



Calls Originated by Cisco Unified Communications Manager

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Overview

A call originated by the Cisco Unified Communications Manager (Unified CM) first enters the Unified Intelligent Contact Management (ICM) system when someone dials a Unified CM route point that is associated with the JTAPI interface into Unified ICM. These calls initiate a Unified ICM routing script that can be used to place the caller into queue or into a self-service application, select an available agent, or invoke Application Gateway. A call invoked through the JTAPI interface to the Unified ICM is a typical post-route request. This call provides a dialed number, ANI, variables, and returns a label. The Unified CM then delivers the call to the destination specified by the returned label. As with other ACD post-route requests, the exchange ends at the destination. Unified ICM cannot send a subsequent label to that Unified CM unless Unified CM issues another post-route request.

This limitation creates one difference between calls originated by Unified CM and calls originated through a Ingress Voice Gateway. Unified CVP can continue to route and reroute the call as many times as necessary. When calls are originated from Unified CM, routing client responsibilities should be handed off to Unified CVP as soon as possible.

Another difference is when a calls are transferred to a VRU. The ACD routing clients such as Unified CM can be transferred only by using a TranslationRouteToVRU label. When Unified CVP is the routing client, it can handle Translation Route labels as well as the Correlation ID labels that are generated by SendToVRU nodes.

The next sections provide more details on these differences.

Customer Call Flows

The following types of calls originated by Unified CM must be treated differently from calls originated by Unified CVP:

Unified ICM Outbound Calls with IVR Transfer

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- [Warm Consultative Transfers and Conferences, on page 2](#)

Unified ICM Outbound Calls with IVR Transfer

The Cisco Unified CCE Outbound Dialer introduces an outbound call by impersonating a Skinny Client Control Protocol (SCCP) phone and places the outbound call from the Unified CM. When a person answers the call, Unified CM transfers the call to a Unified CCE destination, taking itself out of the loop. If the customer requirement is to provide a Unified CVP message or a self-service application to the called party, then the call is transferred to Unified CVP using a Unified CM route point. This process fits the definition of a call originated by Unified CM.

Internal Help Desk Calls

Enterprises that use IP phones often want to provide their employees with the capability to call into a self-service application, for example, an application that allows employees to sign up for health benefits. The employee also might be trying to reach an agent, such as the IT help desk, and ends up waiting in queue. Both of these scenarios result in calls originating from Unified CM to Unified CVP.

The internal caller can also dial into a self-service application hosted on a Unified CVP VXML Server that is deployed using Model #1, Standalone Self-Service. No ICM is involved in this scenario, but it still qualifies as a call originated by Unified CM.

Warm Consultative Transfers and Conferences

In a typical contact center call flow, most companies want to provide their agents with the ability to transfer calls to a second agent, who might or might not currently be available. There are two ways to transfer: blind transfer or warm consultative transfer (or conference).

In a blind transfer, the first agent dials a number and hangs up; the caller then gets connected to the second agent or placed into a queue if necessary. This type of transfer does not involve a call originated by Unified CM, and it is called Network Transfer. Network Transfer is also discussed in the section on [ICM Managed Transfer](#).

In a warm transfer or conference, the agent dials a number and is connected to the second agent while the caller is placed on hold. The two agents can talk, then they can conference in the caller, and the first agent can then drop off. If the second agent is not available, it is the first agent (and not the caller) who is placed into a queue. All of this processing can take place without involving Unified CVP, unless the first agent needs to be queued. In that case, the first agent's call must be transferred to Unified CVP, which creates a call originated by Unified CM.

Protocol Call Flows

The following are the protocol-level call flows for calls originated by Unified CM in each of the deployment models:

[Model #1: Standalone Self-Service, on page 3](#)

[Model #2: Call Director, on page 3](#)

[Model #3a: Comprehensive Using ICM Micro-apps , on page 4](#)

[Model #3b: Comprehensive Using VXML Server, on page 5](#)



Note Model #4, VRU Only with NIC Controlled Routing, is not discussed here because no NIC is involved with calls originated by Unified CM.

Model #1: Standalone Self-Service

Model #1 does not involve Unified ICM. This model is implemented when a Unified CM user dials a directory number that connects to a VoiceXML Gateway and invokes a Unified CVP VXML Server application. The VoiceXML Gateway is configured in Unified CM as a SIP trunk. The call flow for this model is as follows:

1. A caller dials a route pattern.
2. Unified CM directs the call to the VoiceXML Gateway.
3. The VoiceXML Gateway invokes a voice browser session based on the configured Unified CVP self-service application.
4. The Unified CVP self-service application makes an HTTP request to the Unified CVP VXML Server.
5. The Unified CVP VXML Server starts a self-service application.
6. The Unified CVP VXML Server and VoiceXML Gateway exchange HTTP requests and VoiceXML responses.
7. The caller hangs up.

