



# Connecting Webex Calling to Lumen SIP Trunk via a Multi-tenant Registration- based Local Gateway using Virtual Cisco Unified Border Element deployed in AWS (vCUBE-on-AWS) [IOS- XE17.9.02a]

August 4, 2023

# Table of Contents

Introduction .....	4
Network Topology.....	5
System Components .....	6
Hardware Requirements.....	6
Software Requirements .....	6
Features .....	7
Verified Features.....	7
Features Not Supported.....	7
Features Not Verified.....	7
Features Not Applicable.....	7
Caveats.....	8
Configuration .....	9
1    Configuring Cisco Webex Calling Tenant.....	9
1.1    Add location-Trunk .....	9
1.2    Adding user .....	18
2    Deploying vCUBE on AWS .....	22
3    Configuring Cisco Unified Border Element.....	31
Global vCUBE settings .....	31
Codecs .....	32
IP Networking.....	32
Routing.....	33
DNS Servers.....	33
Message Handling Rules .....	33
SRTP crypto .....	35
STUN ICE-lite .....	35
Tenant .....	36
Number translation rules.....	37
Dial peer .....	37
Configuration example.....	41
Important Information.....	51

## Table of Figures

Figure 1: Network Topology.....	5
Figure 2: Control Hub Services.....	9
Figure 3: Locations .....	10
Figure 4: Location creation or selection .....	10
Figure 5: Add location details. ....	11
Figure 6: Add location details Contd.,.....	11
Figure 7: Add Trunk details Contd., .....	12
Figure 8: Add Trunk details Contd. ....	14
Figure 9:PSTN Connection.....	14
Figure 10: PSTN Connection Contd.,.....	15
Figure 11: PSTN Connection Contd.,.....	15
Figure 12: Add Numbers .....	16
Figure 13: Add Numbers Contd.,.....	17
Figure 14: Add Numbers Contd.,.....	17
Figure 16: Adding Users .....	18
Figure 17: Manually Add or Modify Users .....	18
Figure 18: Adding email address and name.....	19
Figure 19: Confirm Adding .....	19
Figure 20: Add Services for Users .....	20
Figure 21: Assign Numbers .....	21
Figure 22: Add User successful. ....	21
Figure 22: Launch Instance .....	22
Figure 23: Name and Tags.....	22
Figure 24: Browsing AMIs .....	23
Figure 25: Selecting AMI .....	24
Figure 26: Selecting AMI Contd.,.....	25
Figure 27: Verifying the selected AMI.....	26
Figure 28: Instance Type and Key Pair .....	27
Figure 29: Network Settings.....	28
Figure 30: Inbound Security Group Rules .....	29
Figure 31: Storage configuration .....	29
Figure 32: Summary and Launch instance .....	30

## Introduction

This application note describes a tested virtual Cisco Unified Border Element (vCUBE) in Amazon Web Services (AWS) configuration being used as a multi-tenant registration-based Local Gateway (LGW) to connect Webex Calling to a SIP PSTN provider such as Lumen. Please refer to provider documentation and content provided at [www.cisco.com/go/interoperability](http://www.cisco.com/go/interoperability) for guidance on how to adjust this tested configuration to meet the specific requirements of your trunking service.

This document assumes the reader is knowledgeable with the terminology and configuration of vCUBE-in-AWS. The configuration settings specifically required for Webex Calling registration-based LGW along with multi-tenancy are presented. Feature configuration and most importantly the dial plan is customer specific and need individual approach.

- **This application note describes how to configure a Webex Calling registration-based LGW with multi-tenancy running on vCUBE-in-AWS [IOS-XE 17.9.1a] for connectivity to Lumen SIP Trunking service.**
- Testing was performed in accordance with Webex Calling registration-based Local Gateway test methodology along with multi-tenancy and among features verified were – basic calls, DTMF transport, Music on Hold (MOH), semi-attended, attended, and blind transfers, call forward and conference.
- The vCUBE configuration presented in this document is based on a lab environment with a simple dial-plan used to ensure proper interoperability between PSTN network and Webex Calling registration-based Local Gateway with multi-tenancy. The configuration described in this document details the important configuration settings to enable interoperability to be successful and care must be taken by the network administrator deploying Cisco Webex Calling registration-based Local Gateway trunk to successful interworking with the service provider network.

## Network Topology

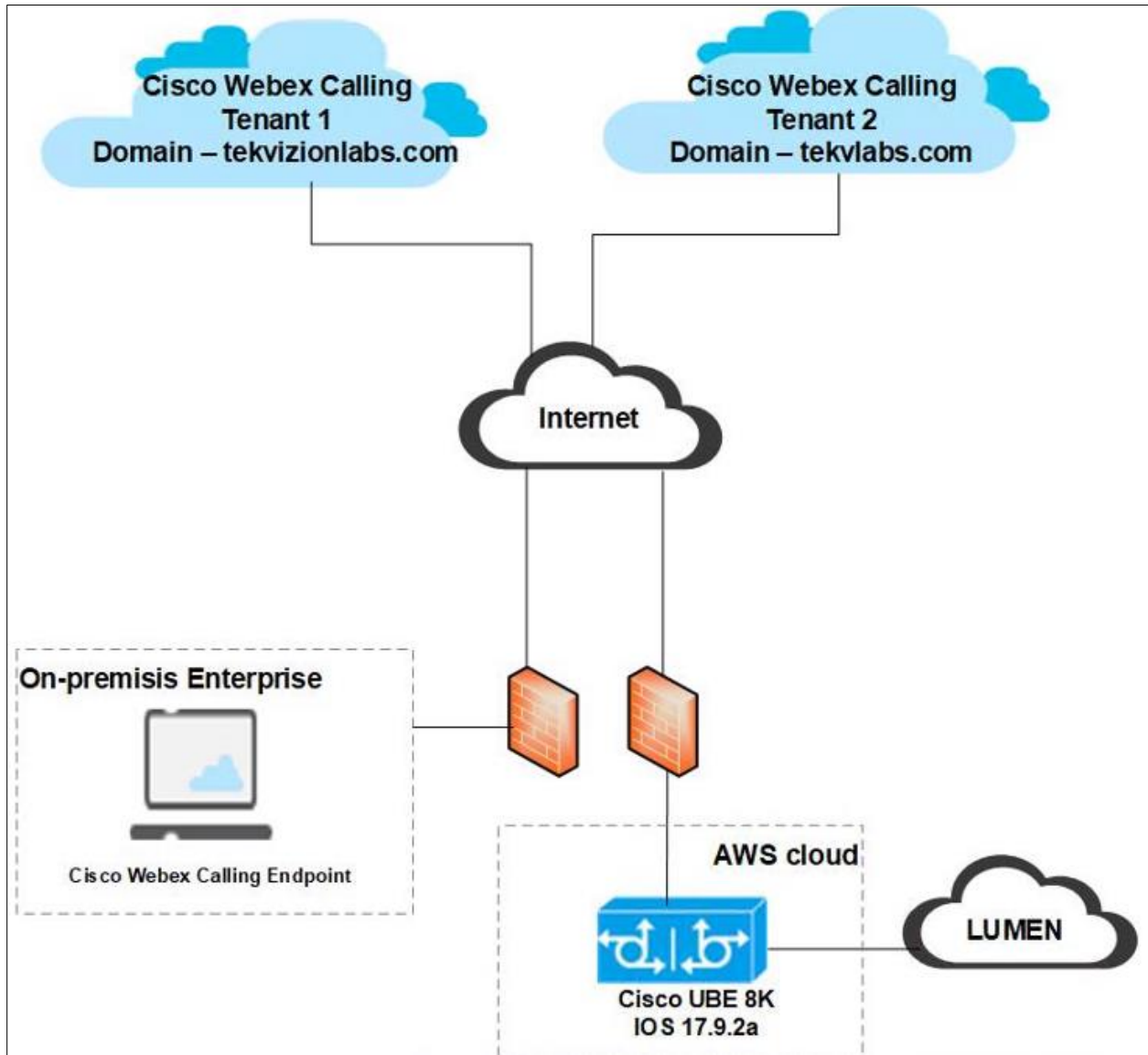


Figure 1: Network Topology

- The network topology includes vCUBE running in AWS as an EC2 instance, Lumen SIP Trunking service, and Cisco Webex Calling Endpoints that include the Webex client and Cisco ATA. vCUBE is registered to Cisco Webex Calling as a LGW for multiple Webex Calling tenants.

## Cisco Webex Calling and Cisco CUBE Settings:

Setting	Value
Transport from vCUBE to Webex Calling	TLS with SRTP
Transport from vCUBE to Lumen	UDP with RTP
Voice Mail Support	YES
Session Refresh	YES
Early Media support	YES

## System Components

### Hardware Requirements

- vCUBE running on AWS
  - cisco C8000V (VXE) processor (revision VXE)
- Cisco ATA 19X

### Software Requirements

- vCUBE:
  - 14.6 running IOS-XE 17.9.2a
  - Cisco IOS Software [Cupertino], Virtual XE Software (X86\_64\_LINUX\_IOSD-UNIVERSALK9-M), Version 17.9.2a, RELEASE SOFTWARE (fc4)
- Cisco ATA 19X-MPP-Version: 11-2-1MPP0001-006
- Cisco Webex Client Version: 43.3.0.25468

# Features

## Verified Features

- Incoming and outgoing calls using G711ulaw voice codecs
- Call Conference
- Fax
  - G711 Pass-through
  - T38 Fax
- Auto Attendant
- Voice Mail
- Call hold & Resume (MoH)
- Semi-attended and Attended Call transfer
- Blind Transfer
- Call forward (all, busy and no answer)
- DTMF (RFC2833)
- IP-PBX Calling number privacy

## Features Not Supported

- Cisco Webex Calling does not support the following
  - Fax Super G3 speed
  - Tone on Hold

## Features Not Verified

- No option to set G729 codec in Webex. As a result, the G729 FAX test cases are not tested.

## Features Not Applicable

- The following are the sections that are not applicable for this test topology:
  - Codec mid-call re-negotiation
  - IP-PBX Telephone Number Support

## Caveats

- Internet Gateway in AWS will not convert the public IP to private IP assigned to the vCUBE when it hands over the SIP request from Lumen to the vCUBE-in-AWS. SIP Profiles are used in vCUBE to convert the public IP to the private IP in the SIP messages to process the incoming call. Similarly SIP Profiles are created to convert the private IP address to the public IP address in the SDP and SIP headers for the SIP messages from vCUBE to Lumen for proper call establishment and call clearance.
- The following behavior is observed in media establishment when Webex users use the MPP phone and the Webex client.
  - In the MPP phone, the ICE candidates are not nominated, though STUN request and response are processed between MPP phone and vCUBE. Hence ICE Re-INVITE is not received from Webex. However, media connected between Webex relay server IP and call connected with bi-directional audio. The issue has been raised to cisco [CUBE-1177].
  - In Webex clients, the ICE candidates are nominated with successful STUN processing and media connected with Client User IPs. Hence Webex client is used for this testing.
- Cisco ATA registered to Webex calling uses only G711 codec for voice call. Hence, T38 fax transmission test cases were successful with G711 voice codec only.
- Webex does not negotiate ICE candidate attributes with ATA 19X.



# Configuration

## 1 Configuring Cisco Webex Calling Tenant

### 1.1 Add location-Trunk

Step1:

Login to Cisco Webex Control Hub and navigate to Services.

