CCS-UC-1

SIP Endpoint with Cisco® Unified Communications Manager 10.5

Configuration Guide

Crestron Electronics, Inc.

This document was written by the Technical Publications department at Crestron.

Contents

CCS-UC-1: SIP Endpoint with Cisco Unified Communications Manager 10.5

Introduction

This configuration guide describes the necessary procedure to configure the Crestron Mercury™ device to register to the Cisco® Unified Communications Manager as a basic SIP endpoint.

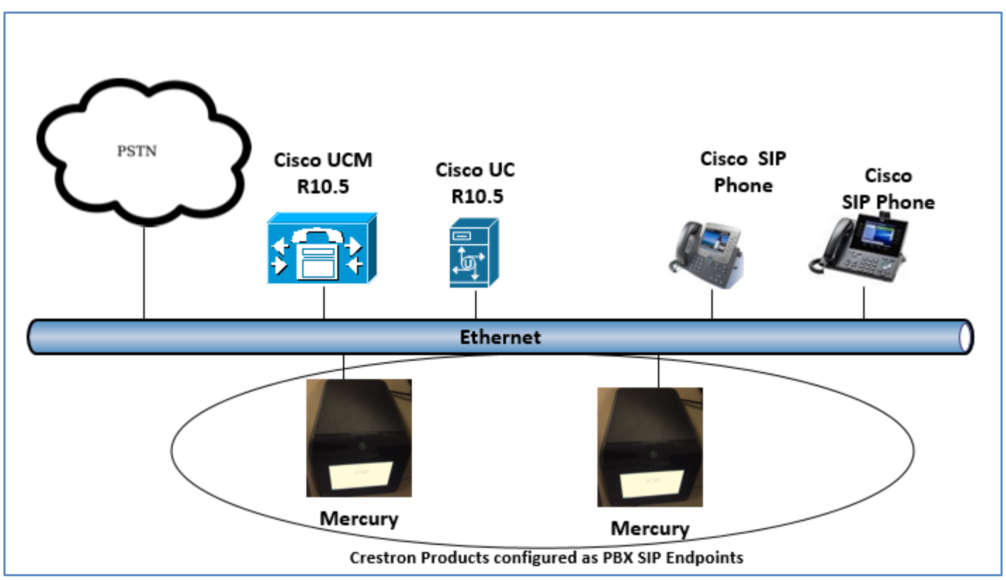
Audience

This document is intended for users attempting to configure and use the Crestron Mercury devices as SIP endpoints registering to the Cisco Unified Communications Manager (Cisco UCM).

Topology

The network topology for the Crestron Mercury endpoint to interop with the Cisco UCM is shown below.

SIP Endpoint Integration with Cisco UCM - Reference Network



The lab network consists of the following components:

- Cisco UCM cluster for voice features
- Cisco SIP phones
- Crestron Mercury devices as SIP endpoints

Software Requirements

- Cisco Unified Communication Manager v 10.5.2.13900-12
- Cisco Unity Connection v 10.5.2.13900-12
- Crestron Mercury device v 1.3353.00029

Hardware Requirements

- Cisco UCS-C240-M3S VMWare Host running ESXi 5.5
- Cisco 3845 as PSTN Gateway
- Cisco phone models: 8961 (SIP), 8945 (SIP)
- Crestron Mercury devices (2)

Product Description

The Crestron Mercury device is a complete solution for conference rooms. It acts as an all-in-one touch screen, speakerphone and AirMedia® product for conference rooms that integrate microphones and speakers into the user interface at the table.

Crestron Toolbox™ software is used to discover and control all Crestron devices on the network.

The Crestron Mercury web interface is used to control the Crestron Mercury devices on the network.

Summary

The Crestron Mercury devices were configured on the Cisco UCM as basic SIP endpoints since they support only a single line/extension. The devices successfully registered to the Cisco UCM with digest authentication.

The sections below describe supported and unsupported features on a Crestron Mercury device.

Features Supported

- Registration with digest authentication
- Basic Calls with G729, G722, G711u, and G711a codecs
- Caller ID (limited to only calling number)
- DTMF support
- Early media support
- Retrieval of a parked call

- Transferee in a call transfer
- Conference participant
- Member of hunt group
- Voice mail access and interaction

Features Not Supported

- Caller ID presentation with name and number display
- Call hold and resume
- Call forwarding on the device (Forwarding can be configured on the PBX for the DN assigned to the endpoint.)
- Call waiting
- Conference
- Initiating attended call transfer
- Initiating semi-attended call transfer
- Initiating blind call transfer
- Configuration of shared line on device
- Initiating call park
- Do Not Disturb (DND)

Known Issues and Limitations

- The Crestron Mercury device does not allow calls to be placed or accepted as long as the SIP server is unreachable and the device is un-registered. This causes an established active call to be dropped in a scenario where there is a PBX network outage due to the device losing its registration status. This issue is tracked via Crestron's Bugzilla™ software Defect: 128016.
- Caller ID is not supported on the Crestron Mercury device. Currently, only the calling party number is displayed as the caller ID. This issue is tracked via Crestron's Bugzilla software Defect: 119006.
- The active call timer on the Crestron Mercury device does not reflect the correct call duration. The active call duration includes the time for which the unit was being alerted also. This issue is tracked via Crestron's Bugzilla software Defect: 124001.
- The first ringback heard on Crestron Mercury device is stuttered. It resembles a mix of local and remote ringback. This issue is tracked via Crestron's Bugzilla software Defect: 122421.
- On the Crestron Mercury web user interface, there is currently no notification provided to the user when certain mandatory configurations are missing. This issue is tracked via Crestron's Bugzilla software Defect: 125193.
- On the Crestron Mercury web user interface, a configuration of DHCP OFF on the Network configuration page mandates configuration of both the adapters. The user is unable to save changes unless both the adapters are configured and is notified of an invalid IP against the default of 0.0.0.0 for an unused adapter. This issue is tracked via Crestron's Bugzilla software Defect: 126236.

- On the Crestron Mercury device, for certain called numbers that cannot be reached or are invalid, the user only hears a reorder tone and does not have the option to disconnect the call except by pressing the call button again. This issue is tracked via Crestron's Bugzilla software Defect: 122633.

Crestron Mercury Configuration

Setup

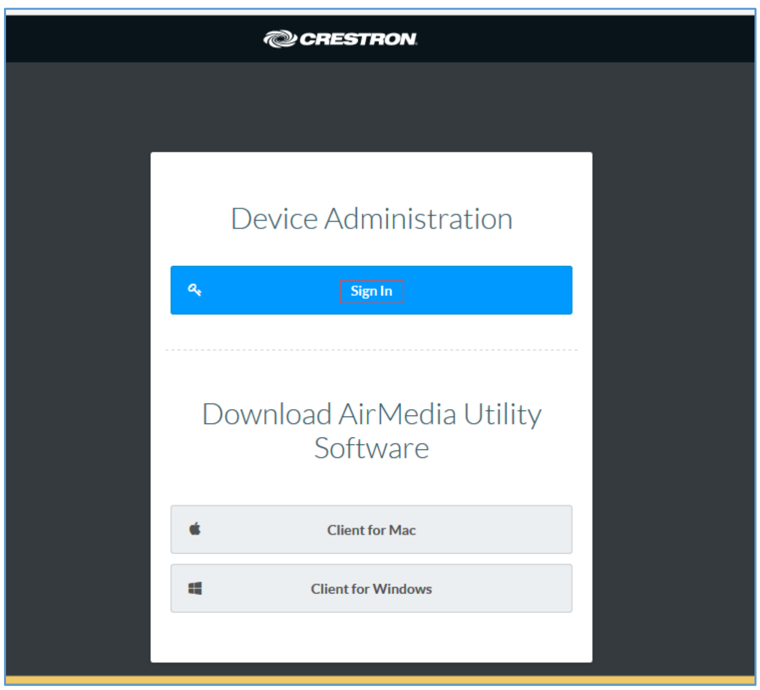
The LAN port of the Crestron Mercury device needs to be connected to one PoE+ port to power it up and network for connectivity with the Cisco UCM. The PoE+ switch that is used should have the LLDP functionality enabled for the device to power up and be completely functional. By default, the "poeplus" configuration is set to Off on the device.

Configuring the device

To configure the Crestron Mercury device, follow this procedure:

1. Access the web GUI for the device by using an http session with the device's IP address. 10.80.10.100 was used in this example as the device IP. The initial page that displays is shown below.

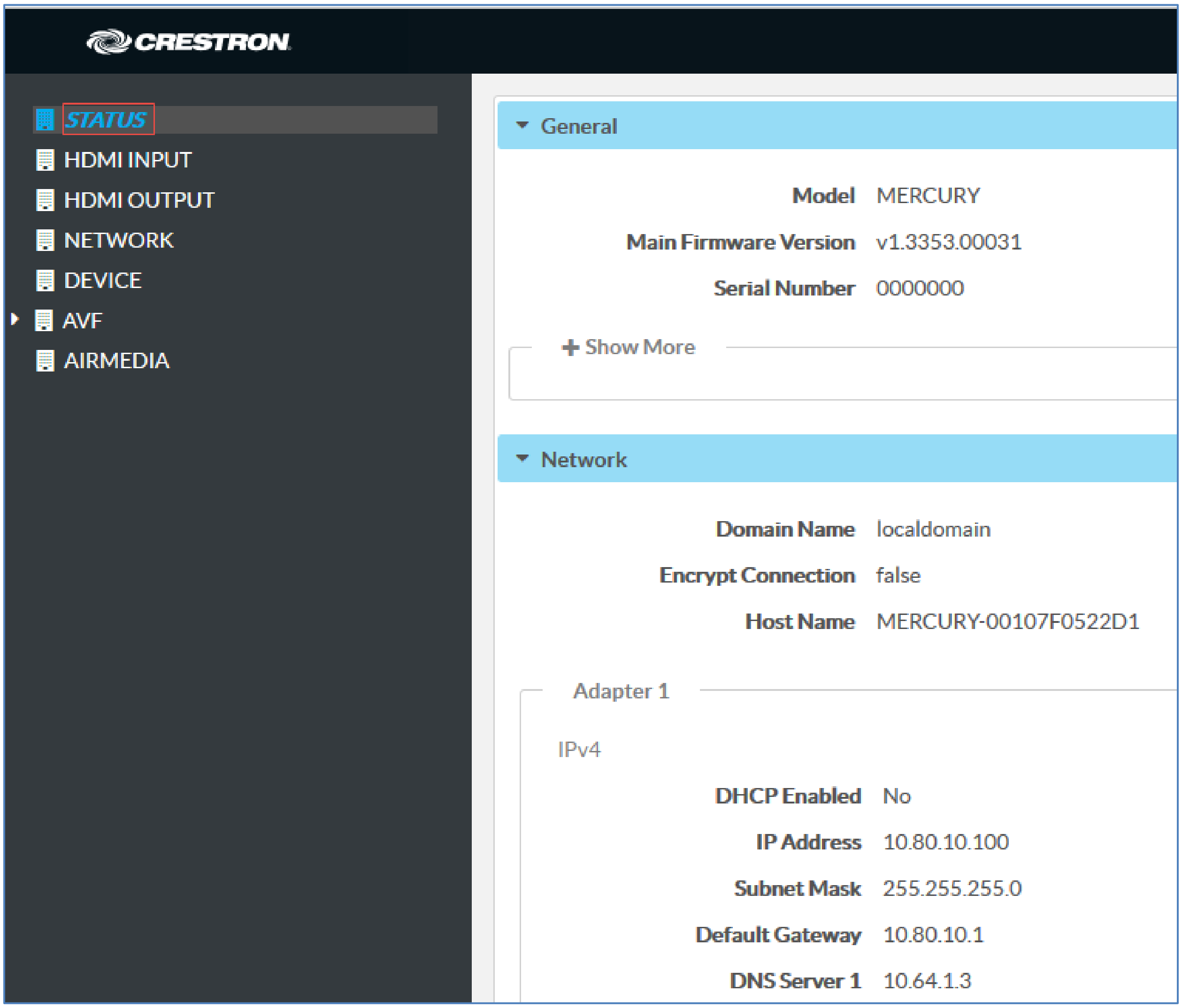
   Crestron Mercury Configuration: Login to Web GUI

2. Click Sign In and log in to the device. For information on device administration, refer to the CCS-UC-1 Supplemental Guide (Doc. 7844) at www.crestron.com/manuals.

   The Status screen that appears displays basic information on the device.

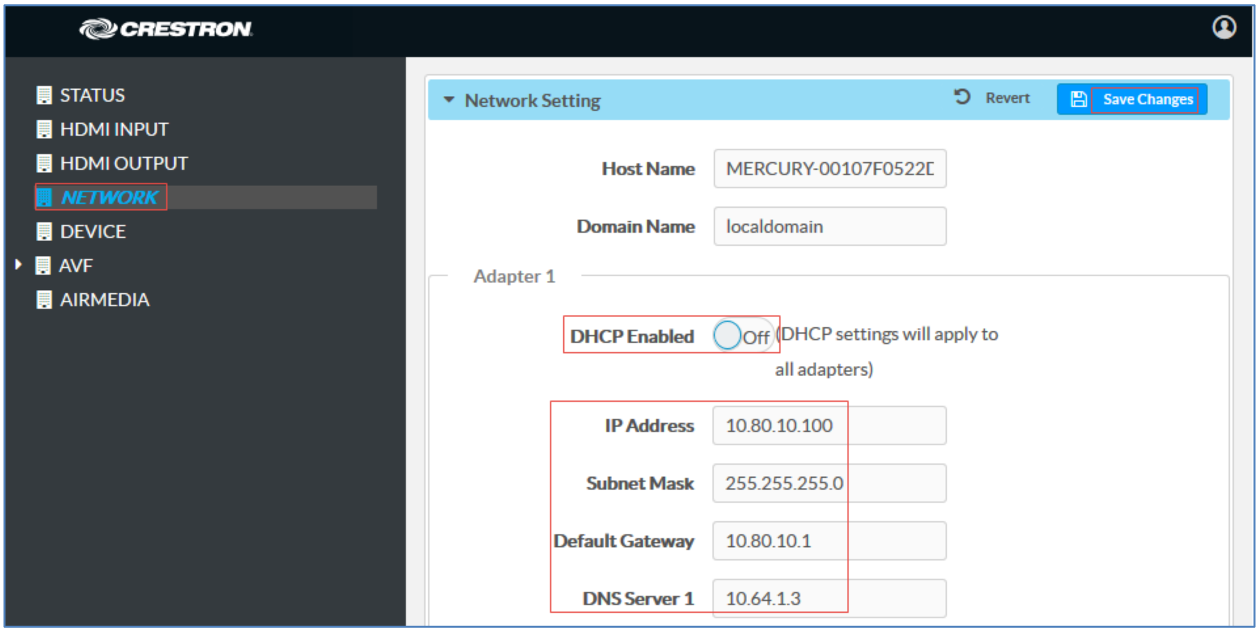
Crestron Mercury: Status



The device can be configured from the **Network** page.

3. On the web GUI, navigate to **Network**.

Crestron Mercury Configuration: Network Setting: DHCP Off: Static IP Configured



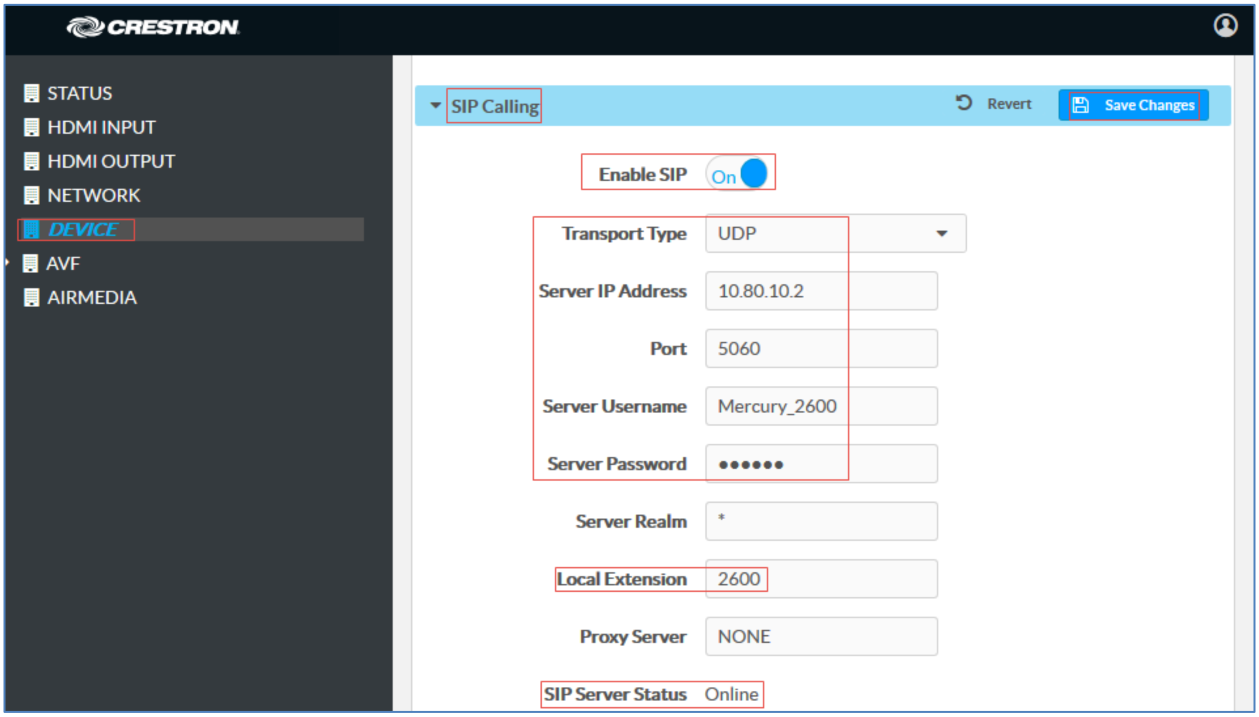
4. Enter the following parameters in the Adapter 1 section to configure the Crestron Mercury device.
   - DHCP: Either of the two can be chosen:
     - Obtain an IP address automatically
     - Use the following IP address

     For the test, a static IP was configured.
     - IP address: *10.80.10.100* was used in this example.
     - Subnet Mask: *255.255.255.0* was used in this example.
     - Default Gateway: *10.80.10.1* was used in this example.
     - DNS Server 1: *10.64.1.3* was used in this example.
5. Click Save Changes.

Configuring the SIP Parameters

1. On the web GUI, navigate to **Device** > **SIP Calling**

Crestron Mercury Configuration: SIP Calling Parameters



2. Enable the check box for **Enable SIP**.
3. Configure the **Server IP Address**: Enter the IP Address of the primary Cisco UCM node. *10.80.10.2* was used in this example.
4. Configure the **Port**: *5060* was used in this example.
5. Configure the **Server Username**: Enter the end user configured on Cisco UCM for this device. *Mercury_2600* was used in this example.
6. Configure the **Server Password**: Enter the password as configured on Cisco UCM for this end user.
7. Configure the **Local Extension**: Enter the directory number that was configured for this device on Cisco UCM. *2600* was used in this example.
8. Leave all other fields at their default values.
9. Click **Save Changes**.

Once the device successfully registers with the Cisco UCM, the **SIP Server Status** updates its status to show *Online.*

Cisco UCM Configuration

This section describes the Cisco UCM configuration necessary to integrate the Crestron Mercury device as a basic SIP endpoint.

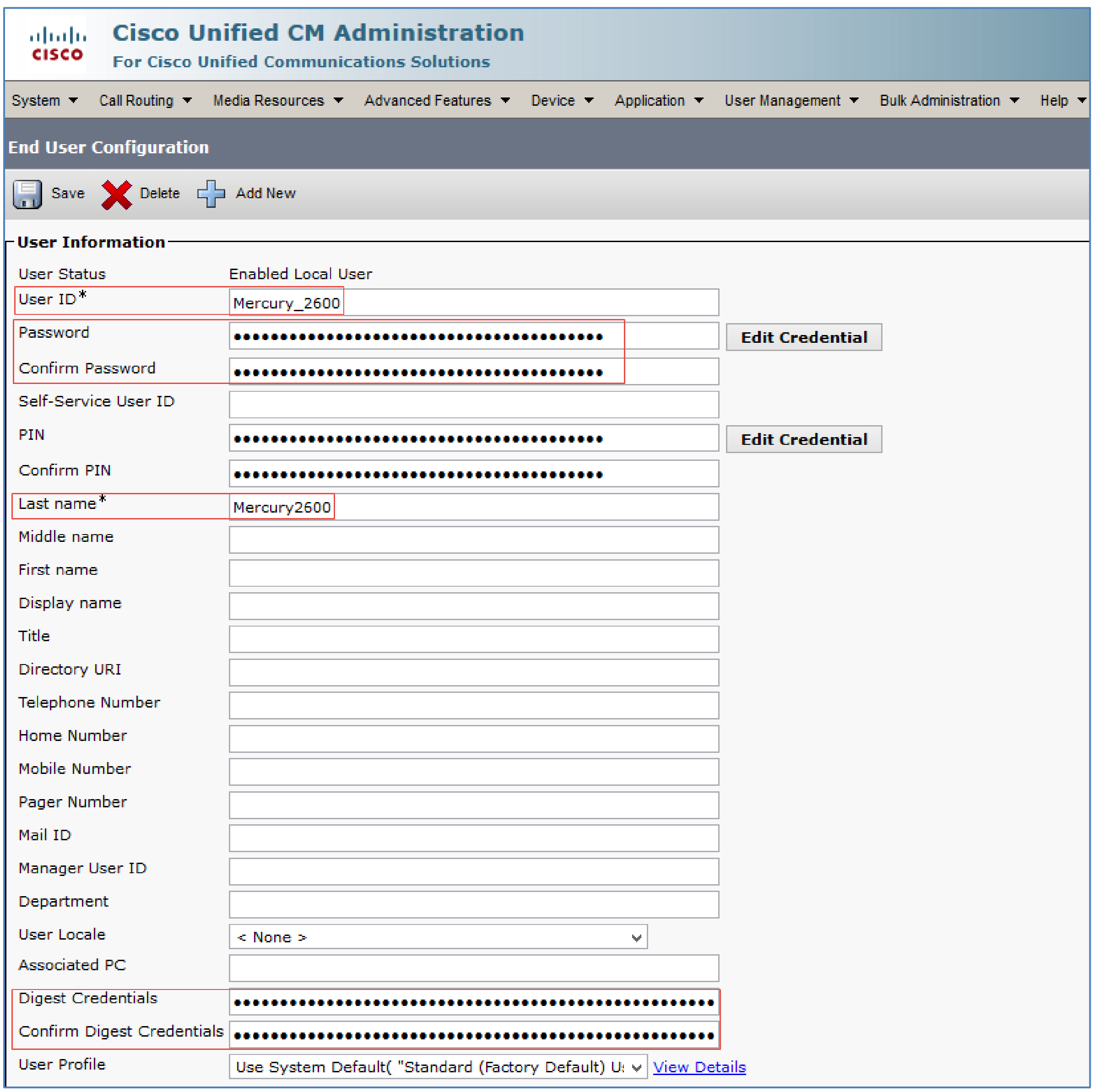
NOTE: It is assumed that the general installation and basic Cisco UCM configuration have already been administered.

