Preconfiguration

- Prerequisites for Call Flow Model Configuration, on page 1
- Preconfiguration Tasks, on page 1
- Additional Configuration Instructions, on page 10
- Order of Device Operations, on page 10
- Manage Devices, on page 11

Prerequisites for Call Flow Model Configuration

This section describes the configuration procedures and information you need before you select a call flow model and implement it.

Design Prerequisites

- Read the *Configuration Guide for Cisco Unified Customer Voice Portal*.

- Understand Cisco Unified Customer Voice Portal (CVP) and the description of call flow models.

- Analyze the design information that is provided in *Configuration Guide for Cisco Unified Customer Voice Portal*, and then choose a call flow model for your desired Unified CVP implementation.

- Create the simplified all-in-one-box step-by-step call model examples.

- Use the troubleshooting information and examples as templates.

Preconfiguration Tasks

Procedure

Step 1   Have network information. See Network Information, on page 2.

Step 2   Perform ring no answer settings with SIP. See Ring No Answer Settings with SIP.

Step 3 Install Unified CVP on your computer. For Unified CVP installation, see *Installation and Upgrade Guide for Cisco Unified Customer Voice Portal* at https://www.cisco.com/en/US/products/sw/custcosw/ps1006/prod_installation_guides_list.html and Unified CVP Installation, on page 3.

Step 4 Install Cisco Unified Intelligent Contact Management (ICM), Cisco Unified Communications Manager (CM), VXML and ingress gateways.

Step 5 Ensure that you have login credentials for Operations Console and Reporting Server. To sign in to Operations Console and view its menus, see Operations Console.

Step 6 Route calls through the network to the VRU. See Route Calls Through the Network to the VRU, on page 4.

Step 7 Configure ethernet switch/server NIC, gateways, and Call Server settings. See Ethernet Switch/Server NIC, Gateways and Call Server Settings, on page 4.

Step 8 Apply contact center gateway debug settings. Apply Contact Center Gateway Debug Settings, on page 7.

Step 9 Check the network VRU types. See the Network VRU Types, on page 8.

Step 10 Refer to the SIP dialed number pattern matching algorithm. See SIP Dialed Number Pattern Matching Algorithm, on page 9.

Step 11 Obtain licenses for the required Unified CVP components.

Step 12 Default security settings can prevent you from using Operations Console. Check your security policy and, if needed, change the settings to a less restrictive level.

Related Topics

Network Information

To configure Unified CVP components and additional solution CVP components for a call flow model, ensure that you have the following network information:

- Understanding of which Unified CVP call flow model to implement.

Note For information about call flow models, see the *Configuration Guide for Cisco Unified Customer Voice Portal*.

- Network topology for your system, including addresses and names of the solution components.

- Failover strategy for Gateways, Unified CVP components, and Media Servers.

- Strategy for inbound call routing (that is, dial-peers versus Proxy Server).

- Naming resolution system for Gateways (DNS versus configured on the Gateway).

- Naming schemes to be used for Unified Intelligent Contact Management Enterprise (ICME) peripheral gateways, peripherals, and routing clients.

- If you are using a voice response unit (VRU) other than Unified CVP, have information about VRU trunk group number and number of trunks.

- Know locale values to be used for automatic speech recognition (ASR) and text to speech (TTS) servers.

- Know whether one or multiple VRUs, which refers to the dialed number, are to be used for each customer.

Note If all the dialed numbers use the same VRU, use the default Network VRU instead of configuring multiple Network VRUs. For more information, see Configure Common Unified ICMH for Unified CVP Switch Leg.

Related Topics

Configure Common Unified ICMH for Unified CVP Switch Leg

Unified CVP Installation

- Install the Unified CVP software. For the installation procedures of Unified CVP components, see the https://www.cisco.com/en/US/products/sw/custcosw/ps1006/prod_installation_guides_list.html.

- Install the solution components.

- If you are using Unified CVP as a Unified ICME queuing platform, ensure that the VRU peripheral gateways use service control with Service Control Reporting enabled. If you are using it as a self-service platform, disable Service Control Reporting. Also, note the VRU Connection Port that is used for each VRU peripheral gateways Peripheral Interface Manager (PIM).