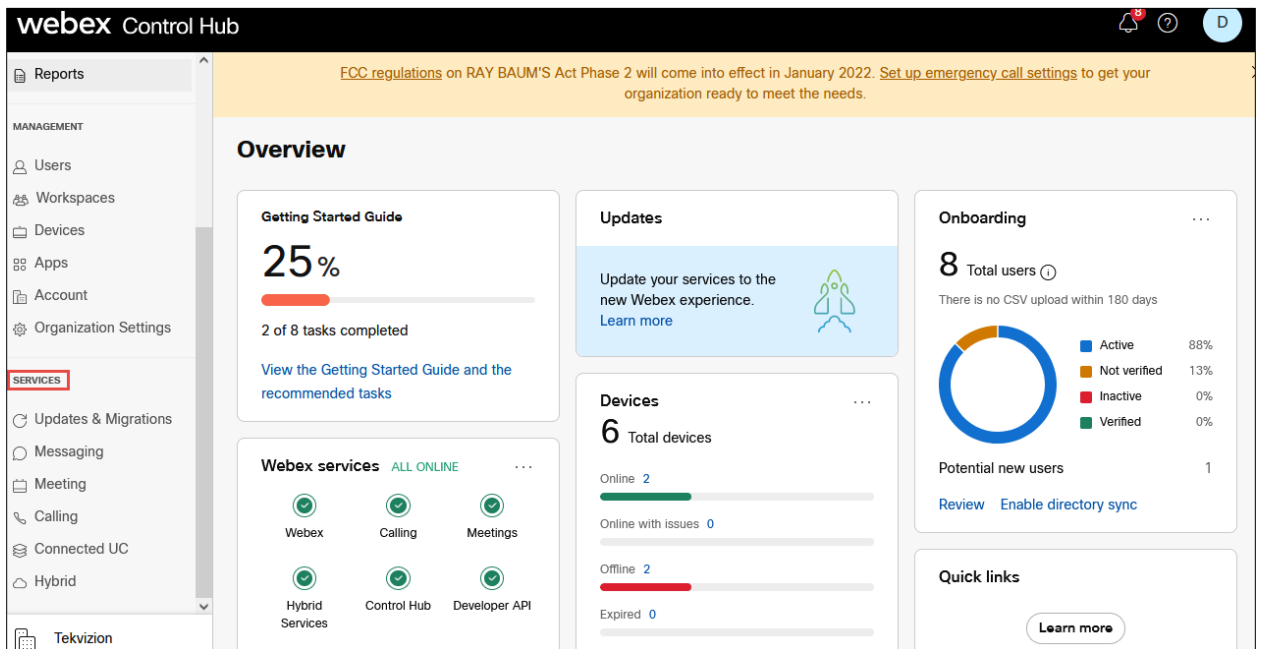


Figure 2: Control Hub Services

Step 2:

Navigate to **Calling** and click on **Locations**.

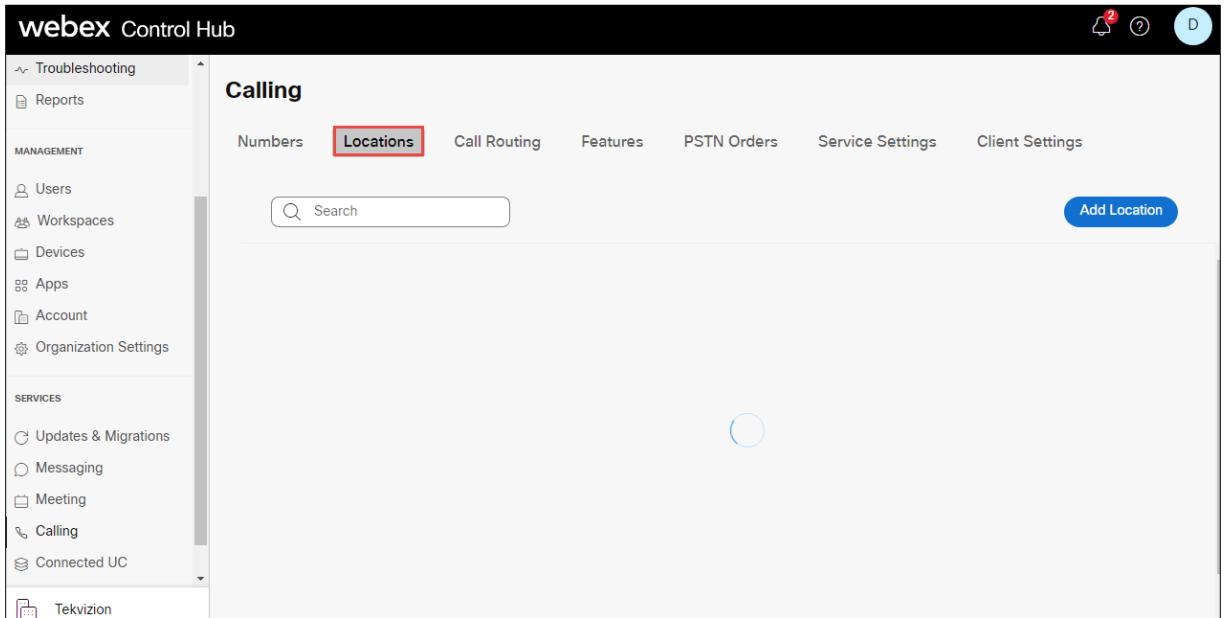


Figure 3: Locations

Step 3:

Click on **Add Location**

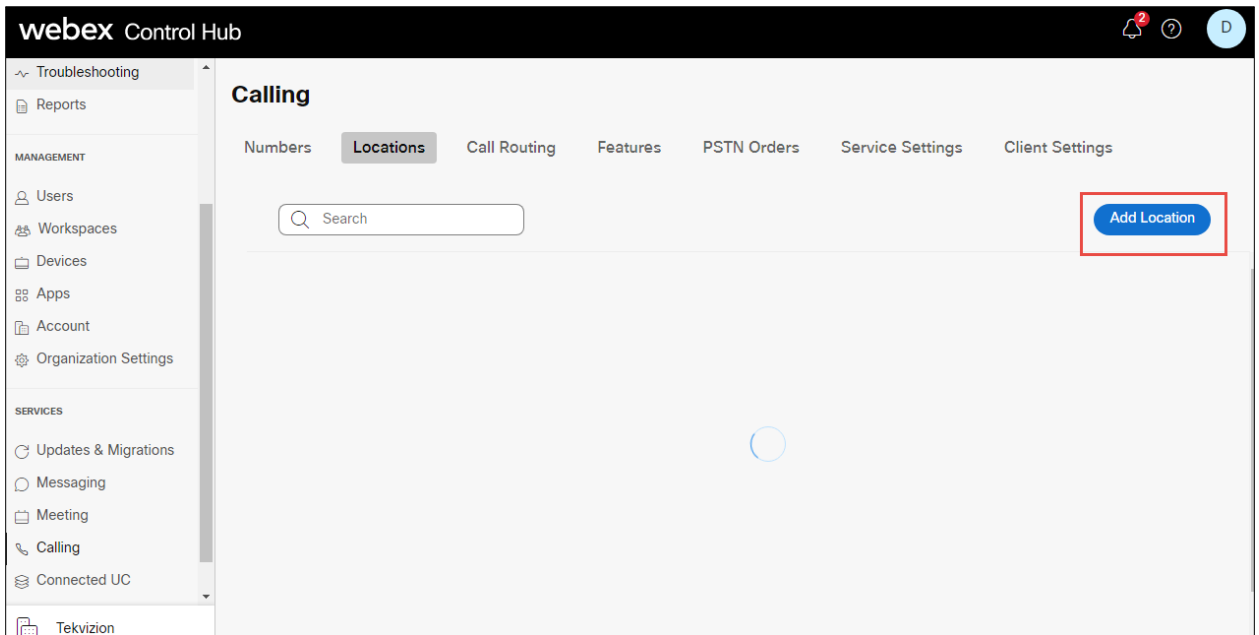


Figure 4: Location creation or selection

Step 4:

Enter **Location** details and click **save**. After adding the location, you will be prompted to add connection type, select No for the connection type. It can be added later.

The screenshot shows a form titled "Add Location" with a red border. The form is divided into two columns. The left column contains: "Location Name" with a text input field containing "Cisco" and a clear button (x); "Country/Region" with a dropdown menu showing "United States of America"; "Location Address" with a text input field containing "3701 W Plano Pkwy ste 300" and a clear button (x), and a secondary text input field for "Street address line 2 (optional)"; and "City/Town" with a text input field containing "Plano" and a clear button (x). The right column contains: "Announcement Language" with a dropdown menu showing "English" and a help icon (i); "Email Language" with a dropdown menu showing "English - American English" and a help icon (i); and "Time zone" with a dropdown menu showing "Select a time zone".

Figure 5: Add location details.

The screenshot shows the continuation of the "Add Location" form. The left column contains: "City/Town" with a text input field containing "Plano" and a clear button (x); "State/Province/Region" with a dropdown menu showing "Texas"; and "Zip/Postal code" with a text input field containing "75075-7840" and a clear button (x). At the bottom right of the form, there are two buttons: "Cancel" and "Save". The "Save" button is highlighted with a red border.

Figure 6: Add location details Contd.,

Step 5:

Navigate to **Calling** → **Call Routing** → **Add Trunk** and provide the details of Location and name for the SIP Trunk

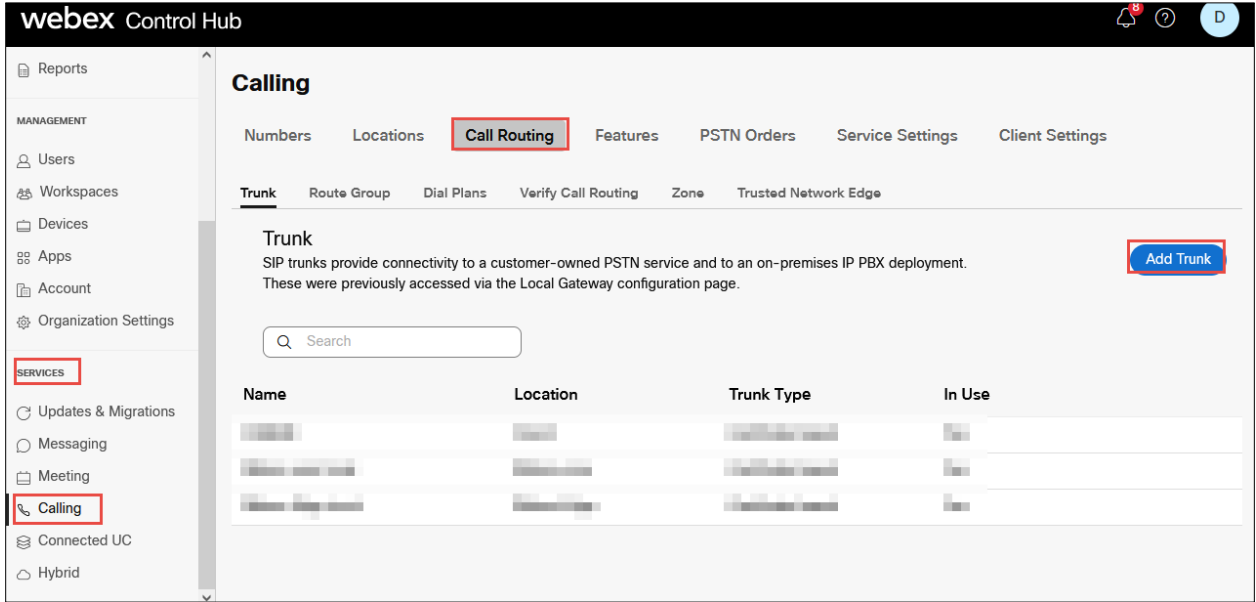


Figure 7: Add Trunk details Contd.,

## Add Trunk

### Location

This location is where the trunk is physically connected. To create a new location, visit the [Locations](#) page.

AWS\_vCUBE\_LGW

### Name

AWS\_vCUBE1

### Trunk Type

Choose the right trunk type for this local gateway. [Learn more](#) on trunk type

Registration based

### Device Type

Select Device

### Dual Identity Support


The Dual Identity Support setting impacts the handling of the From header and P-Asserted-Identity (PAI) header when sending an initial SIP INVITE to the trunk for an outbound call. When enabled, the From and PAI headers are treated independently and may differ. When disabled, the PAI header is set to the same value as the From header. Please refer to the documentation for more details.



Cancel

Save

## Add Trunk



### AWS\_vCUBE1 Successfully Created.

Visit [Route Group](#) page to add trunk(s) to a route group.  
 Visit [Locations](#) page to configure PSTN connection to individual locations.  
 Visit [Dial Plans](#) page to use this trunk as the routing choice for a dial plan.