Configure the End User

To configure the end user, follow this procedure:

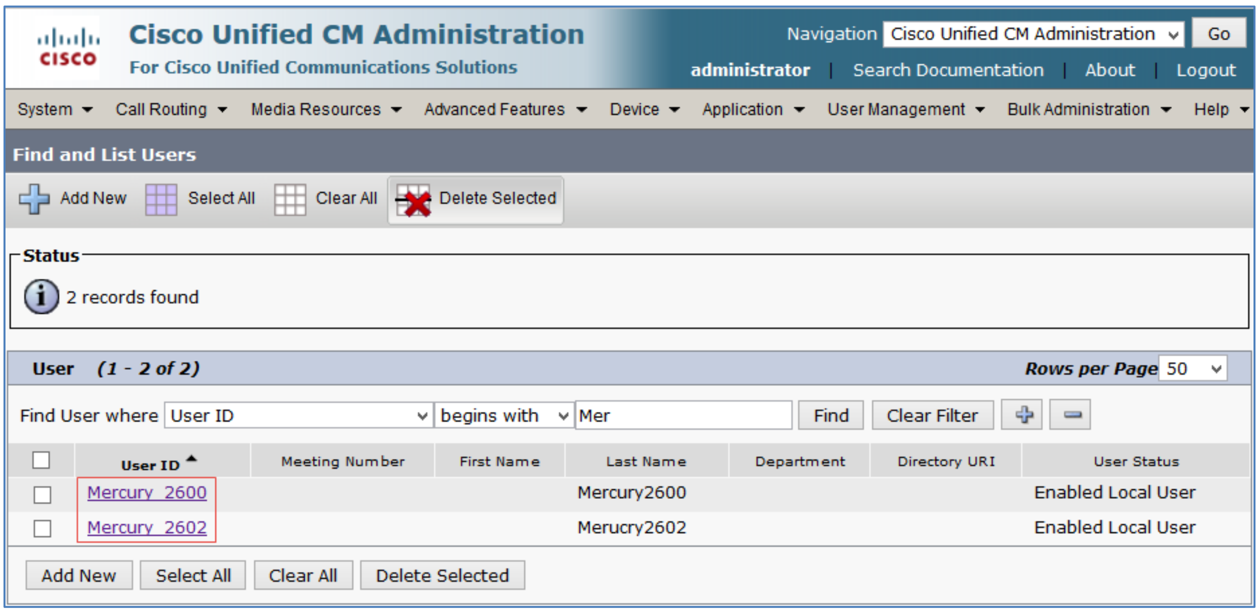
1. Navigate to User Management > End User.
2. Click Add New. The End User configuration window appears.

Cisco UCM: End User configuration



3. Configure **User ID**: Enter a unique end user identification name. Two users were configured for this example for the Crestron Mercury devices: *Mercury_2600* and *Mercury_2602*.
4. Configure **Password**: Enter any password. This same password will be entered on the device for the SIP Server Password. *123456* was used in this example.
5. Confirm **Password**: Re-enter the same password entered above.
6. Configure the **Last Name**: Enter the end user's last name.
7. Configure the **Digest Credentials**: Enter a string of alphanumeric characters.
8. Confirm the **Digest Credentials**: Re-enter the digest credentials configured above.
9. Click **Save**. All of the configured users are listed .

Cisco UCM: End Users configured for all Mercury devices



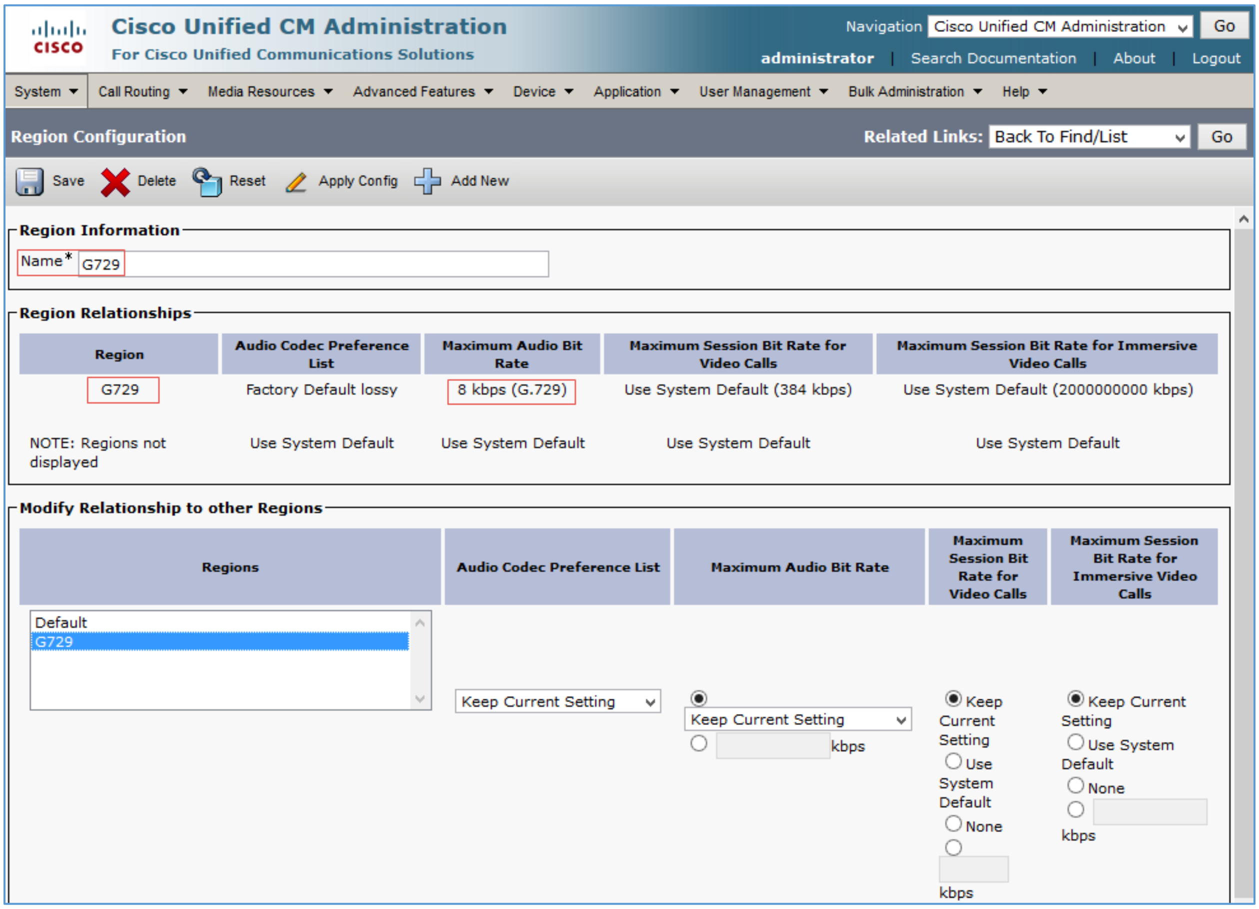
Configure Region for G729

To test the device capabilities with G729, a separate region with the G.729 codec as preference needs to be configured. This new region needs to be assigned to the default device pool.

To configure a new region, perform the following procedure.

1. Navigate to **System** > **Region Information** > **Region**.
2. Click **Add New**.

Cisco UCM: Region Configuration



3. Configure a **Name:** *G729* was used in this example.
4. Click **Save**.
5. On the screen that follows, select the newly added region in the lower pane and select the ***Maximum Audio bit Rate*** from the drop-down menu as *8kbps (G.729)*.
6. Click **Save**.

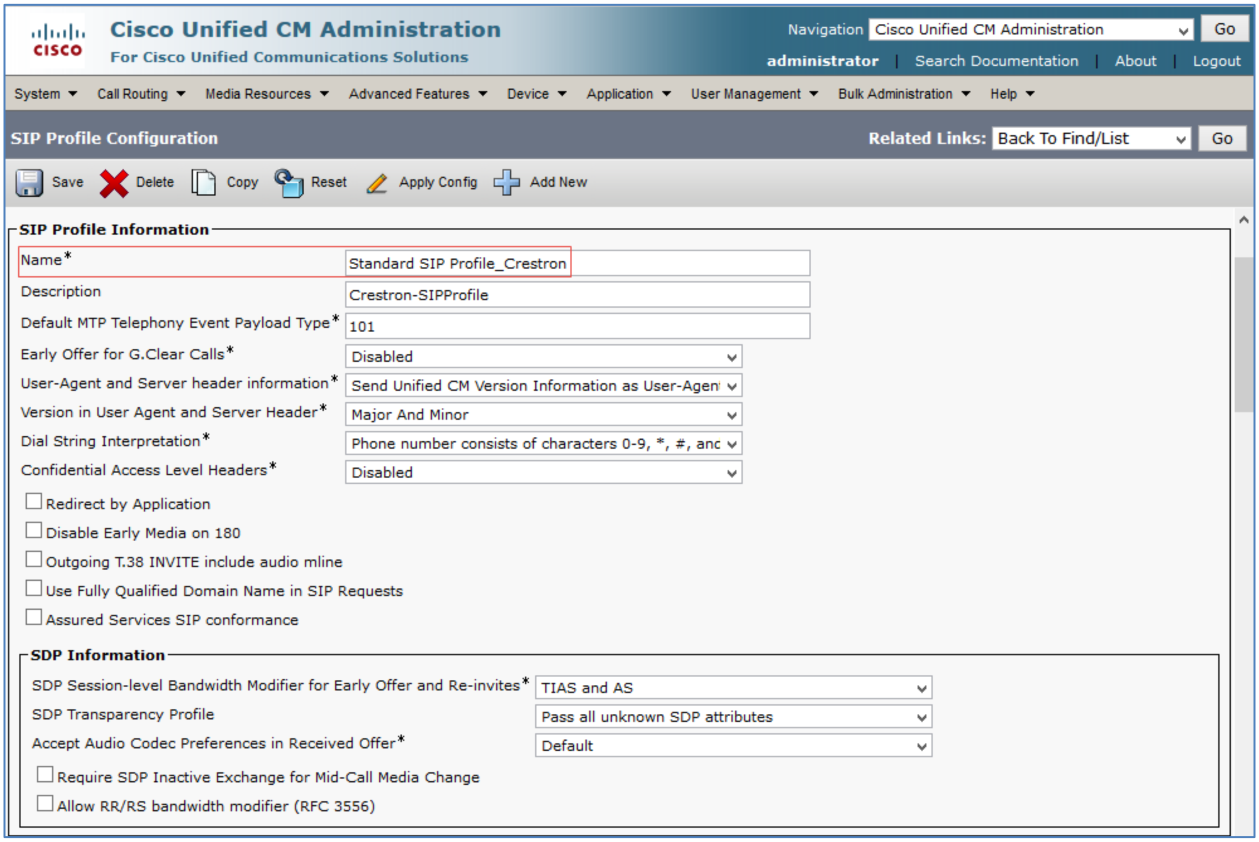
Configure a SIP Profile

For the example, a new SIP profile, Standard SIP Profile_Crestron, was configured and assigned to the trunk used for PSTN calls.

To add a new SIP profile, follow this procedure.

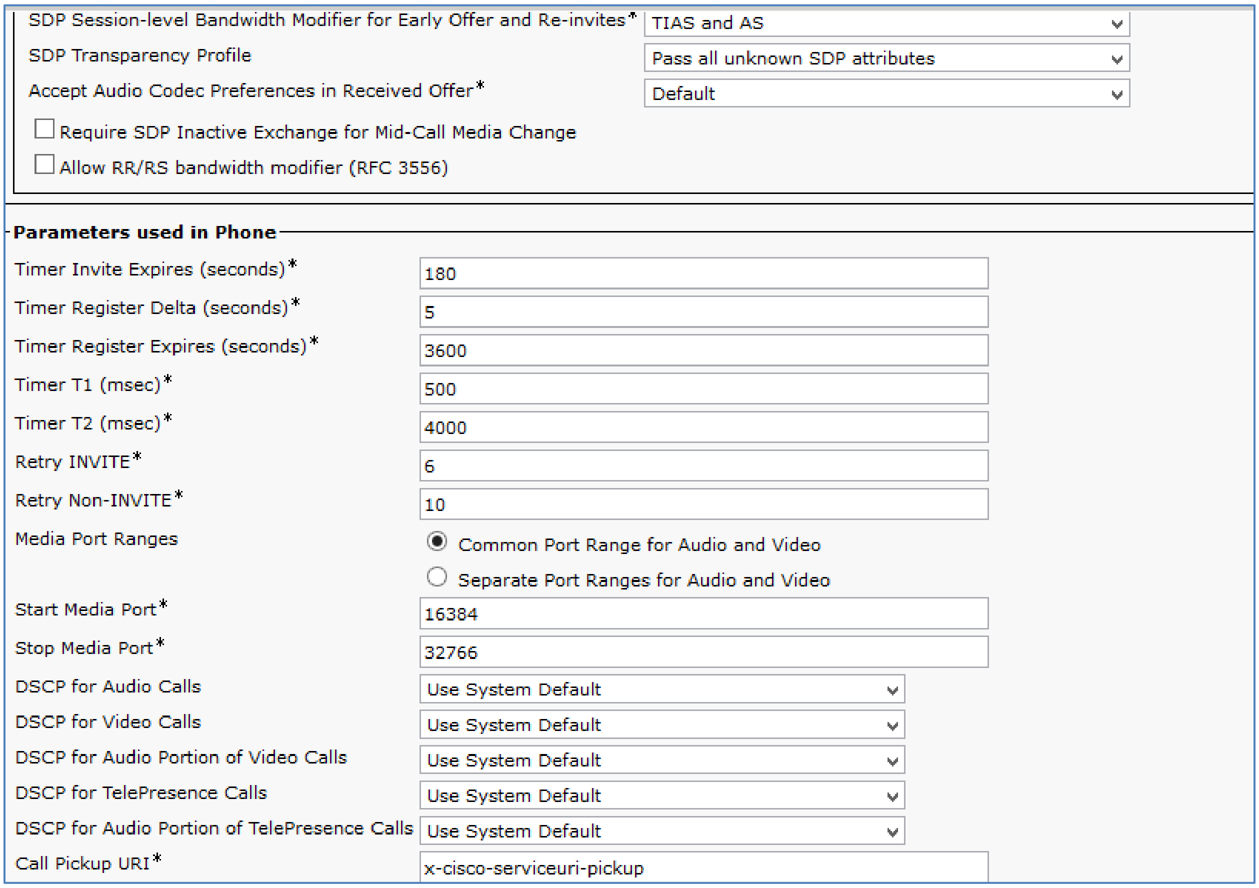
1. Navigate to Device > Device Settings > SIP Profile.

Cisco UCM: SIP Profile Configuration (1/4)

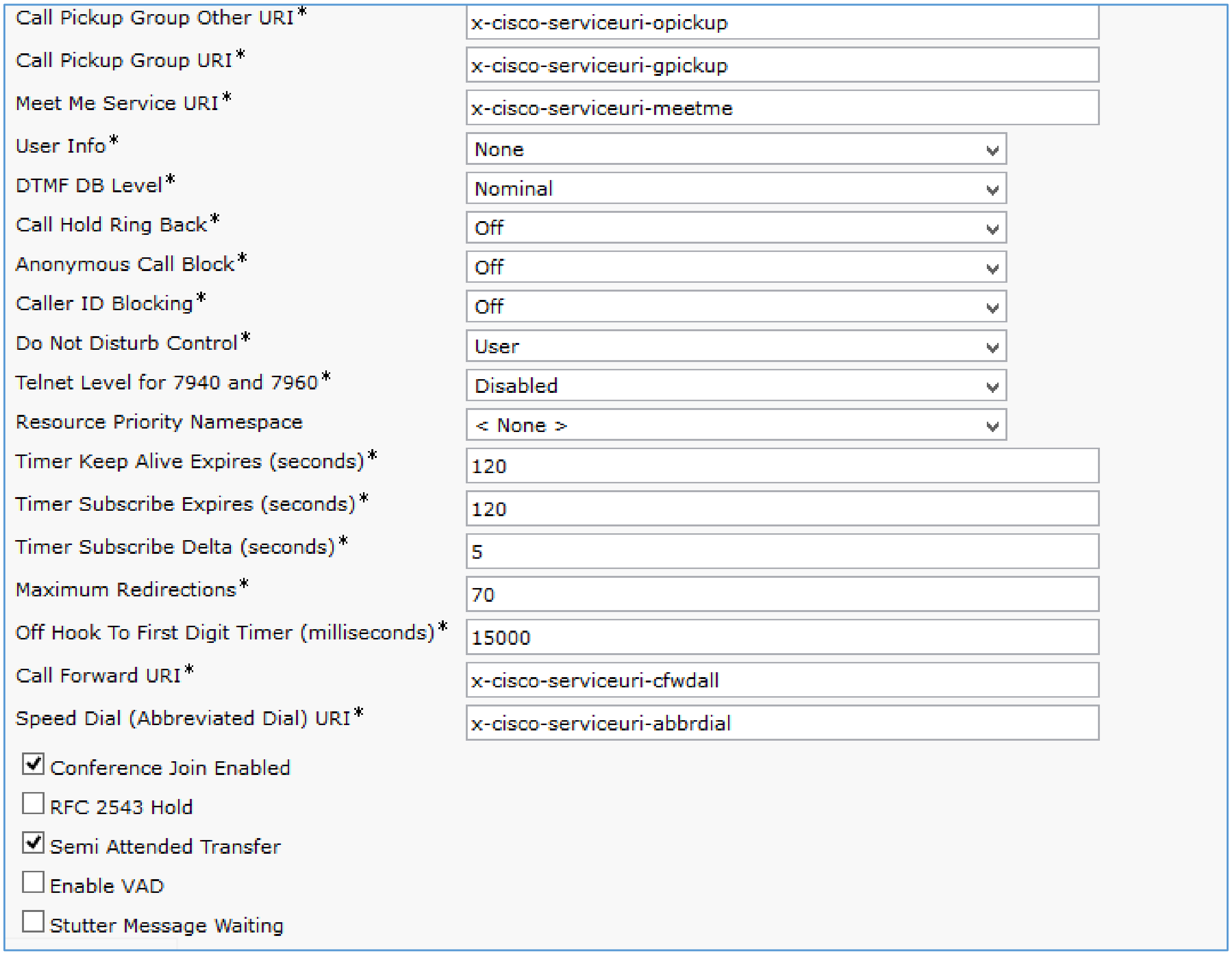


2. On the screen that appears, click Add New and configure the SIP Profile.
   a. Assign a Name. *Standard SIP Profile_Crestron* was used for this example.

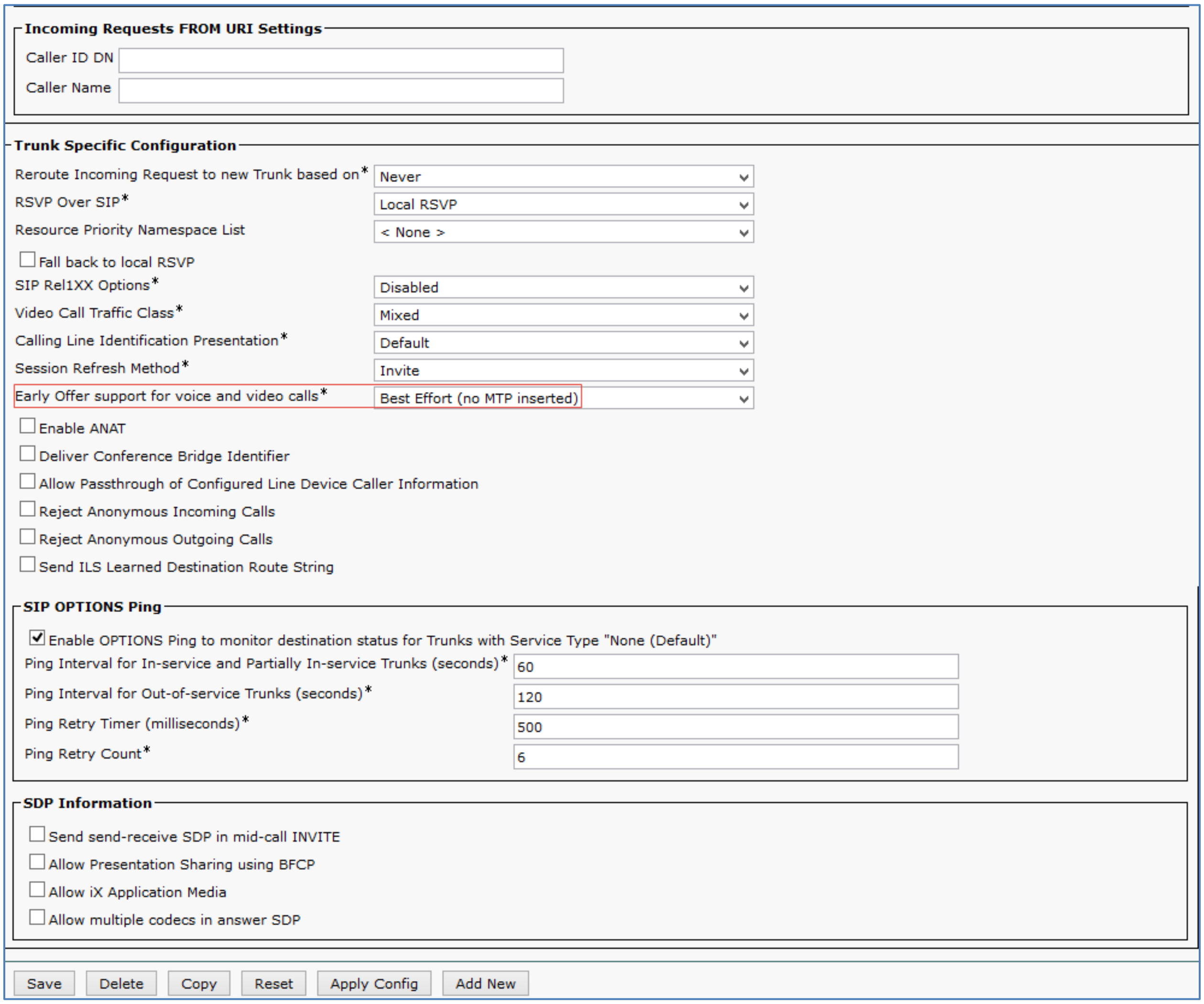
Cisco UCM: SIP Profile Configuration (2/4)



Cisco UCM: SIP Profile Configuration (3/4)



Cisco UCM: SIP Profile Configuration (4/4)



b. Configure **Early Offer support for voice and video calls** as *Best Effort (no MTP inserted).*

3. Retain all other default configurations.

4. Click **Save**, and then click **Apply Config**.

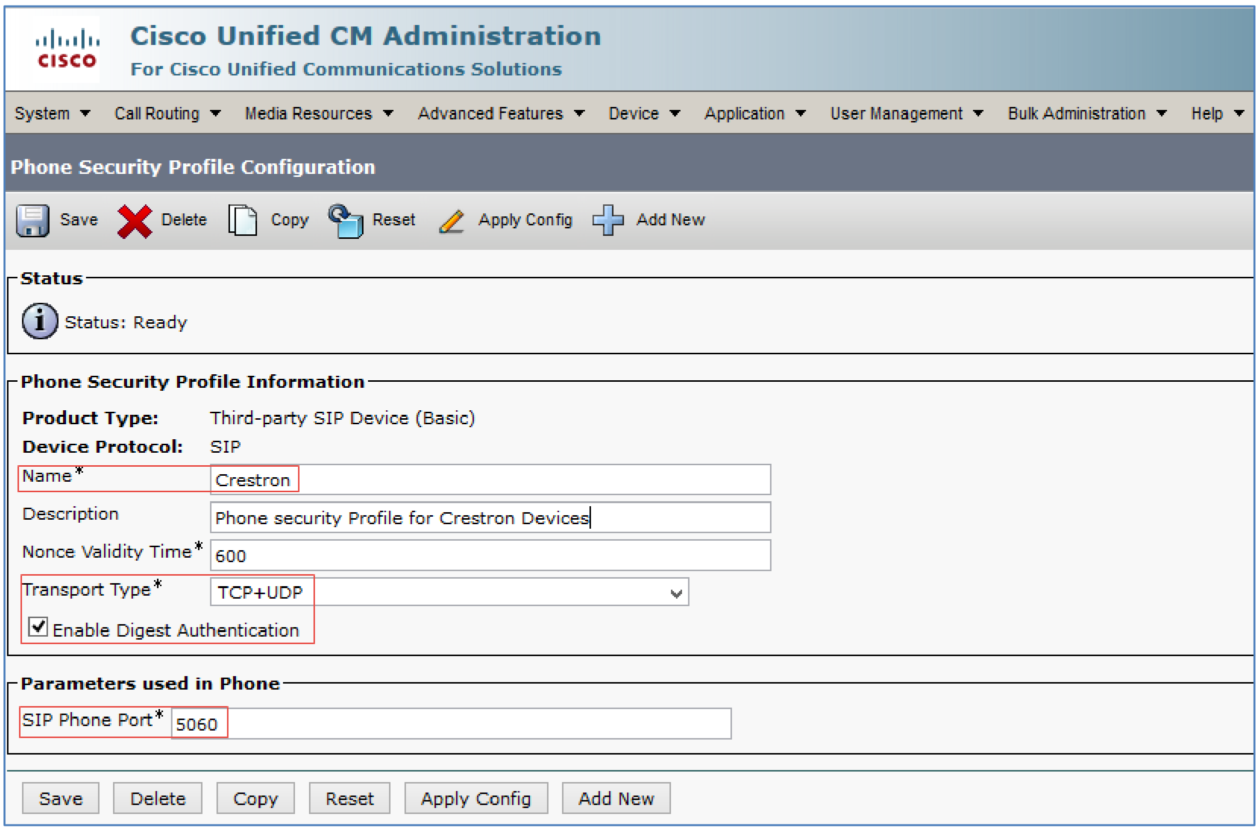
Configure Phone Security Profile

For the example, a phone security profile was configured for the Crestron Mercury device with digest authentication enabled.