Note
- For information on IVR-related Service Control reporting and queue reporting, see the https://www.cisco.com/en/US/products/sw/custcosw/ps1844/products_user_guide_list.html and the https://www.cisco.com/en/US/products/sw/custcosw/ps1001/products_user_guide_list.html.

- For Unified CVP reporting, see Reporting Guide for Cisco Unified Customer Voice Portal available at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-customer-voice-portal/products-user-guide-list.html.

- Ensure that the NIC cards, voice gateway, and network components have the Ethernet interfaces configured with matching speed and duplex settings.

Note
- For details about the required Ethernet Switch/Server NIC settings, see Ethernet Switch/Server NIC, Gateways and Call Server Settings, on page 4.

- For details on design considerations and guidelines for deploying enterprise network solutions that includes Unified CVP, see the *Configuration Guide for Cisco Unified Customer Voice Portal*.

Related Topics

Route Calls Through the Network to the VRU

Most call flow models involve a step in which the call must be transferred to a VoiceXML gateway. Depending on the specific call flow model in use, one of two techniques is applied to direct that transfer. Both techniques involve one or multiple labels that Unified ICME or Unified Intelligent Contact Management Host (ICMH) provides. Configure these in the other call routing components of the solution to deliver a call to an appropriate VoiceXML gateway. Such labels are part of the overall dialed number plan of the contact center, and must be determined before you configure Unified CVP.

Table 1: Call Flows Using Network VRUs and Customer VRU

Call Flows	Task
Using Network VRUs of Type 7 or 10	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.
With a Customer VRU in Unified ICMH environments and for NIC Type 8 call flow models	• 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 Dialed Number Identification Service (DNIS) that is 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 Unified ICME to identify the call might be 9999.

Ethernet Switch/Server NIC, Gateways and Call Server Settings

Ensure to have the following Ethernet Switch/Server NIC, gateways, and Call Server settings:

⚠️

Caution The **Auto** option is applicable only for matched port/NIC at Gigabit Ethernet (1000 Mbps). If you are unsure of the adjacent station configuration, select 1000/Full on the Gigabit interface. You can use the **Auto** option only if both stations supply Gigabit interfaces.

Table 2: Ethernet Switch/Server NIC, Gateways and Call Server Settings

Ethernet Switch Speed	Server/Gateway NIC Speed	Speed/Duplex Setting for Switch Port	Speed/Duplex Setting for Server/GW NIC
1000 Mb	1000 Mb	1000/Full	1000/Full
1000 Mb	1000 Mb	Auto/Auto	Auto/Auto
1000 Mb	100 Mb	100 Mb/Full	100 Mb/Full

Ethernet Switch Speed	Server/Gateway NIC Speed	Speed/Duplex Setting for Switch Port	Speed/Duplex Setting for Server/GW NIC
100 Mb	100 Mb	100 Mb/Full	100 Mb/Full
100 Mb	1000 Mb	100 Mb/Full	100 Mb/Full

Call Server and VXML Gateway in Different Subnets

Unified CVP shows one to two seconds delay in the Call Server when VXML gateway bootstraps the call. The delay is caused if the Call Server and VXML gateway are in different subnets.

To avoid the delay:

Procedure

Step 1   Open the registry of the machine.

Step 2   Navigate to the following path:
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters\Interfaces\<Interface GUID.

Step 3   Set **TcpAckFrequency** parameter to 1.

Step 4   Restart the windows machine.

Trunk Utilization and Reporting

DS0 Trunk Information

Through Unified CVP, Unified ICM passes the gateway trunk and DS0 information from the arriving SIP call.

PSTN gateway trunk and DS0 information received at ICM has the following purposes:

- Reporting

- Routing in the Unified CCE Script Editor where TrunkGroupID and TrunkGroupChannelNum information is available for routing decisions.