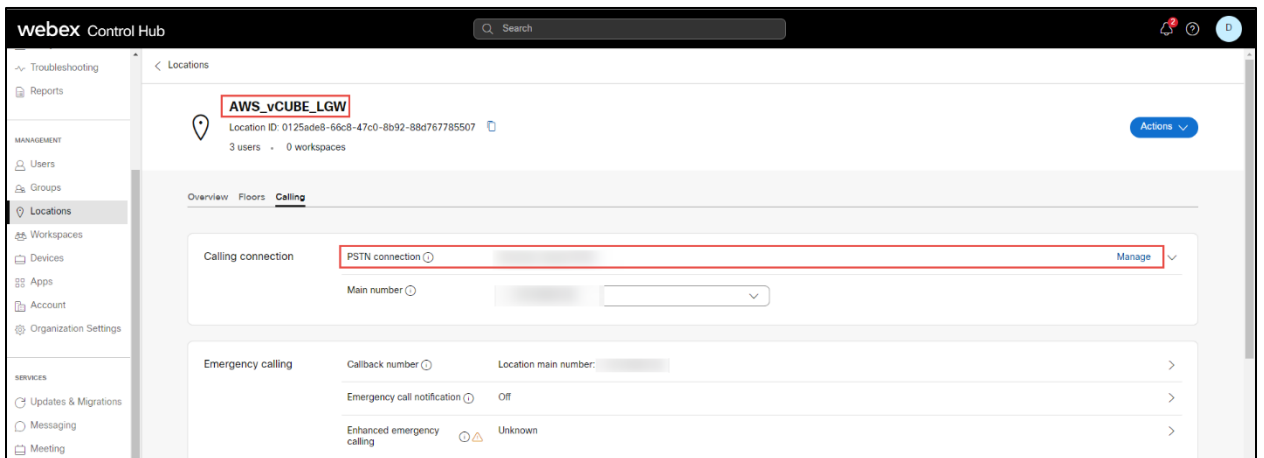
#### Trunk Info

<p><b>Status</b> ● OFFLINE</p> <p><b>Trunk Group OTG/DTG</b> aws_...gu</p> <p><b>Outbound Proxy Address</b> da05.sipconnect-us.bcl.d.webex.com</p> <p><b>Registrar Domain</b> 9...cisco-bcl.d.com</p>	<p><b>Line/Port</b> AWS_...LGU@...cisco-bcl.d.com</p> <p><b>Authentication Information</b> Record the username and password below. If you lose this information, you need to retrieve the username and reset the password.</p> <p><b>Username:</b> AWS_vCUBE [copy icon]</p> <p><b>Password:</b> [copy icon]</p>
---	--

Figure 8: Add Trunk details Contd.

### Step 6:

Choose the location and select Manage in PSTN Connection to add Connection type.



The screenshot shows the Cisco Webex Control Hub interface. On the left is a navigation sidebar with options like Troubleshooting, Reports, Users, Groups, Locations, Workspaces, Devices, Apps, Account, and Organization Settings. The main content area is titled 'Locations' and shows details for a location named 'AWS\_vCUBE\_LGW'. Under the 'Calling' tab, there is a 'Calling connection' dropdown menu currently set to 'PSTN connection'. A 'Manage' button is visible next to this dropdown. Below this, there are fields for 'Main number' and 'Emergency calling' settings, including 'Callback number', 'Location main number', 'Emergency call notification' (set to Off), and 'Enhanced emergency calling' (set to Unknown).

Figure 9: PSTN Connection

Step 7:

Select the **Connection Type** as **Premises-based PSTN** and click on Next

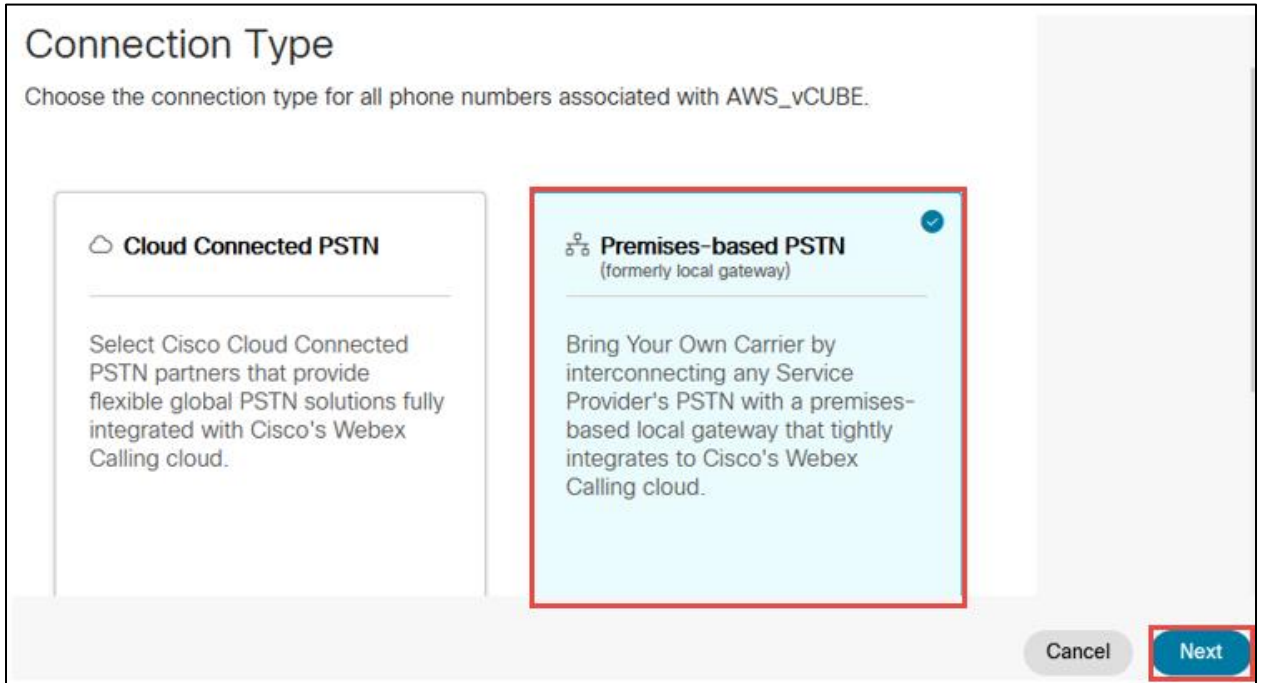


Figure 10: PSTN Connection Contd.,

Step 8:

Select the SIP trunk created earlier and click on Save

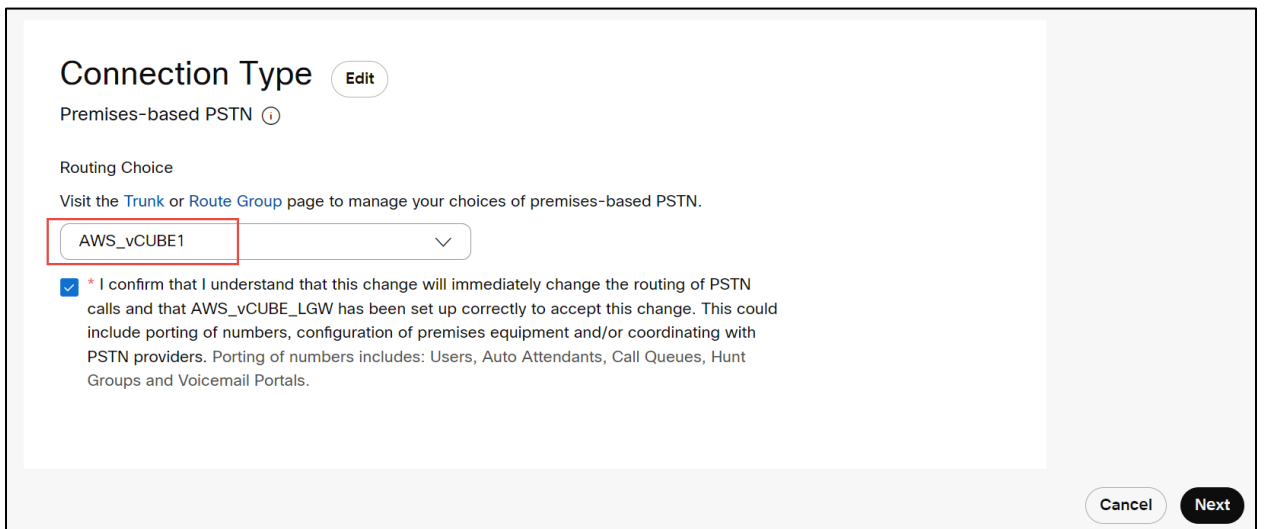


Figure 11: PSTN Connection Contd.,

Step 9:

Select the **Numbers**, Click on **Manage** and choose **Add**. Select the **Location** and **PSTN Connection**

The screenshot displays a configuration interface for adding numbers. At the top, a progress bar indicates the current step is 'Select a Location', with 'Select Numbers' and 'Done' as subsequent steps. The main heading is 'Choose a Location to Add Numbers'. Below this, there are two dropdown menus: 'Location' and 'PSTN Connection'. The 'Location' dropdown is set to 'AWS\_vCUBE\_LGW' and the 'PSTN Connection' dropdown is set to 'Premises-based PSTN - AWS\_vCUBE'. A red rectangular box highlights these two dropdown menus. In the bottom right corner, there are two buttons: 'Cancel' and 'Next'.

Figure 12: Add Numbers



**Step 10:**

Add the phone numbers provided by service provider and complete the wizard.

Select a Location      **Select Numbers**      Done

## Enter numbers you want to add

Input your numbers, with area codes, to add them to this location.  
Country codes, plus signs, dashes, and parentheses are optional.  
Valid examples: 4507832223, (450) 783-2223, 450-783-2223, +1-450-783-2223

Activate Numbers Later

(972) [redacted] x    (972) [redacted] x


Enter phone numbers separated by commas

2/1000 Phone numbers      Clear All

Back    Save

Figure 13: Add Numbers Contd.,

Select a Location      Select Numbers      **Done**



✓ **Successfully saved numbers**

Phone Numbers (2)

(972) [redacted]

(972) [redacted]

Close

Figure 14: Add Numbers Contd.,

## 1.2 Adding user

Step 1:

In the Cisco Webex Control Hub, select **Users** in the left pane. To add a user, click on **Manage Users** button.

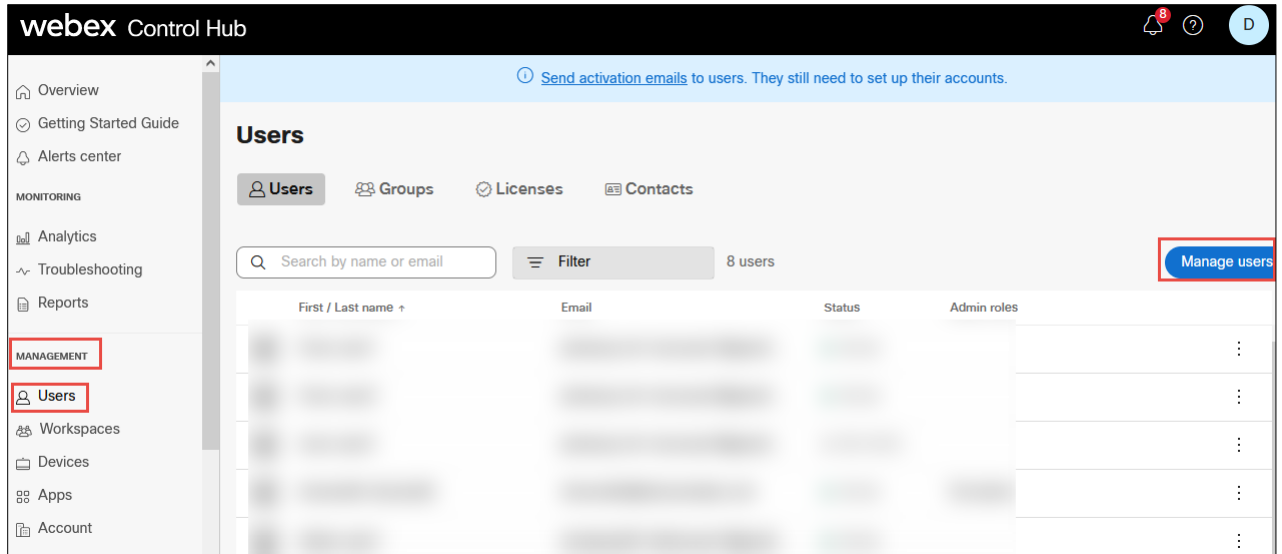


Figure 15: Adding Users

Step 2:

In the Manage Users window, click on **Manually Add or Modify Users** option.