To configure the common Phone Security Profile, perform the following procedure.

1. Navigate to **System** > **Security** > **Phone Security Profile**.
2. Click **Add New**.

Cisco UCM: Phone Security Profile Configuration for Crestron Mercury



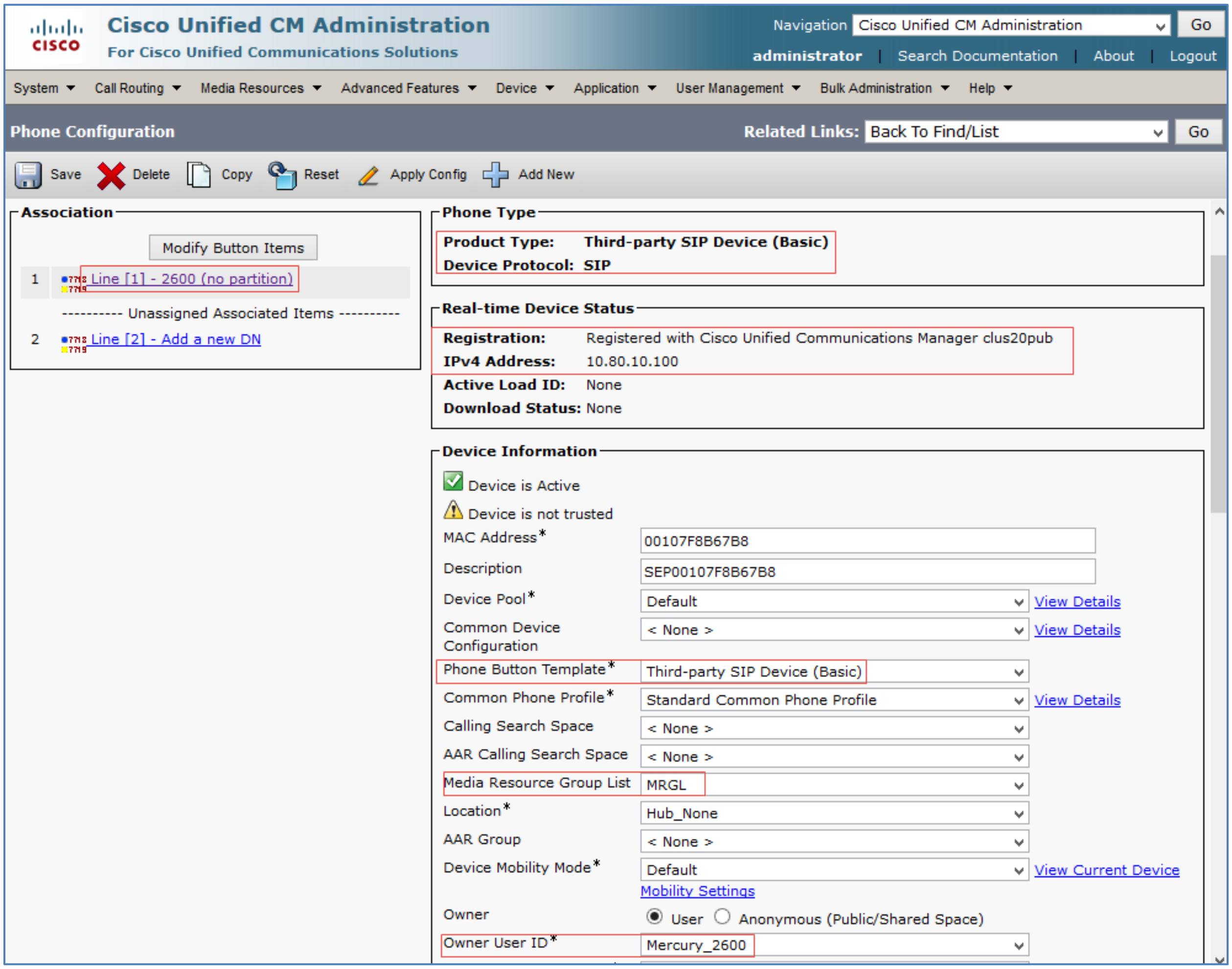
3. Configure a **Name**: *Crestron* was used in this example.
4. Configure **Transport Type**: *TCP+UDP*.
5. Check the **Enable Digest Authentication** check box.
6. Configure **SIP Phone Port**: *5060*.
7. Click **Save**.

Configure the Crestron Mercury Device as a Third-party SIP Device

To configure the Crestron Mercury device as a third-party SIP device, follow this procedure:

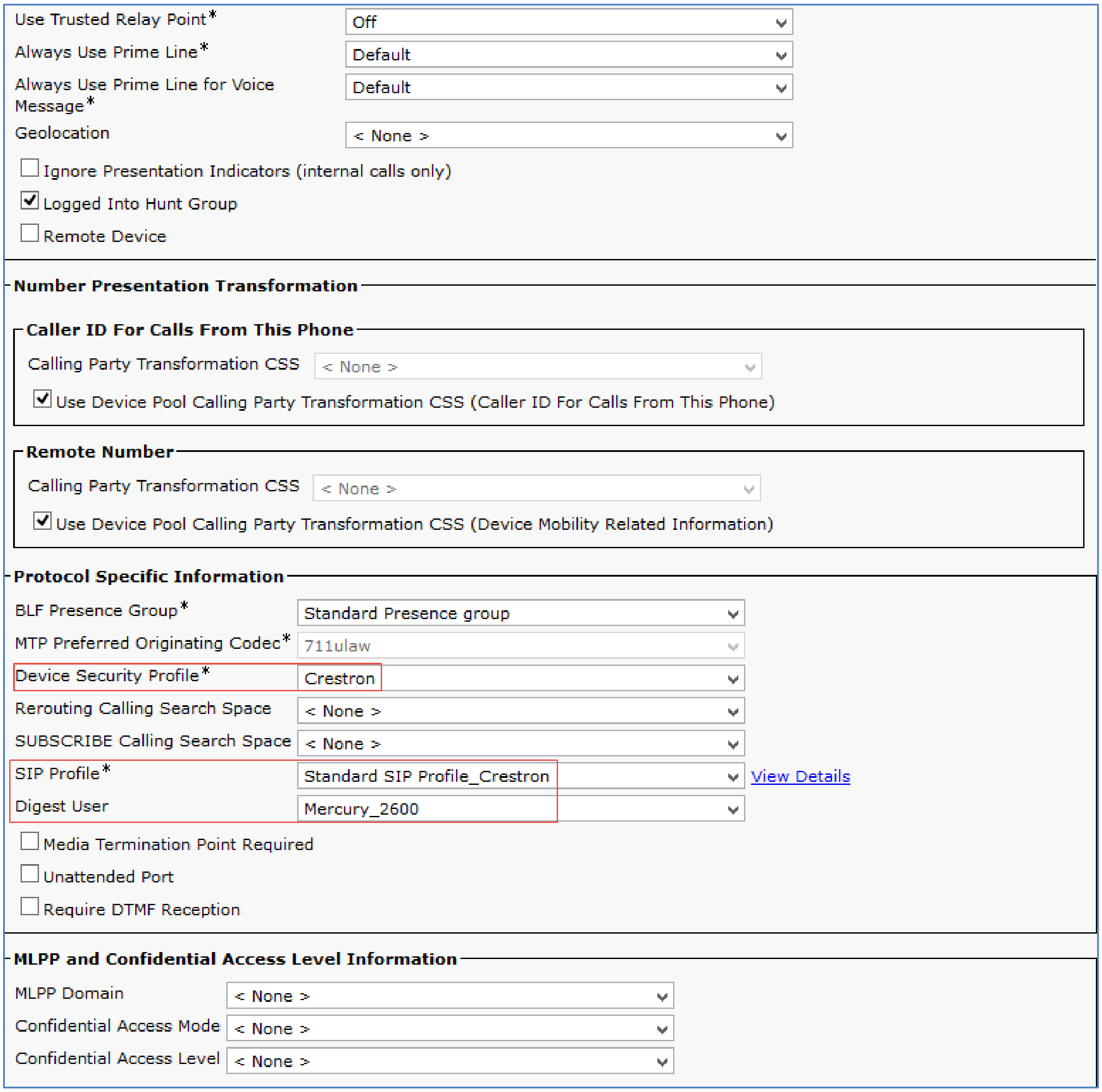
1. Navigate to **Device** > **Phone.**
2. Click **Add New**.

Cisco UCM: Phone Configuration: Add Crestron Mercury Device as Third-party SIP Device (1/2)



3. Select **Product Type** as **Third-party SIP Device (Basic)**.
4. Click **Next**.
5. Configure **MAC Address:** Enter MAC address of the device.
6. Select **Device Pool** as **Default**.
7. Select **Phone Button Template** as **Third-party SIP Device (Basic)**.
8. Select **Owner User ID:** select the End User configured earlier from the drop-down menu. *Mercury_2600* was selected in this example for the first Crestron Mercury device, and *Mercury_2602* for the second Crestron Mercury device.

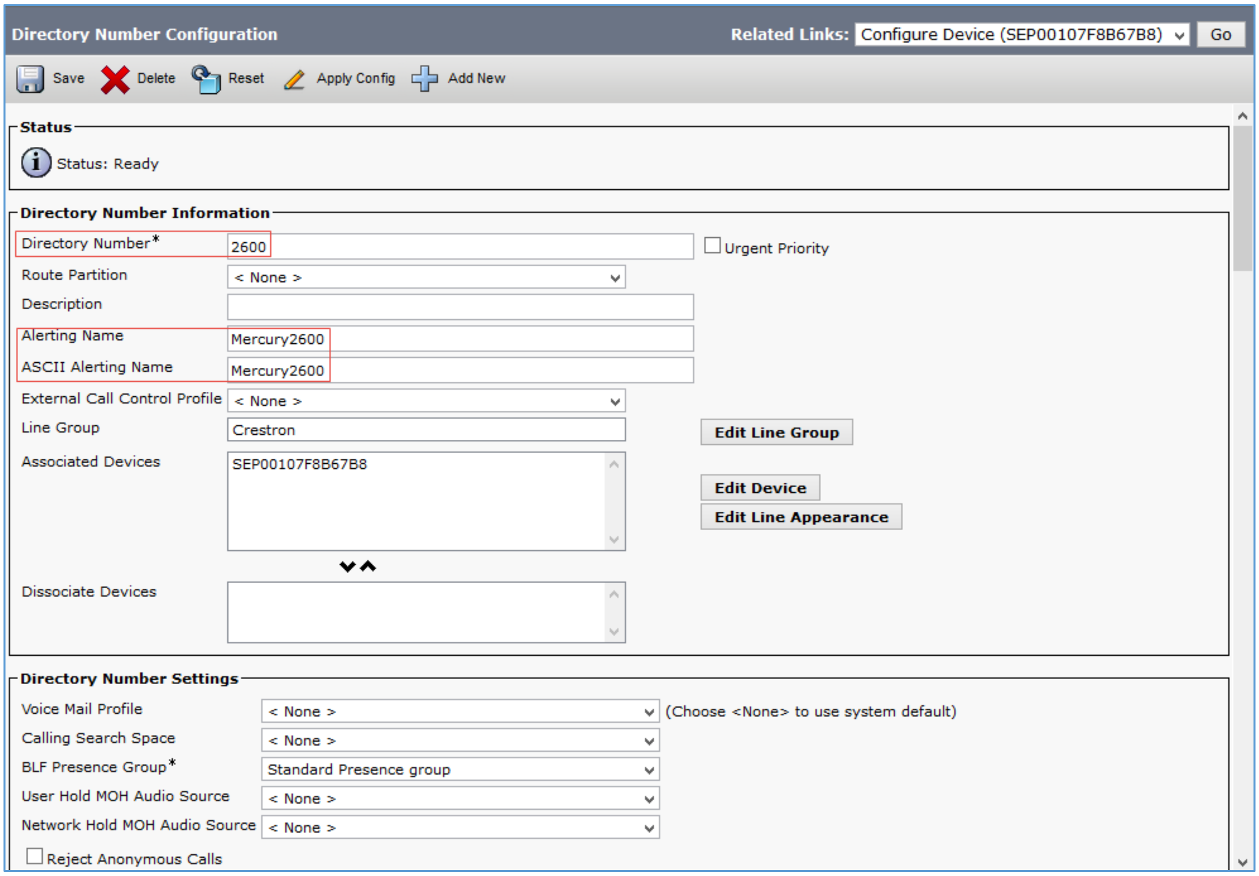
Cisco UCM: Phone Configuration: Add Crestron Mercury Device as Third-party SIP Device (2/2)



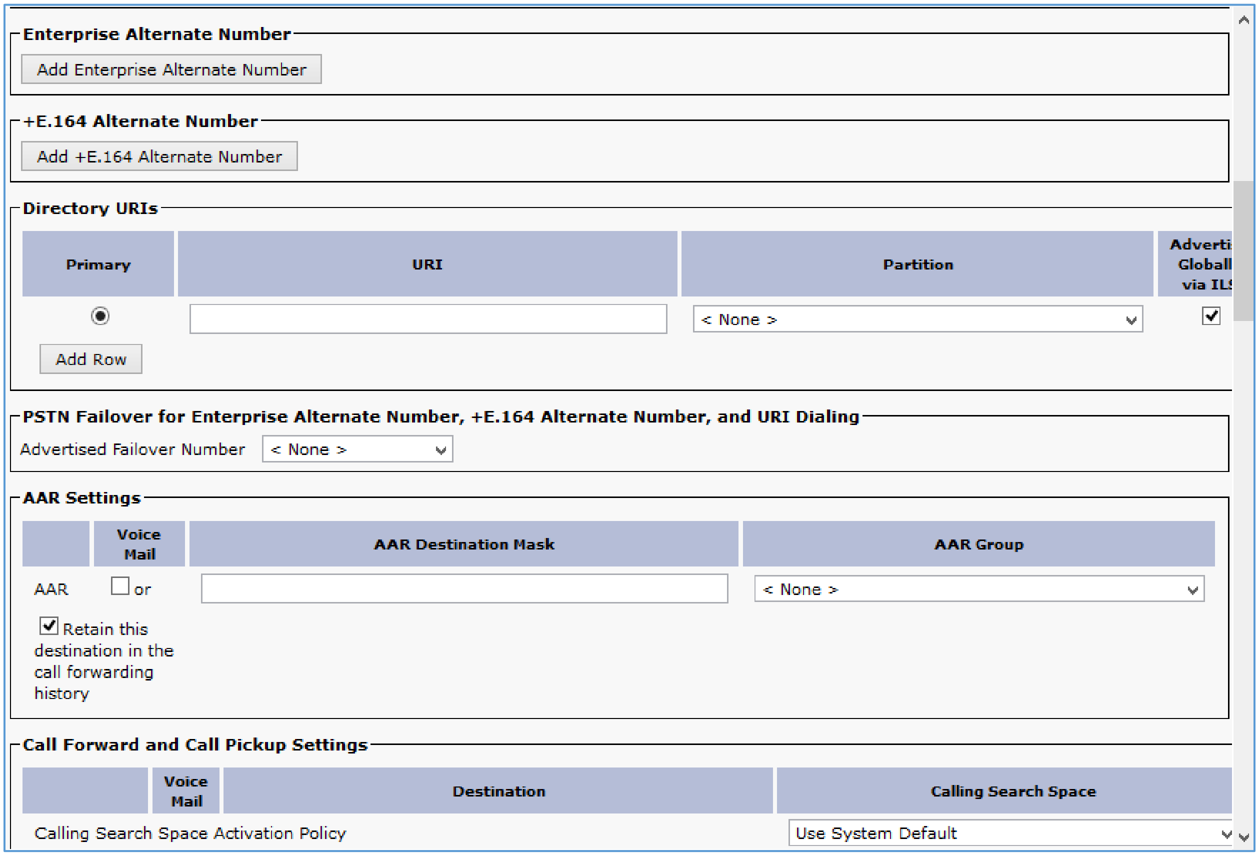
9. Select **Device Security Profile** as configured earlier from the drop-down menu. *Crestron* was used in this test.
10. Select **SIP Profile** as configured earlier from the drop-down menu. *Standard SIP Profile_Crestron* was used in this example.
11. Select **Digest User:** select the End User configured earlier from the drop-down menu. *Mercury_2600* was selected in this example for the first Crestron Mercury device, and *Mercury_2602* for the second Crestron Mercury device.
12. Click **Save**.

13. Add a DN to this phone. DN *2600* was configured for one of the Crestron Mercury devices in this test. Similarly, DN 2602 was added to the other Crestron Mercury device.

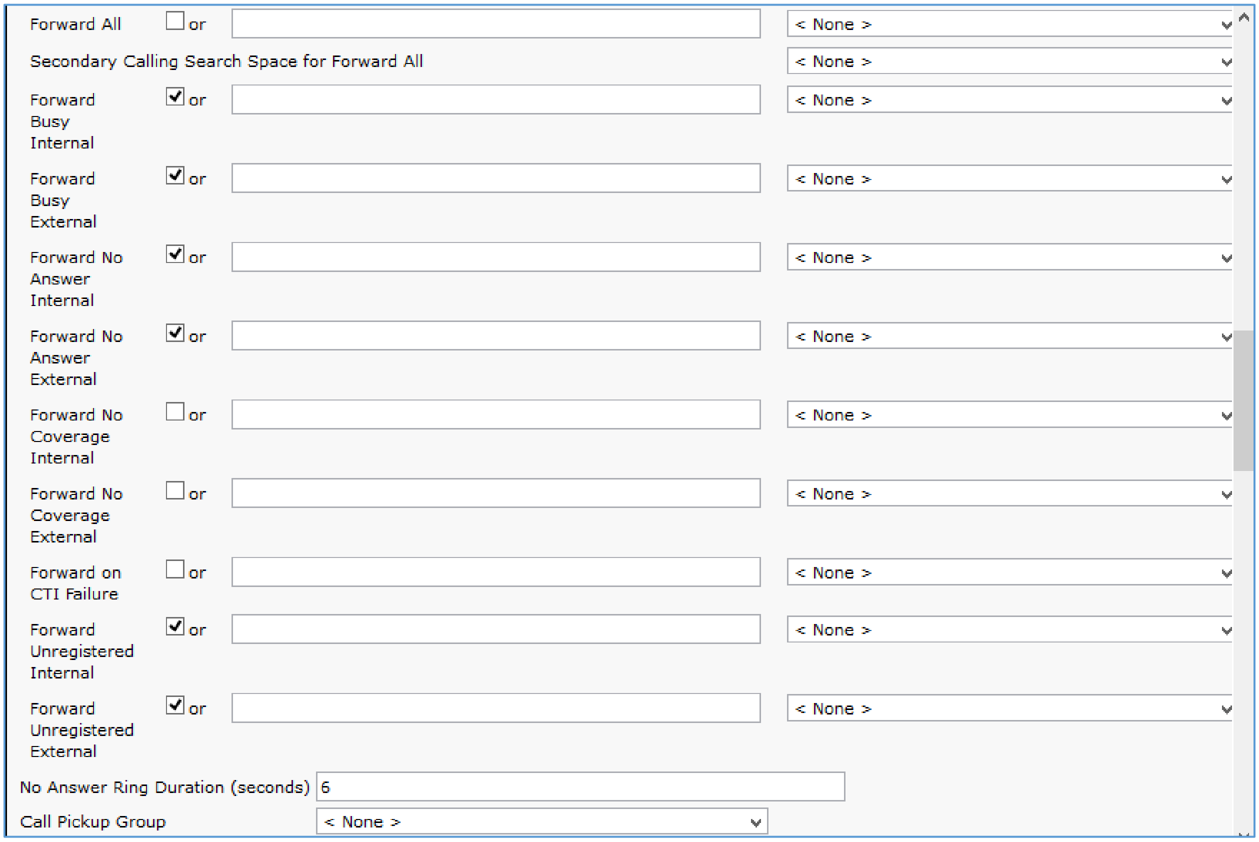
Cisco UCM: Directory Number Configuration: Add DN to Crestron Device: Third-party SIP Device (1/5)



