NAM** and **CICMs**: 1. Configure the Network VRUs and PGs for the Switch leg.	For instructions see "Common NAM/CICM Configuration for ISN Switch Leg" section on page C-77.
	On the **NAM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and labels for each ISN Switch.	Specify the following: • Type: **7**. • Name: **otherVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **otherVRU** will be assumed. • Define a **Label** for each Application Server that is handling the **Switch** leg. – Label: Network Routing Number. – Type: **Normal**. – Routing client: Select the routing client configured for that ISN Application Server peripheral from the drop-down list. **Note** Make sure the Network VRU label is identical in the NAM and CICM. It is recommended that the Network VRU Name be identical as well to avoid confusion.

Table C-6 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Network VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **NAM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the VRU Client Leg. 2. Configure a peripheral for each VRU connected to each PG.	For each VRU connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, that is <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this VRU peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • **Do not** select the Enable Post-routing checkbox.
	On the **CICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and labels for each ISN Switch. 2. Define a Label for reaching the NAM.	Specify the following: • Type: **7**. • Name: **otherVRU**. **Note** This name is used by convention; however, any name will do. • Define a **Label** for routing the calls through the network to the VRU.: – Label: The Network Routing Number. – Type: **Normal**. – Routing client: Select the INCRP Routing Client from the drop-down list.
	In the **NAM**, ICM Configuration Manager, **System Information** tool: 1. Define the correlation IDs. 2. If there will be Routing Scripts on the NAM, define a default Network VRU.	For Step 1, do the following in the General section of the **System Information** tool: • Set maximum and minimum correlation ID values. – Minimum correlation ID: Starting number for the correlation ID, for example, 1000. – Maximum correlation ID: Ending number for the correlation ID, for example, 1099. For Step 2, do the following in the General section of the **System Information** tool: • Define the Default Network VRU: **otherVRU**.
	On the **CICM**, ICM Configuration Manager, **System Information** tool: 1. Define a default Network VRU.	In the General section of the **System Information** tool: • Define the Default Network VRU: **otherVRU**.

Table C-6 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Network VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Application Server**: 1. Configure the ports for the both legs of the call. 2. Check other settings.	Do the following: • On the Call Definitions page, set the **Dialed Number Maximum Length if no Correlation ID present** field to the length of the Network Routing Number. • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the ports for the "New Call" groups according to the licenses purchased and capacity; the "ID from ICM" group is not used since this leg of the call will not go to the "other" VRU. • See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On each **ISN Voice Browser**: 1. Configure the Gatekeeper. 2. Configure the capacity. 3. Check other settings.	Specify the following: • **SetGateKeeper <*NewValue*>** Where <*NewValue*> is the IP address for the Gatekeeper serving the Voice Browser. • Configure the total number of calls and IVR ports according to the licenses purchased, call profiles and capacity. (For instructions, see Chapter 4, "Voice Browser Administration".) • See Chapter 4, "Voice Browser Administration" for other settings you might want to adjust from the default values.
	On the **CICM**, ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts.	Create scripts to be used for IVR treatment and agent transfer, as described in other sections of this manual and in the ICM manuals. The VRU scripts are associated with the applicable Network VRU, that is, **otherVRU**. Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU. For more information about creating scripts, see **Chapter 2, "Using NAM/ICM with the ISN IVR Solution."** **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **ICM**, ICM Configuration Manager: 1. Configure dialed numbers, call types and applicable customers.	For more information, see the *Cisco ICM Software Configuration Guide*.

Table C-6 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Network VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco Content Services Switch (CSS): 1. If necessary, configure the CSS.	For more information, see the Cisco Content Services Switch user documentation.

ISN Queue and Transfer Deployment with "Other" Customer VRU, NAM/ICM

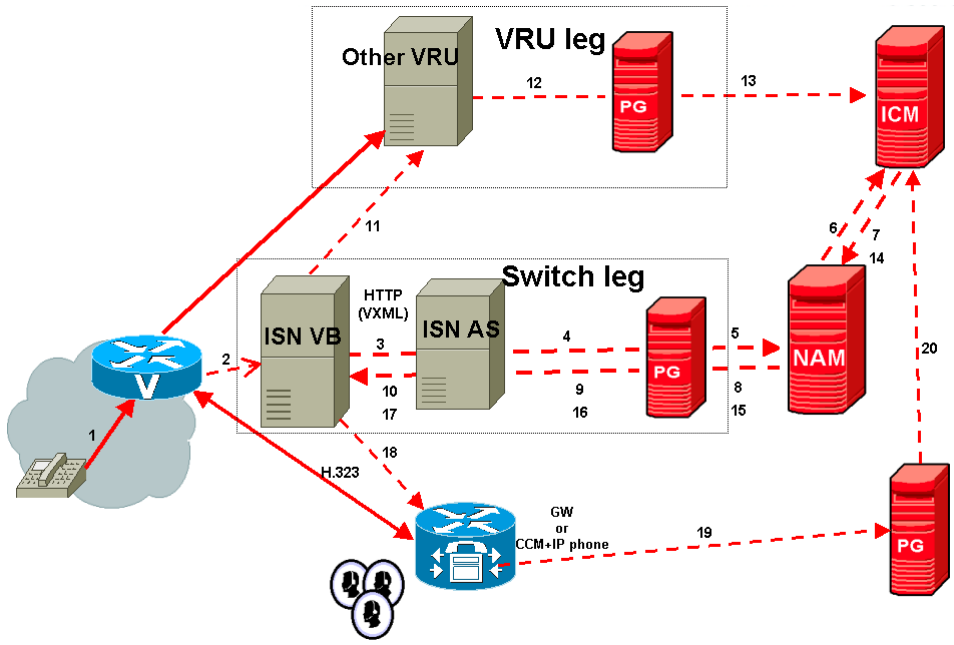
In this deployment model, the ISN is at the NAM. It acts as the Switch to transfer calls to the Customer VRU and agents. The Customer VRU is deployed at the CICM; it is not an ISN, but rather, some other VRU which provides voice treatment.

Tip For failover and redundancy, it might be appropriate to configure a service array for the Customer VRU. This appendix only gives instructions for configuring a service; for information about for configuring a service array, for configuring a service array, see the Cisco ICM Software user documentation.

Figure C-7 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-7 ISN Queue and Transfer Deployment with "Other" Customer VRU, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are three Network VRUs configured:
  - One on the NAM for the Switch leg (Type 5).
  - One for the NAM for the VRU leg (Type 8).
  - One for the CICM for the INCRP connection.

- You must define a Translation Route and Labels for the VRU at the CICM, together with matching labels in the NAM.
- Use the CICM Script Editor's TranslationRouteToVRU node to connect the call to the VRU at the CICM.

Table C-7 contains the configuration instructions for this deployment model.

Table C-7 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Customer VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used to receive the calls from the network (the **Switch** leg): 1. Configure the Gateway inbound routing to send the call over IP to the ISN Voice Browser using dial peers or Gatekeeper lookup. 2. Configure the Ethernet connections.	For more information about **Steps 1** and **2**, see Chapter 8, "VoIP Configuration."
	On the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper. 2. Configure the Gatekeeper to send all the VRU connections to the applicable Gateway.	For more information and instructions, see Chapter 8, "VoIP Configuration." For Step 2, include the following: **zone prefix *<GK>* *<Network Routing Number>** gw-priority 10 *<VRU address(es)>*** For example: ***zone prefix gk-stooge 8001112222* gw-priority 10 vru1@provider.com vru2@provider.com***
	On the **NAM** and **CICMs**: 1. Configure the Network VRUs and PGs for the Switch leg.	For instructions see "Common NAM/CICM Configuration for ISN Switch Leg" section on page C-77.
	On the **CICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and labels for each ISN Switch.	Specify the following: • Type: **8**. • Name: **otherVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **otherVRU** will be assumed.

Table C-7 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Customer VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the VRU. 2. Configure a peripheral for each VRU connected to each PG.	For each VRU connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, that is <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this VRU peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • **Do not** select the Enable Post-routing checkbox. **Advanced** tab: • Network VRU: **otherVRU**.
	On the **CICM**, ICM Configuration Manager, **Service Explorer** tool: 1. Configure a Service and Route for each VRU. **Note** You can also use service arrays. Refer to the ICM documentation set for more information.	Specify the following: • Service Name: **otherVRU**. • Route Name: **PeripheralName_otherVRU**. • **Do not** configure a peripheral target or label.
	On the **CICM**, ICM Configuration Manager, **Network Trunk Group Explorer** tool: 1. Configure the network trunk group. 2. Configure the trunks. **Note** You must configure one Network Transfer Group and one associated Trunk Group for each VRU leg ISN Application Server.	For Step 1, specify the following: • Network Trunk Group Name: A name descriptive of this trunk group. For Step 2, specify the following: • Peripheral Name: A name descriptive of this trunk group. • Peripheral Number: The **VRU trunk group number** (from the VRU). • Peripheral Trunk Count: Trunk count from the VRU. • Configure the trunks within the trunk group.

Table C-7 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Customer VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **Translation Route Explorer** tool: 1. Define a Translation Route for each VRU Peripheral. 2. Configure translation route and label information for each VRU peripheral.	For Step 1, do the following: • **Translation Route** tab: – Name: The name of the target VRU peripheral. (This is by convention; this value must be unique in the enterprise.) – Type: **DNIS** and select the Service defined in the previous step. For Step 2, do the following: • **Route** tab: – Name: By convention, this is the name of the target VRU peripheral, followed by the DNIS that this route will use (for example, MyVRU_2000). – Service Name drop-down: Select **PeripheralName.otherVRU** • **Peripheral Target** tab: – Enter the first DNIS that will be seen by the VRU that you will be using for this translation route. **Note** The DNIS pool used for each VRU peripheral must be unique. – Select a **Network Trunk Group** which belongs to the target VRU from the drop-down list. • **Label** tab: – Label: The translation route label (which may or may not be the same DNIS you entered on the Peripheral Target tab). – Type: **Normal** – Routing Client: INCRP Routing Client that is mapped to the applicable NAM Routing Client. **Note** Repeat the Route and corresponding Peripheral Target and Label information for each DNIS in the pool.

Table C-7 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Customer VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **NAM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and labels for each translation route number.	Specify the following: • Type: **8.** • Name: **otherVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **otherVRU** will be assumed. • Define a **Label** for every translation route label created in the Translation Route Explorer in the CICM. The entire set must also be duplicated for each ISN routing client. – Label: Enter each translation route number in each translation route DNIS pool. – Type: **Normal**. – Routing client: Select each ISN from the drop-down list. **Note** Because of the large number of labels involved, you might prefer to perform this task with the application Bulk Configuration tool.
	On each **ISN Application Server**: 1. Configure the ports for the both legs of the call. 2. Check other settings.	Do the following: • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the ports for the "New Call" groups according to the licenses purchased and capacity; the "ID from ICM" group is not used since this leg of the call will not go to the "other" VRU. • See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On each **ISN Voice Browser**: 1. Configure the Gatekeeper. 2. Configure the capacity. 3. Check other settings.	Specify the following: • **SetGateKeeper <*NewValue*>** Where <*NewValue*> is the IP address for the Gatekeeper serving the Voice Browser. • Configure the total number of calls and IVR ports according to the licenses purchased, call profiles and capacity. (For instructions, see Chapter 4, "Voice Browser Administration".) • See Chapter 4, "Voice Browser Administration" for other settings you might want to adjust from the default values.

Table C-7 Configuration Checklist, ISN Queue and Transfer Deployment with "Other" Customer VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts.	Create scripts to be used for IVR treatment and agent transfer. The VRU scripts are associated with the applicable Network VRU, that is, **otherVRU**. Use the CICM Script Editor's TranslationRouteToVRU node to connect the call to the Network VRU. For more information about creating scripts, see **Chapter 2, "Using NAM/ICM with the ISN IVR Solution."** **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **ICM**, ICM Configuration Manager: 1. Configure dialed numbers, call types and applicable customers.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **ICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco Content Services Switch (CSS): 1. If necessary, configure the CSS.	For more information, see the Cisco Content Services Switch user documentation.

ISN Advanced Speech

This section describes the call flows and provides configuration instructions for the following ISN deployment models:

- ISN Advanced Speech Deployment, ICM Enterprise
- ISN Advanced Speech Deployment, NAM/CICM

ISN Advanced Speech Deployment, ICM Enterprise

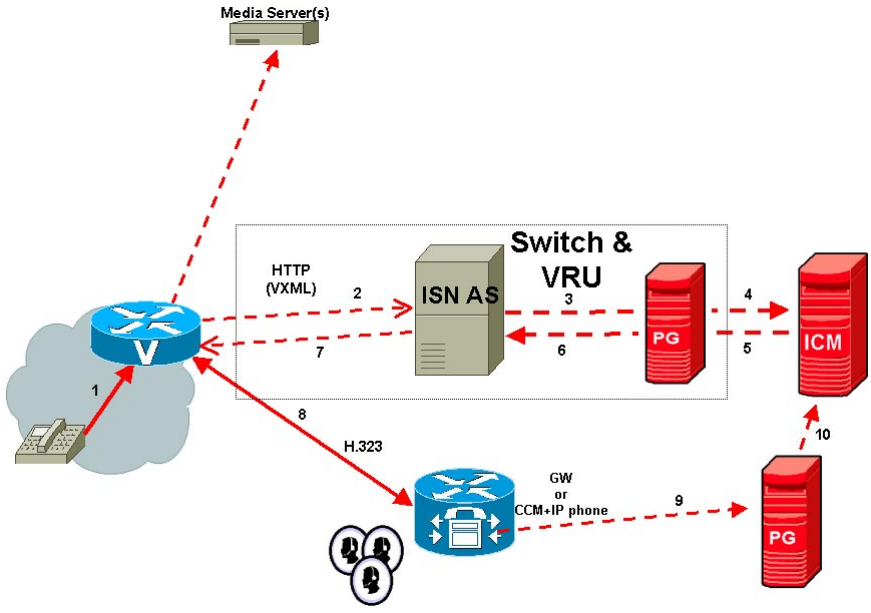
In this deployment model, the ISN works with the Voice Gateway to act as the VRU and as the Switch to transfer the call to an agent. The VRU voice treatment is provided at the Voice Gateway, and may include ASR/TTS.