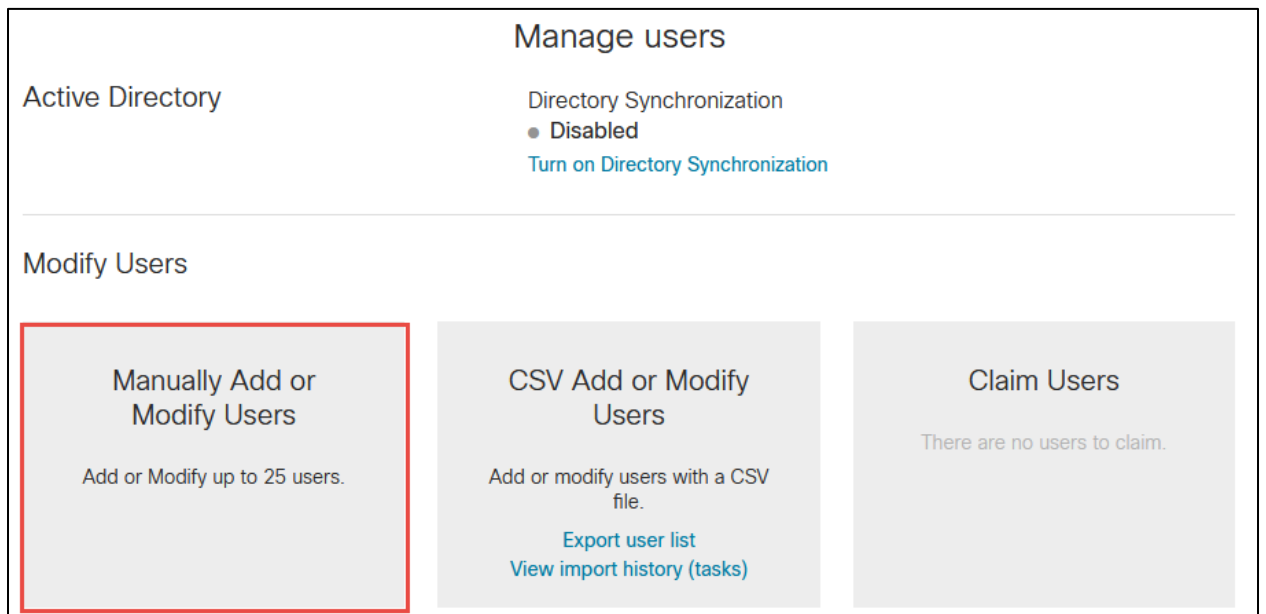


Figure 16: Manually Add or Modify Users

Step 3:

Select either **Email address** or **Names and Email address** and provide the necessary email address. Sample Name and email address provided here is below. Click on **+** symbol to add the user and click on **Next**.

**Manage users**

**Manually Add or Modify Users**  
Enter up to 25 users to modify.

Email address

Names and Email address

Cisco user3 l+ciscouser3@...l.com +

Back Next

Figure 17: Adding email address and name.

Step 4:

Click on **the Confirm Adding** button to add the new user and click on **Next**.

**Manage users**

**Users to be Added or Modified**

Email Address ↑	Name	Status
l+ciscouser3@...l.com	Cisco user3	New User

Back Next

Figure 18: Confirm Adding

Step 5:

Add Services for the Users. Here select **Webex Calling** under **the Calling** section and click **Next**.

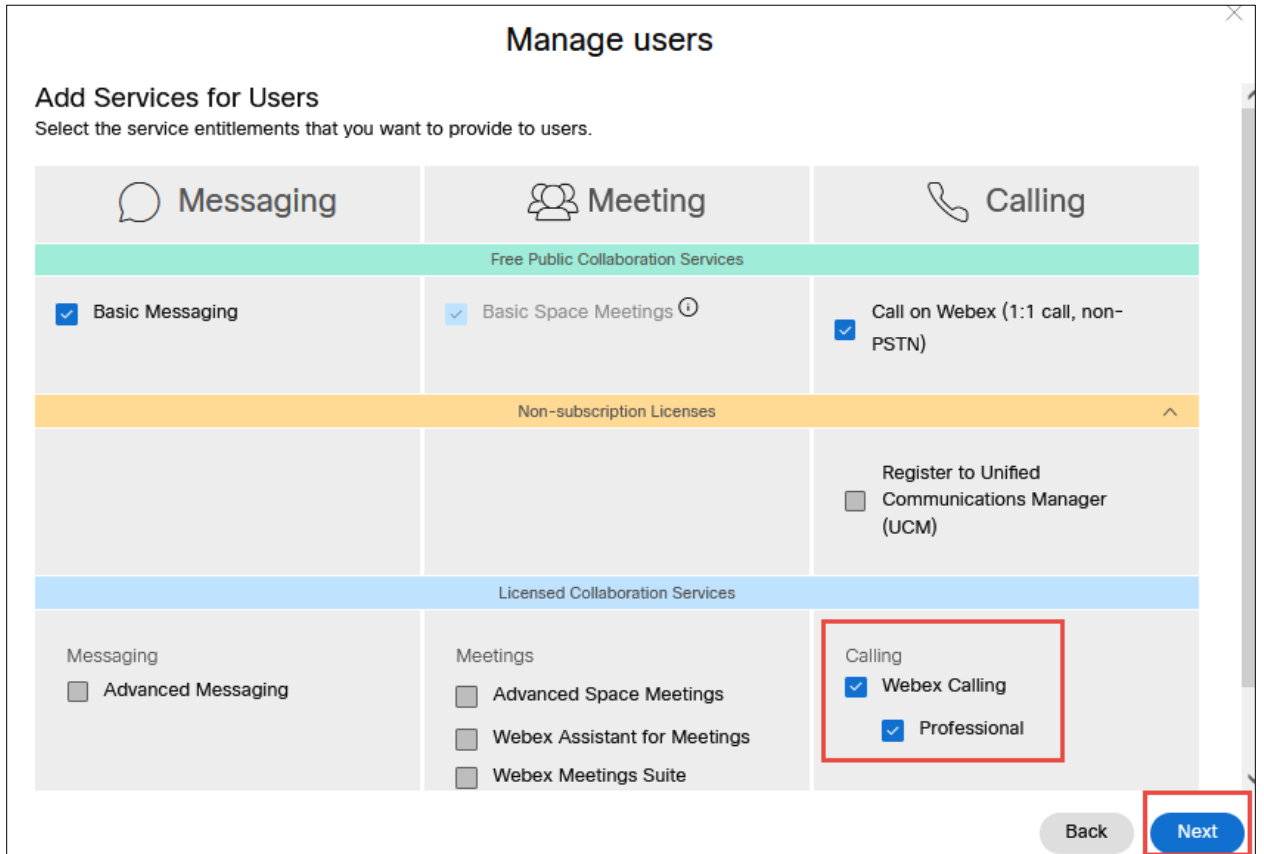


Figure 19: Add Services for Users

Step 6:

Assign the user to an appropriate location and select the phone number and extension. Click on **the Finish** button.

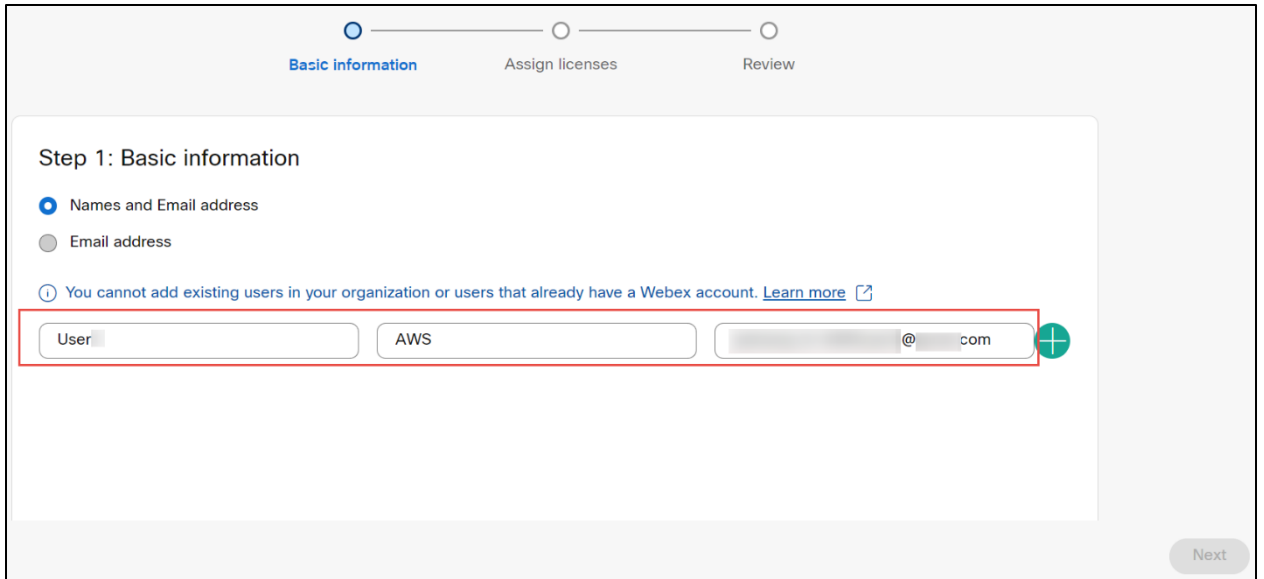


Figure 20: Assign Numbers

Step 7:

Successful creation of user will be displayed in the Add Users window. Click on the Finish button.

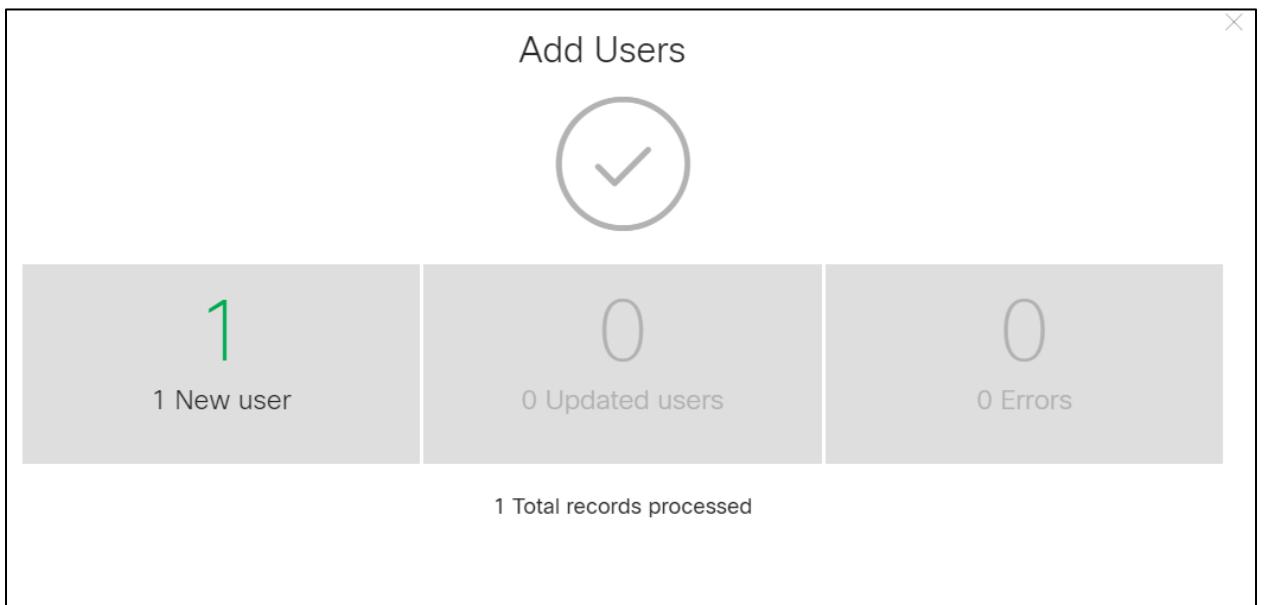


Figure 21: Add User successful.