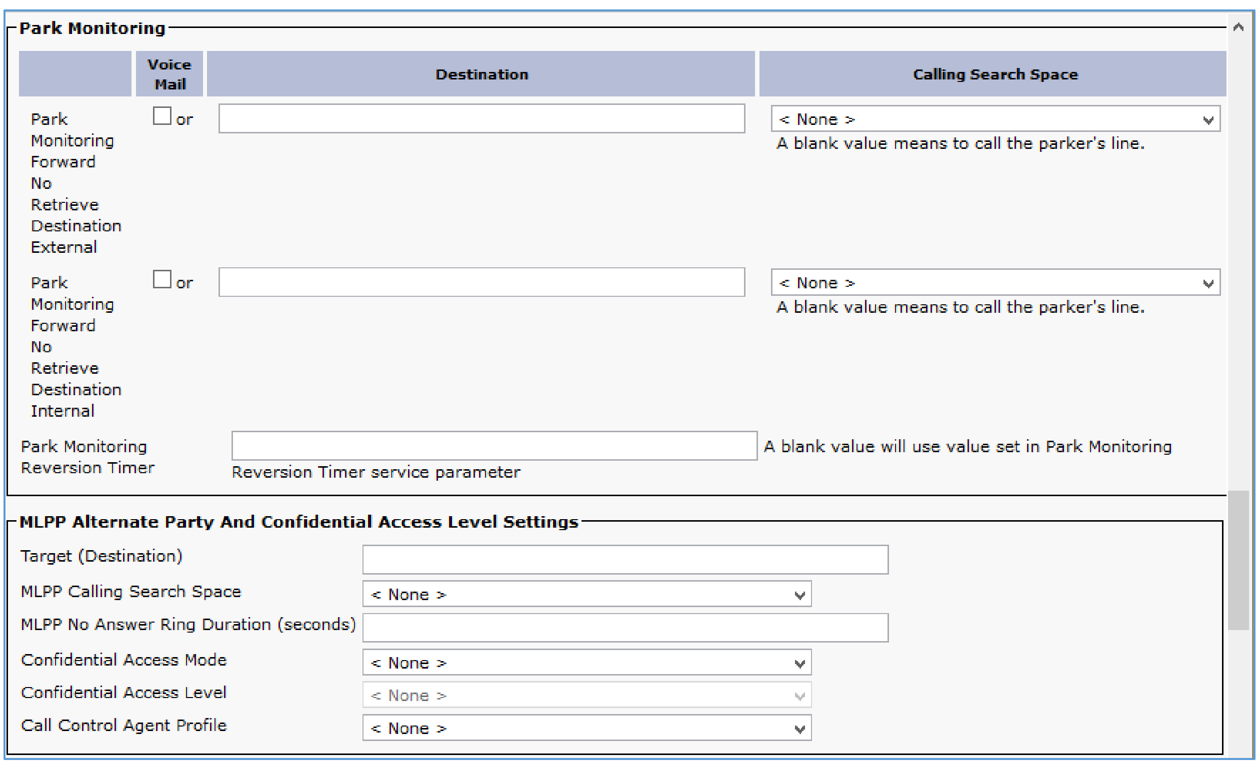
Cisco UCM: Directory Number Configuration: Add DN to Crestron Device: Third-party SIP Device (2/5)



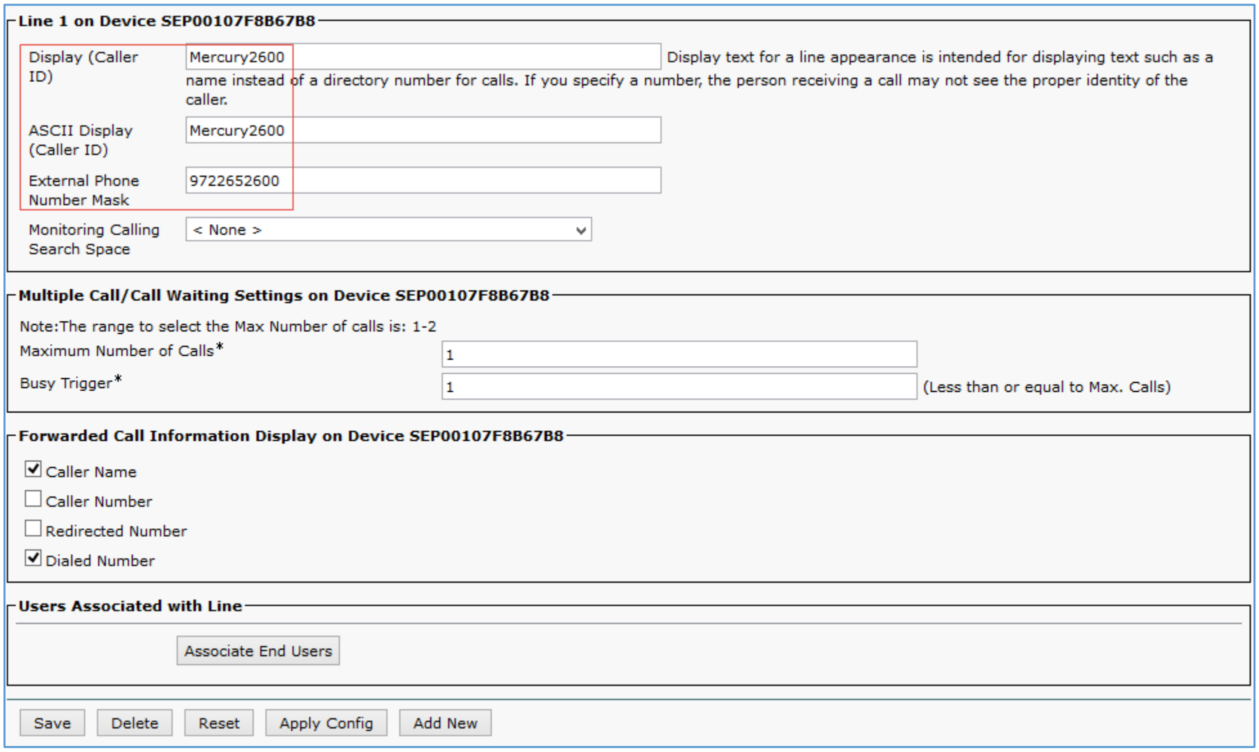
Cisco UCM: Directory Number Configuration: Add DN to Crestron Device: Third-party SIP Device (3/5)



Cisco UCM: Directory Number Configuration: Add DN to Crestron Device: Third-party SIP Device (4/5)



Cisco UCM: Directory Number Configuration: Add DN to Crestron Device: Third-party SIP Device (5/5)



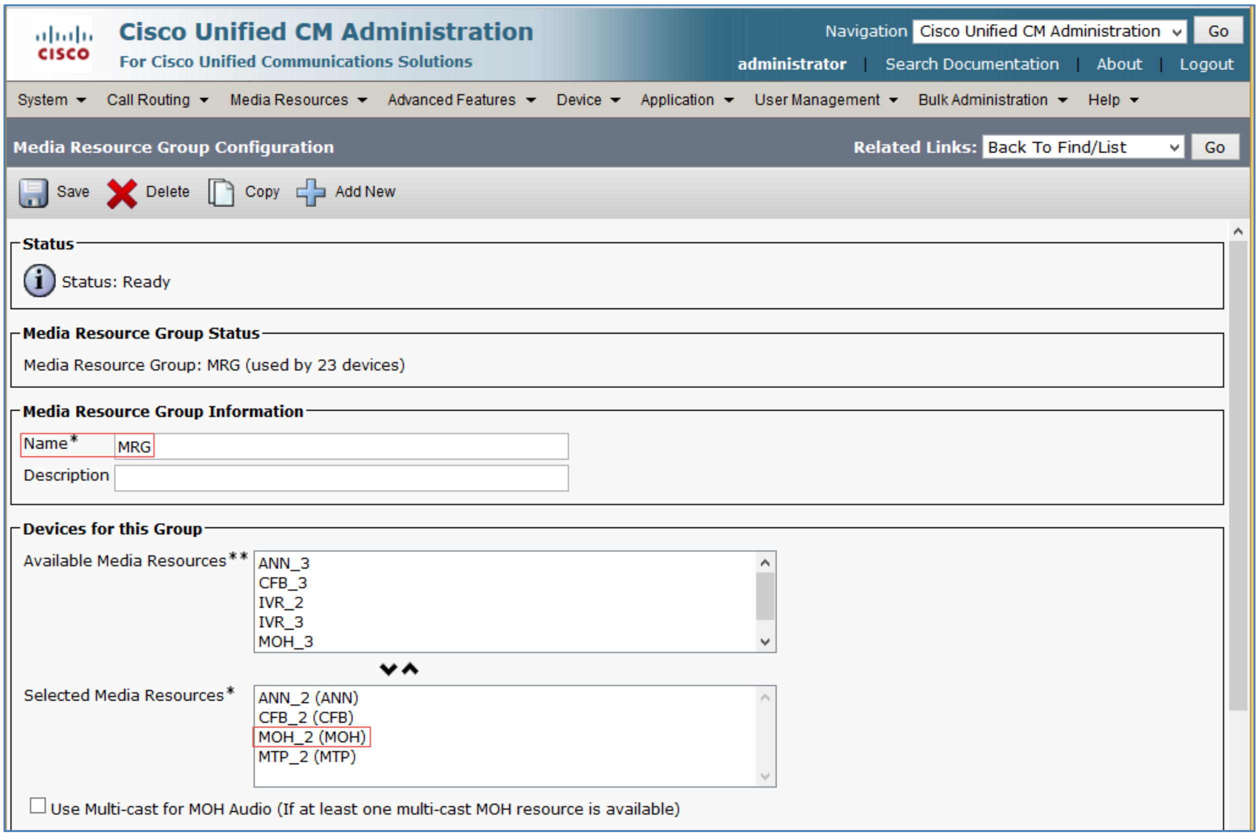
Configure Media Resource Group and Media Resource Group List

A Media Resource Group (MRG) is required to include Music on Hold servers Conference Bridges, and Media Termination Points that may be required to test the Cisco UCM or Service Provider features.

To configure a Media Resource Group "MRG", perform the following procedure.

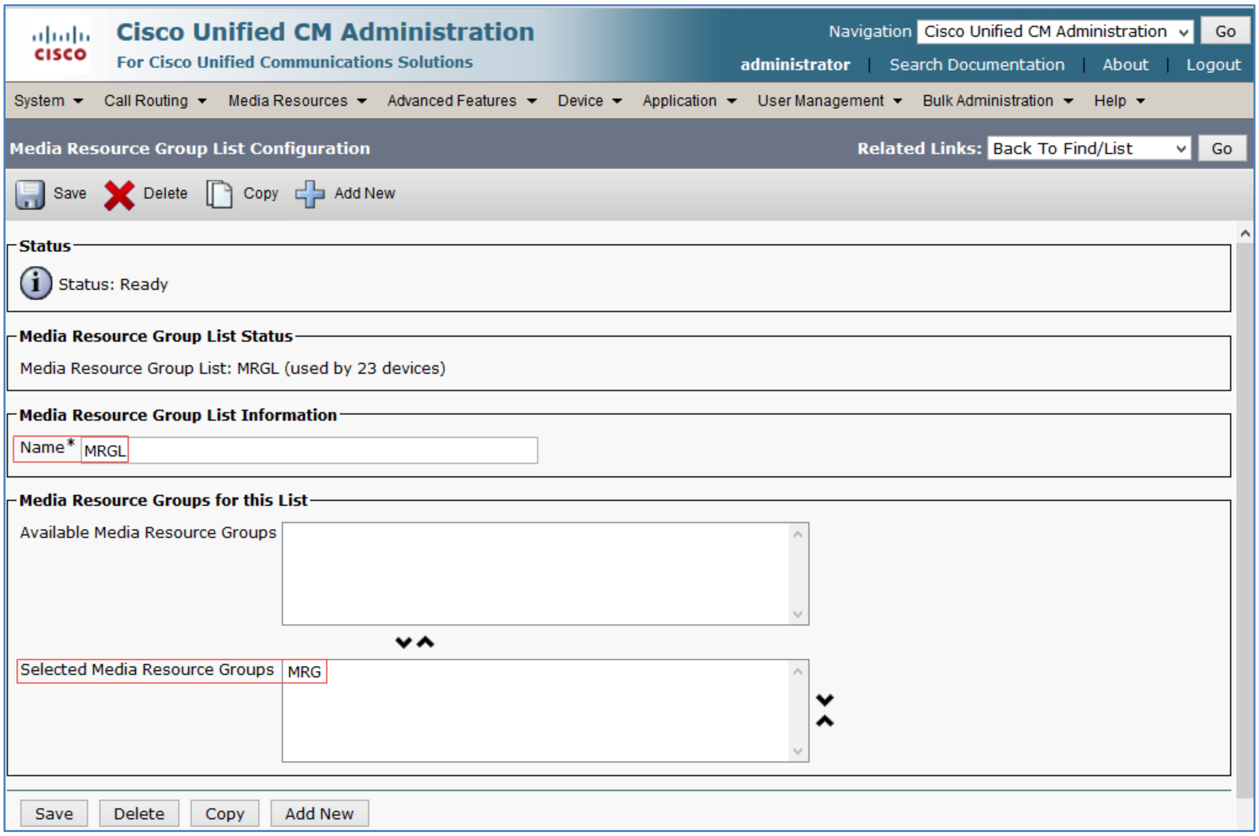
1. Select **Media Resources** > **Media Resource Group**.
2. Click **Add New**.

Cisco UCM: Media Resource Group Configuration



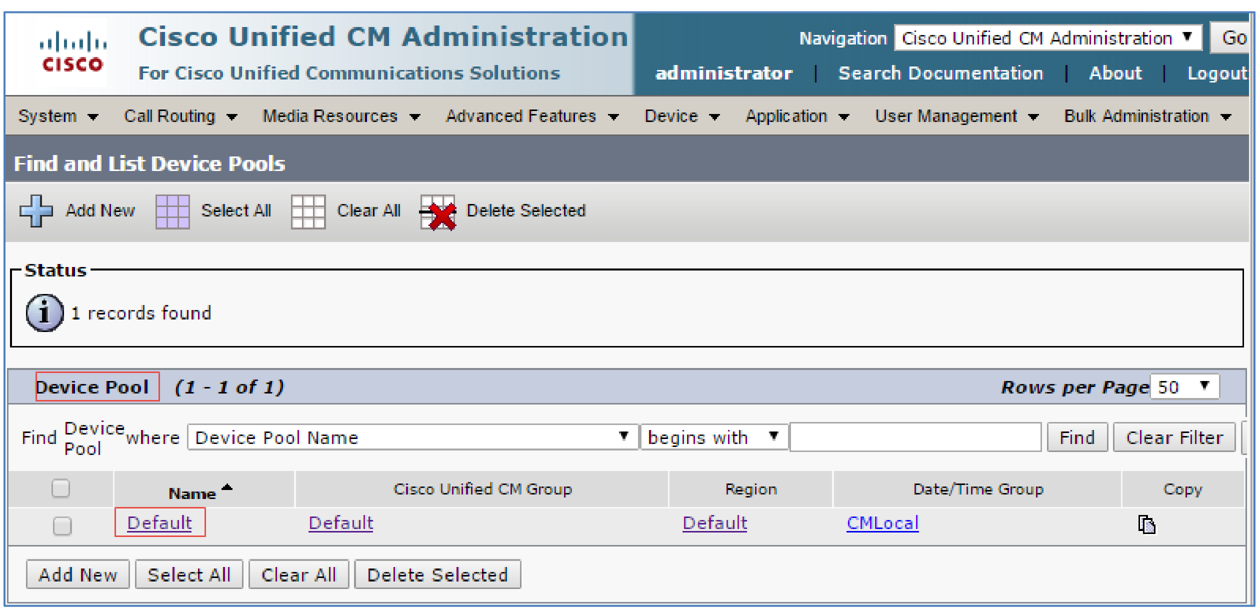
3. Provide a **Name** and select media resources from the **Available Media Resources**. (These are assumed to have been added earlier and are available for use/registered with this Cisco UCM.)
4. Next, configure the Media Resource Group List **MRGL**.
   a. Select **Media Resources** > **Media Resource Group List**.
   b. Click **Add New**.

Cisco UCM: Media Resource Group List Configuration

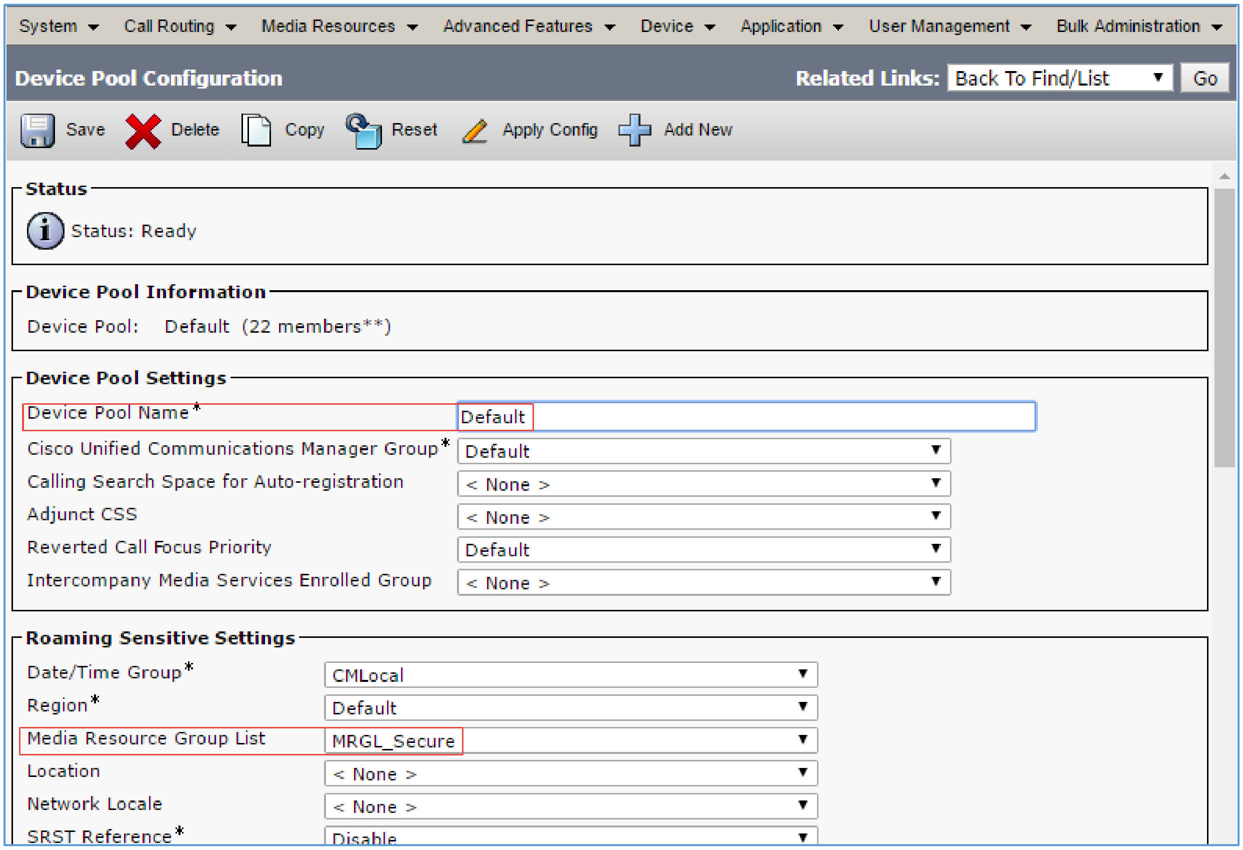


c. Provide the **Name: MRGL** and select the media resource groups from the **Available Media Resource Groups**.

Cisco UCM: Find and List Device Pools



Cisco UCM: Device Pool Configuration: Update MRGL on Defalut



Configure Trunks

Two trunks were configured for this validation test:

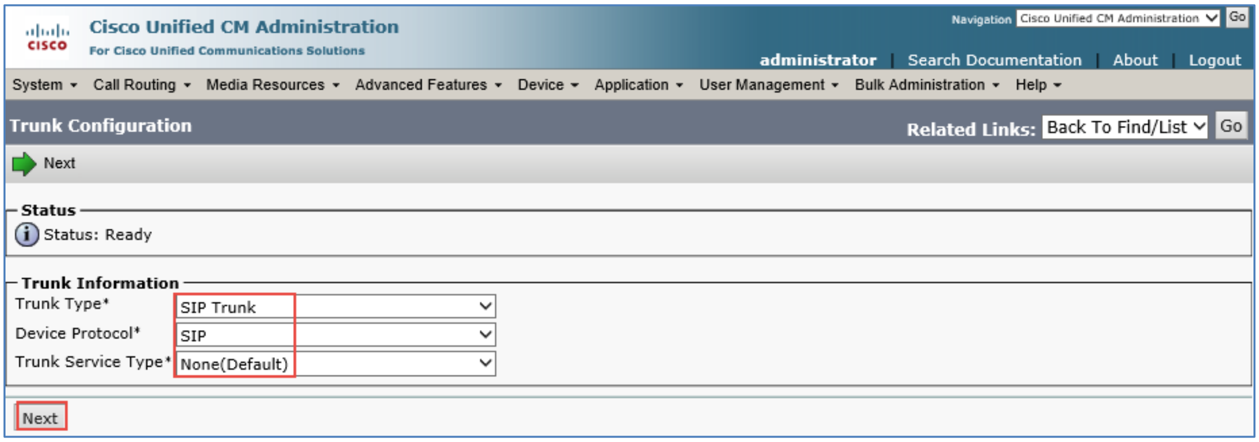
- Between the Cisco UCM and the PSTN Gateway for calls to the PSTN
- Between the Cisco UCM and Cisco Unity Connection for voice mail

Cisco UCM- PSTN Gateway Trunk Configuration

To create a new trunk, perform the following procedure.

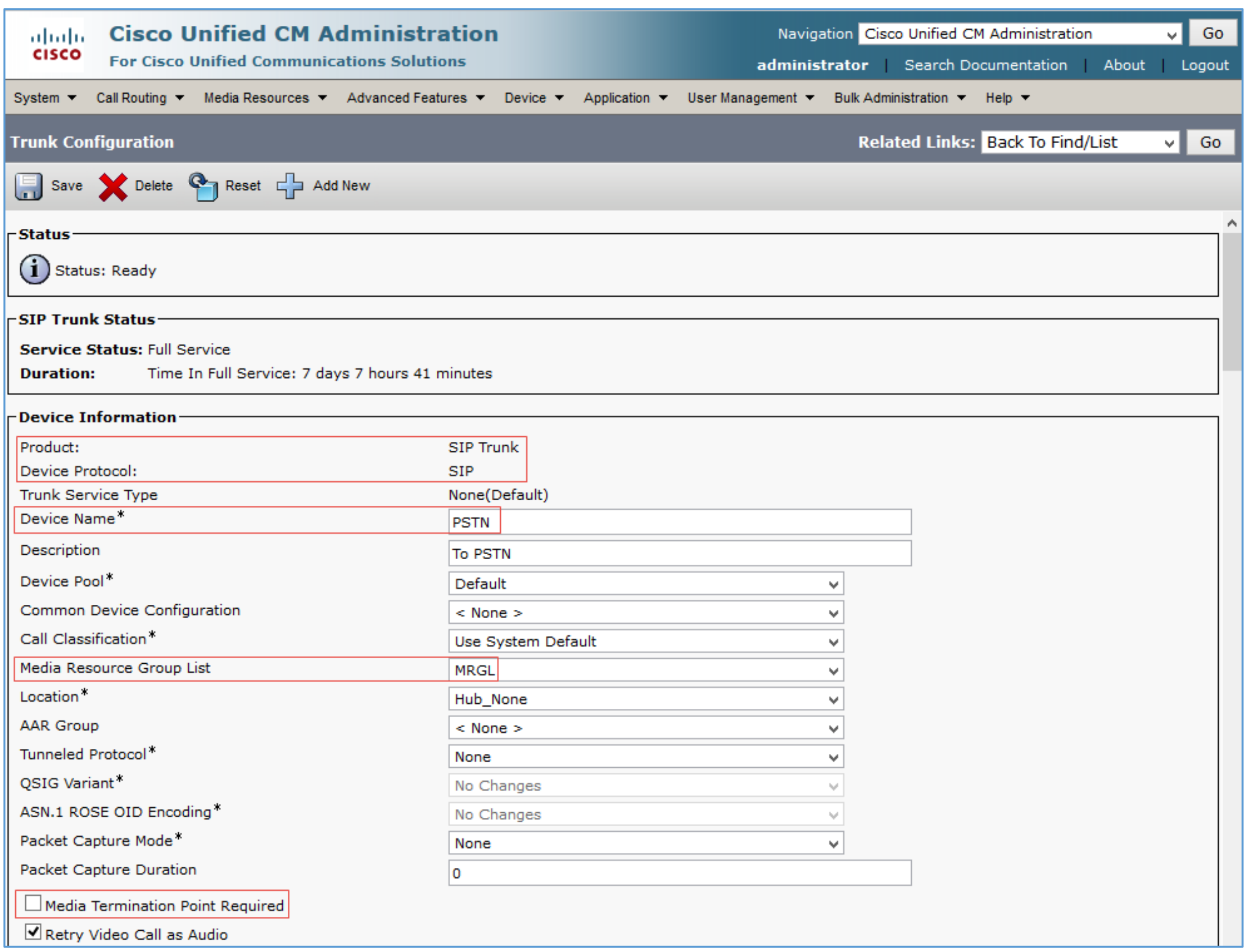
1. From the **Device** drop-down menu, select **Trunk**.
2. Click **Add New**.