Note Queuing and network transfers are not possible and the ISN Voice Browser is not part of this deployment.

Figure C-8 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-8 ISN Advanced Speech Deployment, ICM Enterprise



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are two Network VRUs configured:
  - One for the Switch leg (Type 5).
  - One for the VRU leg (Type 5).

Note Although the same Network VRU could be used for both purposes on the NAM, it is recommended that you keep them separate for flexibility in changing deployment models at some other time.

- Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU.

Table C-8 contains the configuration instructions for this deployment model.

Table C-8 Configuration Checklist, ISN Advanced Speech Deployment, ICM Enterprise

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used for the **VRU** leg: 1. Configure the servers and voice application it will use. 2. Configure the Ethernet connections. 3. Copy the bootstrap files from ISN Installation. 4. Configure the characteristics for the VRU leg.	For instructions for **Step 1**, see "Common Gateway Configuration for VRU Leg" section on page C-75. For more information about **Steps 2, 3,** and **4**, see Chapter 8, "VoIP Configuration." For **Step 3**, the files to be copied from the Application Server machine to the Gateway are as follows: • If you are using a content switch for failover, the files are in: <basedir>/ApplicationServer/Downloads/ VB-CSS-CallRestart • Otherwise, they are in: <basedir>/ApplicationServer/Downloads/ VB-noCSS-CallRestart For **Step 4**: **dial-peer voice <Dial-Peer Number> pots** **application vru-leg** **incoming called-number <dialed number pattern> T** **direct-inward-dial**
	If the ISN is going to transfer calls, on the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper.	For more information and instructions, see Chapter 8, "VoIP Configuration."
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the Switch leg.	Specify the following: • Type: **5**. • Name: **isnSwitch**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnSwitch** will be assumed.

Table C-8 Configuration Checklist, ISN Advanced Speech Deployment, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the ISN. 2. Configure a peripheral for each ISN Application Server connected to each PG.	For each VRU connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, that is <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this ISN peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • Select the Enable Post-routing checkbox. **Advanced** tab, select the name **isnSwitch** from the Network VRU field drop-down list. **Routing Client** tab: • Name: By convention, use the same name as the peripheral. • Client Type: **VRU**.
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU and its labels.	Specify the following: • Type: **5**. • Name: **isnVRU** **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define one **Label** for each ISN peripheral: – Label: Any number. **Note** This label is not used, however, it must be configured. – Type: **Normal** – Routing client: Select the routing client for the ISN Application Server from the drop-down list.
	ICM Configuration Manager, **System Information** tool: 1. Define a default Network VRU.	On the **System Information** tab, define the Default Network VRU name, **IsnVRU**.

Table C-8 Configuration Checklist, ISN Advanced Speech Deployment, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Application Server**: 1. Configure the ports. 2. Check other settings.	Do the following: • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the ports for the "New Call" groups according to the licenses purchased and capacity; the "ID from ICM" group is not used since the switch and VRU functions are handled in the single call leg. • See Chapter 5, "Application Server Administration" other settings you might want to adjust from the default values.
	ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts.	Create scripts to be used for IVR treatment and agent transfer. The VRU scripts are associated with the applicable Network VRU, that is, **IsnVRU**. Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU. For more information about creating scripts, see **Chapter 2, "Using NAM/ICM with the ISN IVR Solution."** **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **ICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **ICM**, ICM Configuration Manager: 1. Configure dialed numbers, call types and applicable customers.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **ICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco Content Services Switch (CSS): 1. If necessary, configure the CSS.	For more information, see the Cisco Content Services Switch user documentation.

ISN Advanced Speech Deployment, NAM/CICM

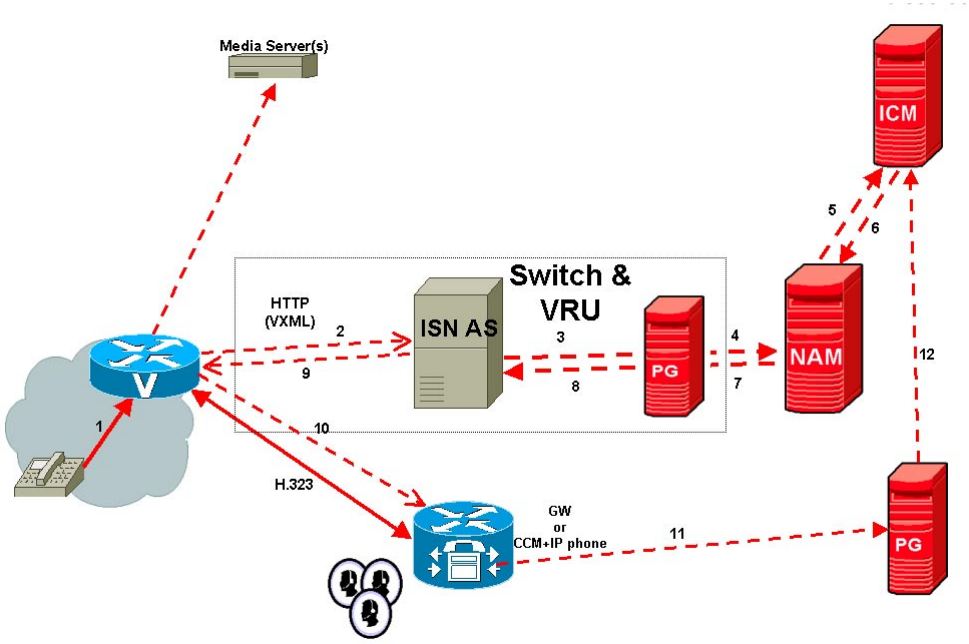
In this deployment model, the ISN (Application Server only) is deployed at the NAM where it works with the Voice Gateway to act as the VRU and as the Switch to transfer the call to an agent. The VRU voice treatment is provided at the Voice Gateway, and may include ASR/TTS.

Note Queuing and network transfers are not possible and the ISN Voice Browser is not part of this deployment.

Figure C-9 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-9 ISN Advanced Speech Deployment, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are three Network VRUs configured:
  - One on the NAM for the Switch leg (Type 5).
  - One on the NAM for the VRU leg (Type 5).
  - One on the CICM for the INCRP connection.

Note Although the same Network VRU could be used for both purposes on the NAM, it is recommended that you keep them separate for flexibility in changing deployment models in the future.

- Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU.

Table C-9 contains the configuration instructions for this deployment model.

Table C-9 Configuration Checklist, ISN Advanced Speech Deployment, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used for the **VRU** leg: 1. Configure the servers and voice application it will use. 2. Configure the Ethernet connections. 3. Copy the bootstrap files from ISN Installation. 4. Configure the characteristics for the VRU leg.	For instructions for **Step 1**, see "Common Gateway Configuration for VRU Leg" section on page C-75. For more information about **Steps 2, 3,** and **4**, see Chapter 8, "VoIP Configuration." For **Step 3**, the files to be copied from the Application Server machine to the Gateway are as follows: • If you are using a content switch for failover, the files are in: <basedir>/ApplicationServer/Downloads/VB-CSS-CallRestart • Otherwise, they are in: <basedir>/ApplicationServer/Downloads/VB-noCSS-CallRestart For **Step 4**: **dial-peer voice <Dial-Peer Number> pots** **application vru-leg** **incoming called-number <dialed number patter>** **direct-inward-dial**
	If the ISN is going to transfer calls, on the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper.	For more information and instructions, see Chapter 8, "VoIP Configuration."
	On the **NAM** and **CICMs**: 1. Configure the Network VRUs and PGs for the Switch leg.	For instructions see "Common NAM/CICM Configuration for ISN Switch Leg" section on page C-77.

Table C-9 Configuration Checklist, ISN Advanced Speech Deployment, NAM/CICM (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and labels for reaching the NAM.	Specify the following: • Type: **5**. • Name: **isnVRU** **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define **Label** for the NAM. – Label: Any number. **Note** This label is not used, it must be configured and it must match the label configured at the NAM for the VRU leg. – Type: **Normal** – Routing client: Select the INCRP routing client from the drop-down list.
	On the **CICM**, ICM Configuration Manager, **System Information** tool: 1. Define a default Network VRU for the VRU leg.	On the **System Information** tab, define the Default Network VRU name, **IsnVRU**.
	On the **NAM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU and its labels for the VRU leg.	Specify the following: • Type: **5**. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for each ISN peripheral: – Label: Any number. **Note** Although this label is not used, it must be configured, and the **same number** must be used for all ISN peripherals. – Type: **Normal**. – Routing client: Select the routing client configured for that ISN Application Server peripheral from the drop-down list. **Note** Make sure the Network VRU label is identical in the NAM and CICM. It is recommended that the Network VRU Name be identical as well to avoid confusion.
	If there will be routing scripts on the **NAM**, ICM Configuration Manager, **System Information** tool: 1. Define a default Network VRU.	On the **System Information** tab, define the Default Network VRU name, **IsnVRU**.

Table C-9 Configuration Checklist, ISN Advanced Speech Deployment, NAM/CICM (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Application Server**: 1. Configure the ports. 2. Check other settings.	Do the following: • Configure the ports for the "New Call" groups according to the licenses purchased and capacity; the "ID from ICM" group is not used since the switch and VRU functions are handled in the single call leg. **Note** See Chapter 5, "Application Server Administration" other settings you might want to adjust from the default values.
	CICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts.	Create scripts to be used for IVR treatment and agent transfer. The VRU scripts are associated with the applicable Network VRU, that is, **IsnVRU**. Use the **CICM** Script Editor's SendToVRU node to connect the call to the Network VRU. **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure dialed numbers, call types and applicable customers.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco Content Services Switch (CSS): 1. If necessary, configure the CSS.	For more information, see the Cisco Content Services Switch user documentation.

ISN VRU Deployments with NIC Routing

This section describes the call flows and provides configuration instructions for the following ISN deployment models:

- "NIC with Type 2, ISN Queue and Transfer Deployment, ICM Enterprise"
- "NIC with Type 2, ISN Queue and Transfer Deployment Customer VRU, NAM/CICM"
- "NIC with Type 2 or 8 ISN Advanced Speech Deployment, ICM Enterprise"
- "NIC with Type 2 or 8 ISN Advanced Speech Deployment Customer VRU, NAM/CICM"
- "NIC with Type 3 or 7 ISN Advanced Speech Deployment Network VRU, NAM/CICM"

NIC with Type 2, ISN Queue and Transfer Deployment, ICM Enterprise

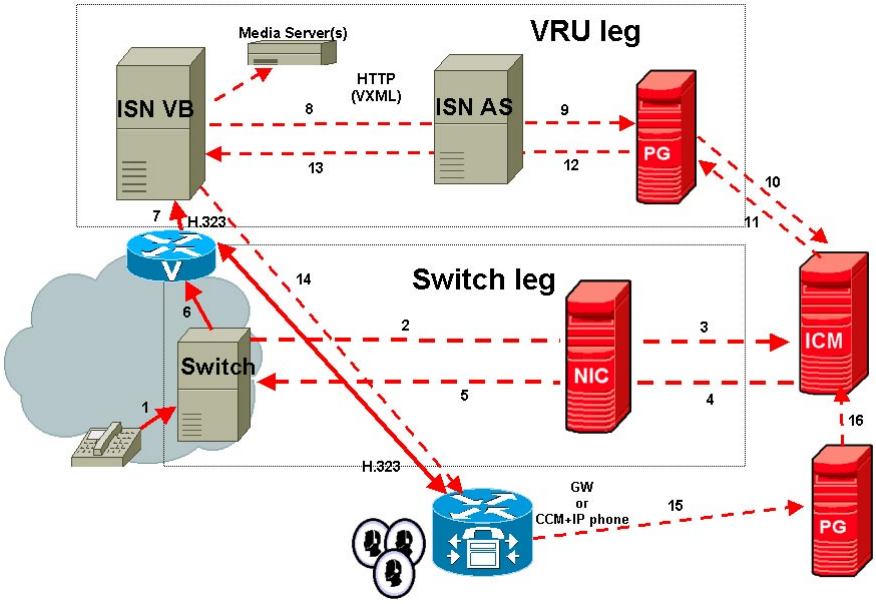
In this deployment model, a NIC is being used to preroute the call. The ISN is deployed as a Customer VRU; the VRU voice treatment is provided by the ISN Voice Browser. The ISN also acts as a switch to transfer the call to an agent; queuing is supported.

Note Network transfers and ASR/TTS processing are not available in this deployment.

Figure C-10 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-10 NIC with Type 2, ISN Queue and Transfer Deployment, ICM Enterprise



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- Set the Network VRU to Type 2.
- Define a Translation Route and labels for the VRU Peripheral (Network VRU labels do not need to be configured.)
- Use the ICM Script Editor's TranslationRouteToVRU node to connect the call to the Network VRU.

Table C-10 contains the configuration instructions for this deployment model.

Table C-10 Configuration Checklist, NIC with Type 2, ISN Queue and Transfer Deployment VRU, ICM Enterprise

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateway**: 1. Configure the Gateway inbound routing to send the call over IP to the ISN Voice Browser using dial peers or Gatekeeper lookup. 2. Configure the Ethernet connections. 3. Copy the bootstrap files from the ISN application:	For instructions for **Step 1**, see "Common Gateway Configuration for VRU Leg" section on page C-75. For more information about **Steps 1, 2,** and **3,** see Chapter 8, "VoIP Configuration." For **Step 3**, the files to be copied from the Application Server machine to the Gateway are in: <basedir>/ApplicationServer/Downloads/VB-noCSS-CallRestart
	On the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper. 2. If the ISN is going to transfer calls, register all the Gateways with the Gatekeeper.	For more information and instructions, see Chapter 8, "VoIP Configuration."
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU.	Specify the following: • Type: **2**. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed.