Repeat the same steps in another Webex tenant for Multi tenancy setup.

## 2 Deploying vCUBE on AWS

Step 1:

Login to AWS console using the URL <https://console.aws.amazon.com/> . Expand **Instances**, click on **instances** and click on **Launch instances**

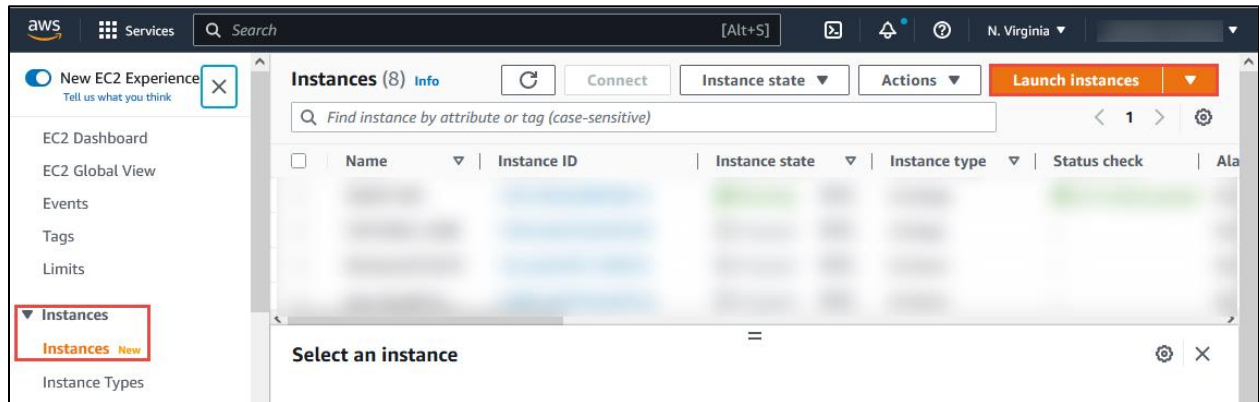


Figure 22: Launch Instance

Step 2:

Enter the **Name and Tags** for the instance

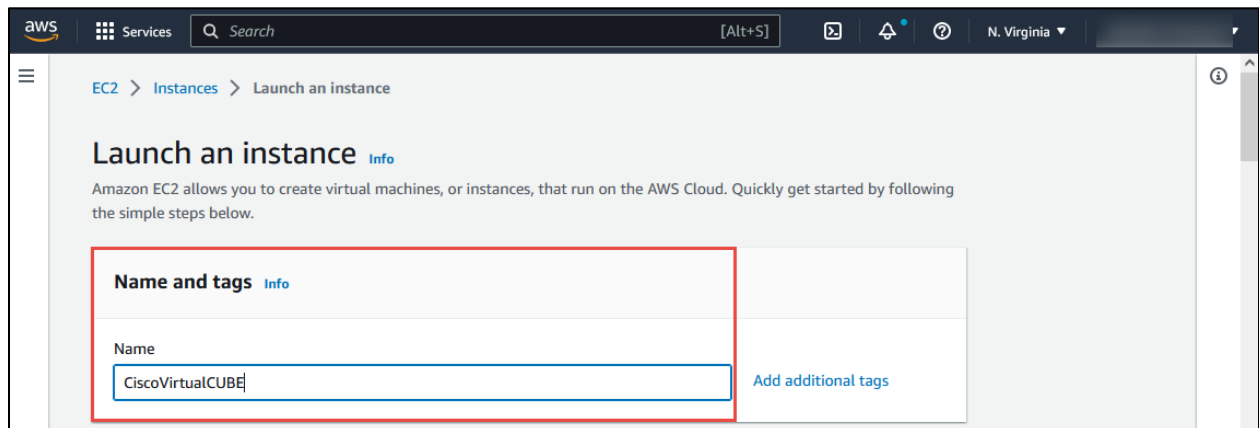


Figure 23: Name and Tags

Step 3:

In the **Application and OS Images (Amazon Machine Image)** section click on **Browse more AMIs**

▼ **Application and OS Images (Amazon Machine Image)** [Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Q Search our full catalog including 1000s of application and OS images

Recents

**Quick Start**

Amazon Linux  
aws

macOS  
Mac

Ubuntu  
ubuntu

Windows  
Microsoft

Red Hat  
Red Hat

SUSE  
SUSE


  
**Browse more AMIs**  
Including AMIs from AWS, Marketplace and the Community

Figure 24: Browsing AMIs

Step 4:

In the search box query for “Cisco-vCUBE” and select the required image for vCUBE and click on **Continue**

**Choose an Amazon Machine Image (AMI)**

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Search: Cisco-vCUBE

Quickstart AMIs (0) | My AMIs (0) | **AWS Marketplace AMIs (1)** | Community AMIs (5)

Refine results

Categories

- Infrastructure Software (1)
- Business Applications (1)

Publisher

- Cisco (1)

Pricing model

- Bring Your Own License (1)

Cisco-vCUBE (1 result) showing 1 - 1

Sort By: Relevance

**Cisco Virtual CUBE Session Border Controller - BYOL** **Select**

By Cisco | Ver 17.0

Part of the Cisco® Collaboration Edge Architecture, Cisco Unified Border Element (CUBE) is an enterprise-class Session Border Controller (SBC) solution that makes it possible to connect and interwork large, midsize, and small business unified communications networks with public and private IP...

Figure 25: Selecting AMI

**Cisco Virtual CUBE Session Border Controller - BYOL**

Cisco | 0 AWS reviews | Bring Your Own License

Overview | Product details | Pricing | Usage | Support

Virtual Cisco Unified Border Element (vCUBE) SBC running on Cisco IOS XE virtual router products.

Typical total price: /Hr  
Total pricing per instance for services hosted on c5.large in us-east-1.  
[See additional pricing information.](#)

Latest version: 17.0

Delivery methods: Amazon Machine Image

Operating systems: Other Cisco IOS XE

Categories: Network Infrastructure, Security, Collaboration & Productivity

**Continue**



*Figure 26: Selecting AMI Contd.,*

Step 5:

Selected **Cisco-vCUBE** AMI will appear under the section **AMI from catalog** with the details

### ▼ Application and OS Images (Amazon Machine Image) [Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

AMI from catalog | Recents | Quick Start

Amazon Machine Image (AMI)

Cisco-vCUBE-17. [redacted]-35cc9c32-0757-499d-9eff-abc02e6231c8  
ami-06fb791ed55d9435a

Verified provider

[Browse more AMIs](#)  
Including AMIs from AWS, Marketplace and the Community

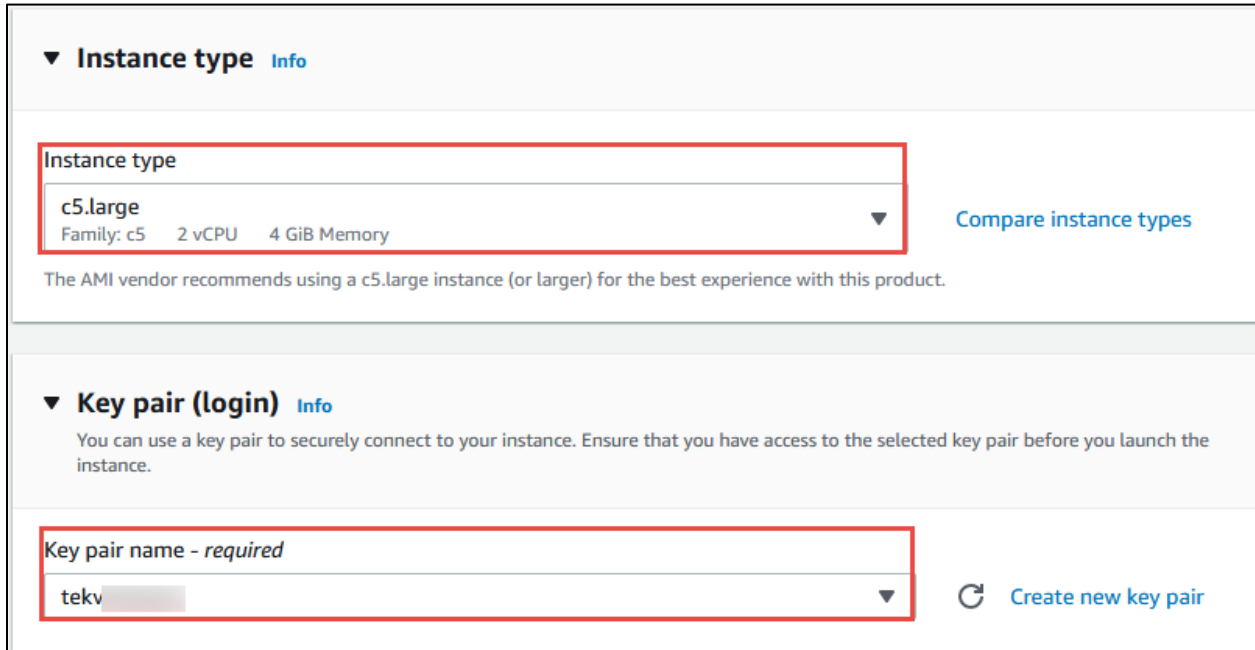
Catalog	Published	Architecture	Virtualization	Root device type	ENA Enabled
AWS	2022-05-04T12	x86_64	hvm		Yes
Marketplace AMIs	:34:18.000Z			ebs	

If you have an existing license entitlement to use this software, then you can launch this software without creating a new subscription. If you do not have an existing entitlement, then by launching this software, you will be subscribed to this software and agree that your use of this software is subject to the pricing terms and the seller's [End User License Agreement](#)

Figure 27: Verifying the selected AMI

Step 6:

**Instance type** will be auto populated based on the chosen AMI. Choose the existing **Key pair** or create a new key pair to access the instance



The screenshot displays two sections of the AWS console. The first section, titled "Instance type" with an "Info" link, features a dropdown menu currently set to "c5.large". Below the dropdown, it lists "Family: c5", "2 vCPU", and "4 GiB Memory". To the right of the dropdown is a "Compare instance types" link. Below the dropdown, a message states: "The AMI vendor recommends using a c5.large instance (or larger) for the best experience with this product." The second section, titled "Key pair (login)" with an "Info" link, includes a descriptive sentence: "You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance." Below this is another dropdown menu labeled "Key pair name - required" with "tekv" selected. To the right of this dropdown is a "Create new key pair" link with a refresh icon.

Figure 28: Instance Type and Key Pair

Step 7:

In the **Network Settings** choose **VPC** and **Subnet** as defined for the network to host vCUBE. **Security Group name** will be auto created while deploying the image

The screenshot displays the AWS Network Settings console. At the top, the 'Network settings' section is expanded. Under 'VPC - required', a dropdown menu shows 'vpc-0b871afb17f666321 (VPC)'. Below this, the 'Subnet' section shows 'subnet-0246f1a75cfd0f948' with details: VPC: vpc-0b871afb17f666321, Owner: 664887287655, Availability Zone: us-east-1d, IP addresses available: 244, and CIDR: /24. The 'Auto-assign public IP' is set to 'Disable'. In the 'Firewall (security groups)' section, the 'Create security group' radio button is selected. The 'Security group name' field contains 'Cisco Virtual CUBE Session Border Controller - BYOL-17. -AutogenByAWSMP--1'. A description field at the bottom contains the text: 'This security group was generated by AWS Marketplace and is based on recommended'.