Model #2: Call Director

Model #2 has only switching and has no VRU leg. Calls originated by Unified CM are always delivered directly to their targets or rejected. No queuing or self-service is involved.

This model assumes that the call is truly originating from Unified CM. This model excludes calls that originally arrived through a Ingress VoiceXML Gateway and were transferred to Unified CM, and are now transferred again. These situations are rare because Unified CM can usually handle those transfers itself. There are exceptions, however, such as when the target is an ACD other than Unified CM.

This model requires that the following items be configured:

- Unified CM route point that invokes a Unified ICM script
- Unified CVP configured as a Type 10 NetworkVRU
- VRU translation routes to Unified CVP
- Translation route Dialed Number Identification Service (DNIS) numbers configured in the Unified CVP Call Server
- Unified CM configured with a SIP trunk
- Unified CM route patterns for Translation Route DNIS

The call flow for this model is as follows:

1. A caller dials a route point.
2. Unified ICM invokes a routing script.
3. The routing script encounters a TranslationRouteToVRU node to transfer the call to Unified CVP. (Unified CVP is configured as a Type 10 NetworkVRU.)
4. Unified ICM returns the translation route label to Unified CM.
5. Unified CM consults the SIP Proxy to locate the Unified CVP Call Server.
6. Unified CM connects the call to the Unified CVP Call Server.
7. The routing script encounters a Select or Label node, and it selects a target label.
8. Unified ICM returns the target label to the Unified CVP Call Server (not to the device that issued the route request).
9. The Unified CVP Call Server consults the SIP Proxy to locate the destination device.
10. The Unified CVP Call Server communicates through SIP with the target device and instructs Unified CM to establish a media stream to it.

If the target device issues another route request to Unified ICM. This part of the call flow is not possible without the initial TranslationRouteToVRU mentioned in step 3.

11. Unified ICM invokes a new routing script.
12. The routing script encounters a Select or Label node, and it selects a target label.
13. Unified ICM returns the target label to the Unified CVP Call Server (not to the device that issued the route request).
14. The Unified CVP Call Server consults the SIP Proxy to locate the destination device.
15. The Unified CVP Call Server communicates using SIP with the target device and instructs Unified CM to establish a media stream to the device.

Model #3a: Comprehensive Using ICM Micro-apps

Model #3a involves both call switching and VRU activity. This model differs from Model #2, so the calls must be transferred to the VoiceXML Gateway after they are transferred to the Unified CVP Switch leg. Queuing is possible in this model because it is basic prompt-and-collect activity.

This model requires that the following items be configured:

- Unified CM CTI route point that invokes a Unified ICM script
- Unified CVP configured as a Type 10 NetworkVRU
- The CTI route point configured in Unified ICM as a DN with a Type 10 NetworkVRU
- The NetworkVRU must have labels for the Unified CVP Switch leg routing client
- The NetworkVRU labels must be configured in a SIP Proxy to point to VoiceXML Gateways
- Unified CM configured with a SIP trunk

The call flow for this model is as follows:

1. A caller dials a route point.
2. Unified ICM invokes a routing script.
3. The routing script encounters a SendToVRU node to transfer the call to Unified CVP. (Unified CVP is configured as a Type 10 NetworkVRU.)
4. Unified ICM returns the VRU label with Correlation ID to Unified CM.
5. Unified CM consults the SIP Proxy to locate the Unified CVP Call Server.
6. The call is connected to the Unified CVP Call Server.
7. Unified ICM sends a VRU transfer label with Correlation ID to the Unified CVP Call Server.
8. The Unified CVP Call Server consults the SIP Proxy to locate the VoiceXML Gateway.
9. The Unified CVP Call Server communicates through SIP with the VoiceXML Gateway and instructs Unified CM to establish a media stream to it.
10. The routing script executes one or more Unified CVP Microapplications through RunExternalScript nodes, plays media files, requests DTMF input, and so forth.
11. While the Unified CVP Microapplications are in progress, a target agent becomes available to take the call.
12. Unified ICM determines a label for the target agent.
13. Unified ICM returns the target label to the Unified CVP Call Server.
14. The Unified CVP Call Server consults the SIP Proxy to locate the destination device.
15. The Unified CVP Call Server communicates through SIP with the target device and instructs Unified CM to establish a media stream to it, removing the VoiceXML Gateway's media stream.

If the target device later issues another route request to Unified ICM, the call flow again is performed as described. The call must again be transferred with Correlation ID through SendToVRU to the Unified CVP Call Server and VoiceXML Gateway to create the VRU leg. Microapplications might be executed, and eventually the new target label is delivered to the Unified CVP Switch leg, which transfers the call to that target.