Cisco UCM: Trunk Configuration: Add New Trunk

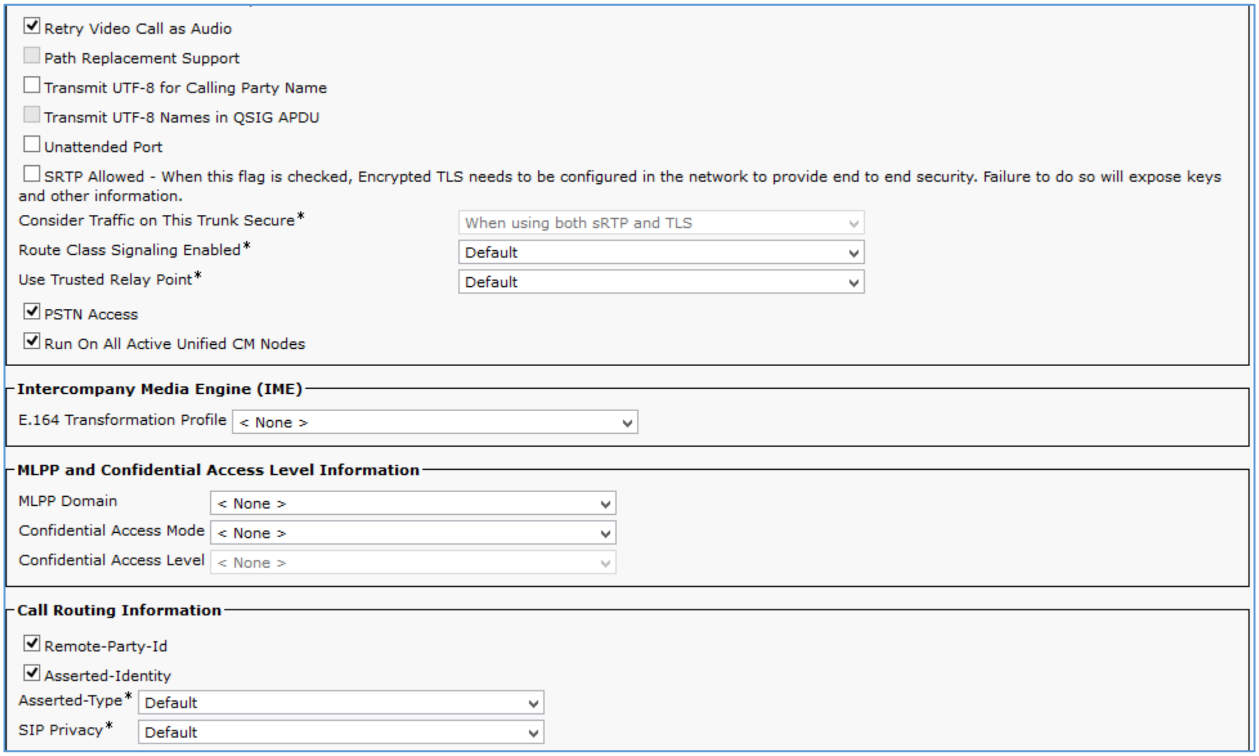


3. Configure **Trunk Type: SIP Trunk**.
4. Configure **Device Protocol: SIP**.
5. Configure **Trunk Service Type: None (Default)**.
6. Click **Next**.

Cisco UCM: Trunk Configuration: Configure Cisco UCM-PSTN Trunk Parameters (1/5)

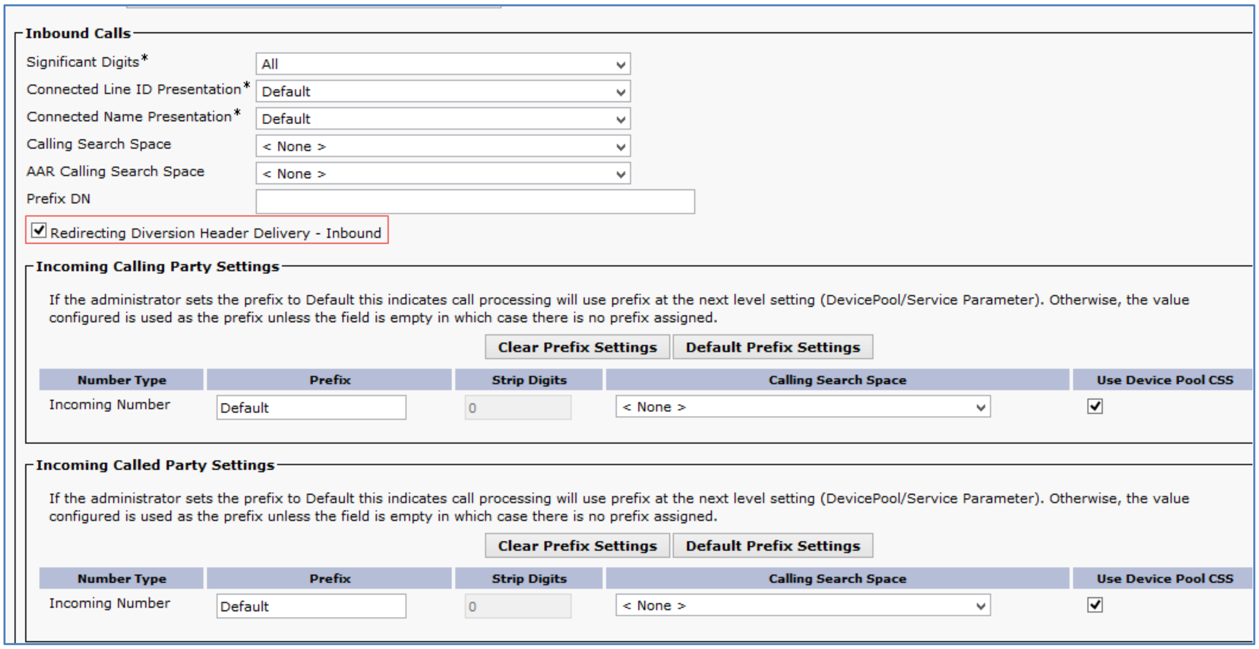


Cisco UCM: Trunk Configuration: Configure Cisco UCM-PSTN Trunk Parameters (2/5)



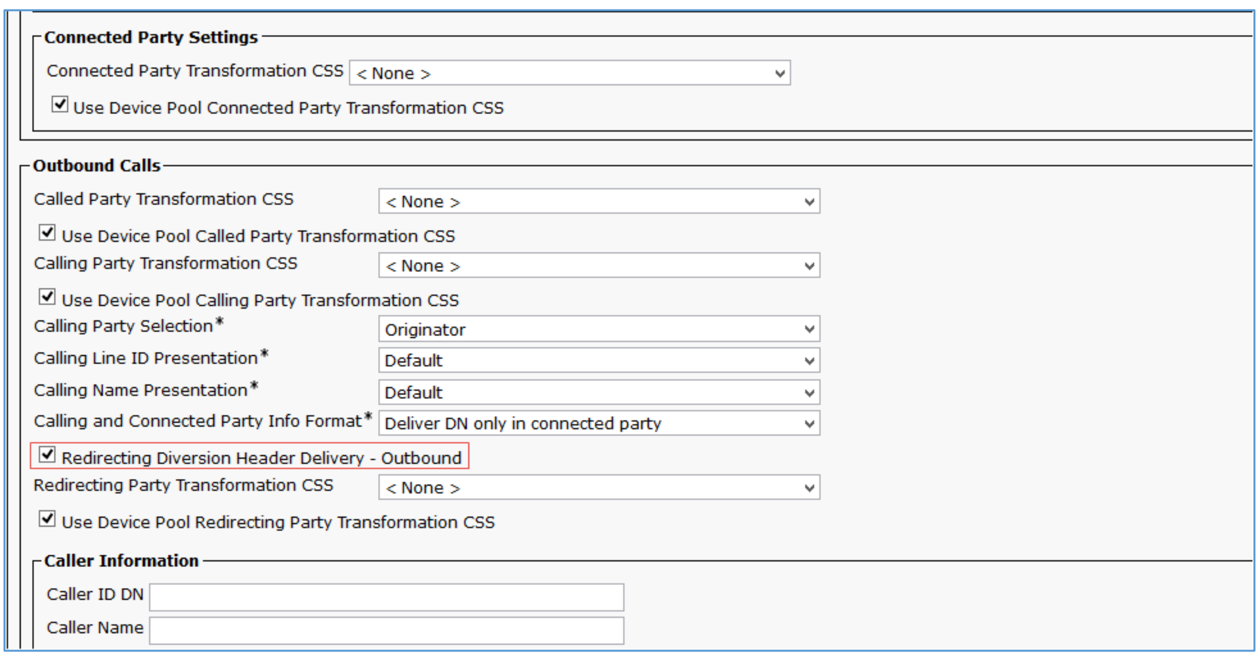
7. In the **Device Name** field, enter a unique SIP Trunk name and optionally provide a description. *PSTN* was configured in this example.
8. From the **Device Pool** drop-down list, select a device pool. *Default* was used in this example.
9. From the **Media Resource Group List**, select **MRGL** from the drop-down menu.
10. Ensure that the **Media Termination Point Required** check box is unchecked.

Cisco UCM: Trunk Configuration: Configure Cisco UCM-PSTN Trunk Parameters (3/5)



11. Select the Redirecting Diversion Header Delivery – Inbound check box.

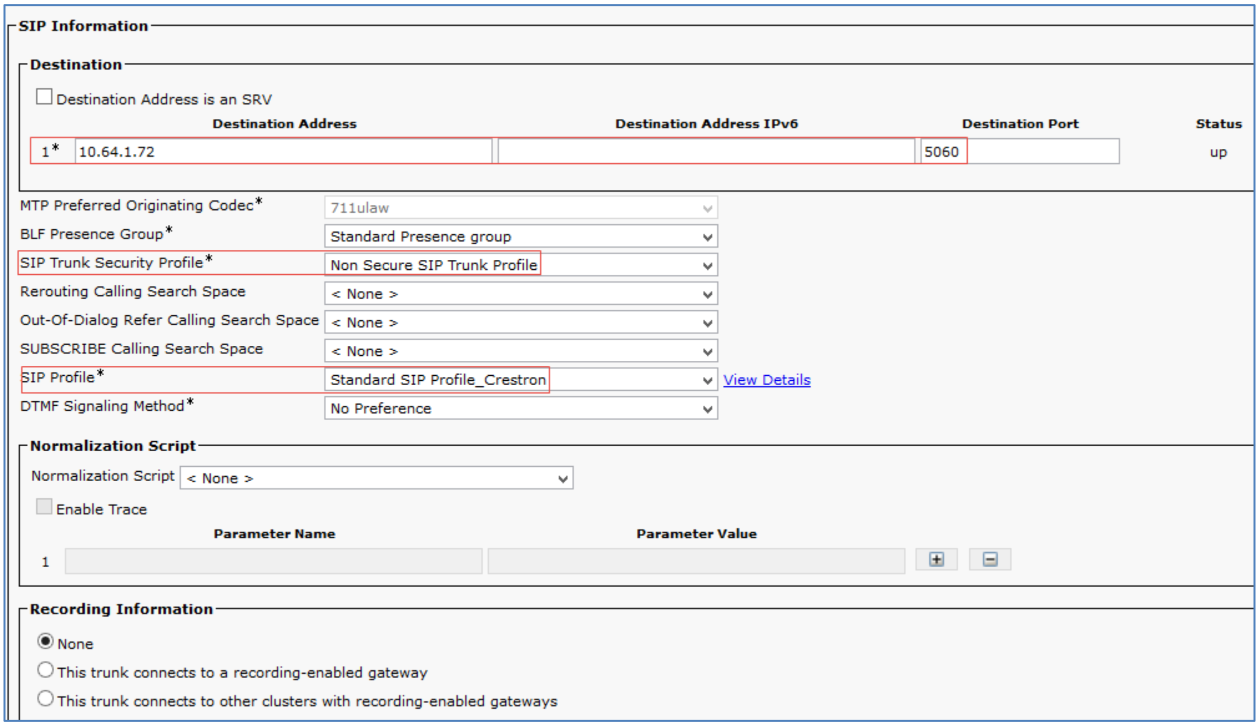
Cisco UCM: Trunk Configuration: Configure Cisco UCM-PSTN Trunk Parameters (4/5)



12. Select the Redirecting Diversion Header Delivery – Outbound check box.

13. Configure the SIP Information.

Cisco UCM: Trunk Configuration: Configure Cisco UCM-PSTN Trunk Parameters (5/5)



a. Enter the **Destination Address** and **Destination Port** of the PSTN Gateway.

b. Select the default **Non Secure SIP Trunk Profile** as the SIP Trunk Security Profile.

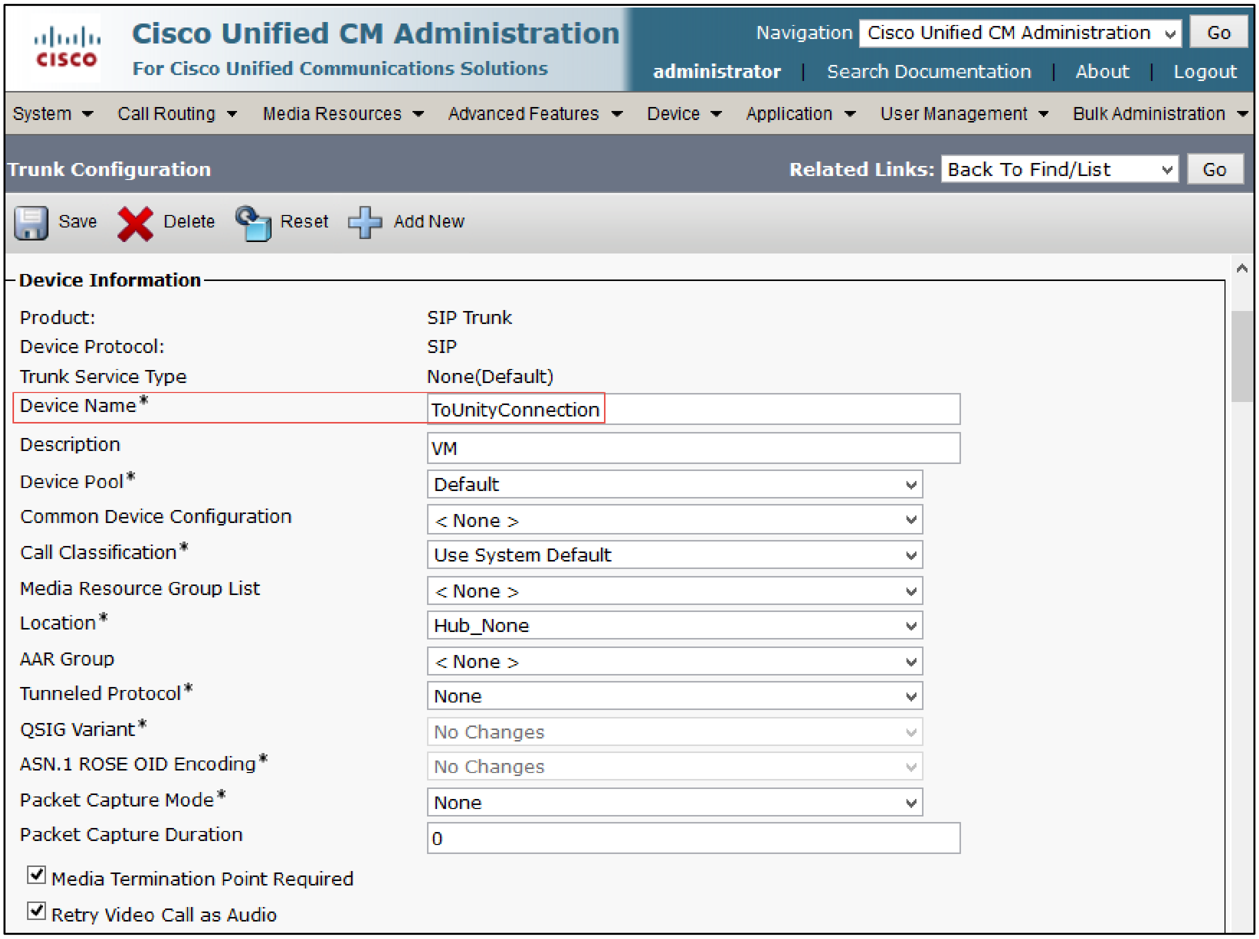
c. Select the configured **Standard SIP Profile_Crestron** SIP Profile.

14. Click **Save**.

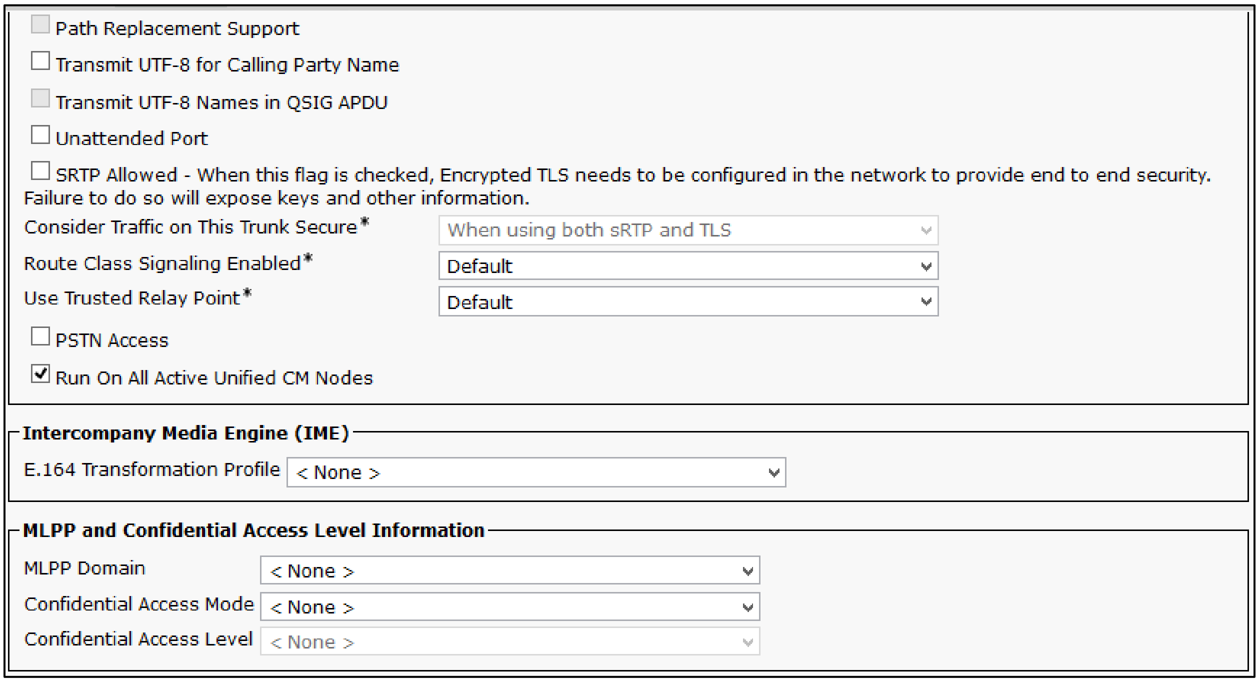
Cisco UCM - Unity Connection Trunk Configuration

Similar to the above trunk configuration, configure a new trunk from Cisco UCM to the Unity Connection Server.

Cisco UCM: Trunk Configuration: Trunk to Voice Mail System: Unity Connection (1/5)



Cisco UCM: Trunk Configuration: Trunk to Voice Mail System: Unity Connection (2/5)



☐ Path Replacement Support

☐ Transmit UTF-8 for Calling Party Name

☐ Transmit UTF-8 Names in QSIG APDU

☐ Unattended Port

☐ SRTP Allowed - When this flag is checked, Encrypted TLS needs to be configured in the network to provide end to end security. Failure to do so will expose keys and other information.