Figure 29: Network Settings

Step 8:

In the **Inbound Security Groups rules** section define the rules as per the requirement to access the instance and leave the values to default or customize the configuration in the **Advanced network configuration** based on the requirement

**Inbound security groups rules**

▼ Security group rule 1 (TCP, 22) Remove

Type [Info](#) Protocol [Info](#) Port range [Info](#)

ssh TCP 22

Source type [Info](#) Source [Info](#) Description - optional [Info](#)

Custom Add CIDR, prefix list or security group e.g. SSH for admin desktop

[Add security group rule](#)

► [Advanced network configuration](#)

Figure 30: Inbound Security Group Rules

Step 9:

In the **Configure Storage** leave the settings to default

▼ **Configure storage** [Info](#) Advanced

1x 16 GiB gp2 Root volume (Not encrypted)

[Free tier eligible customers can get up to 30 GB of EBS General Purpose \(SSD\) or Magnetic storage](#)

[Add new volume](#)

0 x File systems [Edit](#)

Figure 31: Storage configuration

Step 10:

In the **Summary** section review the detail and click on **Launch instance**. vCUBE will be running as an EC2 instance in AWS after a successful launch

► **Advanced details** [Info](#)

---

▼ **Summary**

Number of instances [Info](#)

1

**Software Image (AMI)**  
Cisco Virtual CUBE Session Border Controller - BYOL  
ami-06fb791ed55d9435a

**Virtual server type (instance type)**  
c5.large

**Firewall (security group)**  
New security group

**Storage (volumes)**  
1 volume(s) - 16 GiB

**Free tier:** In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet. ✕

Cancel **Launch instance**

Figure 32: Summary and Launch instance

## 3 Configuring Cisco Unified Border Element

### Global vCUBE settings

In order to enable vCUBE IP2IP SBC functionality, following command must be entered:

```
voice service voip
ip address trusted list
  ipv4 23.89.76.128 255.255.255.128
  ipv4 128.177.14.0 255.255.255.0
  ipv4 139.177.64.0 255.255.248.0
  ipv4 170.72.242.0 255.255.255.0
  ipv4 170.72.17.128 255.255.255.128
  ipv4 199.19.196.0 255.255.254.0
  ipv4 23.89.33.0 255.255.255.0
  ipv4 23.89.154.0 255.255.255.128
  ipv4 128.177.36.0 255.255.255.0
  ipv4 139.177.72.0 255.255.254.0
  ipv4 150.253.209.128 255.255.255.128
  ipv4 170.72.82.0 255.255.255.128
  ipv4 199.19.199.0 255.255.255.0
  ipv4 23.89.40.0 255.255.255.128
  ipv4 85.119.56.0 255.255.254.0
  ipv4 135.84.168.0 255.255.248.0
  ipv4 170.72.29.0 255.255.255.0
  ipv4 185.115.196.0 255.255.252.0
  ipv4 199.59.64.0 255.255.248.0
  ipv4 170.72.0.128 255.255.255.128
  ipv4 XX.XX.79.250 255.255.255.255
  ipv4 XX.XX.235.70
address-hiding
mode border-element
media bulk-stats
allow-connections sip to sip
no supplementary-service sip refer
no supplementary-service sip handle-replaces
fax protocol pass-through g711ulaw
trace
sip
  early-offer forced
```

```
midcall-signaling passthru
privacy-policy passthru
g729 annexb-all
sip-profiles inbound
```

## Explanation

Command	Description
allow-connections sip to sip	Allow IP2IP connections between two SIP call legs
fax protocol	Specifies the fax protocol
no supplementary-service sip refer no supplementary-service sip handle-replaces	Disable forwarding SIP REFER message for call transfers and replace the Dialog-ID in the Replaces header with the peer Dialog-ID
early-offer forced	Forces LGW to send the SDP information in the initial INVITE message
g729 annexb-all	Allows all variants of G729

## Codecs

G711u-Law and G729 voice codecs are configured for this testing. Codec preferences used to change according to the test plan description.

```
voice class codec 1
codec preference 2 g711ulaw
codec preference 1 g729br8
```

## IP Networking

```
interface GigabitEthernet1
ip address dhcp
ip nat outside
negotiation auto
no mop enabled
no mop sysid
```



## Routing

IP route is used to route calls to Webex and PSTN Lumen.

```
ip route 0.0.0.0 0.0.0.0 172.31.26.1
```

## DNS Servers

DNS must be configured to resolve addresses for Webex Calling

```
ip name-server 8.8.8.8
```

## Message Handling Rules

### *Manipulations for outbound messages to Webex calling tenant 1*

```
voice class sip-profiles 200
rule 9 request ANY sip-header SIP-Req-URI modify "sips:(.*)" "sip:\1"
rule 10 request ANY sip-header To modify "<sips:(.*)" "<sip:\1"
rule 11 request ANY sip-header From modify "<sips:(.*)" "<sip:\1"
rule 12 request ANY sip-header Contact modify "<sips:(.*)>" "<sip:\1;transport=tls>"
rule 13 response ANY sip-header To modify "<sips:(.*)" "<sip:\1"
rule 14 response ANY sip-header From modify "<sips:(.*)" "<sip:\1"
rule 15 response ANY sip-header Contact modify "<sips:(.*)" "<sip:\1"
rule 20 request ANY sip-header From modify ">" ";otg=aws_XXXX_lgu>"
rule 30 request ANY sip-header P-Asserted-Identity modify "sips:(.*)" "sip:\1"
rule 31 request ANY sdp-header Connection-Info modify "172.31.26.74" "XX.228.235.70"
rule 32 request ANY sdp-header Session-Owner modify "IN IP4 172.31.26.74" "IN IP4
XX.228.235.70"

rule 33 request ANY sdp-header Audio-Attribute modify "a=candidate:1 1(.*)
172.31.26.74 (.*)" "a=candidate:1 1\1 XX.228.235.70 \2"
rule 34 request ANY sdp-header Audio-Attribute modify "a=candidate:1 2(.*)
172.31.26.74 (.*)" "a=candidate:1 2\1 XX.228.235.70 \2"
rule 35 response ANY sdp-header Connection-Info modify "172.31.26.74"
"XX.228.235.70"

rule 36 response ANY sdp-header Session-Owner modify "IN IP4 172.31.26.74" "IN IP4
XX.228.235.70"

rule 37 response ANY sdp-header Audio-Attribute modify "a=candidate:1 1(.*)
172.31.26.74 (.*)" "a=candidate:1 1\1 XX.228.235.70 \2"
rule 38 response ANY sdp-header Audio-Attribute modify "a=candidate:1 2(.*)
172.31.26.74 (.*)" "a=candidate:1 2\1 XX.228.235.70 \2"
rule 40 response ANY sdp-header Audio-Connection-Info modify "172.31.26.74"
"XX.228.235.70"
```

```
rule 41 request ANY sdp-header Audio-Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 42 response ANY sdp-header Audio-Connection-Info modify "172.31.26.74"
"XX.228.235.70"
```

## *Manipulations for outbound messages to Webex calling tenant 2*

```
voice class sip-profiles 500
rule 9 request ANY sip-header SIP-Req-URI modify "sips:(.*)" "sip:\1"
rule 10 request ANY sip-header To modify "<sips:(.*)" "<sip:\1"
rule 11 request ANY sip-header From modify "<sips:(.*)" "<sip:\1"
rule 12 request ANY sip-header Contact modify "<sips:(.*)>" "<sip:\1;transport=tls>"
rule 13 response ANY sip-header To modify "<sips:(.*)" "<sip:\1"
rule 14 response ANY sip-header From modify "<sips:(.*)" "<sip:\1"
rule 15 response ANY sip-header Contact modify "<sips:(.*)" "<sip:\1"
rule 20 request ANY sip-header From modify ">" ";otg=aws_XXXX_lgu>"
rule 30 request ANY sip-header P-Asserted-Identity modify "sips:(.*)" "sip:\1"
rule 31 request ANY sdp-header Connection-Info modify "172.31.26.74" "XX.228.235.70"
rule 32 request ANY sdp-header Session-Owner modify "IN IP4 172.31.26.74" "IN IP4
XX.228.235.70"
rule 33 request ANY sdp-header Audio-Attribute modify "a=candidate:1 1(.*)
172.31.26.74 (.*)" "a=candidate:1 1\1 XX.228.235.70 \2"
rule 34 request ANY sdp-header Audio-Attribute modify "a=candidate:1 2(.*)
172.31.26.74 (.*)" "a=candidate:1 2\1 XX.228.235.70 \2"
rule 35 response ANY sdp-header Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 36 response ANY sdp-header Session-Owner modify "IN IP4 172.31.26.74" "IN IP4
XX.228.235.70"
rule 37 response ANY sdp-header Audio-Attribute modify "a=candidate:1 1(.*)
172.31.26.74 (.*)" "a=candidate:1 1\1 XX.228.235.70 \2"
rule 38 response ANY sdp-header Audio-Attribute modify "a=candidate:1 2(.*)
172.31.26.74 (.*)" "a=candidate:1 2\1 XX.228.235.70 \2"
rule 40 response ANY sdp-header Audio-Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 41 request ANY sdp-header Audio-Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 42 response ANY sdp-header Audio-Connection-Info modify "172.31.26.74"
"XX.228.235.70"
```

## *Manipulations for outbound messages to Lumen*

```
voice class sip-profiles 100
rule 1 request ANY sip-header Contact modify "@.*:" "@XX.228.235.70:"
```

```

rule 2 response ANY sip-header Contact modify "@.*:" "@XX.228.235.70:"
rule 4 request ANY sip-header P-Asserted-Identity modify "@.*>" "@XX.228.235.70>"
rule 5 response ANY sip-header P-Asserted-Identity modify "@.*>" "@XX.228.235.70>"
rule 6 response ANY sdp-header Audio-Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 7 request ANY sdp-header Audio-Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 8 request ANY sdp-header Connection-Info modify "172.31.26.74" "XX.228.235.70"
rule 9 response ANY sdp-header Connection-Info modify "172.31.26.74" "XX.228.235.70"
rule 10 request ANY sdp-header Session-Owner modify "IN IP4 172.31.26.74" "IN IP4
XX.228.235.70"
rule 11 response ANY sdp-header Session-Owner modify "IN IP4 172.31.26.74" "IN IP4
XX.228.235.70"
rule 12 request ANY sip-header Via modify "172.31.26.74:5060" "XX.228.235.70:5060"
rule 13 request INVITE sip-header Diversion modify "@.*>" "@XX.228.235.70>"

```

### *Manipulations for inbound messages from Lumen*

```

voice class sip-profiles 222
rule 200 request ANY sip-header To copy "sip:(.*)@" u01
rule 201 request INVITE sip-header SIP-Req-URI modify "sip:(.*)@.*:(.*)"
"sip:\1@172.31.26.74:\2"
rule 202 request ACK sip-header SIP-Req-URI modify "sip:.*@(.) (.*)"
"sip:\u01@172.31.26.74:5060 \2"
rule 203 request INVITE sip-header To modify "<sip:(.*)@.*>" "<sip:\1@172.31.26.74>"

```

## S RTP crypto

Used to set the crypto cipher for the Webex Calling

```

voice class srtp-crypto 200
crypto 1 AES_CM_128_HMAC_SHA1_80

```

## STUN ICE-lite

```

voice class stun-usage 200
stun usage ice lite

```

## Tenant

### *To Webex Calling tenant 1*

```
voice class tenant 200
  registrar dns:XXXX.cisco-bcld.com scheme sips expires 240 refresh-ratio 50 tcp tls
  credentials number AWS_XXXX_LGU username AWS_XXXX_LGU password 6 XXXXXX realm
Broadworks
  authentication username AWS_XXXX_LGU password 6 XXXXXX realm BroadWorks
  authentication username AWS_XXXX_LGU password 6 XXXXXX realm XXXX.cisco-bcld.com
  no remote-party-id
  sip-server dns:XXXX.cisco-bcld.com
  connection-reuse
  srtp-crypto 200
  session transport tcp tls
  url sips
  error-passthru
  asserted-id pai
  bind control source-interface GigabitEthernet1
  bind media source-interface GigabitEthernet1
  no pass-thru content custom-sdp
  sip-profiles 200
  outbound-proxy dns:da05.sipconnect-us.bcld.webex.com
  privacy-policy passthru
```