Following message is used in the examples:

The PSTN trunk group data comes from the PSTN Gateway in the SIP INVITE as shown:

```
Via: SIP/2.0/UDP
192.168.1.79:5060;x-route-tag="tgrp:2811-b-000";x-ds0num="ISDN 0/0/0:15
0/0/0:DS1 1:DS0";branch
```

The following logic is used in Unified CVP to parse and pass the PSTN trunk group information to Unified ICM:

- For TrunkGroupID, look for **tgrp:** in the **x-route-tag** field.

- If **tgrp:** found **TrunkGroupID=value after tgrp:**> + <**data between ISDN and :DS1 tags**>· Using the above example: **TrunkGroupID = 2811-b-000<space>0/0/0:15 0/0/0.**
- TrunkGroupID = <I**P addr of originating device in Via header**> + <**data between ISDN and:DS1 tags**>

  Using the above example: **TrunkGroupID=192.168.1.79<space>0/0/0:15 0/0/0.**

- For TrunkGroupChannelNum, look for **DS0** in **x-ds0nun** field.

  - If found, **TrunkGroupChannelNum** = <**value before the :DS0**>· Using the above example: **TrunkGroupChannelNum = 1**
  - **TrunkGroupChannelNum** = <**max int value**> to indicate we did not find the DS0 value.

    Using the above example: **TrunkGroupChannelNum = Integer.MAX_VALUE (2^31 - 1)**

Trunk Utilization Routing and Reporting

Through the Trunk Utilization feature, a gateway is used for real-time Unified CVP routing and Unified ICM reporting and scripting. A gateway pushes the status of memory, DS0, DSP, and CPU to Unified CVP. Because this feature uses a push method to send resource data to Unified CVP, resources are monitored more closely and failover can occur faster when a device goes down or is out of resources.

This feature has the following characteristics:

- Each gateway can publish an SIP OPTIONS message with CPU, Memory, DS0, and DSP information to Unified CVP every three minutes when operation conditions are normal on the gateway.

- The push interval is configurable through the Cisco IOS CLI on the gateway.

- If a high watermark level is reached, the gateway sends the SIP OPTIONS message immediately with an **Out-Of-Service = true** indication, and does not send another OPTIONS message until the low watermark level is reached with an **Out-Of-Service = false** indication.

- Up to five Resource Availability Indication (RAI) targets can be set up on the gateway.

Trunk Utilization Routing can also be used to update trunk group status in the Unified CCE router. A PSTN call (through the ICM script) can query the router with a preroute from a NIC to use the available ingress gateway for the post route to Unified CVP.

Note   DS0 is the data line that provides utilization information about the number of trunks free on a gateway.

Gateway Trunk Utilization with Server Group Pinging Combination

When you combine the Server Group element polling feature with the Cisco IOS Gateway trunk utilization feature, your solution has faster failover for high availability call signaling.

Deployment Considerations

- For Proxy Server deployment with CUSP:

  - Configure TDM originating gateways for resource allocation indication-targets (RAI-targets) to provide status in OPTIONS message to primary and secondary Unified CVP Call Servers, for

reporting purposes. The data is used for reporting, and not routing so the data needs to be sent to Call Servers that have reporting enabled.

- Configure primary and secondary CUSP proxy servers with Server Groups pinging to Unified CVP, VXML Gateways, and Unified Communications Manager elements.
- Configure Unified CVP with Server Group that pings to both primary and secondary CUSP proxies for outbound calls.

- For a non-proxy deployment:

- Configure TDM originating gateways for RAI-targets to provide status in OPTIONS message to primary and secondary Call Servers. Unified CVP can handle the messages for both reporting and routing purposes. If used for routing, then the gateway must be in a server group by itself on Unified CVP.
- Configure Unified CVP with Server Groups that pings to Unified CVP, VXML Gateways, and Unified Communications Manager elements for outbound calls.
- Configure VXML gateways for RAI-targets to provide status in the OPTIONS message to primary and secondary Call Servers.

- Configure the Unified CVP Call Servers to send the same hostname in the contact header of OPTIONS requests to the gateways. This process enables a single RAI-target to be configured to all Call Servers and is important because the limit is five targets. The parameter to set is called Options Header Override.