Table C-10 Configuration Checklist, NIC with Type 2, ISN Queue and Transfer Deployment VRU, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the VRU. 2. Configure a peripheral for each ISN Application Server connected to each PG.	For each Application Server connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, for example, <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this VRU peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • Select the Enable Post-routing checkbox. **Advanced** tab, select the name **isnVRU** from the Network VRU field drop-down list. **Routing Client** tab: • Name: By convention, this is the same as the peripheral. • Client Type: **VRU**. • **Do not** select the Network Transfer preferred checkbox. (This allows the Customer ISN to receive the transfer request.)
	On the **ICM**, ICM Configuration Manager, **Service Explorer** tool: 1. Configure a Service and Route for each VRU. **Note** You can also use service arrays. Refer to the ICM user documentation for more information.	Specify the following: • Service Name: **isnVRU**. • Route Name: **PeripheralName_isnVRU**. • **Do not** configure a peripheral target or label.
	On the **ICM**, ICM Configuration Manager, **Network Trunk Group Explorer** tool: 1. Configure the network trunk group. 2. For each ISN Application Server for the VRU leg, configure an associated trunk group. **Note** You must configure one Network Transfer Group and one associated Trunk Group for each VRU leg ISN Application Server.	For Step 1, specify the following: • Network Trunk Group Name: A name descriptive of this trunk group. For Step 2, specify the following: • Peripheral Name: A name descriptive of this trunk group. • Peripheral Number: **200** (this much match the group number of type “ID fro ICM” in the Application Server, which is 200 by default). • Trunk Count: Select **Use Trunk Data** from the drop-down list. • **Do not** configure any trunks.

Table C-10 Configuration Checklist, NIC with Type 2, ISN Queue and Transfer Deployment VRU, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager, **Translation Route Explorer** tool: 1. Define a Translation Route for each VRU Peripheral. 2. Configure translation route and label information for each VRU peripheral.	For **Step 1**, specify the following: • **Translation Route** tab: – Name: The name of the target VRU peripheral. (This is by convention; this value must be unique in the enterprise.) – Type: **DNIS** and select the Service defined in the previous step. For **Step 2**, specify the following: • **Route** tab: – Name: By convention, this is the name of the target VRU peripheral, followed by the DNIS that this route will use, for example, MyVRU_2000. (This is by convention; this value must be unique in the enterprise.) – Service Name drop-down: Select **PeripheralName.isnVRU**. • **Peripheral Target** tab: – Enter the first DNIS that will be seen by the VRU that you will be using for this translation route. **Note** The DNIS pool used for each VRU peripheral must be unique. – Select a **Network Trunk Group** which belongs to the target VRU from the drop-down list. • **Label** tab: – Label: Enter the translation route label (which might or might not be the same DNIS you entered on the Peripheral Target tab). – Type: **Normal**. – Routing Client: Select NIC Routing Client. **You must configure an additional label for each NIC routing client.** **Note** Repeat the Route and corresponding Peripheral Target and Label information for each DNIS in the pool.

Table C-10 Configuration Checklist, NIC with Type 2, ISN Queue and Transfer Deployment VRU, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Application Server**, Call Definitions and ICM pages: 1. Configure the group number and ports for both legs of the call. 2. Configure the dialed numbers used in the translation route. 3. Check other settings.	Do the following: • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the group number for the "ID from ICM" call group. The group number must match the trunk group number in the Network Trunk group used for the translation route. Configure the number of ports according to the licenses purchased and capacity. Configure each of the **DNIS** numbers used for translation routes. (The "New Call" group is not used since the calls are being sent to the VRU (ISN) after some initial processing by the NIC/ICM.) **Note** See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On the **ICM**, ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts to be used for IVR treatment and agent transfer, as described in other sections of this manual and in the ICM manuals. The VRU scripts are associated with the applicable Network VRU, that is, **isnVRU**.	Use the ICM Script Editor's TranslationRouteToVRU node to connect the call to the Network VRU.
	On the **ICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see the "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **ICM**, ICM Configuration Manager: 1. Configure dialed numbers and call types.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **ICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.

NIC with Type 2, ISN Queue and Transfer Deployment Customer VRU, NAM/CICM

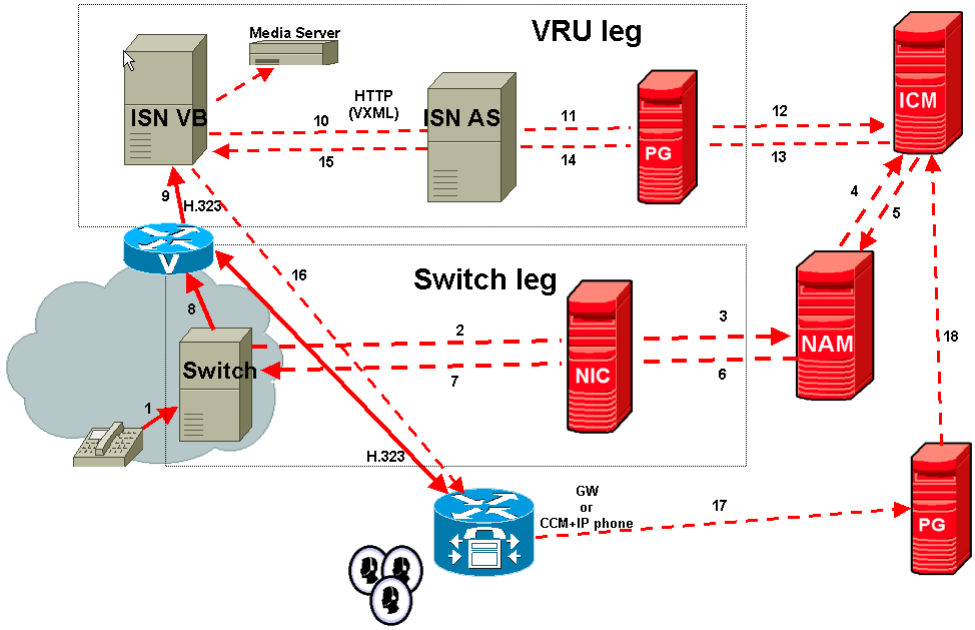
In this deployment model, a NIC is being used to preroute the call. The ISN is deployed as a Customer VRU at the **CICM**; VRU voice treatment is provided by the ISN Voice Browser. The ISN also acts as a switch to transfer the call to an agent; queuing is supported.

Note Network transfers and ASR/TTS processing are not available in this deployment.

Figure C-11 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-11 NIC with Type 2, ISN Queue and Transfer Deployment Customer VRU, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- Set the Network VRU to Type 2.
- Define a Translation Route and labels for the VRU Peripheral in the CICM. (Network VRU labels need to be configured in the NAM.)
- The Network VRU names (where applicable) and the ECC variable configurations must be identical on the NAM and CICM. All labels must be duplicated, but their routing clients will be different.
- Use the **CICM** Script Editor's TranslationRouteToVRU node to connect the call to the Network VRU.

Table C-11 contains the configuration instructions for this deployment model.

Table C-11 Configuration Checklist, NIC with Type 2, ISN Queue and Transfer Deployment VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateway**: 1. Configure the Gateway inbound routing to send the call over IP to the ISN Voice Browser using dial peers or Gatekeeper lookup. 2. Configure the Ethernet connections. 3. Copy the bootstrap files from the ISN application:	For instructions for **Step 1**, see "Common Gateway Configuration for VRU Leg" section on page C-75. For more information about **Steps 1, 2,** and **3,** see Chapter 8, "VoIP Configuration." For **Step 3**, the files to be copied from the Application Server machine to the Gateway are in: <basedir>/ApplicationServer/Downloads/VB-noCSS-CallRestart
	On the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper.	For more information and instructions, see Chapter 8, "VoIP Configuration."
	On the **CICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU and its label.	Specify the following: • Type: **2**. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed.
	On the **CICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the VRU. 2. Configure a peripheral for each VRU peripheral connected to each PG.	For each VRU connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, for example, <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name descriptive of this VRU peripheral, for example, <location>_<vru1> or <dns_name>. • Client Type: **VRU**. • Select the Enable Post-routing checkbox. On the **Advanced** tab, select the name **isnVRU** from the Network VRU field drop-down list. **Routing Client** tab: • Name: By convention, this is the same as the peripheral. • Client Type: **VRU**. • **Do not** select the Network Transfer Preferred checkbox.

Table C-11 Configuration Checklist, NIC with Type 2, ISN Queue and Transfer Deployment VRU, NAM/CICM (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **Service Explorer** tool: 1. Configure a Service and Route for each VRU. **Note** You can also use service arrays. Refer to the ICM documentation set for more information.	Specify the following: • Service Name: **isnVRU**. • Route Name: **PeripheralName_isnVRU**. • **Do not** configure a peripheral target or label.
	On the **CICM**, ICM Configuration Manager, **Network Trunk Group Explorer** tool: 1. Configure the network trunk group. 2. For each ISN Application Server for the VRU leg, configure an associated trunk group. **Note** You must configure one Network Transfer Group and one associated Trunk Group for each VRU leg ISN Application Server.	For Step 1, specify the following: • Network Trunk Group Name: A name descriptive of this trunk group. For Step 2, do the following: • Peripheral Name: A name descriptive of this trunk group. • Peripheral Number: **200** (this much match the group number of type "ID from ICM" in the Application Server, which is 200 by default). • Trunk Count: Select **Use Trunk Data** from the drop-down list. • **Do not** configure any trunks.

Table C-11 Configuration Checklist, NIC with Type 2, ISN Queue and Transfer Deployment VRU, NAM/CICM (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **Translation Route Explorer** tool: 1. Define a Translation Route for each VRU Peripheral. 2. Configure translation route and label information for each VRU peripheral.	For **Step 1**, specify the following: • **Translation Route** tab: – Name: The name of the target VRU peripheral. (This is by convention; this value must be unique in the enterprise.) – Type: **DNIS** and select the Service defined in the previous step. For **Step 2**, do the following: • **Route** tab: – Name: By convention, this is the name of the target VRU peripheral, followed by the DNIS that this route will use, for example, MyVRU_2000. (This is by convention; this value must be unique in the enterprise.) – Service Name drop-down: select **PeripheralName.isnVRU**. • **Peripheral Target** tab: – Enter the first DNIS that will be seen by the VRU that you will be using for this translation route. **Note** The DNIS pool used for each VRU peripheral must be unique. – Select a **Network Trunk Group** which belongs to the target VRU from the drop-down list. • **Label** tab: – Label: The translation route label (which might or might not be the same DNIS you entered on the Peripheral Target tab). – Type: **Normal**. – Routing Client: Select INCRP Routing Client. **Note** Repeat the Route and corresponding Peripheral Target and Label information for each DNIS in the pool.
	On the **NAM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU. 2. Define a label for each NIC routing client and each translation route.	Specify the following: • Type: **2**. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for each NIC routing client and each translation route. – Label: Translation Route number. – Type: **Normal**. – Routing client: Select the NIC routing client from the drop-down list.

Table C-11 Configuration Checklist, NIC with Type 2, ISN Queue and Transfer Deployment VRU, NAM/CICM (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Application Server**: 1. Configure the ports for both legs of the call. 2. Check other settings.	Do the following: • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the group number for the "ID from ICM" call group. The group number must match the trunk group number in the Network Trunk group used for the translation route. Configure the number of ports according to the licenses purchased and capacity. Configure each of the DNIS numbers used for translation routes. (The "New Call" group is not used since the calls are being sent to the VRU (ISN) after some initial processing by the NIC/ICM.) **Note** See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On each **ISN Voice Browser**: 1. Configure the Gatekeeper. 2. Configure the capacity. 3. Check other settings.	Specify the following: • **SetGateKeeper <*NewValue*>** Where <*NewValue*> is the IP address for the Gatekeeper serving the Voice Browser. • Configure the total number of calls and IVR ports according to the licenses purchased, call profiles and capacity. (For instructions, see Chapter 4, "Voice Browser Administration".) • See Chapter 4, "Voice Browser Administration" for other settings you might want to adjust from the default values.
	On the **CICM**, ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts to be used for IVR treatment and agent transfer, as described in other sections of this manual and in the ICM manuals. The VRU scripts are associated with the applicable Network VRU (for example, **isnVRU**).	Use the CICM Script Editor's TranslationRouteToVRU node to connect the call to the Customer VRU.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure dialed numbers and call types.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.

NIC with Type 2 or 8 ISN Advanced Speech Deployment, ICM Enterprise

In this deployment model, the ISN works with the Voice Gateway to act as the VRU; VRU voice treatment is provided the Gateway and can include ASR/TTS.

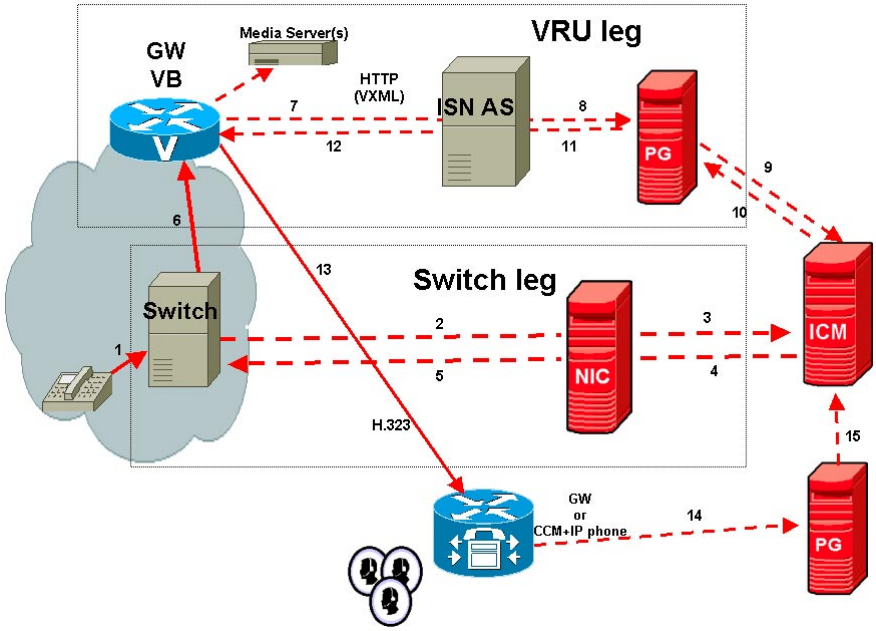
When deployed with a NIC being used to queue and transfer calls (VRU Type 8), the NIC interfaces to the TDM switch to transfer the call to an agent. When deployed with a NIC used to preroute the call (VRU Type 2), the ISN also acts as a switch to transfer the call to an agent; queuing and network transfers are not possible.