Consider Traffic on This Trunk Secure*	When using both sRTP and TLS
Route Class Signaling Enabled*	Default
Use Trusted Relay Point*	Default

☐ PSTN Access

☑ Run On All Active Unified CM Nodes

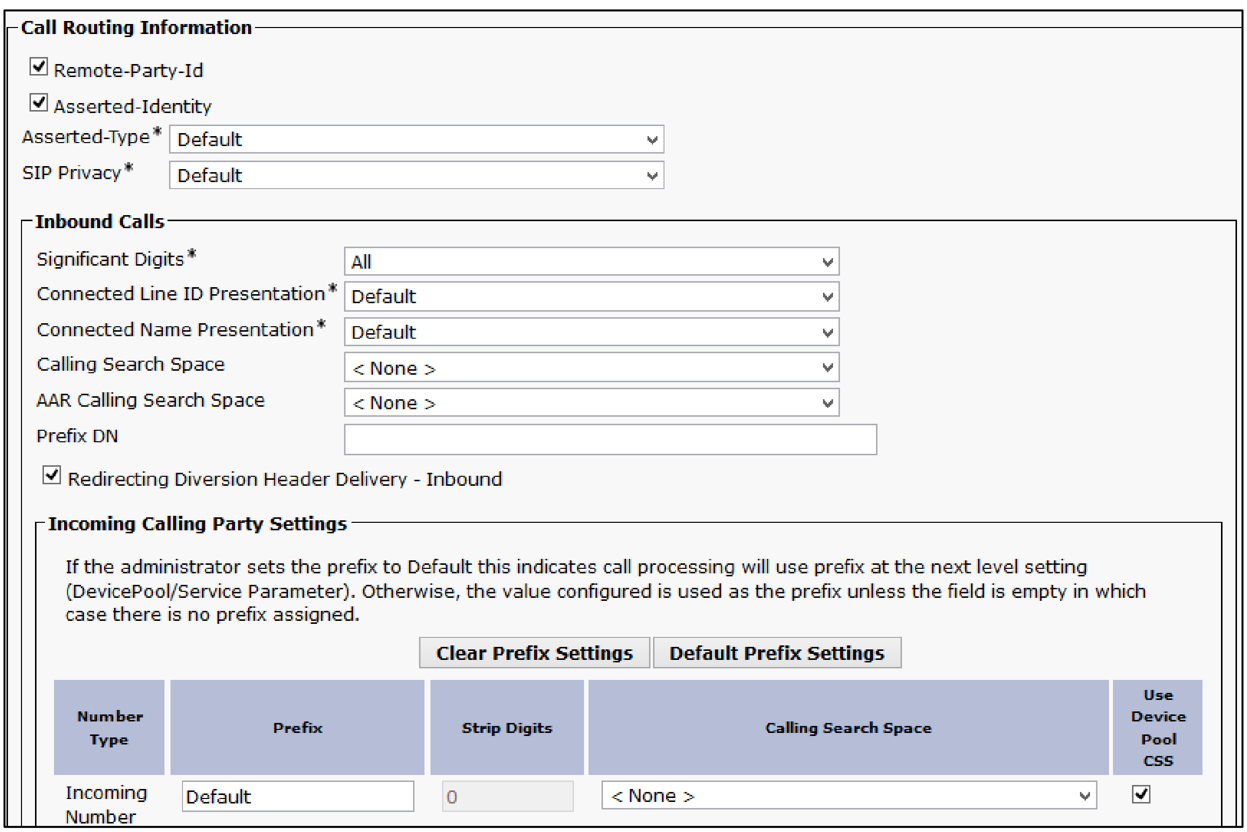
Intercompany Media Engine (IME)

E.164 Transformation Profile	< None >

MLPP and Confidential Access Level Information

MLPP Domain	< None >
Confidential Access Mode	< None >
Confidential Access Level	< None >

Cisco UCM: Trunk Configuration: Trunk to Voice Mail System: Unity Connection (3/5)



Call Routing Information

☑ Remote-Party-Id

☑ Asserted-Identity

Asserted-Type*	Default
SIP Privacy*	Default

Inbound Calls

Significant Digits*	All
Connected Line ID Presentation*	Default
Connected Name Presentation*	Default
Calling Search Space	< None >
AAR Calling Search Space	< None >
Prefix DN	

☑ Redirecting Diversion Header Delivery - Inbound

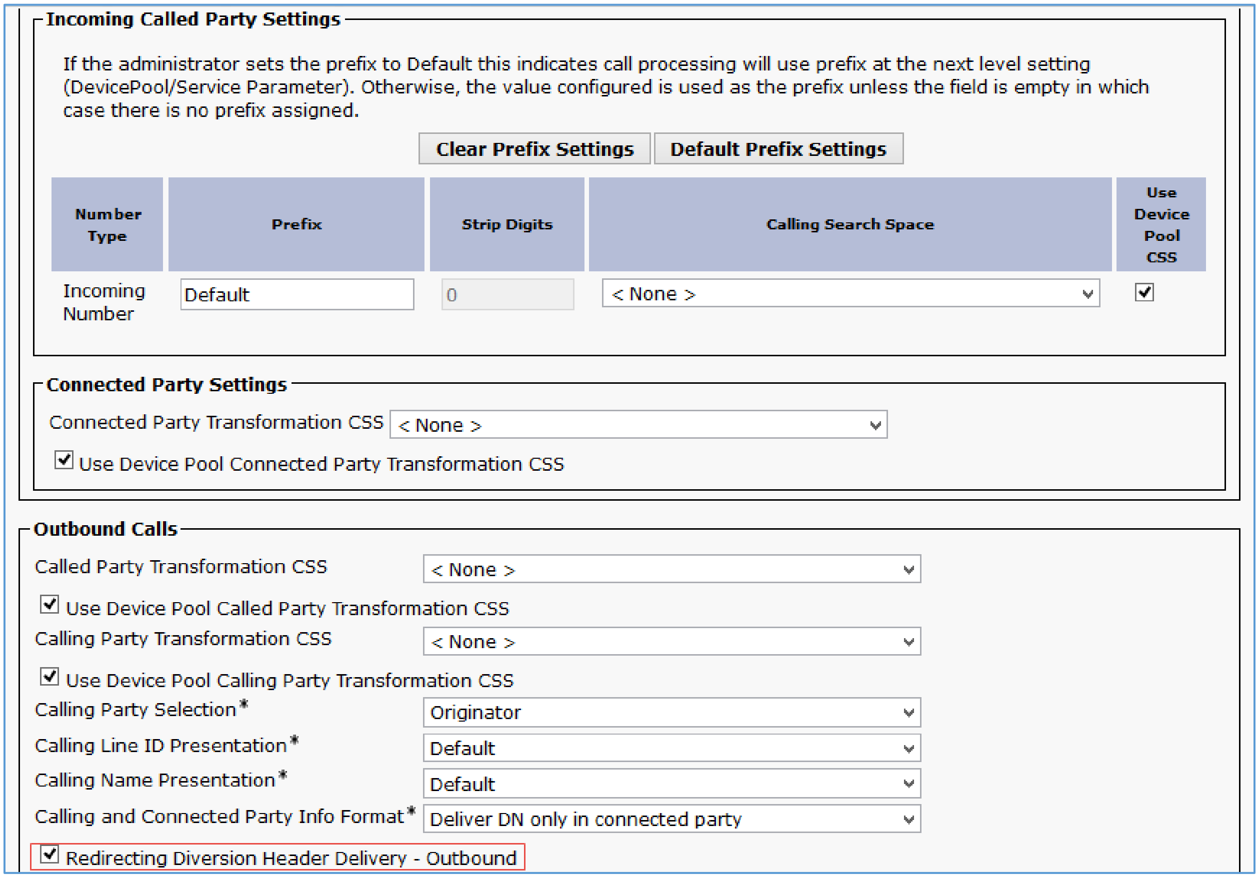
Incoming Calling Party Settings

If the administrator sets the prefix to Default this indicates call processing will use prefix at the next level setting (DevicePool/Service Parameter). Otherwise, the value configured is used as the prefix unless the field is empty in which case there is no prefix assigned.

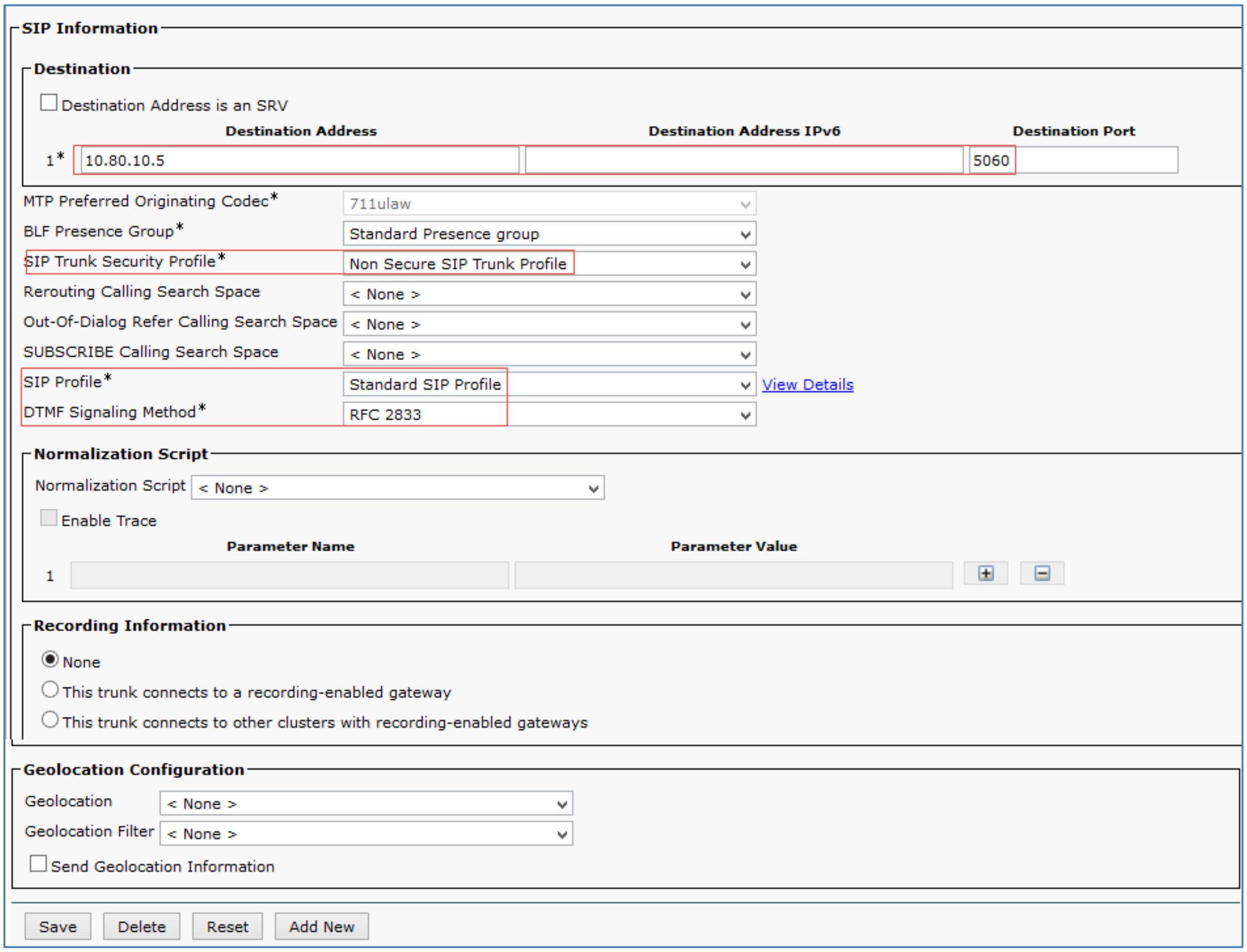
Clear Prefix Settings **Default Prefix Settings**

Number Type	Prefix	Strip Digits	Calling Search Space	Use Device Pool CSS
Incoming Number	Default	0	< None >	☑

Cisco UCM: Trunk Configuration: Trunk to Voice Mail System: Unity Connection (4/5)



Cisco UCM: Trunk Configuration: Trunk to Voice Mail System: Unity Connection (5/5)



Configure Route Patterns

Route patterns were configured for the following:

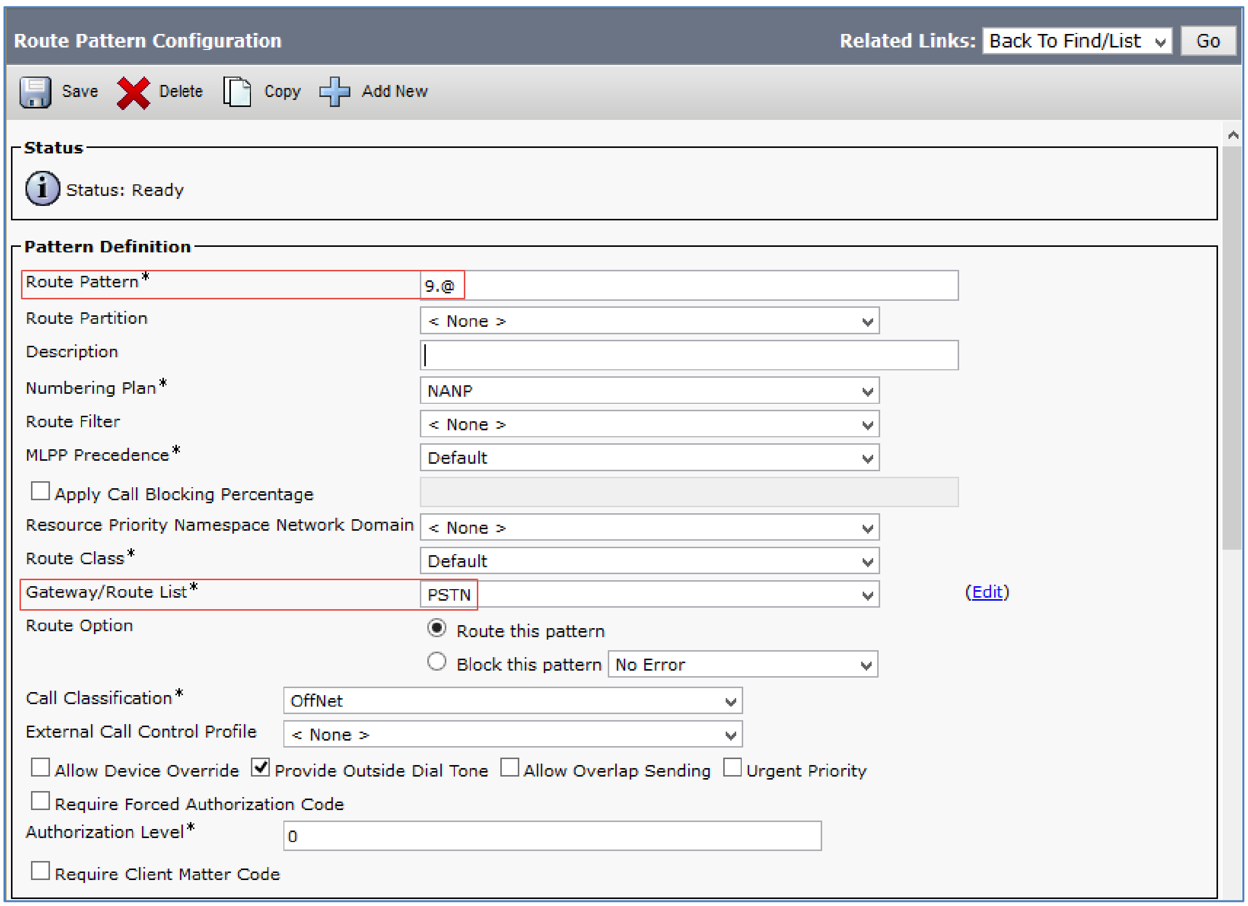
- To route calls from the Cisco UCM to the Cisco UBE towards PSTN GW
- To restrict caller id on outgoing calls.

To configure route patterns, perform the following procedure.

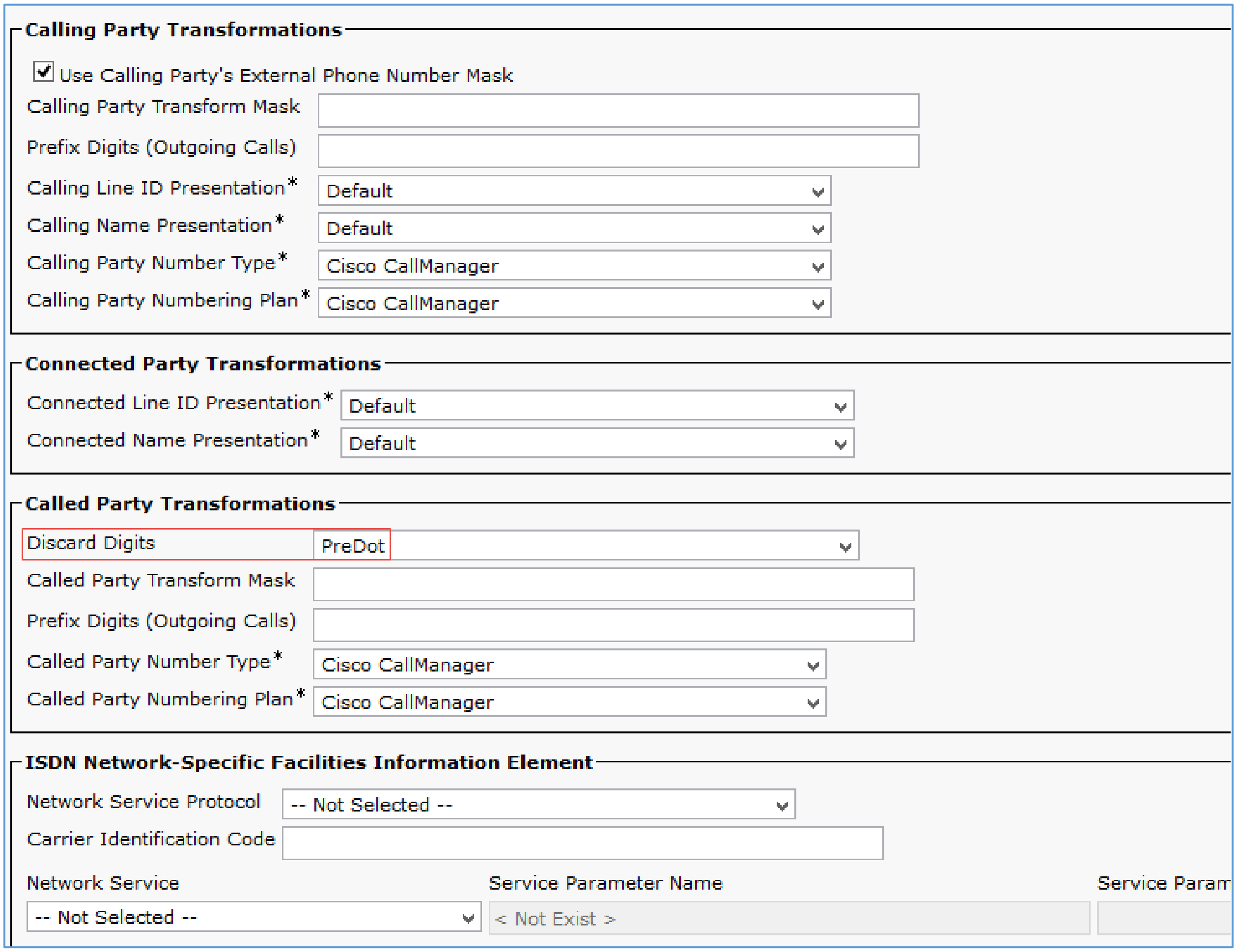
1. Navigate to Call Routing > Route/Hunt > Route Pattern.
2. Click Add New.
3. Enter the details desired, and then click Save.

The route pattern **9.@** and **\+*** were configured to enable outbound dialing from Cisco UCM to PSTN using the access code as 9 and using the +.

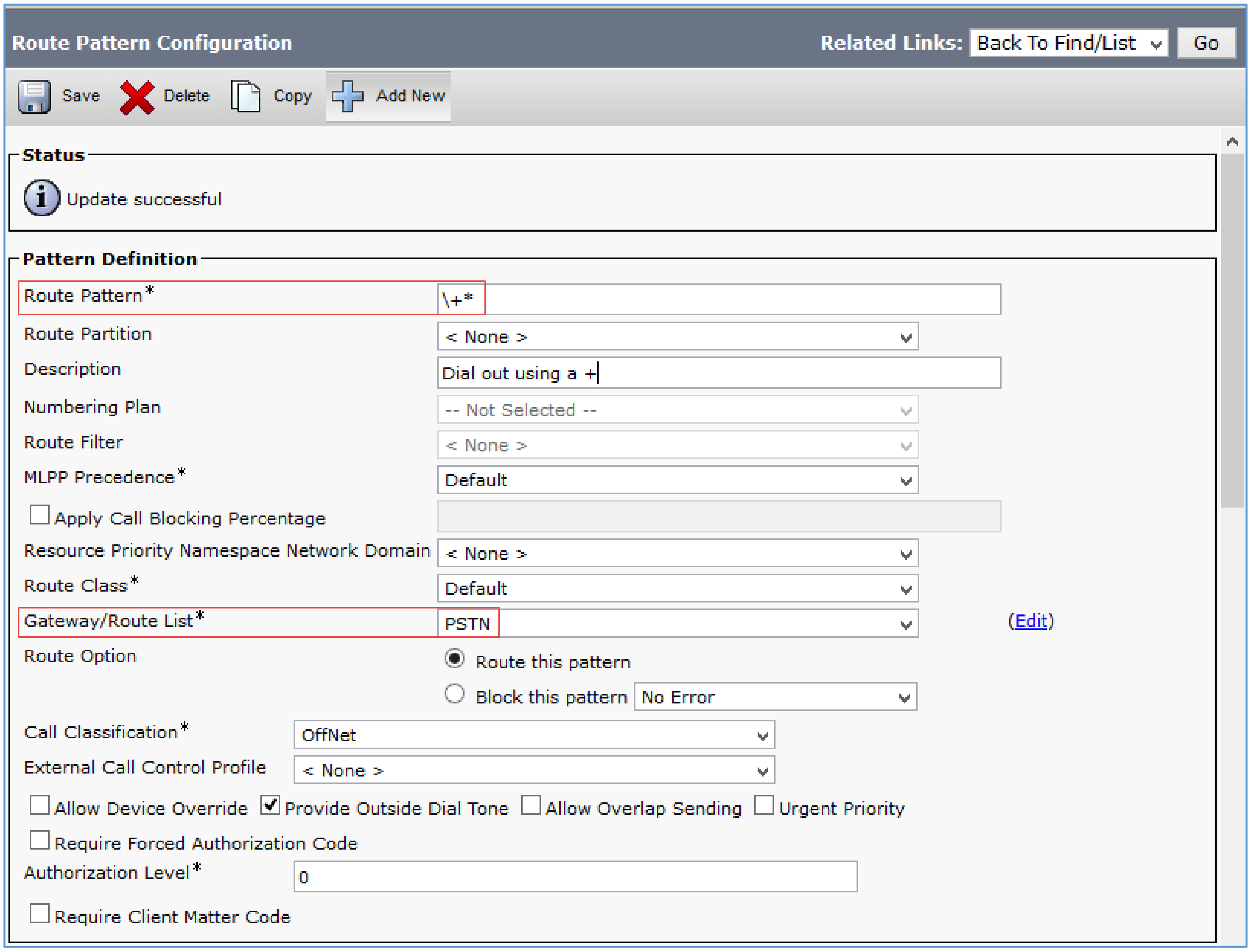
Cisco UCM: Route Pattern Configuration: Outbound Dialing Using Access Code 9 (1/2)



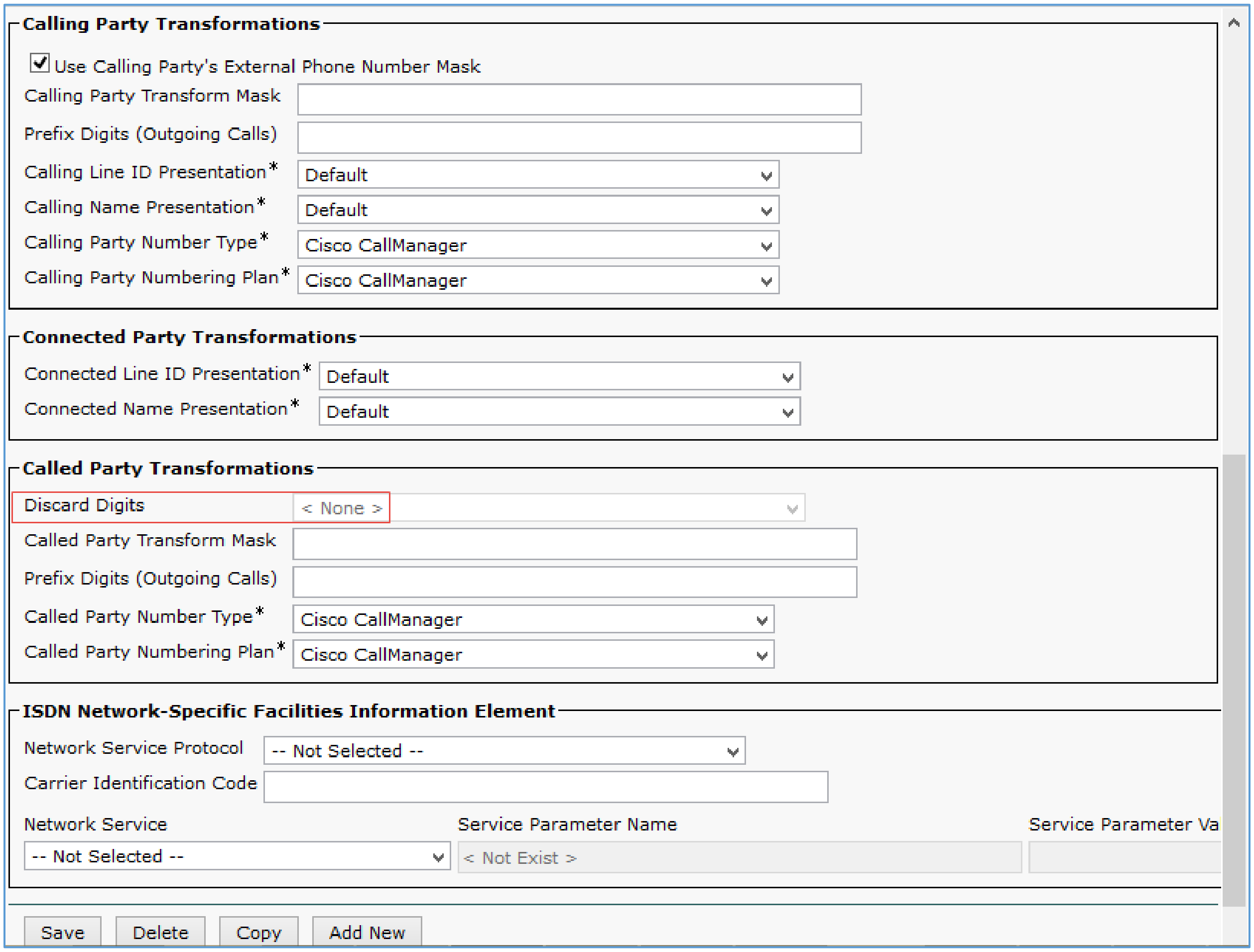
Cisco UCM: Route Pattern Configuration: Outbound Dialing Using Access Code 9 (2/2)