Note See the Cisco IOS documentation for guidelines on the high and low watermark settings.

Limitations:

- RAI is not supported on Proxy Servers.

CUSP servers do not handle the RAI header of OPTIONS messages, so they do not mark the status of elements with that information. If VXML Gateways are down, Unified CVP may send the call using the proxy, because the proxy does not handle incoming RAI headers in OPTIONS. It is possible to use a local static route scheme on Unified CVP to send all calls to the proxy except the Voice XML Gateways calls to create a server group for Voice XML Gateways and take advantage of RAI updates for routing.

Apply Contact Center Gateway Debug Settings

Procedure

Step 1 Log in to the gateway.

Step 2 Type `enable` and type your password to enter the enable mode.

Step 3 Enter the configure terminal command to enter configuration mode.

Step 4 Type `ivr contact-center` to apply default debug settings.

Step 5 Configure the logging buffer size using `set logging buffer`.

Example:

```
set logging buffer 1000000
```

Note   The logging buffer size should be 1000000 or more.

Step 6   Exit configuration mode and return to the enable prompt by pressing **Ctrl-Z**.

Note   To view the current operating configuration, including the changes you made, enter the `show running-config` command.

Step 7   To save the configuration changes, enter the `write` running-config startup-config command at the enable prompt.

Example:

```
User Access Verification
Password:
ccbu-doc-gw4>en
Password:
ccbu-doc-gw4#config t
Enter configuration commands, one per line.  End with CNTL/Z.
ccbu-doc-gw4(config)#ivr
ccbu-doc-gw4(config)#ivr contact-center
ccbu-doc-gw4(config)#^Z
ccbu-doc-gw4#show debug
....
```

Network VRU Types

In Unified ICME, Network VRU is a configuration database entity. It is accessed using the Network VRU Explorer tool of ICM Configuration Manager. A Network VRU entry contains the following information:

- **Type:** A number from 7, 8, and 10, which corresponds to one of the types.

- **Labels:** This is a list of labels, which Unified ICME can use to transfer a call to the particular Network VRU that is being configured. These labels are relevant for Network VRUs of Types 7 and 10. These types use the Correlation ID mechanism to transfer calls. Labels for Type 8 are defined in the Translation Route Explorer tool of ICM Configuration Manager, and are invoked using a Translation Route to VRU node.

  Each label comprises the following components:

  - A digit string, which becomes a DNIS that is understood by a SIP Proxy Server, by a static route table, or by gateway dial-peers.

  - A routing client, also known as a switch leg peripheral. Each peripheral device that can act as a switch leg must have its own label, even if the digit strings are the same in all cases.

Unified ICME introduced Network VRU Type 10, which simplifies the configuration of Network VRU's for Unified CVP. For most call flow models, a single Type 10 Network VRU can take the place of the Type 3, 5, 7, or 8 Network VRUs, which were associated with the Customer Instance and the Switch and VRU leg peripherals. The VRU-Only call flow models still require Type 8. However, in a specific case Type 7 is required.

Network VRU configuration entries themselves have no value until they are associated with active calls. Following are the three places in Unified ICME where you can perform this association:

- Advanced tab for a given peripheral in the PG Explorer tool of the ICM Configuration Manager.

- Customer Instance configuration in the ICM Instance Explorer tool of the ICM Configuration Manager.

- On every VRU Script configuration in the Network VRU Script List tool of the ICM Configuration Manager.

Depending on the call flow model, use Unified ICME to search either the peripheral or the customer instance to determine how to transfer a call to a VRU. Unified ICME examines the following:

- The Network VRU and the Network VRU using the Translation Route mechanism. The network VRU is associated with the switch leg peripheral when the call first arrives on a switch leg and Network VRU is associated with the VRU leg peripheral when the call is being transferred.

- The Network VRU from the System Information tool, when the call is being transferred to the VRU using the Correlation ID mechanism. The Network VRU is associated with the Customer Instance or the default Network VRU.