Note The ISN Voice Browser is not part of this deployment.

Figure C-12 shows the call flow for the Type 2 deployment model; in this figure, the ISN transfers the call. Figure C-13 shows the call flow for the Type 8 deployment model; in this figure, the NIC transfers the call.

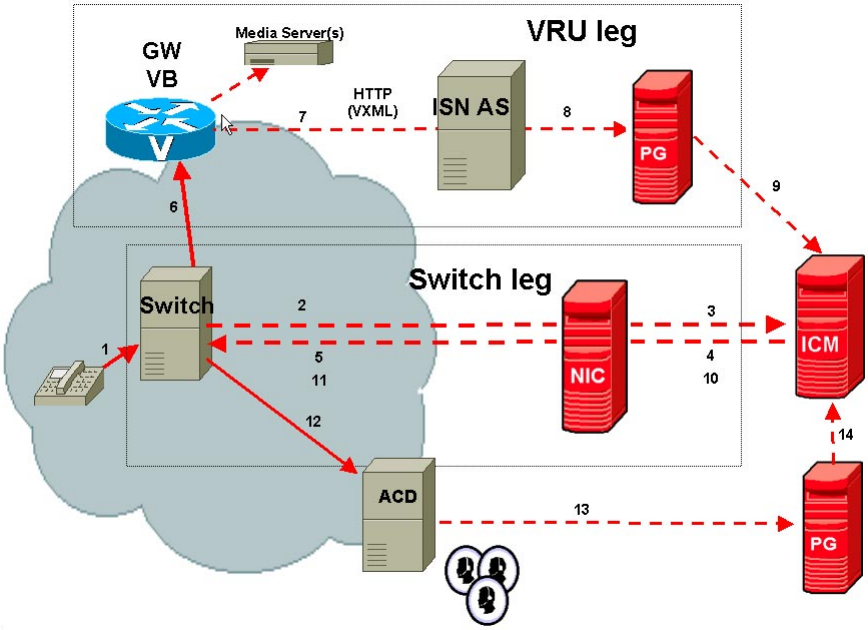
Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-12 NIC with Type 2, ISN Advanced Speech Deployment, ICM Enterprise



Note: The numbers in the figure indicate call flow progression.

Figure C-13 NIC with Type 8, ISN Advanced Speech Deployment, ICM Enterprise



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- There are two Network VRUs:
  - A Type 2 if NIC is prerouting calls.
  - A Type 8 if NIC is queuing and transferring calls.
- Define a Translation Route and labels for the VRU Peripheral (Network VRU labels do not need to be configured.)
- Use the ICM Script Editor's TranslationRouteToVRU node to connect the call to the Network VRU.

Table C-12 contains the configuration instructions for this deployment model.

Table C-12 Configuration Checklist, NIC with Type 2 or Type 8, ISN Advanced Speech, ICM Enterprise

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used for the **VRU** leg: 1. Configure the servers and voice application it will use. 2. Configure the Ethernet connections. 3. Copy the bootstrap files from ISN Installation. 4. Configure the characteristics for the VRU leg.	For instructions for **Step 1**, see "Common Gateway Configuration for VRU Leg" section on page C-75. For more information about **Steps 2, 3,** and **4**, see Chapter 8, "VoIP Configuration." For **Step 3**, the files to be copied from the Application Server machine to the Gateway are as follows: • If you are using a content switch for failover, the files are in: <basedir>/ApplicationServer/Downloads/noVB-CSS-CallRestart • Otherwise, they are in: <basedir>/ApplicationServer/Downloads/noVB-noCSS-CallRestart For **Step 4**: **dial-peer voice <Dial-Peer Number> pots** **application vru-leg** **incoming called-number <dialed number pattern for translation route numbers>** **direct-inward-dial**
	If the ISN is going to transfer calls, on the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper.	For more information and instructions, see Chapter 8, "VoIP Configuration."
	On the **ICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU.	Specify the following: • Type: **2** or **8**, depending on the specific deployment model. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed.

Table C-12 Configuration Checklist, NIC with Type 2 or Type 8, ISN Advanced Speech, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG. 2. Configure a peripheral for each ISN Application Server connected to each PG.	For each ISN Application Server connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: To something representative of this PG, for example, <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: Something representative of this ISN peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • Specify one of the following: – If using **Type 2**, select the Enable Post-routing checkbox and continue. – If using **Type 8**, **do not** select the Enable Post-routing checkbox and skip the Routing Client tab instructions below. **Advanced** tab: • Select the name **isnVRU** from the Network VRU field drop-down list. **Routing Client** tab (for Type 2 only): • Name: By convention, this is the same as the peripheral. • Client Type: **VRU**. • **Do not** select the Network Transfer preferred checkbox. (This allows the Customer ISN to receive the transfer request.)
	On the **ICM**, ICM Configuration Manager, **Service Explorer** tool: 1. Configure a Service and Route for each VRU. **Note** You can also use service arrays. Refer to the ICM documentation set for more information.	Specify the following: • Service Name: **isnVRU**. • Route Name: **PeripheralName_isnVRU**. • **Do not** configure a peripheral target or label.

Table C-12 Configuration Checklist, NIC with Type 2 or Type 8, ISN Advanced Speech, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **ICM**, ICM Configuration Manager, **Network Trunk Group Explorer** tool: 1. Configure the network trunk group. 2. For each ISN Application Server for the VRU leg, configure an associated trunk group. **Note** You must configure one Network Transfer Group and one associated Trunk Group for each VRU leg ISN Application Server.	For Step 1, specify the following: • Network Trunk Group Name: A name descriptive of this trunk group. For Step 2, specify the following: • Peripheral Name: A name descriptive of this trunk group. • Peripheral Number: **200** (this much match the group number of type "ID fro ICM" in the Application Server, which is 200 by default). • Trunk Count: Select **Use Trunk Data** from the drop-down list. • **Do not** configure any trunks.
	On the **ICM**, ICM Configuration Manager, **Translation Route Explorer** tool: 1. Define a Translation Route for each VRU Peripheral. 2. Configure translation route and label information for each VRU peripheral.	For Step 1, specify the following: • **Translation Route** tab: – Set the **Name** field to the name of the target VRU peripheral. (This is by convention; this value must be unique in the enterprise.) – Set the **Type** field to **DNIS** and select the Service defined in the previous step. For Step 2, do the following: • **Route** tab: – Set the **Name**. By convention, this is the name of the target VRU peripheral, followed by the DNIS that this route will use, for example, MyVRU_2000. (This is by convention; this value must be unique in the enterprise.) – Service Name drop-down: Select **PeripheralName.isnVRU**. • **Peripheral Target** tab: – Enter the first DNIS that will be seen by the VRU that you will be using for this translation route. **Note** The DNIS pool used for each VRU peripheral must be unique. – Select a **Network Trunk Group** which belongs to the target VRU from the drop-down list. • **Label** tab: – Set the Label: Enter the translation route label (which might or might not be the same DNIS you entered on the Peripheral Target tab). – Type: Normal. – Routing Client: Select NIC Routing Client. **You must create and additional label for each NIC routing client.** **Note** Repeat the Route and corresponding Peripheral Target and Label information for each DNIS in the pool.

Table C-12 Configuration Checklist, NIC with Type 2 or Type 8, ISN Advanced Speech, ICM Enterprise (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Application Server** Call Definition and ICM pages: 1. Configure the group number and ports for both legs of the call. 2. Configure the dialed numbers used in the translation route. 3. Check other settings.	Do the following: • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the group number for the "ID from ICM" call group. The group number must match the trunk group number in the Network Trunk group used for the translation route. Configure the number of ports according to the licenses purchased and capacity. Configure each of the numbers used for translation routes. (The "New Call" group is not used since the calls are being sent to the VRU (ISN) after some initial processing by the NIC/ICM.) **Note** See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On the **ICM**, ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts to be used for IVR treatment and agent transfer, as described in other sections of this manual and in the ICM manuals. The VRU scripts are associated with the applicable Network VRU (for example, **isnVRU**).	Use the ICM Script Editor's TranslationRouteToVRU node to connect the call to the Network VRU.
	On the **ICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **ICM**, ICM Configuration Manager: 1. Configure dialed numbers and call types.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **ICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco CallManager (CCM): 1. Configure the CCM.	For more information, see the Cisco CallManager user documentation.

NIC with Type 2 or 8 ISN Advanced Speech Deployment Customer VRU, NAM/CICM

In this deployment model, the ISN is deployed as a Customer VRU at the **CICM**. The ISN Application Server works with the Voice Gateway to act as the VRU; VRU voice treatment is provided at the Voice Gateway and can include ASR/TTS.

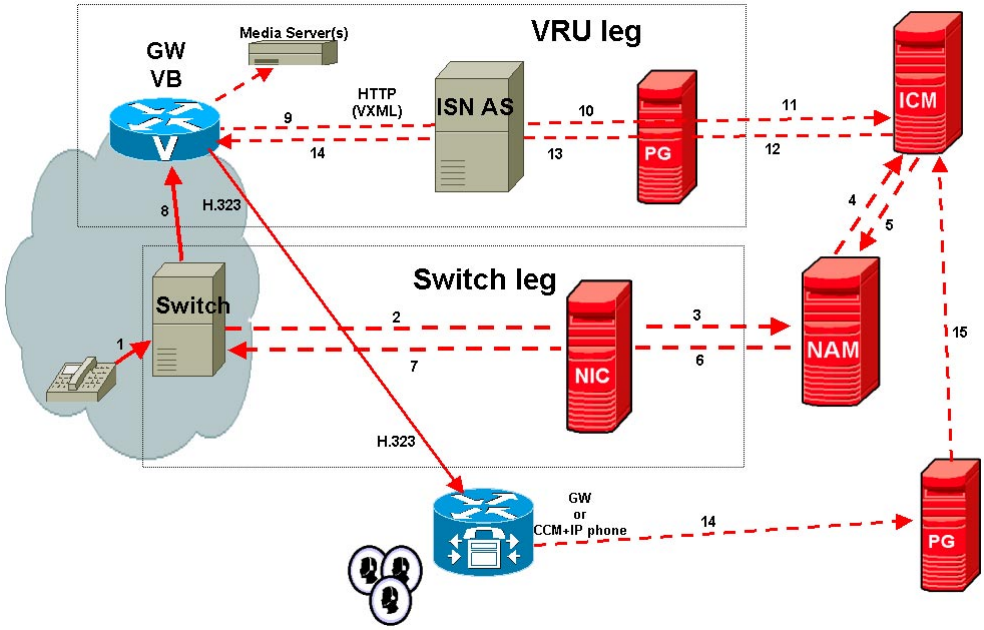
When deployed with a NIC being used to queue and transfer calls (VRU Type 8), the NIC interfaces to the TDM switch to transfer the call to an agent. When deployed with a NIC used to preroute the call (VRU Type 2), the ISN also acts as a switch to transfer the call to an agent; queuing and network transfers are not possible.

Note The ISN Voice Browser is not part of this deployment.

Figure C-14 shows the call flow for the Type 2 deployment model; in this figure, the ISN transfers the call once. Figure C-15 shows the call flow for the Type 8 deployment model; in this figure, the NIC transfers the call.

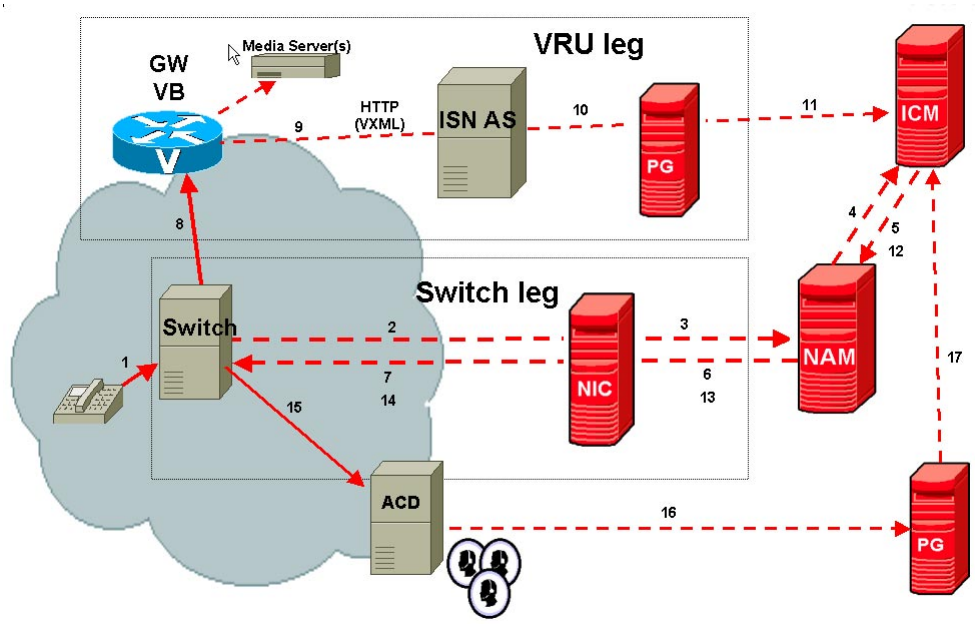
Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-14 NIC with Type 2, ISN Advanced Speech Deployment Customer VRU, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

Figure C-15 NIC with Type 8, ISN Advanced Speech Deployment Customer VRU, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

The setup for these deployment models is virtually the same; you must:

- Set the Network VRU:
  - To Type 2 if NIC is prerouting calls.
  - To Type 8 if NIC is queuing and transferring calls.
- The Network VRU Names (where applicable) and the ECC variable configurations must be identical on the NAM and CICM. All labels must be duplicated, but their routing clients will be different.
- Define a Translation Route and labels for the VRU Peripheral in the CICM. (Network VRU labels need to be configured in the NAM.)
- Use the **CICM** Script Editor's TranslationRouteToVRU node to connect the call to the Network VRU.