Cisco UCM: Pattern Configuration: Outbound Dialing Using a + (1/2)

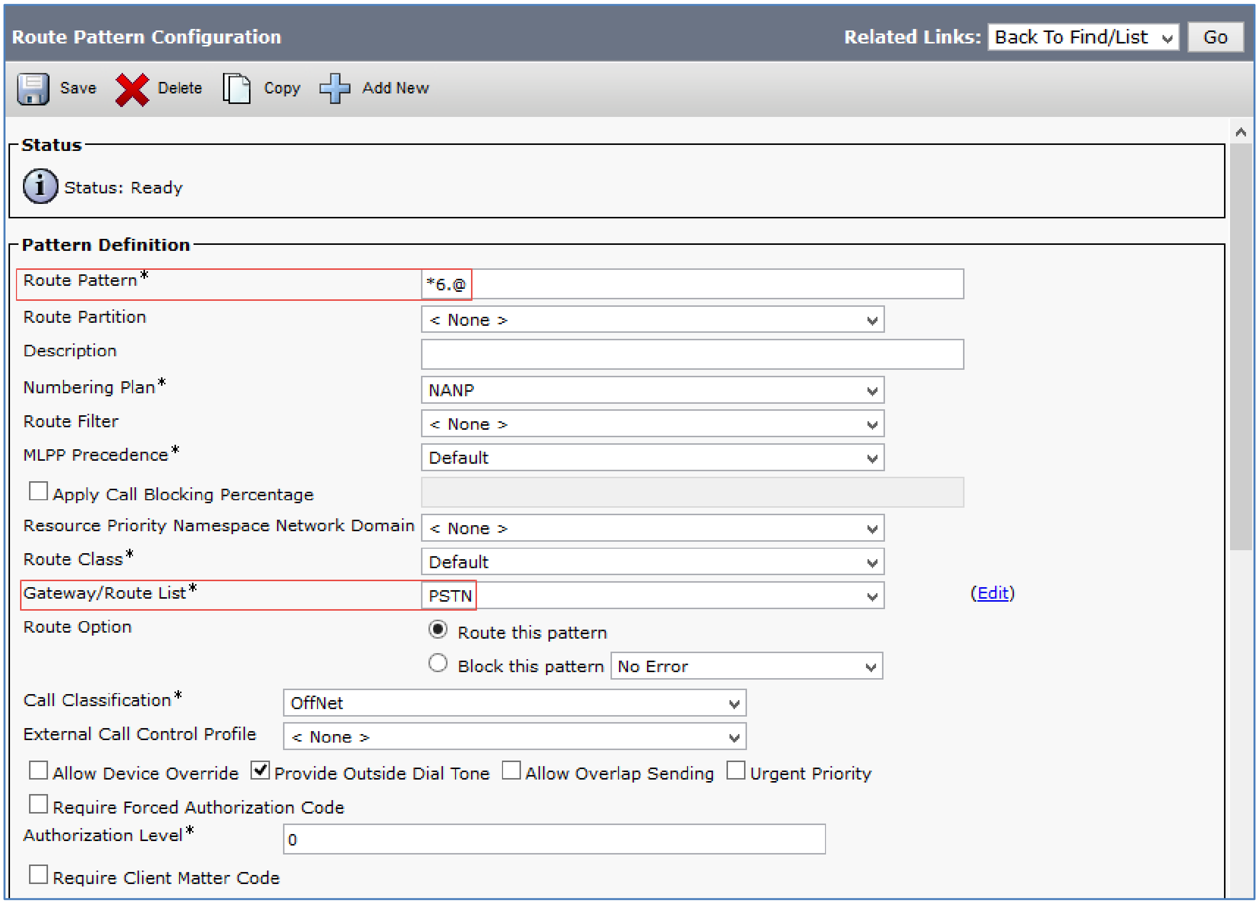


Cisco UCM: Pattern Configuration: Outbound Dialing Using a + (2/2)

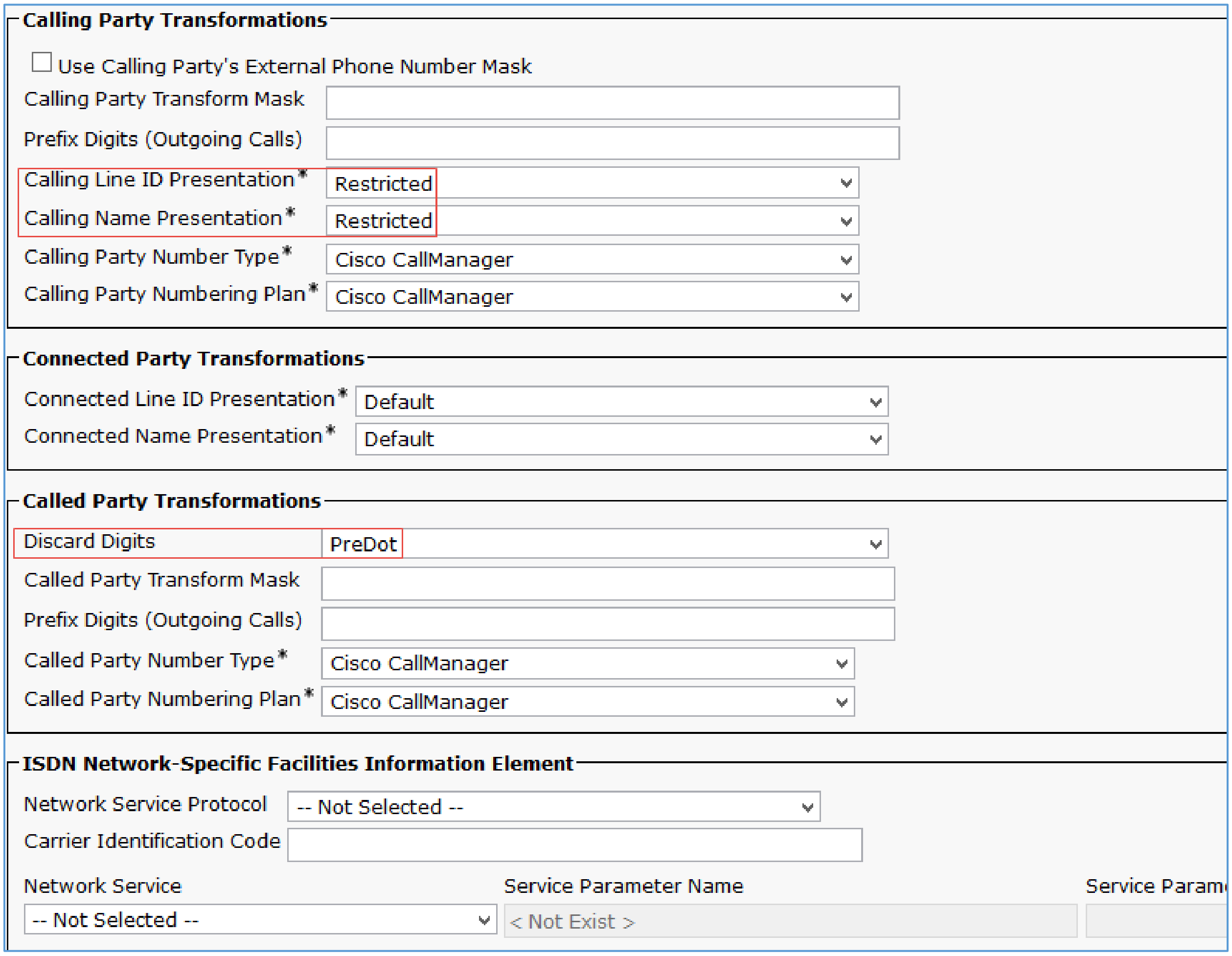


Similarly, the route pattern of ***6.@** was configured to restrict caller ID on outbound calls.

Cisco UCM: Route Pattern Configuration: Restrict Caller ID (1/2)

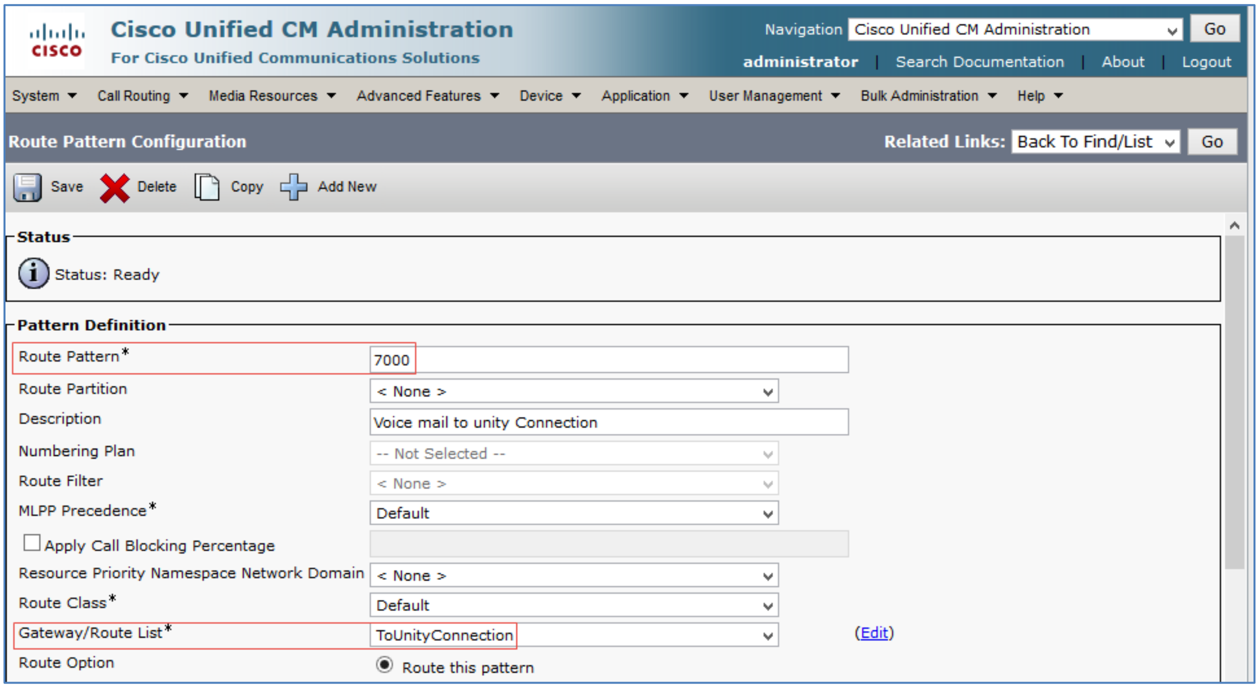


Cisco UCM: Route Pattern Configuration: Restrict Caller ID (2/2)

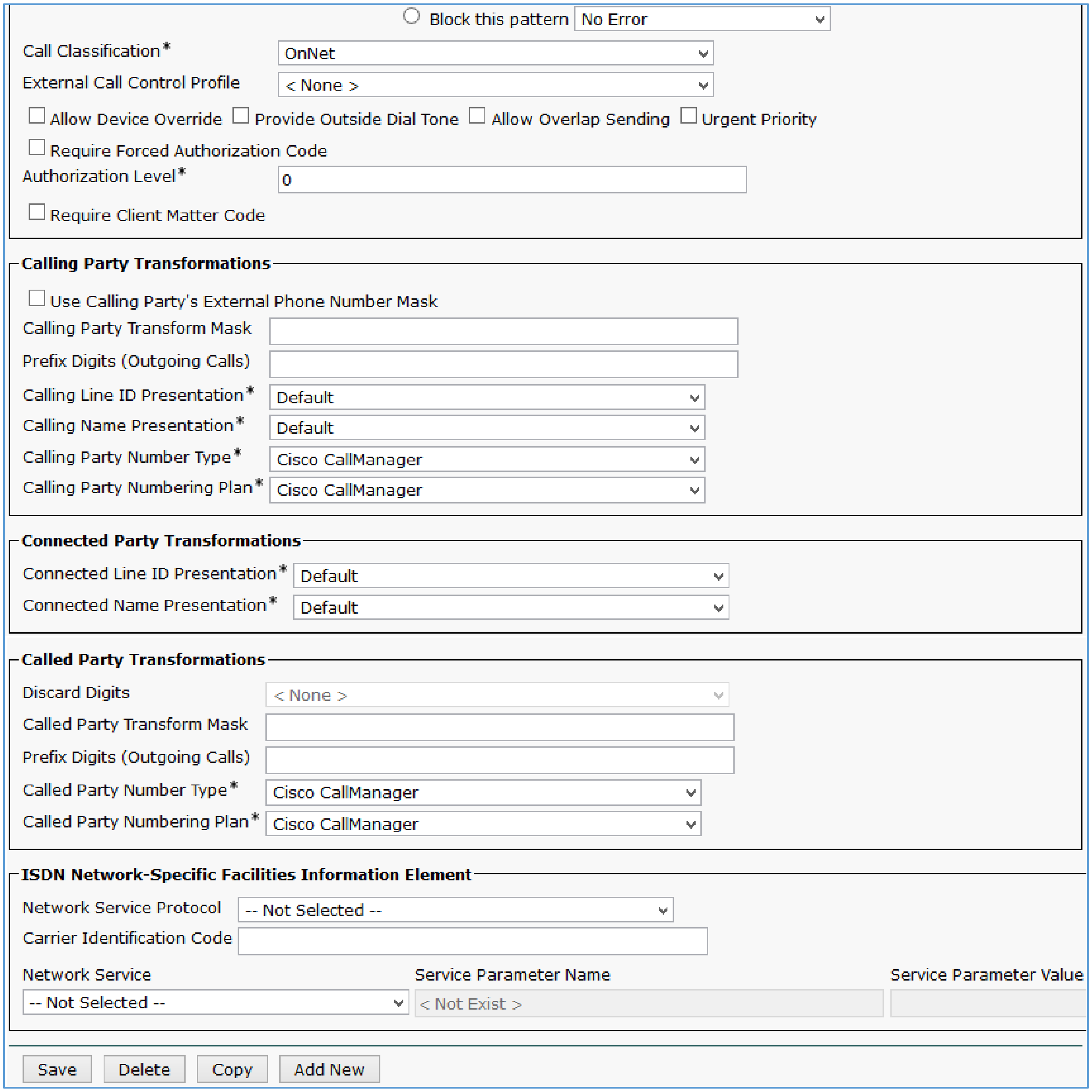


A route pattern of 7000 was configured to route the voice mail pilot number (7000) to the Unity Connection server.

Cisco UCM: Route Pattern Configuration: Voice Mail Pilot Number (1/2)



Cisco UCM: Route Pattern Configuration: Voice Mail Pilot Number (2/2)



Voice Mail Configuration

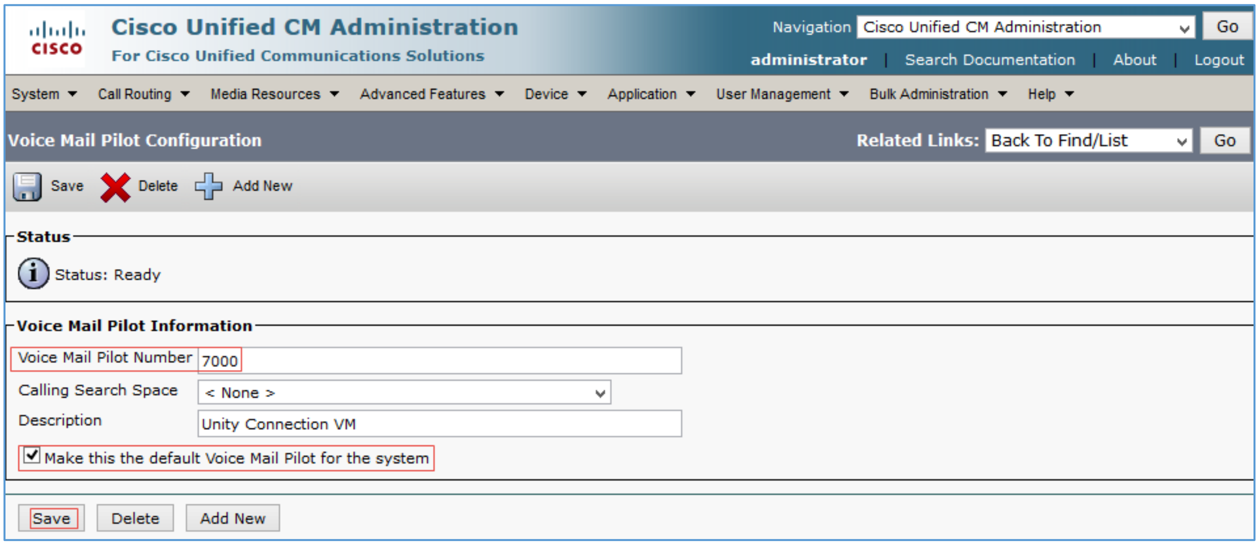
A Cisco UCM - Cisco Unity Connection SIP integration was performed to test the voice mail scenarios. Below is the configuration on Cisco UCM and Unity Connection for the same.

Configure Voice Mail Pilot and Voice Mail Profile on Cisco UCM

Use the following procedure to configure voice mail pilot and voice mail profile on Cisco UCM.

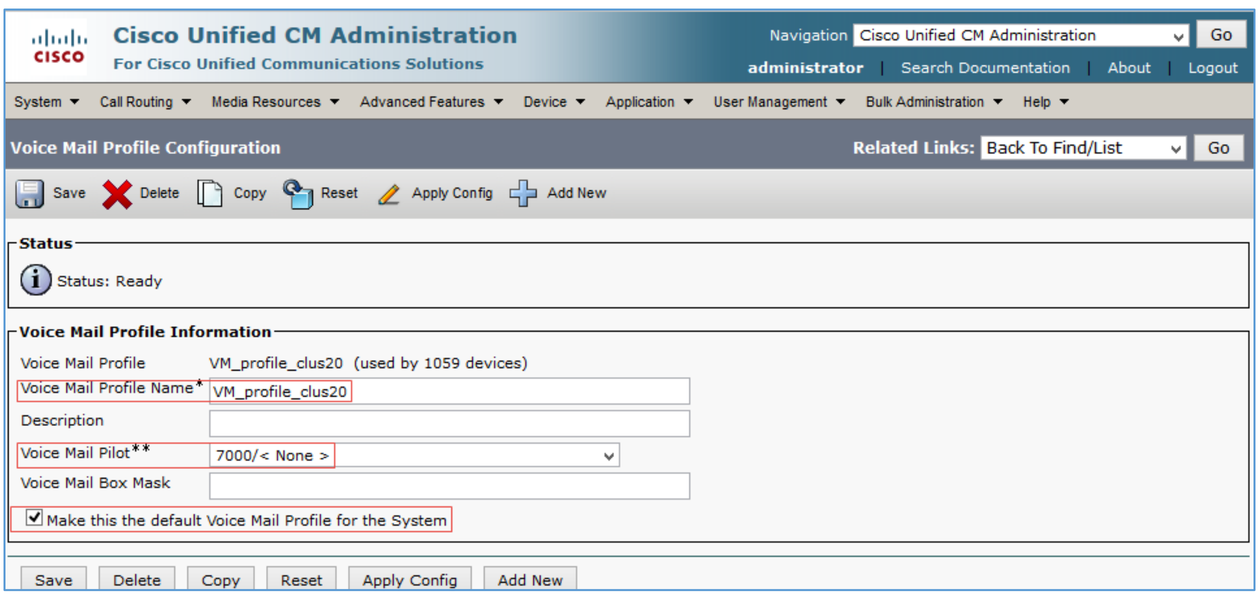
1. Navigate to **Advanced Features** > **Voice Mail** > **Voice Mail Pilot**.

Cisco UCM: Voice Mail Pilot Configuration: Add Voice Mail Pilot Number



2. Add a new pilot number. *7000* was configured for this example.
3. Select the **Make this the default Voice Mail Pilot for the system** check box.
4. Configure a **Voice Mail Profile** with this pilot number . *VM_profile_clus20* was configured for this example.

Cisco UCM: Voice Mail Profile Configuration



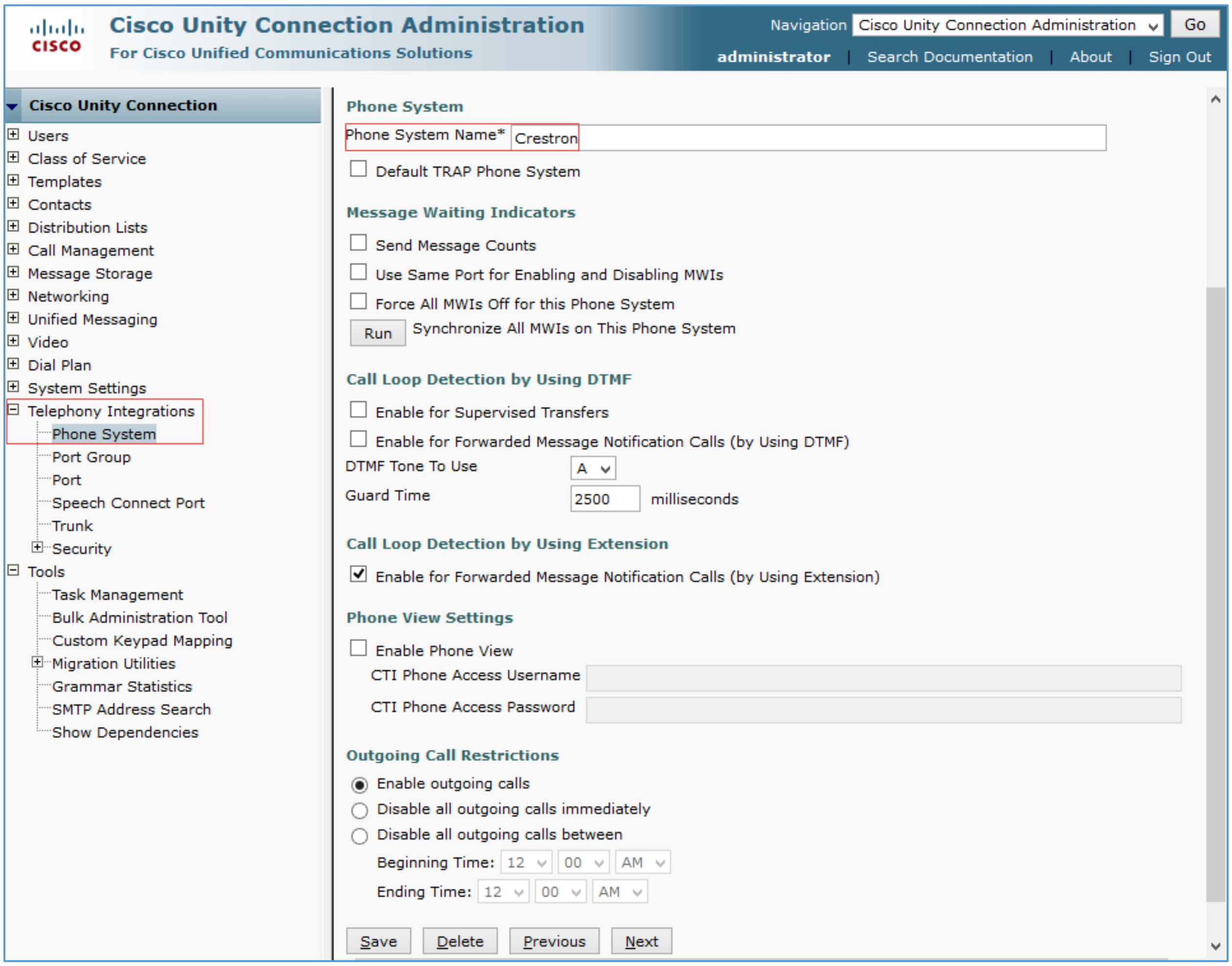
5. Check the **Make this the default Voice Mail Pilot for the system** check box.