Model #3b: Comprehensive Using VXML Server

Model #3b does not differ significantly from Model #3a regarding call control and signaling. The only difference is that the Unified CVP Microapplications executed in Model #3b might also include subdialog requests to the Unified CVP VXML Server as well. The self-service applications are not likely to be invoked during the period when the call is queued. Any agent selection nodes or queue nodes in the Unified ICM routing script are postponed until after the self-service application has completed and control has returned to the Unified ICM routing script.

Deployment Implications

This section presents guidelines for these tasks for incorporating calls originated by Unified CM into the deployment:

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- [Hosted Implementations](#)
- [Cisco Unified Communications Manager Configuration, on page 7](#)
- [Sizing](#)

Unified ICM Configuration

- With Cisco Unified ICM 7.0, to perform subsequent call control through Unified CVP, always use translation route to route the call to Unified CVP as a Type 2 NetworkVRU before delivering the call to its next destination. This practice passes the control to Unified CVP as an charge of subsequent call transfers because Unified CM cannot receive any further labels.
- To perform any queuing treatment, prompt and collect, or self-service applications, always follow translation route with a SendToVRU node. SendToVRU can sometimes be invoked implicitly by a Queue node or a RunExternalScript node, but you should not rely on that method. Always include an actual SendToVRU node.
- With Cisco Unified ICM 7.1, to perform subsequent call control through Unified CVP, a translation route is not necessary if you use a Type 10 NetworkVRU. The Type 10 VRU uses the Correlation ID method to perform a transfer from Unified CM to Unified CVP using a SendToVRU node. When the SendToVRU node is used with a Type 10 VRU, an initial transfer to Unified CVP hands off call control to Unified CVP, and then an automatic second transfer to the VRU leg is performed to deliver the call to a VoiceXML Gateway for IVR treatment.



Note This call flow and all others in this document assume that you are using Cisco Unified ICM 7.0(0) or later.

- For additional configuration requirements, see [Protocol Call Flows](#).
- When the SendToVRU node is used with a Type 10 VRU, an initial transfer to Unified CVP hands off call control to Unified CVP, and then an automatic second transfer to the VRU leg is performed to deliver the call to a VoiceXML Gateway for IVR treatment.

Hosted Implementations

Translation routes sent by one ICM router must be received by a peripheral connected to the same ICM router. Therefore, you can use a translation route to route a call from a Unified CM at the CICM level into Unified CVP only if Unified CVP is also located at the CICM level. In Hosted environments, this means you must provision Unified CVP Call Servers (Call Servers) at the CICM level even if you already have other Call Servers at the NAM level.

For more details on this subject, see the chapter on [Cisco Unified ICM Interactions](#).

Cisco Unified Communications Manager Configuration

The following guidelines apply to Unified CM configuration:

- Configure a SIP trunk.
- Configure the appropriate route patterns for the Translation Route DNIS or VRU Label with Correlation ID appended. The Correlation ID method is used with a Type 10 VRU, and the route pattern in Unified CM must be configured to allow the extra digits to be appended, such as adding an exclamation point (!) to the end of the route pattern.
- When configuring agent labels, consider which device is the routing client. In situations where the label will be returned directly to Unified CM, Unified CM must be the routing client. In situations where the label will be sent to Unified CVP, the labels must be associated with each of the Unified CVP Switch leg Call Servers.

SIP Proxy Dial-Plan Configuration

If you are using a SIP Proxy, the VRU label associated with the Unified CM routing client must be different from the VRU label associated with the Unified CVP routing clients. The reason is because the VRU label for a call originated by Unified CM is intended to send the call to the Unified CVP Call Server to hand off call control first. The VRU label for a call where Unified CVP is already the routing client is intended to be sent to the VoiceXML Gateway for treatment. Once the call has been sent to Unified CVP to hand off call control, Unified CVP subsequently transfers to the VRU label associated with the Unified CVP routing client and delivers the call to the VoiceXML Gateway for queuing treatment.

The dial plan in your SIP Proxy should be structured as follows:

[Unified CM routing client VRU label + correlation-id]: pointing to CVP server(s)

[CVP routing client VRU label + correlation-id]: pointing to VoiceXML Gateway(s)

For a description of the Cisco SIP Proxy Server, refer to [SIP Proxy Server](#).

Mobile Agent in UCM

Mobile Agent Connect Tone initiated by JGW/UCM and Whisper Announcement initiated by Unified CVP can overlap because JGW/UCM has control on the LCP and RCP port. To avoid overlapping, either use the Mobile Agent Connect Tone or the CVP Whisper Announcement.