Table C-13 contains the configuration instructions for this deployment model.

Table C-13 Configuration Checklist, NIC with Type 2 or 8, ISN Advanced Speech Deployment Customer VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used for the **VRU** leg: 1. Configure the servers and voice application it will use. 2. Configure the Ethernet connections. 3. Copy the bootstrap files from ISN Installation. 4. Configure the characteristics for the VRU leg.	For instructions for **Step 1**, see "Common Gateway Configuration for VRU Leg" section on page C-75. For more information about **Steps 2, 3,** and **4**, see Chapter 8, "VoIP Configuration." For **Step 3**, the files to be copied from the Application Server machine to the Gateway are as follows: • If you are using a content switch for failover, the files are in: • <basedir>/ApplicationServer/Downloads/noVB-CSS-CallRestart • Otherwise, they are in: • <basedir>/ApplicationServer/Downloads/noVB-noCSS-CallRestart For **Step 4**: **dial-peer voice <Dial-Peer Number> pots** **application vru-leg** **incoming called-number <dialed number pattern for translation route numbers>** **direct-inward-dial**
	If the ISN is going to transfer calls, on the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper.	For more information and instructions, see Chapter 8, "VoIP Configuration."
	On the **CICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU.	Specify the following: • Type: **2 or 8**, depending on the specific deployment model. • Name: **PeripheralName_isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed.

Table C-13 Configuration Checklist, NIC with Type 2 or 8, ISN Advanced Speech Deployment Customer VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG. 2. Configure a peripheral for each Application Server connected to each PG.	For each VRU connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name representative of this PG, for example, <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name representative of this VRU peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • Specify one of the following: – If using **Type 2**, select the Enable Post-routing checkbox and continue. – If using **Type 8**, **do not** select the Enable Post-routing checkbox and skip the Routing Client tab instructions below. On the **Advanced** tab, select the name **isnVRU** from the Network VRU field drop-down list. **Routing Client** tab (Type 2 only): • Name: By convention, this is the same as the peripheral name. • Client Type: **VRU**. • **Do not** select the Network Transfer preferred checkbox. (This allows the Customer ISN to receive the transfer request.)
	On the **CICM**, ICM Configuration Manager, **Service Explorer** tool: 1. Configure a Service and Route for each VRU. **Note** You can also use service arrays. Refer to the ICM documentation set for more information.	In the filter data pane, select each ISN peripheral defined above and specify the following: • Service Name: **isnVRU**. • Route Name: **PeripheralName_isnVRU**. • **Do not** configure a peripheral target or label.
	On the **CICM**, ICM Configuration Manager, **Network Trunk Group Explorer** tool: 1. Configure the network trunk group(s). 2. For each ISN Application Server for the VRU leg, configure an associated trunk group. **Note** You must configure one Network Transfer Group and one associated Trunk Group for each VRU leg ISN Application Server.	For Step 1, do the following: • Network Trunk Group Name: A name that is descriptive of this network trunk group. For Step 2, do the following: • Peripheral Name: A name descriptive of this trunk group. • Peripheral Number: **200** (this much match the group number of type "ID from ICM" in the Application Server, which is 200 by default). • Trunk Count: Select **Use Trunk Data** from the drop-down list. • **Do not** configure any trunks.

Table C-13 Configuration Checklist, NIC with Type 2 or 8, ISN Advanced Speech Deployment Customer VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **Translation Route Explorer** tool: 1. Define a Translation Route for each VRU Peripheral. 2. Configure routes, peripheral targets, and labels for each DNIS to be used for each VRU peripheral.	For Step 1, do the following: • **Translation Route** tab: – Name: The name of the target VRU peripheral. (This is by convention; this value must be unique in the enterprise.) – Type: **DNIS**. For Step 2, do the following: • **Route** tab: – Name: By convention, this is the name of the target VRU peripheral, followed by the DNIS that this route will use, for example, MyVRU_2000. (This is by convention; this value must be unique in the enterprise.) – Service Name drop-down: Select **PeripheralName.isnVRU**. • **Peripheral Target** tab: – Enter the first DNIS that will be seen by the VRU that you will be using for this translation route. **Note** The DNIS pool used for each VRU peripheral must be unique. – Select a Network Trunk Group that belongs to the target VRU from the drop-down list. • **Label** tab: – Routing Client: Select the INCRP Routing Client that was mapped to the applicable NAM Routing Client. – Label: Enter the translation route number (which might or might not be the same DNIS you entered on the Peripheral Target tab). – Type: Normal **Note** Repeat the Route and corresponding Peripheral Target and Label information for each DNIS in the pool.
	On the **NAM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg. 2. Define a label for each NIC routing client and each translation route number. **Note** For each NIC routing client, define all the same labels you defined above in the CICM Translation Route Explorer.	Specify the following: • Type: **2**. or **8**, depending on the specific deployment model. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for each NIC routing client and each translation route number. – Label: Translation Route number. – Type: **Normal**. – Routing client: Select the NIC routing client from the drop-down list.

Table C-13 Configuration Checklist, NIC with Type 2 or 8, ISN Advanced Speech Deployment Customer VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On each **ISN Application Server** Call Definitions and ICM pages: 1. Configure the group number and ports for both legs of the call. 2. Configure the dialed numbers used in the translation route. 3. Check other settings.	Do the following: • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the group number for the "ID from ICM" call group. The group number must match the trunk group number in the Network Trunk group used for the translation route (usually 200). Configure the number of ports according to the licenses purchased and capacity. Configure each of the DNIS numbers used for translation routes. (The "New Call" group is not used since the calls are being sent to the VRU (ISN) after some initial processing by the NIC/CICM.) **Note** See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On the **CICM**, ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts to be used for IVR treatment and agent transfer, as described in other sections of this manual and in the ICM manuals. The VRU scripts are associated with the applicable Network VRU (for example, **isnVRU**).	Use the CICM Script Editor's TranslationRouteToVRU to connect the call to the VRU.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure dialed numbers and call types.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco CallManager (CCM): 1. Configure the CCM.	For more information, see the Cisco CallManager user documentation.

NIC with Type 3 or 7 ISN Advanced Speech Deployment Network VRU, NAM/CICM

In this deployment model, the ISN is deployed as a Network VRU at the **NAM**. The ISN Application Server works with the Voice Gateway to act as the VRU; VRU voice treatment is provided at the Voice Gateway and can include ASR/TTS.

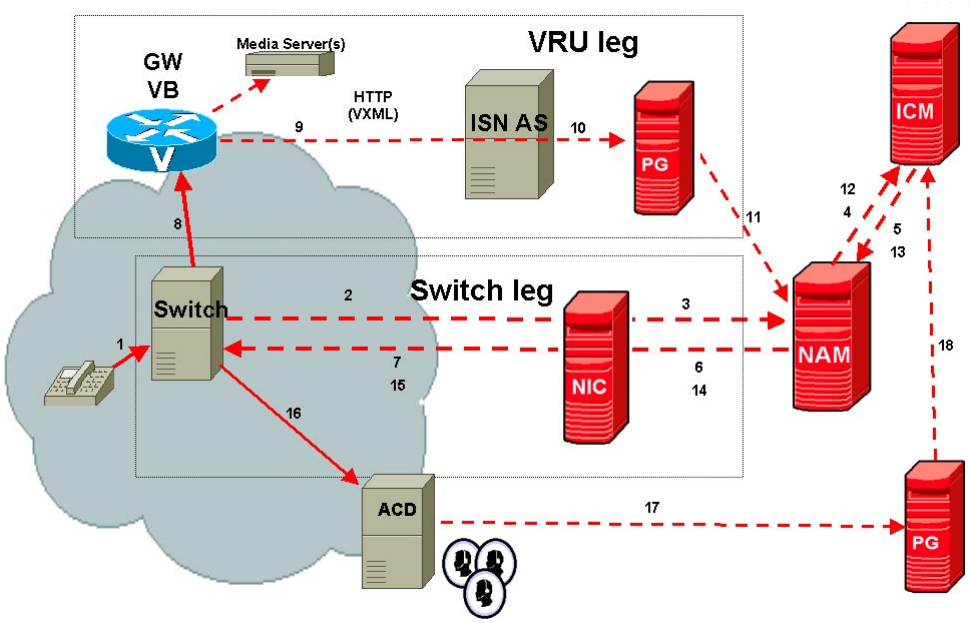
The NIC interfaces to the TDM switch to transfer calls to the ISN for VRU treatment and to queue and transfer calls using a VRU Type 3 or 7 call flow.

Note The ISN Voice Browser is not part of this deployment.

Figure C-16 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover. Also, the Gatekeeper is not shown.

Figure C-16 NIC with Type 3 or 7, ISN Advanced Speech Deployment Network VRU, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

Configuration overview for this deployment model:

- Set the Network VRU Type to a 3 or 7.
- System Information on the NAM and CICM must include correlation ID settings.
- The Network VRU names (where applicable), correlation IDs, and the ECC variable configurations must be identical on the NAM and CICM. All Labels must also be duplicated, but their routing clients will be different.
- Use the CICM Script Editor's SendToVRU node to connect the call to the Network VRU.

Table C-14 contains the configuration instructions for this deployment model.

Table C-14 Configuration Checklist, NIC with Type 3 or 7, ISN Advanced Speech Deployment Network VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **Gateways** used for the **VRU** leg: 1. Configure the servers and voice application it will use. 2. Configure the Ethernet connections. 3. Copy the bootstrap files from ISN Installation. 4. Configure the characteristics for the VRU leg.	For instructions for **Step 1**, see "Common Gateway Configuration for VRU Leg" section on page C-75. For more information about **Steps 2, 3,** and **4**, see Chapter 8, "VoIP Configuration." For **Step 3**, the files to be copied from the Application Server machine to the Gateway are as follows: • If you are using a content switch for failover, the files are in: <basedir>/ApplicationServer/Downloads/noVB-CSS-CallRestart • Otherwise, they are in: <basedir>/ApplicationServer/Downloads/noVB-noCSS-CallRestart For **Step 4**: **dial-peer voice <dial-Peer Number> voip** **application vru-leg** **incoming called-number <network routing number> T** (for example, incoming called-number 8001112222T **dtmf-relay rtp-nte H245-signal h245-alphanumeric** **codec g711ulaw** **no vad** **Note** These characteristics are for VRU legs requiring ASR and/or TTS treatment. If you have other requirements for dtmf relay, codecs, or vad settings, you should modify the command accordingly.
	On the **Gatekeeper**: 1. Register all the Gateways with the Gatekeeper.	For more information and instructions, see Chapter 8, "VoIP Configuration."
	On the **NAM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the **VRU Client** leg. 2. Configure a peripheral for each Application Server to be used as a VRU leg connected to each PG.	For each ISN Application Server connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name representative of this PG, for example, <location>_A for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name representative of this VRU peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • **Do not** select the Enable Post-routing checkbox.

Table C-14 Configuration Checklist, NIC with Type 3 or 7, ISN Advanced Speech Deployment Network VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the VRU leg and labels for reaching the NAM.	Specify the following: • Type: **3** or **7**, depending on the specific deployment model. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for the NAM. – Label: Network routing number. – Type: **Normal**. – Routing client: Select the INCRP Routing Client from the drop-down list.
	On the **NAM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU and a label for each NIC that is using this VRU.	Specify the following: • Type: **3** or **7**, depending on the specific deployment model. • Name: **isnVRU**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnVRU** will be assumed. • Define a **Label** for each NIC that is using this VRU: – Label: Network routing number. – Type: **Normal**. – Routing client: Select the routing client for that NIC from the drop-down list. **Note** Make sure the Network VRU label is identical in the NAM and CICM. It is recommended that the Network VRU Name be identical as well to avoid confusion.
	On the **NAM**, ICM Configuration Manager, **System Information** tool: 1. Define the correlation IDs. 2. If there will be routing scripts on the NAM, Define a default Network VRU.	Do the following in the General section of the **System Information** tool: • Set minimum and maximum correlation ID values. – Minimum correlationID: Starting number for the correlation ID, for example, 1000. – Maximum correlationID: Ending number for the correlation ID, for example, 1099. • Define the Default Network VRU: **IsnVRU**.
	If there will be routing scripts on the NAM, on the **NAM**, ICM Configuration Manager, **System Information** tool: 1. Define a default Network VRU.	In the General section of the **System Information** tool: • Define the Default Network VRU: **IsnVRU**.