### *To Webex Calling tenant 2*

```
voice class tenant 500
  registrar dns:XXXX.cisco-bcld.com scheme sips expires 240 refresh-ratio 50 tcp tls
  credentials number AWS_XXXX_LGU username AWS_XXXX_LGU password 6 XXXXXX realm
Broadworks
  authentication username AWS_XXXX_LGU password 6 XXXXXX realm BroadWorks
  authentication username AWS_XXXX_LGU password 6 XXXXXX realm XXXX.cisco-bcld.com
  no remote-party-id
  sip-server dns:XXXX.cisco-bcld.com
  connection-reuse
  srtp-crypto 200
  session transport tcp tls
  url sips
  error-passthru
```

```
asserted-id pai
bind control source-interface GigabitEthernet1
bind media source-interface GigabitEthernet1
no pass-thru content custom-sdp
sip-profiles 500
outbound-proxy dns:da09.sipconnect-us.bcld.webex.com
privacy-policy passthru
```

### *To Lumen*

```
voice class tenant 100
  session transport udp
  url sip
  error-passthru
  bind control source-interface GigabitEthernet1
  bind media source-interface GigabitEthernet1
  no pass-thru content custom-sdp
  sip-profiles 100
```

## Number translation rules

### *To Lumen*

```
voice translation-rule 1
  rule 1 /^0972\(.*\)/ /972\1/
  rule 2 /^+1\(.*\)/ /\1/
  rule 3 /^+91\(.*\)/ /01191\1/
voice translation-profile called
  translate called 1
```

## Dial peer

### *Inbound calls from Cisco Webex Calling tenant 1*

```
voice class uri 200 sip
  pattern dtg=aws_XXXX_lgu
  !
dial-peer voice 200 voip
  description Incoming dial-peer from Webex Calling to vCUBE-AWS
  session protocol sipv2
```

```
incoming uri request 200
voice-class codec 1
voice-class sip asserted-id pai
voice-class stun-usage 200
voice-class sip tenant 200
dtmf-relay rtp-nte
srtp
no vad
```

### *Inbound calls from Cisco Webex Calling tenant 2*

```
voice class uri 500 sip
  pattern dtg=aws_XXXX_lgu
!
dial-peer voice 500 voip
  description Incoming dial-peer from Webex Calling-2 to vCUBE-AWS
  session protocol sipv2
  incoming uri request 500
  voice-class codec 1
  voice-class stun-usage 200
  voice-class sip asserted-id pai
  voice-class sip tenant 500
  dtmf-relay rtp-nte
  srtp
  no vad
```

### *Outbound calls to Lumen*

```
voice class e164-pattern-map 101
  e164 +121424259..
  e164 09725980...
  e164 +18.....
  e164 411
!
dial-peer voice 101 voip
  description Outgoing dial-peer from vCUBE-AWS to PSTN
  translation-profile outgoing called
  session protocol sipv2
  session target ipv4:XX.XX.79.250:5060
  session transport udp
```

```
destination e164-pattern-map 101
voice-class codec 1
voice-class sip asserted-id pai
voice-class sip profiles 100
voice-class stun-usage 200
voice-class sip tenant 100
voice-class sip options-keepalive
dtmf-relay rtp-nte
no vad
```

### *Inbound calls from Lumen*

```
voice class uri 100 sip
  host ipv4:XX.XX.79.250
!
dial-peer voice 100 voip
  description Incoming dial-peer from PSTN to vCUBE-AWS
  session protocol sipv2
  session transport udp
  incoming uri via 100
  voice-class codec 1
  voice-class sip asserted-id pai
voice-class sip profiles 222 inbound
  voice-class stun-usage 200
  voice-class sip tenant 100
  dtmf-relay rtp-nte
  no vad
```

### *Outbound calls to Cisco Webex Calling tenant 1*

```
voice class e164-pattern-map 201
  e164 9725980XXX
!
dial-peer voice 201 voip
  description Outgoing dial-peer from vCUBE-AWS to Webex Calling
  session protocol sipv2
  session target sip-server
  session transport tcp tls
  destination e164-pattern-map 201
  voice-class codec 1
```

```
voice-class sip asserted-id pai
voice-class stun-usage 200
voice-class sip tenant 200
dtmf-relay rtp-nte
srtp
no vad
```

### *Outbound calls to Cisco Webex Calling tenant 2*

```
voice class e164-pattern-map 501
  e164 9725980XXX
  !
dial-peer voice 501 voip
description Outgoing dial-peer from vCUBE-AWS to Webex Calling-2

session protocol sipv2
session target sip-server
session transport tcp tls
destination e164-pattern-map 501
voice-class codec 1
voice-class stun-usage 200
voice-class sip asserted-id pai
voice-class sip tenant 500
dtmf-relay rtp-nte
srtp
no vad
```



## Configuration example

The following configuration snippet contains a sample configuration of vCUBE with all parameters mentioned previously.

```
show running-config
version 17.9
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
service call-home
platform qfp utilization monitor load 80
platform punt-keepalive disable-kernel-core
platform console virtual
!
hostname vCUBE_LGW
!
boot-start-marker
boot system bootflash:c8000v-universalk9.17.09.02a.SPA.bin
boot-end-marker
!
vrf definition GS
 rd 100:100
 !
 address-family ipv4
  exit-address-family
 !
aaa new-model
!
aaa authentication login default local
aaa authorization exec default local none
!
aaa session-id common
!
ip name-server 8.8.8.8
ip domain lookup source-interface GigabitEthernet1
!
login on-success log
ipv6 unicast-routing
!
subscriber templating
!
Multilink bundle-name authenticated
!
password encryption aes
!
crypto pki trustpoint TP-self-signed-534146329
 enrollment selfsigned
 subject-name cn=IOS-Self-Signed-Certificate-534146329
 revocation-check none
 rsakeypair TP-self-signed-534146329
```

```

!
crypto pki trustpoint SLA-TrustPoint
  enrollment pkcs12
  revocation-check crl
!
crypto pki trustpoint dummyTp
  revocation-check crl
!
crypto pki certificate chain TP-self-signed-534146329
  certificate self-signed 01

crypto pki certificate chain SLA-TrustPoint
  certificate ca 01

crypto pki certificate chain dummyTp
!
crypto pki certificate pool
  cabundle nvram:ios_core.p7b
  cabundle nvram:ios.p7
voice service voip
  ip address trusted list
    ipv4 23.89.76.128 255.255.255.128
    ipv4 128.177.14.0 255.255.255.0
    ipv4 139.177.64.0 255.255.248.0
    ipv4 170.72.242.0 255.255.255.0
    ipv4 170.72.17.128 255.255.255.128
    ipv4 199.19.196.0 255.255.254.0
    ipv4 23.89.33.0 255.255.255.0
    ipv4 23.89.154.0 255.255.255.128
    ipv4 128.177.36.0 255.255.255.0
    ipv4 139.177.72.0 255.255.254.0
    ipv4 150.253.209.128 255.255.255.128
    ipv4 170.72.82.0 255.255.255.128
    ipv4 199.19.199.0 255.255.255.0
    ipv4 23.89.40.0 255.255.255.128
    ipv4 85.119.56.0 255.255.254.0
    ipv4 135.84.168.0 255.255.248.0
    ipv4 170.72.29.0 255.255.255.0
    ipv4 185.115.196.0 255.255.252.0
    ipv4 199.59.64.0 255.255.248.0
    ipv4 170.72.0.128 255.255.255.128
    ipv4 XX.XX.79.250 255.255.255.255
    ipv4 XX.XX.235.70
  address-hiding
  mode border-element
  media bulk-stats
  allow-connections sip to sip
  no supplementary-service sip refer
  no supplementary-service sip handle-replaces
  fax protocol pass-through g711ulaw
  trace
  sip

```

```

early-offer forced
midcall-signaling passthru
privacy-policy passthru
g729 annexb-all
sip-profiles inbound
!
voice class uri 200 sip
  pattern dtg=aws_XXXX_lgu
!
voice class uri 100 sip
  host ipv4:XX.XX.79.250
!
voice class uri 500 sip
  pattern dtg=aws_XXXX_lgu
!
voice class codec 1
  codec preference 2 g711ulaw
  codec preference 1 g729br8
!
voice class stun-usage 200
  stun usage ice lite
!
voice class sip-profiles 200
  rule 9 request ANY sip-header SIP-Req-URI modify "sips:(.*)" "sip:\1"
  rule 10 request ANY sip-header To modify "<sips:(.*)" "<sip:\1"
  rule 11 request ANY sip-header From modify "<sips:(.*)" "<sip:\1"
  rule 12 request ANY sip-header Contact modify "<sips:(.*)>"
"<sip:\1;transport=tls>"
  rule 13 response ANY sip-header To modify "<sips:(.*)" "<sip:\1"
  rule 14 response ANY sip-header From modify "<sips:(.*)" "<sip:\1"
  rule 15 response ANY sip-header Contact modify "<sips:(.*)" "<sip:\1"
  rule 20 request ANY sip-header From modify ">" ";otg=aws_XXXX_lgu>"
  rule 30 request ANY sip-header P-Asserted-Identity modify "sips:(.*)"
"sip:\1"
  rule 31 request ANY sdp-header Connection-Info modify "172.31.26.74"
"XX.228.235.70"
  rule 32 request ANY sdp-header Session-Owner modify "IN IP4
172.31.26.74" "IN IP4 XX.228.235.70"
  rule 33 request ANY sdp-header Audio-Attribute modify "a=candidate:1
1(.*) 172.31.26.74 (.*)" "a=candidate:1 1\1 XX.228.235.70 \2"
  rule 34 request ANY sdp-header Audio-Attribute modify "a=candidate:1
2(.*) 172.31.26.74 (.*)" "a=candidate:1 2\1 XX.228.235.70 \2"
  rule 35 response ANY sdp-header Connection-Info modify "172.31.26.74"
"XX.228.235.70"
  rule 36 response ANY sdp-header Session-Owner modify "IN IP4
172.31.26.74" "IN IP4 XX.228.235.70"
  rule 37 response ANY sdp-header Audio-Attribute modify "a=candidate:1
1(.*) 172.31.26.74 (.*)" "a=candidate:1 1\1 XX.228.235.70 \2"
  rule 38 response ANY sdp-header Audio-Attribute modify "a=candidate:1
2(.*) 172.31.26.74 (.*)" "a=candidate:1 2\1 XX.228.235.70 \2"
  rule 40 response ANY sdp-header Audio-Connection-Info modify
"172.31.26.74" "XX.228.235.70"

```

```

rule 41 request ANY sdp-header Audio-Connection-Info modify
"172.31.26.74" "XX.228.235.70"
rule 42 response ANY sdp-header Audio-Connection-Info modify
"172.31.26.74" "XX.228.235.70"
!
voice class sip-profiles 222
rule 200 request ANY sip-header To copy "sip:(.*)@" u01
rule 201 request INVITE sip-header SIP-Req-URI modify
"sip:(.*)@.*:(.*)" "sip:\1@172.31.26.74:\2"
rule 202 request ACK sip-header SIP-Req-URI modify "sip:.*@(.) (.)"
"sip:\u01@172.31.26.74:5060 \2"
rule 203 request INVITE sip-header To modify "<sip:(.*)@.*>"
"<sip:\1@172.31.26.74>"
!
voice class sip-profiles 100
rule 1 request ANY sip-header Contact modify "@.*:" "@XX.228.235.70:"
rule 2 response ANY sip-header Contact modify "@.*:"
"@XX.228.235.70:"
rule 4 request ANY sip-header P-Asserted-Identity modify "@.*>"
"@XX.228.235.70>"
rule 5 response ANY sip-header P-Asserted-Identity modify "@.*>"
"@XX.228.235.70>"
rule 6 response ANY sdp-header Audio-Connection-Info modify
"172.31.26.74" "XX.228.235.70"
rule 7 request ANY sdp-header Audio-Connection-Info modify
"172.31.26.74" "XX.228.235.70"
rule 8 request ANY sdp-header Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 9 response ANY sdp-header Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 10 request ANY sdp-header Session-Owner modify "IN IP4
172.31.26.74" "IN IP4 XX.228.235.70"
rule 11 response ANY sdp-header Session-Owner modify "IN IP4
172.31.26.74" "IN IP4 XX.228.235.70"
rule 12 request ANY sip-header Via modify "172.31.26.74:5060"
"XX.228.235.70:5060"
rule 13 request INVITE sip-header Diversion modify "@.*>"
"@XX.228.235.70>"
!
voice class sip-profiles 500
rule 9 request ANY sip-header SIP-Req-URI modify "sips:(.*)" "sip:\1"
rule 10 request ANY sip-header To modify "<sips:(.*)" "<sip:\1"
rule 11 request ANY sip-header From modify "<sips:(.*)" "<sip:\1"
rule 12 request ANY sip-header Contact modify "<sips:(.*)>"
"<sip:\1;transport=tls>"
rule 13 response ANY sip-header To modify "<sips:(.*)" "<sip:\1"
rule 14 response ANY sip-header From modify "<sips:(.*)" "<sip:\1"
rule 15 response ANY sip-header Contact modify "<sips:(.*)" "<sip:\1"
rule 20 request ANY sip-header From modify ">" ";otg=aws_XXXX_lgu>"
rule 30 request ANY sip-header P-Asserted-Identity modify "sips:(.*)"
"sip:\1"