- The Network VRU, which is associated with the VRU Script every time it encounters a RunExternalScript node in its routing script. If the call is currently not connected to the designated Network VRU, Unified ICME does not execute the VRU Script.

Note The previously supported VRU types still work with Unified ICME 7.1(1) and later for existing deployments. However, new installations should use Type 10 and existing deployments should switch to Type 10 on upgrade.

SIP Dialed Number Pattern Matching Algorithm

Refer to the following points to create dialed number patterns:

- Wildcarded DN patterns can contain "." and "X" in any position to match a single wildcard character.

Note Small letter "x" cannot be used as a wildcard.

- Any of the wildcard characters in the set ">*!T" can match multiple characters. However, only one wildcard character can be used for trailing values, else they can always match with remaining characters in the string.

- The highest precedence of pattern matching is an exact match, followed by the most specific wildcard match. When the number of characters is matched equally by more than one wildcarded pattern, precedence is given from top to bottom of the configured DN list.

- There is no explicit software limit on the number of items in the DN pattern list.

Additional Configuration Instructions

- Comprehensive call flows for prerouted calls. See Comprehensive Call Flows for Pre-Routed Calls. This class of call flows is similar to the Unified CVP Comprehensive call flow models, except that calls are first introduced into Unified ICME or Unified ICMH using a path other than through Unified CVP. A Unified ICME routing script is given the chance to preroute such calls before reaching Unified CVP. After the script transfers the call to Unified CVP for either self-service or queuing, the standard Unified CVP Comprehensive call flow model is used.

- Common Unified ICMH Configuration for Unified CVP Switch Leg. See Configure Common Unified ICMH for Unified CVP Switch Leg. It describes Unified ICMH configuration instructions common to Comprehensive Unified ICMH and VRU-Only with NIC routing, with Correlation ID call routing call flow models for Unified CVP switch legs.

- Common Unified ICMH Configuration: Define Unified CVP ECC Variables. It provides instructions on how to set up ECC variables that Unified CVP uses to exchange information with Unified ICMH.

- Using the Metadata ECC Variable. See Metadata ECC Variable. It defines the values for the *user.microapp.metadata* ECC variable.

- Common Configuration for Differentiating VRUs (Unified CVPs) Based on Dialed Number. See Common Configuration for Differentiating VRUs Based on Dialed Number. It provides instructions on how to configure Unified ICME to differentiate the VRUs.

- SIP Proxy Redundancy. See Set Up Ingress Gateway to Use Redundant Proxy Servers and Set Up Call Server with Redundant Proxy Servers.

Related Topics

Comprehensive Call Flows for Pre-Routed Calls
Configure Common Unified ICMH for Unified CVP Switch Leg
Define Unified CVP ECC Variables
Metadata ECC Variable
Common Configuration for Differentiating VRUs Based on Dialed Number
Set Up Ingress Gateway to Use Redundant Proxy Servers
Set Up Call Server with Redundant Proxy Servers

Order of Device Operations

Based on your call flow model, set up the device operations in the following order.

Table 3: Order of Devices

Device Operations	Settings
Device Deployment	• SIP Proxy Server device (optional) • Unified CVP Call Server device • Unified CVP VXML Server device • Unified CVP Reporting Server device • Other Devices (for example, Gateways and Unified CM)
System Configuration	• SIP Server Groups • Dialed Number Pattern • Locations • Courtesy Callback
Miscellaneous	• Register with Smart Licensing (required) • Transfer of VXML applications (required) • Bulk transfer of default Gateway files (required)

Manage Devices

Procedure

Step 1	Add new Unified CVP device.
Step 2	Configure Unified CVP device.
Step 3	Save and deploy Unified CVP device.
Step 4	Transfer License.
Step 5	Restart Unified CVP device to activate license.
Step 6	Verify that Unified CVP devices are active in Operations Console.
Step 7	Deploy system-level configuration, Dialed Number Pattern, SIP Server Groups, Locations, and Courtesy Callback, and verify their statuses.
Step 8	Save and deploy the SNMP Configuration.