Table C-14 Configuration Checklist, NIC with Type 3 or 7, ISN Advanced Speech Deployment Network VRU, NAM/CICM

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **CICM**, ICM Configuration Manager, **System Information** tool: 1. Define a default Network VRU.	In the General section of the **System Information** tool: • Define the Default Network VRU: **IsnVRU**.
	On each **ISN Application Server**: 1. Configure the length of the Network Routing Number. . 2. Configure the ports for the VRU legs of the call 3. Check other settings.	Do the following: • On the Call Definitions page, set the **Dialed Number Maximum Length if no Correlation ID present** field to the length of the Network Routing Number. • Set the VRU Connect Port to match the VRU Connection Port defined in ICM Setup for the corresponding VRU PG peripheral (PIM). • Configure the "ID from ICM" call group. Configure the number of ports according to the licenses purchased and capacity. (The "New Call" group is not used since the calls are being sent to the VRU (ISN) after some initial processing by the NIC/CICM.) **Note** See Chapter 5, "Application Server Administration" for other settings you might want to adjust from the default values.
	On the **CICM**, ICM **Script Editor** tool: 1. Create the VRU scripts and routing scripts to be used for IVR treatment and agent transfer, as described in other sections of this manual and in the ICM manuals. The VRU scripts are associated with the applicable Network VRU (for example, **isnVRU**.)	Use the ICM Script Editor's SendToVRU node to connect the call to the Network VRU. **Note** A RunVRU Script or Queue node is an "implicit" SendToVRU node, although error handling will be easier if the explicit "SendToVRU" node is used.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure the ECC variables.	For more information, see "Common NAM/CICM Configuration: Define ISN ECC variables" section on page C-79.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. Configure dialed numbers and call types.	For more information, see the *Cisco ICM Software Configuration Guide*.
	On the **NAM** and **CICM**, ICM Configuration Manager: 1. If necessary, differentiate VRUs (ISNs) based on dialed number. 2. Define customers and their Network VRU.	For more information, see"Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number" section on page C-81.
	On the Cisco CallManager (CCM): 1. Configure the CCM.	For more information, see the Cisco CallManager user documentation.

Special Cases

This section describes two special deployment modesl:

- ISN Queue and Transfer Deployment with ISN Advanced Speech Deployment Customer VRU, NAM/CICM
- ISN Queue and Transfer Deployment as Queue Point for Consultative Transfers

ISN Queue and Transfer Deployment with ISN Advanced Speech Deployment Customer VRU, NAM/CICM

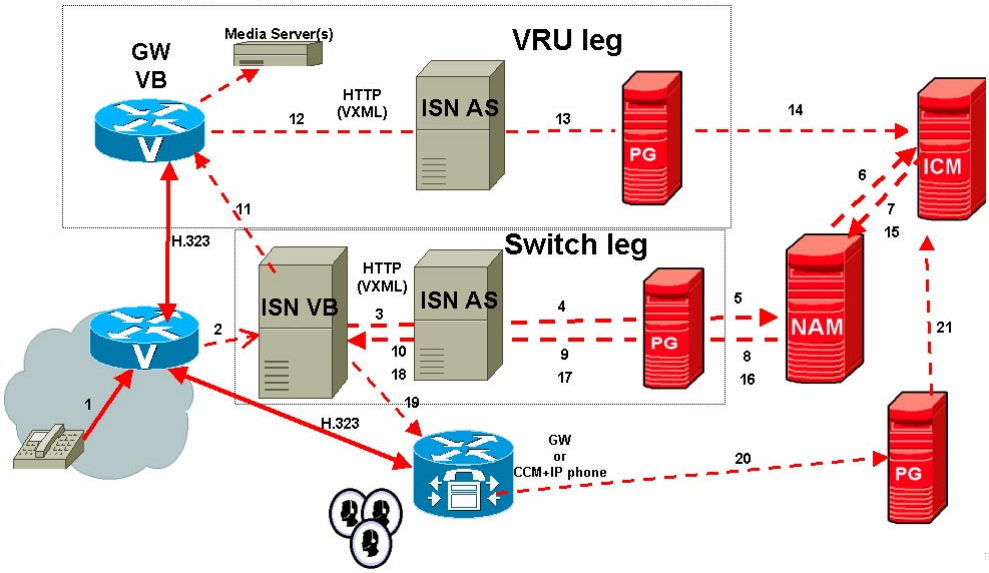
In this deployment, there are two ISNs:

- One is at the NAM where it acts as the Switch to transfer the call to the Customer VRU and agents.
- The other is deployed as a Customer VRU at the CICM.

Figure C-17 shows the call flow for this deployment model.

Note For simplicity, the figure does not illustrate a deployment for redundancy and failover; also the Gatekeeper is not shown.

Figure C-17 ISN Queue and Transfer Deployment with ISN Advanced Speech Deployment, Customer VRU, NAM/CICM



Note: The numbers in the figure indicate call flow progression.

The configuration for the ISN at the NAM (the switch) is identical to that where a Customer VRU is used at the CICM; for more information, see ISN Queue and Transfer Deployment with "Other" Customer VRU, NAM/ICM, page C-33.

In this case the "other VRU" is, in fact, the ISN deployed at the CICM.

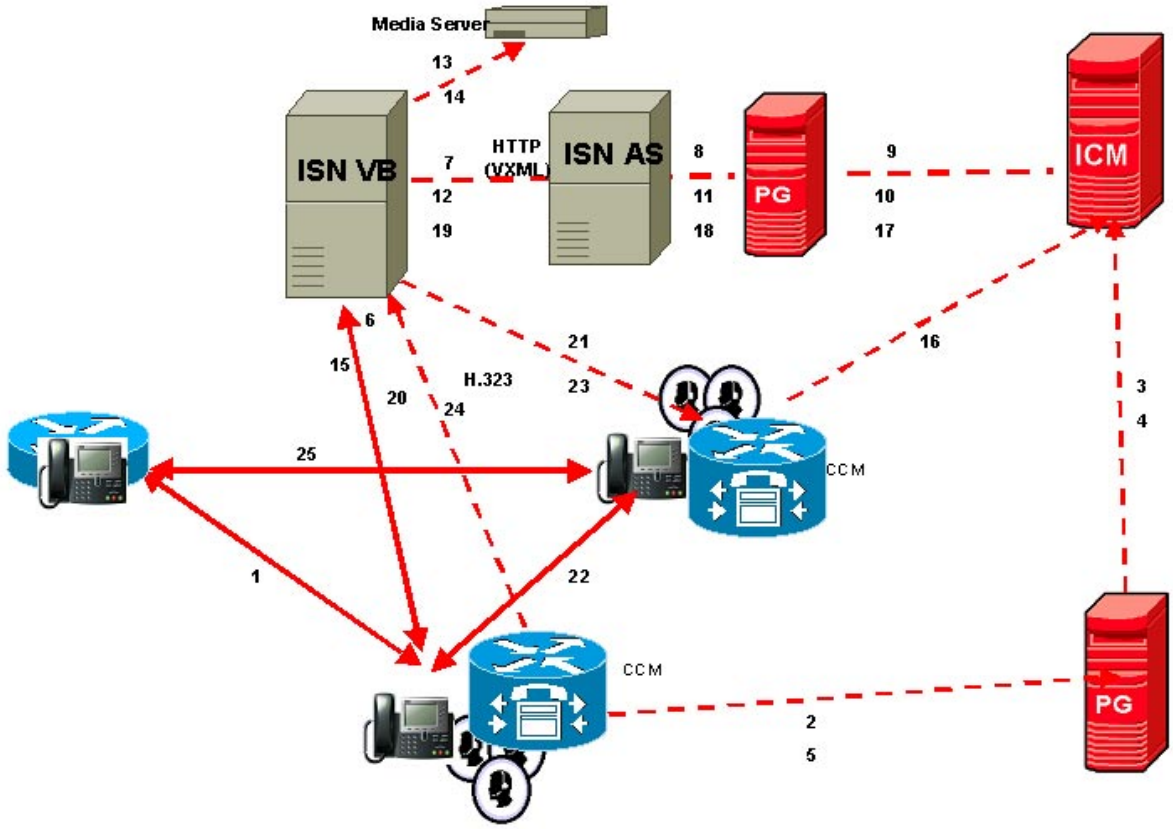
The configuration for the ISN at the CICM (the VRU) is identical to that where a NIC is used to route the call; for more information, see NIC with Type 2 or 8 ISN Advanced Speech Deployment Customer VRU, NAM/CICM, page C-63.

A separate Application Server is required for the two ISN since one is connected to the NAM and the other to the CICM. The Voice Gateway may be used for both ISNs but the configuration of the bootstrap files is beyond the scope of the standard product and professional services must be employed.

ISN Queue and Transfer Deployment as Queue Point for Consultative Transfers

In this deployment, the ISN as a Customer VRU; in a NAM/CICM environment, the ISN is at the CICM. When an IPCC agent does a consultative transfers and needs to be queued, an ISN at the Customer site is the queue point.

Figure C-18 ISN Queue and Transfer Deployment as Queue Point for Consultative Transfers



Note: The numbers in the figure indicate call flow progression.
The starting point for this diagram is that the caller is talking to the IPCC agent.

The configuration for the ISN is identical to that where a NIC (or the ISN) is using type 2 ISN Customer VRU for VRU treatment: see section "**NIC with type 2 or 8 ISN Advanced Speech Deployment VRU, ICM**". This configuration is also applicable to a NAM/CICM environment since the ICM is not aware of the consultation and the NAM is not involved in the "new call" which is presented to the ICM.

If an ISN is deployed as the switch in this solution, a separate Application Server is required for the 2 ISN since one is connected to the NAM and the other to the CICM. The Voice Gateway may be used for both ISNs but the configuration of the bootstrap files is beyond the scope of the standard product and professional services must be employed.

Common Gateway Configuration for VRU Leg

Table C-15 describes Gateway configuration instructions common to all ISN Comprehensive and ISN Advanced Speech deployments where the Gateway is providing VRU voice treatment.

Table C-15 Configuration Checklist, Common Gateway Configuration for Leg

✓	Where To Go/What to Do	Settings Specific to This Deployment
	1. Register the Gateway to its respective Gatekeeper.	Specify the following command: **interface FastEthernet0/0** **h323-gateway voip interface** **h323-gateway voip id <***GK-Zone-name***> ipaddr <***ipaddr of GK***> 1719** **h323-gateway voip h323-id <***H323-id***>** **h323-gateway voip tech-prefix 1#**
	1. If you will use ASR and TTS Servers, specify IP addresses for those Servers for each locale using the applicable name resolution system for the Gateway (DNS or "ip host" commands.	Do one of the following: • If using a CSS, the server name is configured to the virtual IP (VIP) of the Application Server service on the CSS. (For more information, see Appendix D, "Configuring Cisco Content Services Switch (CSS) for Use with ISN.") If using name resolution local to the Gateway (rather than DNS), specify: **ip host isn-vxml <*VIP of application server service on CSS*>** • *If not using a CSS,* primary and backup servers must be configured. If using name resolution local to the Gateway (rather than DNS) specify: **ip host asr-<*locale*> <*ASR server for locale*>** **ip host asr-<*locale*>-backup <*backup ASR server for locale*>** **ip host tts-<*locale*> <*TTS server for locale*>** **ip host tts-<*locale*>-backup <*backup TTS server for locale*>**
	1. If you are using ASR and/or TTS with "external grammar" and expect the Gateway to resolve the addresses for those server give the following commands to the Gateway, specify ASR and/or TTS commands.	Specify the following commands: **ivr asr-server rtsp://<***hostname or ip address of ASR server***> /recognizer** **ivr tts-server rtsp://<***hostname or ip address of TTS server***> /synthesizer** **Note** This setting does not accommodate multiple locales and assumes a CSS is deployed for failover handling.

Table C-15 Configuration Checklist, Common Gateway Configuration for Leg (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	1. Configure the IP address(es) for the ISN Application Servers to be used by the Gateway using the applicable name resolution system for the Gateway (DNS or "ip host" commands).	Specify the following commands: • *If using a CSS*, the server name is configured to the address of the CSS; failover is handled by the CSS. If using name resolution local to the GW (rather than DNS), the command would be: **ip host isn-vxml <*AppServer*>** • *If not using a CSS*, primary and backup servers must be configured. If using name resolution local to the GW (rather than DNS): **ip host isn-vxml <*AppServer*>** **ip host isn-vxml-backup <backup *AppServer*>**
	1. Configure the Gateway to provide voice treatment:	Specify the following commands: **call application voice vru-leg flash:bootstrap.tcl** **call application voice vru-leg language 0 en** **call application voice vru-leg set-location en 0 flash** **call application voice load vru-leg** **call application voice new-call flash:bootstrap.vxml** **call application voice new-call language 0 en** **call application voice new-call set-location en 0 flash** **call application voice load new_call** **call application voice handoff flash:handoff.tcl** **call application voice handoff language 0 en** **call application voice handoff set-location en 0 flash** **Note** The name **vru-leg** is used by convention. Any name will do; since it is referenced elsewhere in this document, the name "vru-leg" will be assumed.

Common NAM/CICM Configuration for ISN Switch Leg

The steps in Table C-16 below describe NAM/ICM configuration instructions common to *all* NAM/CICM deployments for ISN switch legs.

Table C-16 Configuration Checklist, Common NAM/CICM Configuration for ISN Switch Leg

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **NAM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU for the Switch leg. 2. For ISN Queue and Transfer and ISN Advanced Speech deployments, define Labels for each ISN switch.	Specify the following: • Type: **5**. • Name: **isnSwitch**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnSwitch** will be assumed. • Define one **Label** for each ISN Application Server that is handling the Switch leg: – Label: Any number. **Note** Although this label is not used, it must be configured. – Type: **Normal** – Routing client: **isnSwitch**
	On the **CICM**, ICM Configuration Manager, **NIC Explorer** tool: 1. Set the client type for the INCRP NIC.	Specify the following on the **Routing Client** tab for the INCRP NIC: • Client Type: **VRU**.
	On the **CICM**, ICM Configuration Manager, **Network VRU Explorer** tool: 1. Define a Network VRU with a label that uses INCRP as its routing client.	Specify the following: • Type: **5**. • Name: **isnSwitch**. **Note** This name is used by convention. Any name will do; since it is referenced elsewhere in this document, **isnSwitch** will be assumed. • Define one **Label** for each ISN Application Server that is handling the Switch leg: – Label: Any number. **Note** Although this label is not used, it must be configured. – Type: **Normal**. – Routing client: INCRP NIC.