```

```

rule 31 request ANY sdp-header Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 32 request ANY sdp-header Session-Owner modify "IN IP4
172.31.26.74" "IN IP4 XX.228.235.70"
rule 33 request ANY sdp-header Audio-Attribute modify "a=candidate:1
1(.*) 172.31.26.74 (.*)" "a=candidate:1 1\1 XX.228.235.70 \2"
rule 34 request ANY sdp-header Audio-Attribute modify "a=candidate:1
2(.*) 172.31.26.74 (.*)" "a=candidate:1 2\1 XX.228.235.70 \2"
rule 35 response ANY sdp-header Connection-Info modify "172.31.26.74"
"XX.228.235.70"
rule 36 response ANY sdp-header Session-Owner modify "IN IP4
172.31.26.74" "IN IP4 XX.228.235.70"
rule 37 response ANY sdp-header Audio-Attribute modify "a=candidate:1
1(.*) 172.31.26.74 (.*)" "a=candidate:1 1\1 XX.228.235.70 \2"
rule 38 response ANY sdp-header Audio-Attribute modify "a=candidate:1
2(.*) 172.31.26.74 (.*)" "a=candidate:1 2\1 XX.228.235.70 \2"
rule 40 response ANY sdp-header Audio-Connection-Info modify
"172.31.26.74" "XX.228.235.70"
rule 41 request ANY sdp-header Audio-Connection-Info modify
"172.31.26.74" "XX.228.235.70"
rule 42 response ANY sdp-header Audio-Connection-Info modify
"172.31.26.74" "XX.228.235.70"
!
voice class e164-pattern-map 101
e164 +121424259..
e164 09725980...
e164 +18.....
e164 411
!
voice class e164-pattern-map 501
e164 9725980XXX
!
voice class e164-pattern-map 201
e164 9725980XXX
!
voice class tenant 200
registrar dns:XXXX.cisco-bcld.com scheme sips expires 240 refresh-
ratio 50 tcp tls
credentials number AWS_XXXX_LGU username AWS_XXXX_LGU password 6
XXXXXX realm Broadworks
authentication username AWS_XXXX_LGU password 6 XXXXXX realm
BroadWorks
authentication username AWS_XXXX_LGU password 6 XXXXXX realm
XXXX.cisco-bcld.com
no remote-party-id
sip-server dns:XXXX.cisco-bcld.com
connection-reuse
srtp-crypto 200
session transport tcp tls
url sips
error-passthru
asserted-id pai

```

```

bind control source-interface GigabitEthernet1
bind media source-interface GigabitEthernet1
no pass-thru content custom-sdp
sip-profiles 200
outbound-proxy dns:da05.sipconnect-us.bcld.webex.com
privacy-policy passthru
!
voice class tenant 100
  session transport udp
  url sip
  error-passthru
  bind control source-interface GigabitEthernet1
  bind media source-interface GigabitEthernet1
  no pass-thru content custom-sdp
  sip-profiles 100
!
voice class tenant 500
  registrar dns:XXXX.cisco-bcld.com scheme sips expires 240 refresh-
ratio 50 tcp tls
  credentials number AWS_XXXX_LGU username AWS_XXXX_LGU password 6
XXXXXX realm Broadworks
  authentication username AWS_XXXX_LGU password 6 XXXXXX realm
BroadWorks
  authentication username AWS_XXXX_LGU password 6 XXXXXX realm
XXXX.cisco-bcld.com
  no remote-party-id
  sip-server dns:XXXX.cisco-bcld.com
  connection-reuse
  srtp-crypto 200
  session transport tcp tls
  url sips
  error-passthru
  asserted-id pai
  bind control source-interface GigabitEthernet1
  bind media source-interface GigabitEthernet1
  no pass-thru content custom-sdp
  sip-profiles 500
  outbound-proxy dns:da09.sipconnect-us.bcld.webex.com
  privacy-policy passthru
!
voice class srtp-crypto 200
  crypto 1 AES_CM_128_HMAC_SHA1_80
!
voice translation-rule 1
  rule 1 /^0972\(.*\)/ /972\1/
  rule 2 /^+1\(.*\)/ /\1/
  rule 3 /^+91\(.*\)/ /01191\1/
!
voice translation-profile called
  translate called 1
!
license udi pid C8000V sn XXXXXXXXX

```

```

license boot level network-essentials addon dna-essentials
diagnostic bootup level minimal
memory free low-watermark processor 64139
!
spanning-tree extend system-id
!
username ec2-user privilege 15 password 6 XXXXXX
username admin privilege 15 password 6 \XXXXXX
!
redundancy
!
interface VirtualPortGroup0
 vrf forwarding GS
 ip address 192.168.35.101 255.255.255.0
 ip nat inside
 no mop enabled
 no mop sysid
!
interface GigabitEthernet1
 ip address dhcp
 ip nat outside
 negotiation auto
 no mop enabled
 no mop sysid
!
iox
ip forward-protocol nd
ip tcp window-size 8192
ip http server
ip http authentication local
ip http secure-server
ip http client source-interface GigabitEthernet1
!
ip nat inside source list GS_NAT_ACL interface GigabitEthernet1 vrf GS
overload
ip route 0.0.0.0 0.0.0.0 GigabitEthernet1 172.31.26.1
ip route XX.XX.79.250 255.255.255.255 GigabitEthernet1 172.31.26.1
ip route vrf GS 0.0.0.0 0.0.0.0 GigabitEthernet1 172.31.26.1 global
ip ssh rsa keypair-name ssh-key
ip ssh version 2
ip ssh pubkey-chain
 username ec2-user
  key-hash ssh-rsa XXXXXX ec2-user
  key-hash ssh-rsa XXXXXX ec2-user
ip ssh server algorithm publickey ecdsa-sha2-nistp256 ecdsa-sha2-
nistp384 ecdsa-sha2-nistp521 ssh-rsa x509v3-ecdsa-sha2-nistp256
x509v3-ecdsa-sha2-nistp384 x509v3-ecdsa-sha2-nistp521
ip scp server enable
!
ip access-list standard GS_NAT_ACL
 10 permit 192.168.35.0 0.0.0.255
ip access-list standard PSTN

```

```

10 permit any
ip access-list standard Wx
10 permit any
!
control-plane
!
mgcp behavior rsip-range tgcp-only
mgcp behavior comedia-role none
mgcp behavior comedia-check-media-src disable
mgcp behavior comedia-sdp-force disable
!
mgcp profile default
!
dial-peer voice 100 voip
description Incoming dial-peer from PSTN to vCUBE-AWS
session protocol sipv2
session transport udp
incoming uri via 100
voice-class codec 1
voice-class stun-usage 200
voice-class sip asserted-id pai
voice-class sip profiles 222 inbound
voice-class sip tenant 100
dtmf-relay rtp-nte
no vad
!
dial-peer voice 201 voip
description Outgoing dial-peer from vCUBE-AWS to Webex Calling
session protocol sipv2
session target sip-server
session transport tcp tls
destination e164-pattern-map 201
voice-class codec 1
voice-class stun-usage 200
voice-class sip asserted-id pai
voice-class sip tenant 200
dtmf-relay rtp-nte
srtp
no vad
!
dial-peer voice 200 voip
description Incoming dial-peer from Webex Calling to vCUBE-AWS
session protocol sipv2
incoming uri request 200
voice-class codec 1
voice-class stun-usage 200
voice-class sip asserted-id pai
voice-class sip tenant 200
dtmf-relay rtp-nte
srtp
no vad
!

```



```

dial-peer voice 101 voip
  description Outgoing dial-peer from vCUBE-AWS to PSTN
  translation-profile outgoing called
  session protocol sipv2
  session target ipv4:XX.XX.79.250:5060
  session transport udp
  destination e164-pattern-map 101
  voice-class codec 1
  voice-class stun-usage 200
  voice-class sip asserted-id pai
  voice-class sip profiles 100
  voice-class sip tenant 100
  voice-class sip options-keepalive
  dtmf-relay rtp-nte
  no vad
!
dial-peer voice 500 voip
  description Incoming dial-peer from Webex Calling-2 to vCUBE-AWS
  session protocol sipv2
  incoming uri request 500
  voice-class codec 1
  voice-class stun-usage 200
  voice-class sip asserted-id pai
  voice-class sip tenant 500
  dtmf-relay rtp-nte
  srtp
  no vad
!
dial-peer voice 501 voip
  description Outgoing dial-peer from vCUBE-AWS to Webex Calling-2
  session protocol sipv2
  session target sip-server
  session transport tcp tls
  destination e164-pattern-map 501
  voice-class codec 1
  voice-class stun-usage 200
  voice-class sip asserted-id pai
  voice-class sip tenant 500
  dtmf-relay rtp-nte
  srtp
  no vad
!
sip-ua
  transport tcp tls v1.2
  crypto signaling default trustpoint dummyTp cn-san-validate server
!
line con 0
  stopbits 1
line aux 0
line vty 0 4
  transport input ssh
line vty 5 20

```

```
transport input ssh
!
call-home
! If contact email address in call-home is configured as sch-smart-
licensing@cisco.com
! the email address configured in Cisco Smart License Portal will be
used as contact email address to send SCH notifications.
contact-email-addr sch-smart-licensing@cisco.com
profile "CiscoTAC-1"
  active
  destination transport-method http
!
app-hosting appid guestshell
app-vnic gateway1 virtualportgroup 0 guest-interface 0
  guest-ipaddress 192.168.35.102 netmask 255.255.255.0
app-default-gateway 192.168.35.101 guest-interface 0
name-server0 8.8.8.8
end
```

## Important Information

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS. IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES

### **Corporate**

#### **Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
www.cisco.com  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 526-4100

### **European**

#### **Headquarters**

CiscoSystems  
International BV  
Haarlerbergpark  
Haarlerbergweg 13-19  
1101 CH Amsterdam  
The Netherlands  
www-europe.cisco.com  
Tel: 31 0 20 357 1000  
Fax: 31 0 20 357 1100

### **Americas**

#### **Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
www.cisco.com  
Tel: 408 526-7660  
Fax: 408 527-0883

### **AsiaPacific**

#### **Headquarters**

Cisco Systems, Inc.  
Capital Tower  
168 Robinson Road  
#22-01 to #29-01  
Singapore 068912  
www.cisco.com  
Tel: +65 317 7777  
Fax: +65 317 7799

© 2023 Cisco Systems, Inc. All rights reserved.

CCENT, Cisco Lumin, Cisco Nexus, the Cisco logo and the Cisco Square Bridge logo are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn is a service mark of Cisco Systems, Inc.; and Access Registrar, Aironet, BPX, Catalyst, CCDA, CCDP, CCVP, CCIE, CCIP, CCNA, CCNP, CCSP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, EtherFast, EtherSwitch, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, LightStream, Linksys, Meeting Place, MGX, Networking Academy, Network Registrar, Packet, PIX, ProConnect, ScriptShare, SMARTnet, StackWise, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0705R)

Printed in the USA