Configuration on Unity Connection - Add New Phone System

To configure a new phone system, after logging into Unity Connection, perform the following procedure.

1. Navigate to **Telephony Integrations** > **Phone System**.
2. Click **Add New**.

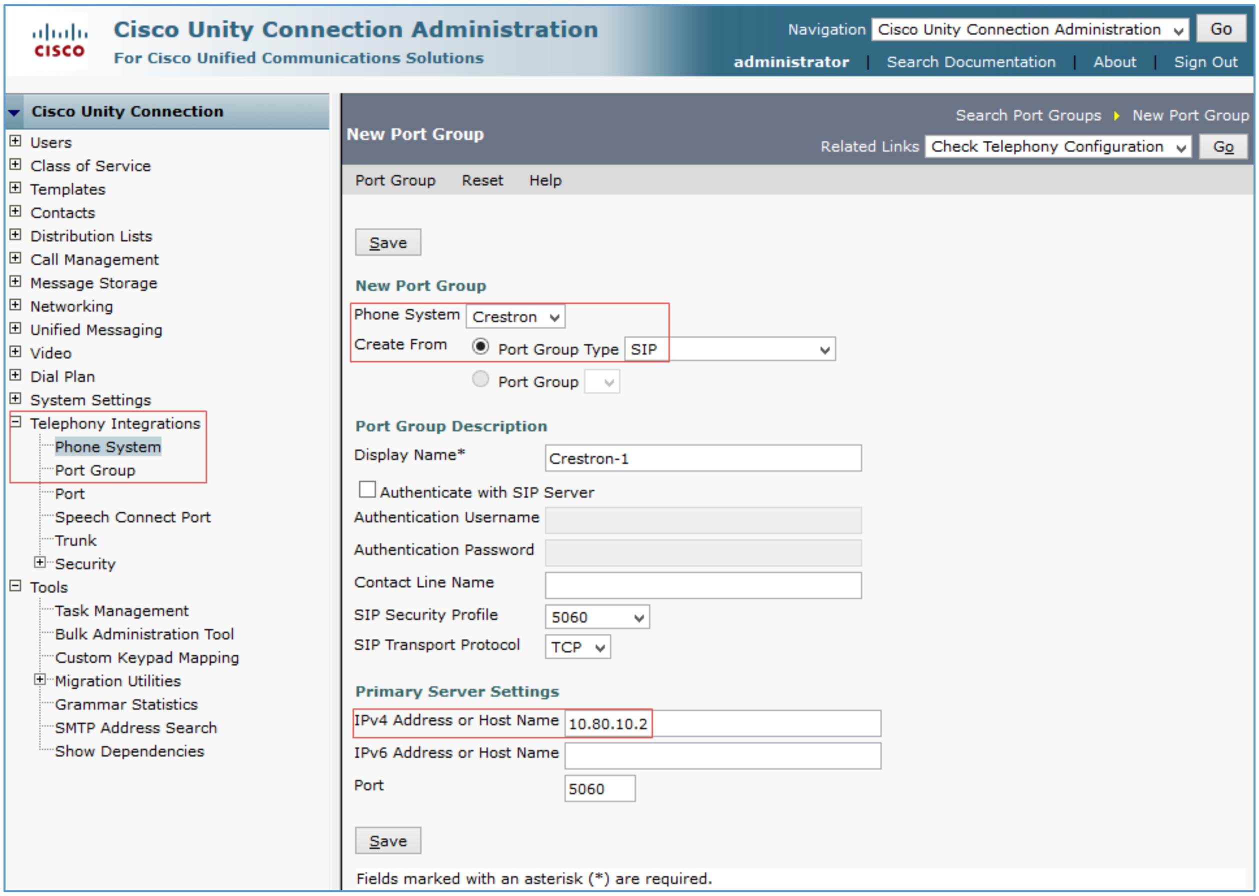
Cisco Unity Connection: Telephony Integrations: Phone System



3. Configure the **Phone System Name**: *Crestron* was used in this example.
4. Click **Save**.

On the **Phone System Basics** page, in the **Related Links** drop-down box, select **Add Port Group**, and select **Go**.

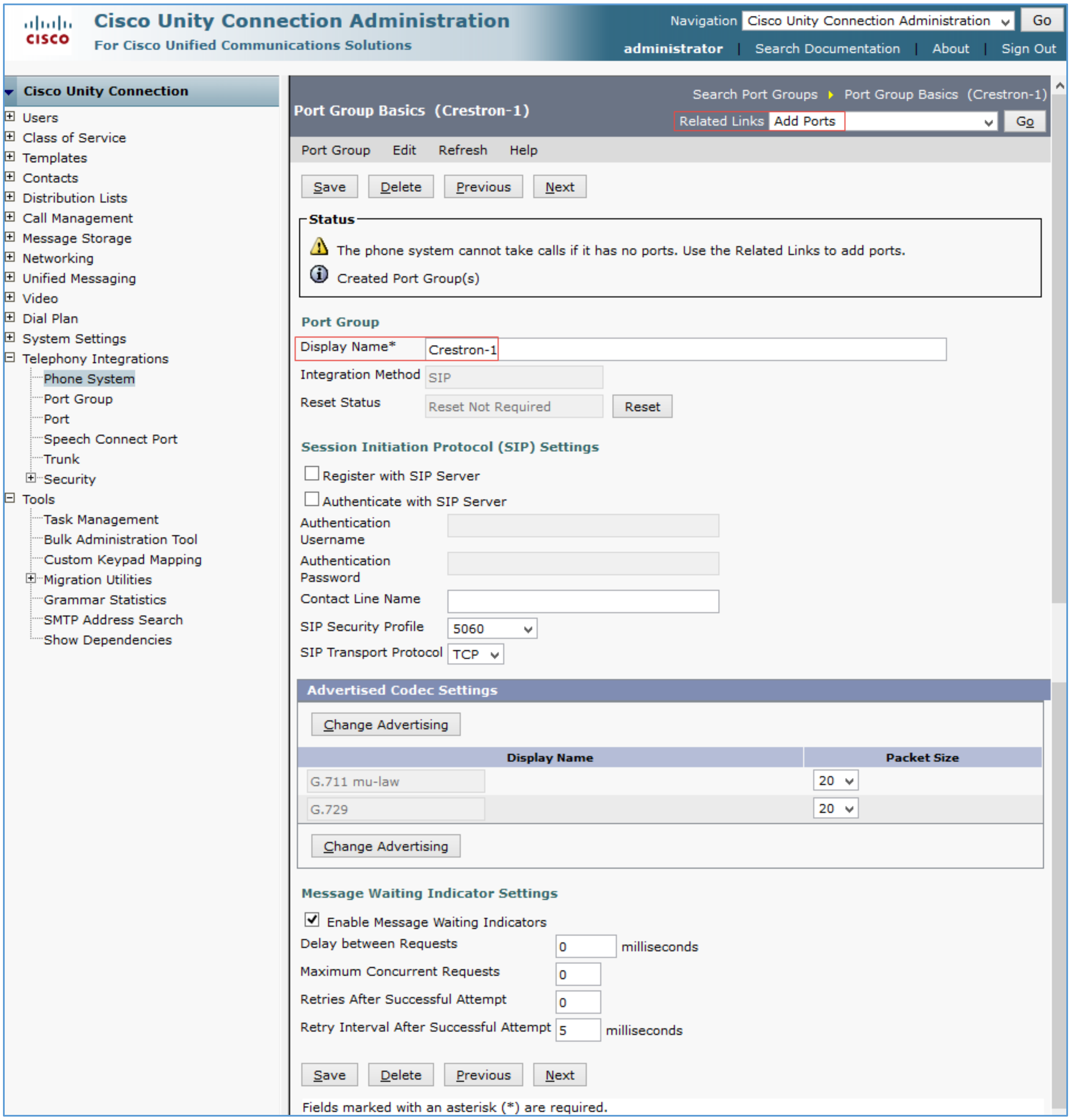
Cisco Unity Connection: Telephony Integrations: Port Group



1. **Phone System**: Select the one created earlier (Crestron).
2. **Create From**: Select **Port Group Type** and select **SIP** from the drop-down menu.
3. **IPv4 Address or Host Name**: Enter the IP address (or host name) of the primary Cisco UCM server that is being integrated with Cisco Unity Connection.
4. Click **Save**.

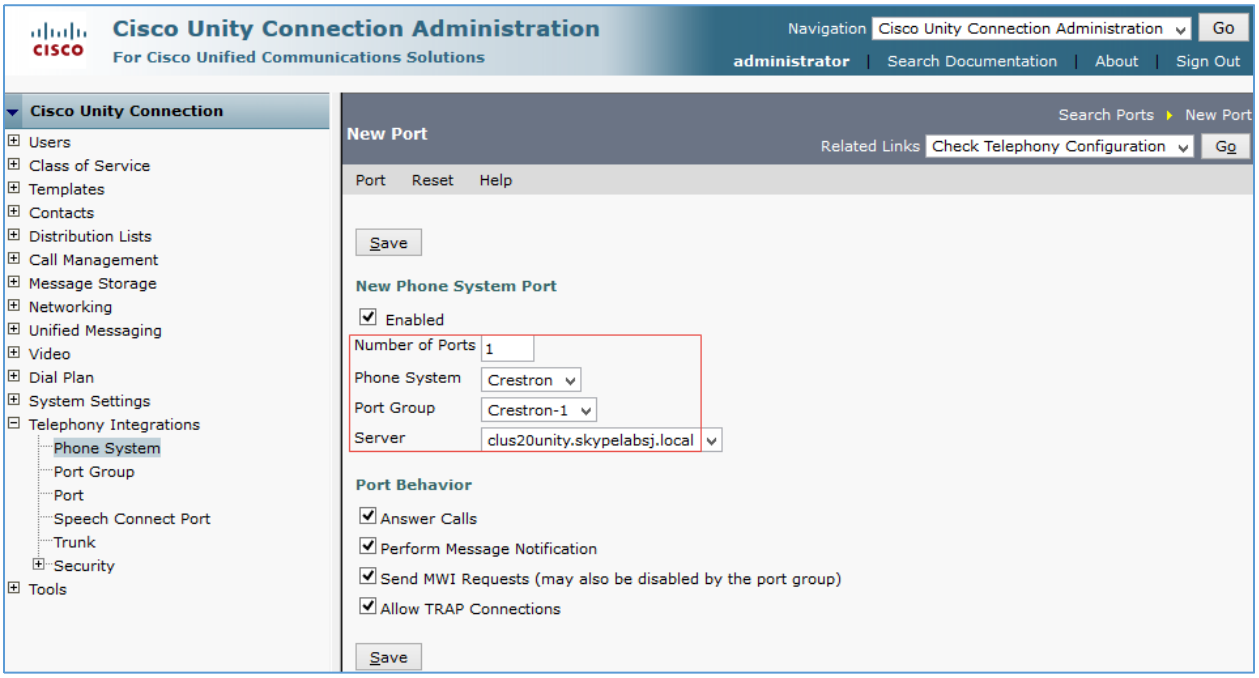
On the “Port Group Basics” page, in the **Related Links** drop-down menu, select **Add Ports** and select **Go**.

Cisco Unity Connection: Telephony Integrations: Port Group Added, Related Links to Add Port



On the **New Port** page, configure the settings and select **Save**.

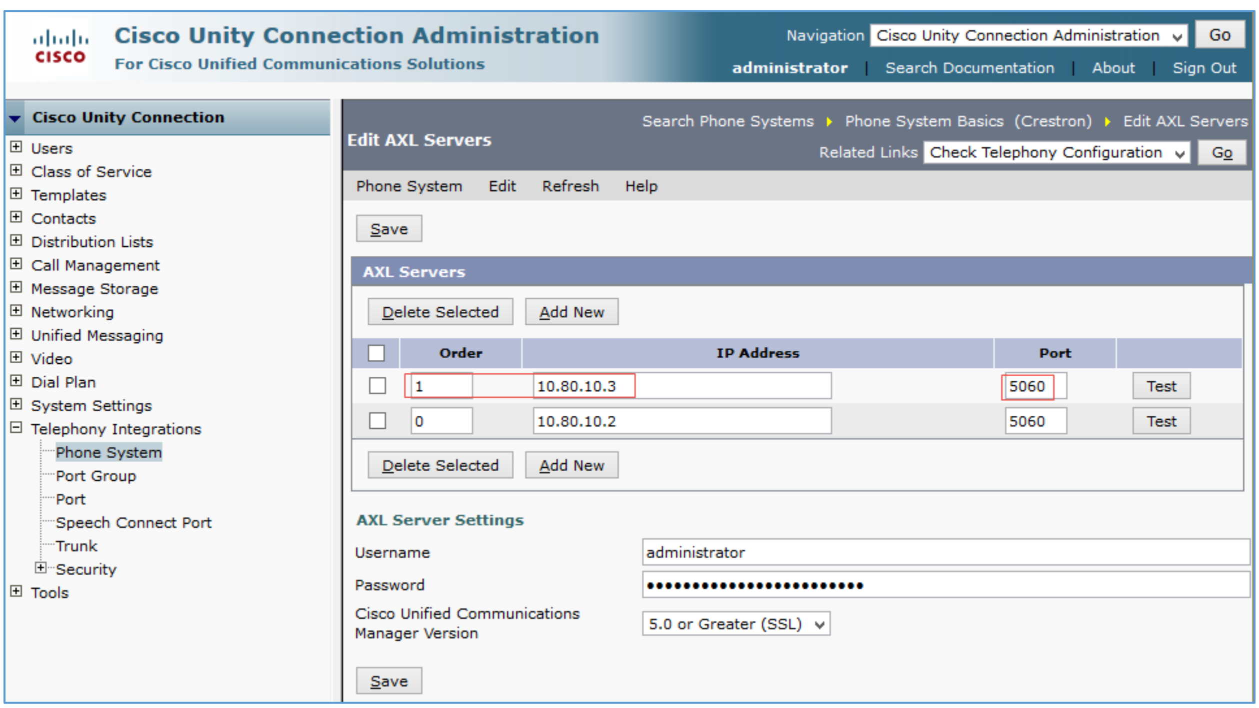
Cisco Unity Connection: Telephony Integrations: Port Group: Add New Port



Add the Cisco UCM subscriber IP also to the list of AXL servers for this phone system.

1. Navigate to **Telephony Integrations** > **Phone System** > **CUCM11.0**.

Cisco Unity Connection: Telephony Integrations: Phone System: Edit AXL servers



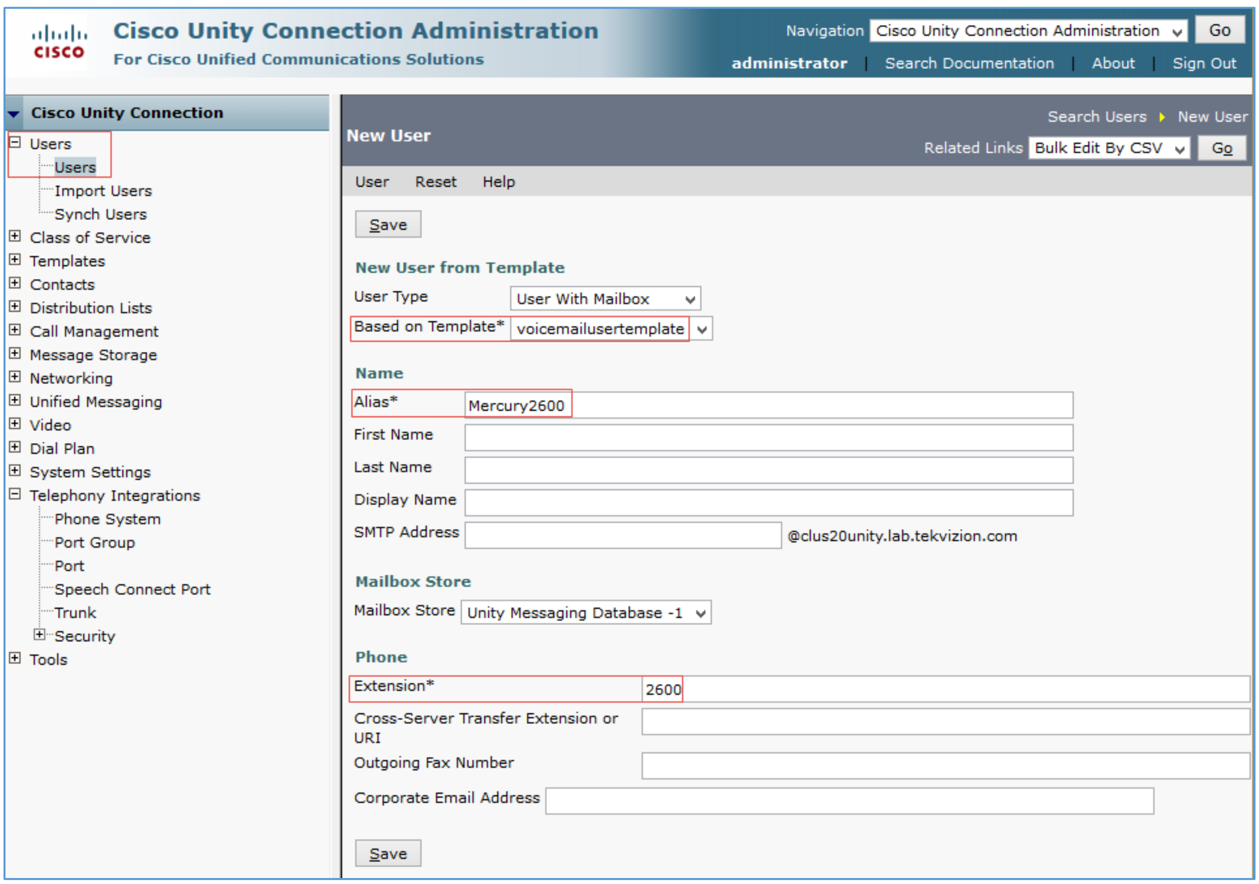
2. On the **Phone System Basics**, click **Edit** > **Cisco Unified Communications Manager AXL Servers**.
3. Click **Add New,** or in the second row, configure the Cisco UCM Subscriber IP and port. *10.80.10.3* and *5060* were used in this example.
4. Click **Save**.

Configure a Voice Mail User

To configure a new user that would have a voice mail box, after logging into Unity Connection, follow this procedure.

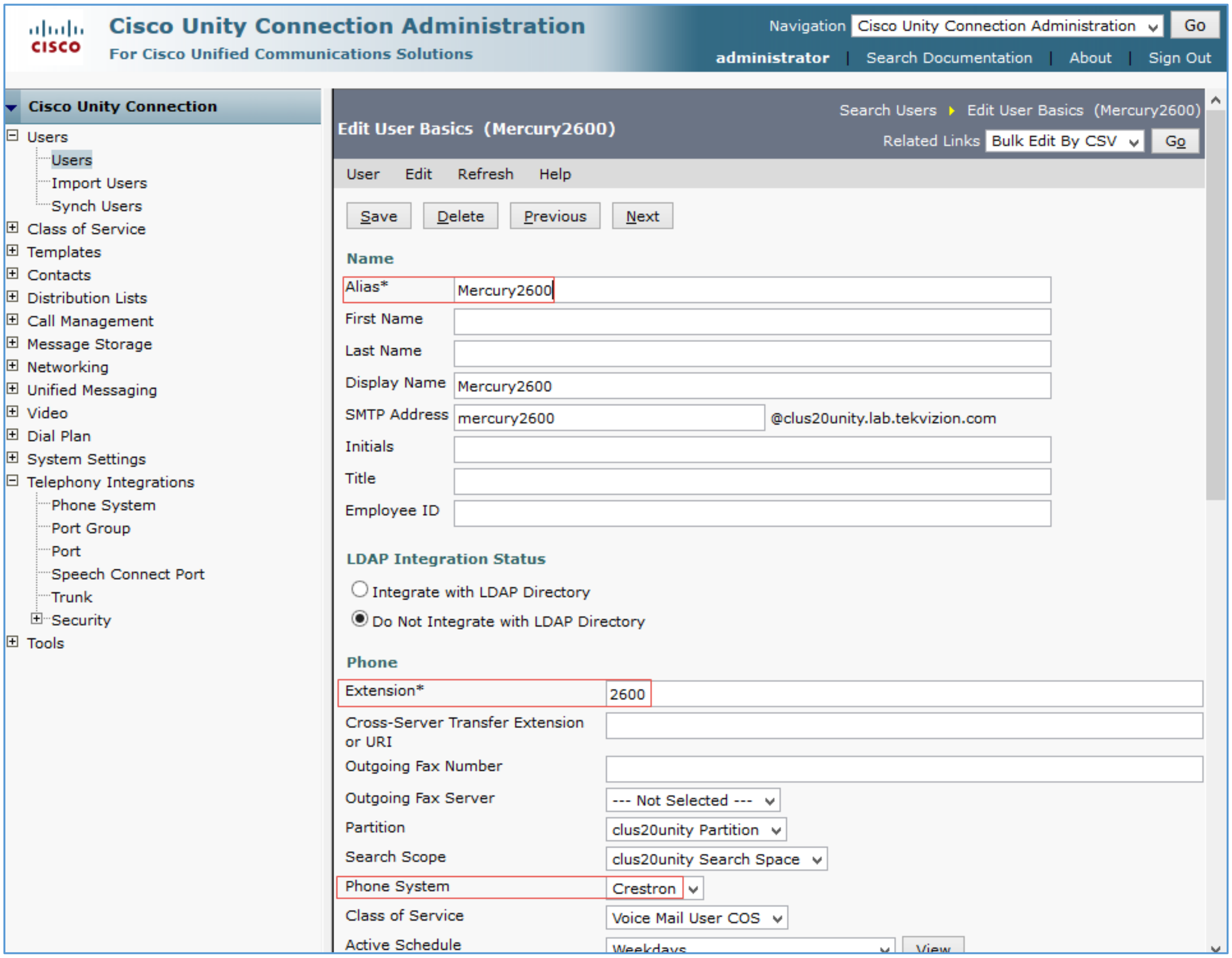
1. Navigate to **Users** > **Users**.
2. Click **Add New**.

Cisco Unity Connection: Users: Add User



3. Configure a **Based on Template** from the drop-down menu. *Voice Mailusertemplate* was used in this example.
4. Configure an **Alias**: *Mercury2600* was used in this example.
5. Configure an **Extension** for the user. *2600* was used in this example.
6. Click **Save**.
7. On the screen that follows, configure the **Phone System.** Select the Phone System configured earlier from drop-down list. *Crestron* was used in this example.

Cisco Unity Connection: Users: Assign Phone System to User



8. Click **Save**.

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