Table C-16 Configuration Checklist, Common NAM/CICM Configuration for ISN Switch Leg (continued)

✓	Where To Go/What to Do	Settings Specific to This Deployment
	On the **NAM**, ICM Configuration Manager, **PG Explorer** tool: 1. Configure each PG to be used for the **Switch** leg. 2. Configure a peripheral for each Application Server to be used for a Switch leg connected to each PG.	For each ISN Application Server connected to this PG, in the tree view pane, select the applicable PG. **Logical Controller** tab: • Client Type: **VRU**. • Name: A name descriptive of this PG, for example, <location>_A, for side A of a particular location. **Peripheral** tab: • Peripheral Name: A name representative of this ISN peripheral, for example, <location>_<isn1> or <dns_name>. • Client Type: **VRU**. • Select the Enable Post-routing checkbox. On the **Advanced** tab, select the name **isnSwitch** from the Network VRU field drop-down list. **Routing Client** tab: • Name: By convention, use the same name as the peripheral. • Client Type: **VRU**. • **Do not** select the Network Transfer Preferred checkbox.

Common NAM/CICM Configuration: Define ISN ECC variables

You need to set up ECC variables that the ISN uses to exchange information with the NAM/ICM.

Note Information about how the ISN uses these ECC variables can be found throughout the manual.

Step 1 Within Configuration Manager, select **Tools > Miscellaneous Tools > System Information** and select the Enable expanded call context checkbox.

Step 2 Within Configuration Manager, select **Tools > List Tools > Expanded Call Variable List**.

Step 3 In the Expanded Call Variable List window, enable the **Add** button by clicking **Retrieve**.

Step 4 Click **Add**. The Attributes property tab is enabled.

Step 5 Create each of the variables in Table C-17, clicking **Save** after defining each variable.

Caution It is important that you enter the ECCs **Name** values listed in Table C-17 exactly as specified. If you do not, the NAM/ICM software will not be able to successfully communicate with the micro-applications on the Application Server.

Length values are a bit more flexible. Unless the values listed in Table C-17 are *specifically* noted as "required," the value in the Length column is the *maximum* the NAM/ICM can handle for that ECC; you can specify a value between 1 and the maximum length.

Table C-17 Micro-Application ECCs

Name	Length	Definition
user.media.id	**Required** value: 36	A number identifying a call to the Application Server and, optionally, the Voice Browser: • For a call arriving from the network, consists of an H.323 Conference ID. • For a call arriving from a non-Voice Browser client, consists of a random number.
user.microapp.currency	**Required** value: 6	Currency type.
user.microapp.error_code	**Required** value: 2	Return status error code to be returned from the ISN to the NAM/ICM upon a False return code in the Run Script Result.
user.microapp.locale	**Required** value: 5	Locale, a combination of language and country which define the grammar and prompt set to use.
user.microapp.media_server	30	Root of the URL for all media files and external grammar files used in the script.
user.microapp.play_data	40	Default storage area for data for Play Data micro-application.
user.microapp.sys_media_lib	10	Directory for all system media files, such as individual digits, months, default error messages, etc.

Table C-17 Micro-Application ECCs (continued)

Name	Length	Definition
user.microapp.app_media_lib	10	Directory for all application-specific media files and grammar files.
Note The system and application media libraries need message and prompt files created/recorded for each locale that will be referenced. For more information, turn to Chapter 3, "Prompt Recording and Distribution."		
user.microapp.grammar_choices	Configurable on the ICM. Maximum length: 210 characters.	Specifies the ASR choices that a caller can input for the Get Speech micro-application. Each option in the list of choices is delimited by a forward slash (/). **Note** If text is placed in this variable that is longer than the variable is configured to handle, only the first 210 characters are sent.
user.microapp.inline_tts	Configurable on the ICM. Maximum length: 210 characters.	Specifies the text for inline Text To Speech (TTS). **Note** If text is placed in this variable that is longer than the variable is configured to handle, only the first 210 characters are sent.
user.microapp.input_type	**Required** value: 1	Specifies the type of input that is allowed. Valid contents are: **D** - DTMF **B** - (Both, the default) DTMF and Voice
user.microapp.caller_input	Configurable on the ICM. Maximum length: 210 characters.	Storage area for any ASR input that is collected from Get Speech. **Note** Get Speech text results will be written to this ECC variable. Results from Get Digits or Menu micro-applications will be written to the CED.
user.microapp.pd_tts	**Required** value: 1	Specifies whether ISN's Text To Speech (TTS) or media files should be played to the caller. Valid contents are: **Y** - Yes, use TTS capabilities **N** - No, do not use TTS capablities; play media files instead. **Note** Used only with Play Data micro-application.
user.num.steps.executed[1]	**Required** value: 10	Used by system to track script progress.
user.session.handled[1]	**Required** value: 5	Used by system to pass information.
user.task.id[1]	**Required** value: 19	Used by system to pass information.
user.connect.script.config[1]	**Required** value: 40	Used by system to pass information.
user.connect.script.name[1]	**Required** value: 39	Used by system to pass information.

Table C-17 Micro-Application ECCs (continued)

Name	Length	Definition
user.connection.type[1]	**Required** value: 17	Used by system to pass information.
user.last.redirected.address[1]	**Required** value: 40	Used by system to pass information.

1. These ECCs are required for Application Server internal processing. Set them and forget them!

Note If you change the length of the ECC variables while the Application Server is running, you need to restart the Application Server for it to work properly.

Step 6 When finished, click **Save** to apply your changes.

Common Configuration for Differentiating VRUs (ISNs) Based on Dialed Number

The Network VRU configuration instructions in this guide assume that all callers will be routed to the same VRUs (ISNs) for VRU treatment purposes. Under this assumption, it is always simplest to rely on the system default Network VRU. However, it is sometimes necessary to differentiate the VRUs (ISNs) based on dialed number. For example, some calls:

- Require Comprehensive treatment, while others only use Queue and Transfer deployment model which does not support ASR/TTS.
- Need to assign different customers or applications to their own ISN machines.

To configure the ICM to differentiate the VRU, do the following:

- Configure more than one Network VRU.
- On the **ICM**, ICM Configuration Manager**, ICM Instance Explorer** tool:
  - Configure the customer(s).
  - Configure the network VRU for each customer if that customer will use a Network VRU other than the default.
- Associate the dialed number(s) to the customer in the Dialed Number List tool.

Configuring Cisco Content Services Switch (CSS) for Use with ISN

This section outlines the general approach and configuration specifics for using CSS with ISN deployments. Users should be familiar with the general concepts of configuring a Cisco Content Services Switch outlined in the *CSS Administration Guide*.

Hardware: The CSS Model 11500 is used for this implementation.

Software: Version 7.10 of the CSS 11500 should be installed on all CSS switches planned for use.

General Approach

In this application of CSS, the engine is used primarily to direct initial session requests for a particular type of service. Sticky and/or stateful connections are not generally configured, primarily because the failover and retry logic for ISN voice applications is maintained within other components of the system.

For example, if the callflow of a particular IVR interaction requires the playing of media, the ISN call model will initiate separate http requests for each prompt expected to be played. As such, the Content Switch will not track state, or necessarily maintain a sticky connection for concurrent requests from the client.

The following general approach will apply to configuring each ISN component type. Specific component-type configuration is covered in the following sections.

Services—One CSS Service is configured for each type of ISN component. For general step-by-step guidelines for configuring Services, please see Chapter 1 of the *CSS Basic Configuration Guide*.

Rules—A content rule should be established for each ISN component type. In order to define a content rule, a content owner must be defined on the Content Switch. (See Chapter 2 of the *CSS Basic Configuration Guide*.) Media Servers, Application Servers, and ASR/TTS Servers may each have their own content rules defined. For general step-by-step guidelines for configuring content rules, please see Chapter 3 of the *CSS Basic Configuration Guide*.

Groups—It may be necessary to define source groups for each service. Group configuration will vary depending upon whether a single VLAN or multiple VLANs are used for the CSS' inbound and outbound traffic from the voice gateway and the ISN component servers. If the servers and the voice gateway clients are on the same VLAN, then destination services will need to be specified. This configuration is sometimes referred to as a 'one-arm' configuration because all traffic passes through one interface. Please see the online documentation for the Cisco Content Switch entitled "How to Configure the CSS to Load Balance Using One Interface". At the time of this writing, the document was located here:

http://www.cisco.com/en/US/products/hw/contnetw/ps789/products_configuration_example09186a0080093dff.shtml

Also see Chapter 5 of the *CSS Basic Configuration Guide* for help determining whether your setup will require destination services. The examples below incorporate the use of destination services.

Keepalives—Each ISN component type will also have a varying type of keepalive defined. The CSS keepalive definitions will allow for an appropriate method of determining whether the component is functional and able to participate in receiving requests.

Media Server Configuration

Media Servers are standard web servers that are responsible for serving ISN prompt files to the voice gateway.

Service

Configure one CSS Service per Media Server.

The following three services represent three Media Servers that can be accessed for ISN prompt playing.

Example 0-1 Configuring Services for Media Servers

```
service mediaserver1
    ip address 10.1.1.1
    type redirect
    port 80
    domain 10.1.1.1
    keepalive type http
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive uri "/index.html"

service mediaserver2
    ip address 10.1.1.2
    type redirect
    port 80
    domain 10.1.1.2
    keepalive type http
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive uri "/index.html"

service mediaserver3
    ip address 10.1.1.3
    type redirect
    port 80
    domain 10.1.1.3
    keepalive type http
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive uri "/index.html"
```

Http Redirects

In order to reduce streaming media traffic, the CSS media server services are configured as http redirect services (also referred to as 'remote' services) within the CSS. With the absence of a 'local' service, this configuration will choose an available service based on the content rule, and present the requesting gateway with an http 302 redirect message. Media streaming will occur directly from the GW to the individual Media Server. For specific information on http redirection services, please see "Specifying a Service Type" in Chapter 1 of the *CSS Basic Configuration Guide*.

Content Rule

Using the content owner you have defined, define a content routing rule for the ISN Media Servers. CSS offers many balancing types for choosing an active media server. This application uses the default defined round-robin as the balancing method. Additionally, a primarySorryServer is defined.

The following content rule implements a layer 5 http round-robin routing rule for two media servers, with the third server reserved for failover.

Example 0-2 Content Rule

```
content MEDIA
    vip address 10.1.1.4
    protocol any
    port 80
    url "/*"
    add service mediaserver1
    add service mediaserver2
    primarySorryServer mediaserver3
```

Keepalives

The media servers are standard http servers. CSS supports varying methods of keepalives used to determine the availability of an individual service.

For media servers, the http keepalive method is recommended. This will ensure that CSS determines the availability of a server at the application layer. In order to implement this keepalive method, the service must identify an available html page which the keepalive will use to determine http availability. For this reason, in addition to the ISN prompt audio files, the server should have an available html document defined. The example assumes an "index.html" document is available on the media servers. The http keepalive method will continuously check for the availability of this document as a means to determine that the server is alive and capable of serving documents.

It is essential that all media servers included in a Media Server Content rule contain all of the ISN audio prompt files intended for use by that content rule to ensure that no matter which server CSS directs the request to, the prompt file will be available.

Use these CSS commands to setup the http keepalives while configuring each media server service:

```
keepalive type http

keepalive uri "/index.html"
```

Keepalive Times

Because these services are directly involved in processing voice calls, the shortest possible failover and re-activation times are desired. As such, set the following keepalive parameters:

keepalive retryperiod 2

keepalive maxfailure 1

Groups

Define a group for the participating media servers if your configuration requires source groups (see the discussion of Groups in the General Approach section above for details.)

Example 0-3 Defining Media Servers Group

```
group mediaservers
    add destination service mediaserver1
    add destination service mediaserver2
    add destination service mediaserver3
    vip address 10.1.1.4
```

Activate services, group and rules:

Activate each service and group of media-servers.

Voice Gateway Configuration

The ISN media server names are defined inside the vxml documents which are passed to the Voice Gateway for processing. The media server name is set within the ICM routing script using an enterprise call variable. (Note that for use with the content switch, the default (not specified) media server name of “file:\\..\MediaServer” is an invalid option. You must specify a valid media-server name.) You must also ensure that the host name that ICM will deliver to the voice gateway as the name of the media server resolves to the virtual ip address of the content rule for the media servers setup on CSS. For example, if the ICM script sets a Media Server name as “media”, then the voice gateways to which the request will be delivered must resolve the name “media” to the VIP of the media-server content rule. This is configured within the voice gateway using the command:

ip host media 10.1.1.4

Note that when using CSS, the media server logic will generate vxml documents that contain “-backup” default backup media-server names. For example, if the media server is named “media”, a vxml document returned to the gateway for prompt playback will contain failover logic within the vxml that includes instructions for trying a server named “media-backup”.

Although a properly configured, redundant CSS setup should mean that the gateway will never actually be required to access the ‘-backup’ host, a ‘-backup’ host should still be configured on the gateway. This is recommended as a precaution. The gateway should still contain a definition for “media-backup” that points to the same VIP service since it is defined within the vxml.

ip host media-backup 10.1.1.4

Multiple Media-Server Rules

You can apply the media-server configuration in a CSS to support a logical division of media based upon any reasonable grouping that the design might call for. As long as the ICM routing script can decide and set the media server name appropriately, CSS can support multiple media server routing rules.

For example: If an ISN system deployment includes multiple language prompts, English and Spanish, the company may elect to house all Spanish versions of media server prompts on 3 media servers, and all English prompts on 3 separate media servers.

Note This choice would be independent of the virtual directory setting, which is controlled by the ISN "language" parameter. While this parameter alters the path in the url of media, our example assumes that the company further wants to house different languages on different servers—perhaps for traffic volume purposes. For more information, on the language parameter, see Chapter 3, "Prompt Recording and Distribution."

In this example, the ICM routing script that constructs the VRU call flow would identify and set the media-server name differently depending upon whether the caller initially has chosen English or Spanish. If they choose English, you might re-set the Media Server name to 'media-english' and if Spanish is selected, 'media-spanish'.

To support this, 6 services would be configured within CSS, one service for each media server. Two (2) content rules would also be configured. Each content rule would map to a different vip address and contain only those services which match the language the rule is configured for. Finally, the voice gateways would have separate host entries for the English and Spanish media-server names (and their –backup version) as set within the ICM scripts. Here is what the content rules would look like:

```
content MEDIA-ENGLISH
    vip address 10.2.1.1
    protocol any
    port 80
    url "/*"
    add service mediaserver-english1
    add service mediaserver-english2
    primarySorryServer mediaserver-english3

content MEDIA-SPANISH
    vip address 10.2.1.2
    protocol any
    port 80
    url "/*"
    add service mediaserver-spanish1
    add service mediaserver-spanish2
    primarySorryServer mediaserver-spanish3
```

The following host entries would then appear on the voice gateways:

```
ip host media-english 10.2.1.1

ip host media-english-backup 10.2.1.1


ip host media-spanish 10.2.1.2
```

```
ip host media-spanish-backup 10.2.1.2
```

Application Server Configuration

CSS should also contain configuration for all application servers used in any IVR leg of a call flow or for any application server that is used as a routing client in a non-ISN voice browser call flow.

Note The Cisco ISN Voice Browser maintains a list of its own application servers used as an interface between voice browser and the ICM for route requests. Retry logic within the Voice Browser controls requests to the Voice Browser's application servers for routing requests via the "ApplicationServerList" Voice Browser definitions. If separate application servers are used for an ISN Voice-Browser's interface to ICM for route requests, these Application Servers do not require configuration within CSS.

Service

Configure one Service per ISN Application Server.

The following three services represent Application Servers that will function as IVR application servers, or as routing client interfaces to ICM where a non-ISN Voice Browser is making the call request.

Example 0-4 Configuring for Services of Application Servers

```
service appserver1
    ip address 10.1.1.5
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type script ap-kal-httpvxml "10.1.1.5"

service appserver2
    ip address 10.1.1.6
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type script ap-kal-httpvxml "10.1.1.6"

service appserver3
    ip address 10.1.1.7
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type script ap-kal-httpvxml "10.1.1.7"
```

Content Rule

Using the content owner you have defined, define a content routing rule for the Application Servers. CSS offers many balancing types for choosing an active Application Server. This application uses the default defined round-robin as the balancing method. Additionally, a primarySorryServer is defined.

The AS content rule is implemented as a layer 4 routing rule.

Example 0-5 Content Rule

```
content APPSERVERS
    protocol tcp
    port 8000
    add service appserver1
    add service appserver2
    primarySorryServer appserver3
    vip address 10.1.1.8
```

Keepalives

For application servers, a CSS scripted keepalive should be used. Included within the ISN Application Server Installation's 'Downloads' directory is a file called 'ASKeepalive.txt'. This file is a scripted keepalive for use with CSS. The scripted keepalive will utilize the application server's built-in heartbeat mechanism to validate that the AS is running at the Application Level. This will ensure that, if an AS is taken out of service, CSS will recognize this state change and mark the CSS service unavailable.

Load the CSS Application Server Keepalive Script into the /scripts directory of the CSS by copying it from a tftp-enabled server onto the Content Switch. During the copy process, name the script:

ap-kal-httpvxml

Assign the keepalive script to each of the Application Server services. The ap-kal-httpvxml keepalive script accepts one parameter, which is the ipaddress of the application server for which the service is configured.

keepalive type script ap-kal-httpvxml "[ipaddress]"

where [ipaddress] is replaced with the address of the service you are configuring.

Note For detailed instructions on implementing scripted keepalives for CSS, please see the section "Using Script Keepalives With Services" located at the end of Chapter 1 of the *CSS Basic Configuration Guide*.

Keepalive Times

Because these services are directly involved in processing voice calls, the shortest possible failover detection is desired. As such, set the following keepalive parameters:

keepalive retryperiod 2

keepalive maxfailure 1

Groups

Define a group for the participating application servers if your configuration requires source groups (see the discussion of Groups in the General Approach section above for details.)

Example 0-6 Defining Application Servers Group

```
group appservers
    add destination service appserver1
    add destination service appserver2
    add destination service appserver3
    vip address 10.1.1.8
```

Activate Services, Group and Rules

Activate each service and group of application servers.

Voice Gateway Configuration

The ISN Application Server names are defined inside the vxml documents which are passed to the Voice Gateway for processing. The names are hard-coded within the initial bootstrap.vxml vxml document housed on the Gateway.

Note For more information, see Appendix C, "ISN Deployment."

For a CSS implementation, the host name embedded within the bootstrap document is "isn-vxml". You must ensure that the host name isn-vxml is set to resolve to the virtual ip address of the content rule for the application servers setup on CSS. This is configured within each voice gateway using the command:

```
ip host isn-vxml 10.1.1.8
```

where 10.1.1.8 is the VIP address servicing the Application Server content rule.

ASR/TTS Server Configuration

If your ISN deployment includes the use of ASR/TTS resources for call processing, the ASR/TTS servers must also be configured within CSS. If your ASR/TTS deployment utilizes a multi-tier architecture to separate MRCP requests from recognition and vocalizer functions (such as a multi-tier Nuance configuration), only the MRCP servers are load-balanced by CSS. The RTSP traffic generated as part of MRCP will be routed around CSS, rather than through it. While this is generally handled by default within MRCP, it may be necessary in some MRCP configurations to specifically instruct the server to pass the RTSP address. Consult your ASR/TTS documentation for specific details.

In this example, one set of MRCP servers handles both the ASR and TTS needs.

However, since ISN breaks out the ASR and TTS resource host names, it may be desirable to separate MRCP server groups by specific function. If separate MRCP servers are used for ASR and TTS resources, define the ASR and TTS CSS components (service, rule, groups) separately. (See the Voice Gateway Configuration section below.)

Service

Configure one Service per ASR/TTS Server responsible for handling MRCP requests.

The following three services represent MRCP ASR / TTS.

Example 0-7 Configuring Services for ASR/TTS Server

```
service asrtts1
    port 554
    protocol tcp
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type tcp
    keepalive port 554
    ip address 10.1.1.9

service asrtts2
    port 554
    protocol tcp
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type tcp
    keepalive port 554
    ip address 10.1.1.10

service asrtts3
    port 554
    protocol tcp
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type tcp
    keepalive port 554
    ip address 10.1.1.11
```

Content Rule

Using the content owner you have defined, define a content routing rule for the ASR/TTS Servers.

The ASR/TTS content rule is implemented as a layer 4 routing rule.

Example 0-8 Content Rule

```
content ASRTTS
    add service asrtts1
    add service asrtts2
    primarySorryServer asrtts3
    protocol tcp
    port 554
    vip address 10.1.1.12
```

Keepalives

For the MRCP ASR/TTS servers, a socket-level keepalive is used. By implementing a socket keepalive, the CSS will make a connection to the MRCP port to validate that the MRCP server is running. The service is considered down if unable to connect to port 554 for MRCP traffic.

To configure the CSS MRCP Keepalive, use the following:

keepalive type tcp

keepalive port 554

Note For detailed instructions on implementing keepalives for CSS, please see the section "Configuring Keepalives for a Service" beginning on page 1-17 of Chapter 1 of the *CSS Basic Configuration Guide*.

Keepalive Times

Because these services are directly involved in processing voice calls, the shortest possible failover detection is desired. As such, set the following keepalive parameters:

keepalive retryperiod 2

keepalive maxfailure 1

Groups

Define a group for the participating ASR/TTS Servers if your configuration requires source groups (see the discussion of Groups in the General Approach section above for details.)

Example 0-9 Defining ASR/TTS Servers Group

```
group asrtts
    add destination service asrtts1
    add destination service asrtts2
    add destination service asrtts3
    vip address 10.1.1.12
```

Activate Services, Group and Rules

Activate each service and group of ASR/TTS servers.

Voice Gateway Configuration

As with media servers and application servers, the ASR / TTS names should resolve to the VIP address running the content rule for ASR and/or TTS on the CSS. This name resolution occurs at each voice gateway. Note that ASR and TTS requests each utilize separate names within the ISN infrastructure, even if the same server(s) handle both ASR and TTS functions. The default English ASR and TTS server names are:

For ASR:

asr-en-us

and

asr-en-us-backup

For TTS:

tts-en-us

and

tts-en-us-backup

These host names should be set to resolve to the VIP address of the content rule that governs each service. (Note that in the CSS sample above, both ASR and TTS functions are handled by the same content rule and group of resources.)

The voice gateway config would contain ip hosts that look like this:

ip host asr-en-us 10.1.1.12

ip host asr-en-us-backup 10.1.1.12

ip host tts-en-us 10.1.1.12

ip host tts-en-us-backup 10.1.1.12

If a network design contains separate MRCP servers for ASR and TTS functions, CSS would contain separate services, separate source groups (if needed), and two separate content rules / vip addresses—one for ASR and another for TTS resources.

In this case, the CSS content rules might look like this:

```
content ASR
    add service asr1
    add service asr2
    primarySorryServer asr3
    protocol tcp
    port 554
    vip address 10.1.3.12

content TTS
    add service tts1
    add service tts2
    primarySorryServer tts3
```

```
protocol tcp
port 554
vip address 10.1.3.13
```

And the gateway entries at the voice gateway would look like this:

```
ip host asr-en-us  10.1.3.12

ip host asr-en-us-backup  10.1.3.12

ip host tts-en-us  10.1.3.13

ip host tts-en-us-backup  10.1.3.13
```

CSS Redundancy

CSS supports several types of failover mechanisms. The Virtual IP redundancy mechanism will allow for a rapid failover from a defined Master CSS to it's backup using VRRP. This failover takes less than 3 seconds and may or may not additionally incorporate the use of ASR. ISN transactions to servers do not require a stateful connection to the gateway. If the CSS fails during a prompt, the vxml documents that drive ISN will retry and re-stream the prompt from the new CSS access.

For this reason, general VIP redundancy is implemented. The sample below shows the redundant section for each of the two CSSs.

CSS1:

```
!************************** CIRCUIT **************************

circuit VLAN1
    ip address 10.1.1.100 255.255.255.0
    ip virtual-router 1 priority 230 preempt
    ip redundant-interface 1 10.1.1.200
    ip redundant-vip 1 10.1.1.4
    ip redundant-vip 1 10.1.1.8
    ip redundant-vip 1 10.1.1.12
```

CSS2:

```
!************************** CIRCUIT **************************

circuit VLAN1
    ip address 10.1.1.101 255.255.255.0
    ip virtual-router 1 priority 230 preempt
    ip redundant-interface 1 10.1.1.200
    ip redundant-vip 1 10.1.1.4
    ip redundant-vip 1 10.1.1.8
    ip redundant-vip 1 10.1.1.12
```

For information and step-by step configuration guidelines on implementing CSS Redundancy using the VIP and VRRP mechanism, please see Chapter 6 of the *CSS Advanced Configuration Guide*, "Configuring VIP and Virtual IP Interface Redundancy".

Complete Configuration Sample

The following is a complete CSS sample configuration for each of two CSS Servers configured in a Virtual Router Redundancy configuration and implementing each of the ISN services described above. Note that in this configuration example, a 'one-arm' configuration is used because the inbound traffic and the services exist on the same vlan.

```
********************** GLOBAL **********************

    ip route 0.0.0.0 0.0.0.0 10.1.1.20 1


!********************** INTERFACE **********************

interface  2/6
    phy 100Mbits-FD

interface  2/16
    bridge vlan 2

!********************** CIRCUIT **********************

circuit VLAN1
    ip address 10.1.1.100 255.255.255.0
    ip virtual-router 1 priority 230 preempt
    ip redundant-interface 1 10.1.1.200
    ip redundant-vip 1 10.1.1.4
    ip redundant-vip 1 10.1.1.8
    ip redundant-vip 1 10.1.1.12


!********************** SERVICE **********************

service mediaserver1
    ip address 10.1.1.1
    type redirect
    port 80
    domain 10.1.1.1
    keepalive type http
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive uri "/index.html"
    active

service mediaserver2
    ip address 10.1.1.2
    type redirect
    port 80
    domain 10.1.1.2
    keepalive type http
    keepalive retryperiod 2
```

```
    keepalive maxfailure 1
    keepalive uri "/index.html"
    active

service mediaserver3
    ip address 10.1.1.3
    type redirect
    port 80
    domain 10.1.1.3
    keepalive type http
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive uri "/index.html"
    active

service appserver1
    ip address 10.1.1.5
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type script ap-kal-httpvxml "10.1.1.5"
    active

service appserver2
    ip address 10.1.1.6
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type script ap-kal-httpvxml "10.1.1.6"
    active

service appserver3
    ip address 10.1.1.7
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type script ap-kal-httpvxml "10.1.1.7"
    active

service asrtts1
    port 554
    protocol tcp
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type tcp
    keepalive port 554
    ip address 10.1.1.9
    active

service asrtts2
    port 554
    protocol tcp
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type tcp
```

```
    keepalive port 554
    ip address 10.1.1.10
    active

service asrtts3
    port 554
    protocol tcp
    keepalive retryperiod 2
    keepalive maxfailure 1
    keepalive type tcp
    keepalive port 554
    ip address 10.1.1.11
    active

!************************** OWNER ************************

owner ISN   content MEDIA
    vip address 10.1.1.4
    protocol any
    port 80
    url "/*"
    add service mediaserver1
    add service mediaserver2
    primarySorryServer mediaserver3
    active

content APPSERVERS
    protocol tcp
    port 8000
    add service appserver1
    add service appserver2
    primarySorryServer appserver3
    vip address 10.1.1.8
    active

content ASRTTS
    add service asrtts1
    add service asrtts2
    primarySorryServer asrtts3
    protocol tcp
    port 554
    vip address 10.1.1.12
    active

!************************** GROUP ************************

group mediaservers
    add destination service mediaserver1
    add destination service mediaserver2
    add destination service mediaserver3
    vip address 10.1.1.4
    active
```

```
group appservers
    add destination service appserver1
    add destination service appserver2
    add destination service appserver3
    vip address 10.1.1.8
    active

group asrtts
    add destination service asrtts1
    add destination service asrtts2
    add destination service asrtts3
    vip address 10.1.1.12
    active
```

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