

在联系中心企业版中配置安全SIP信令

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简介

本文档介绍如何在联系中心企业版(CCE)综合呼叫流程中保护会话初始协议(SIP)信令。

先决条件

证书生成和导入不在本文档的讨论范围之内，因此必须创建思科统一通信管理器(CUCM)、客户语音门户(CVP)呼叫服务器、思科虚拟语音浏览器(CVVB)和思科统一边界元素(CUBE)的证书并将其导入到各自的组件中。如果使用自签名证书，则必须在不同组件之间执行证书交换。

要求

Cisco 建议您了解以下主题：

- CCE
- CVP
- CUBE
- CUCM
- CVVB

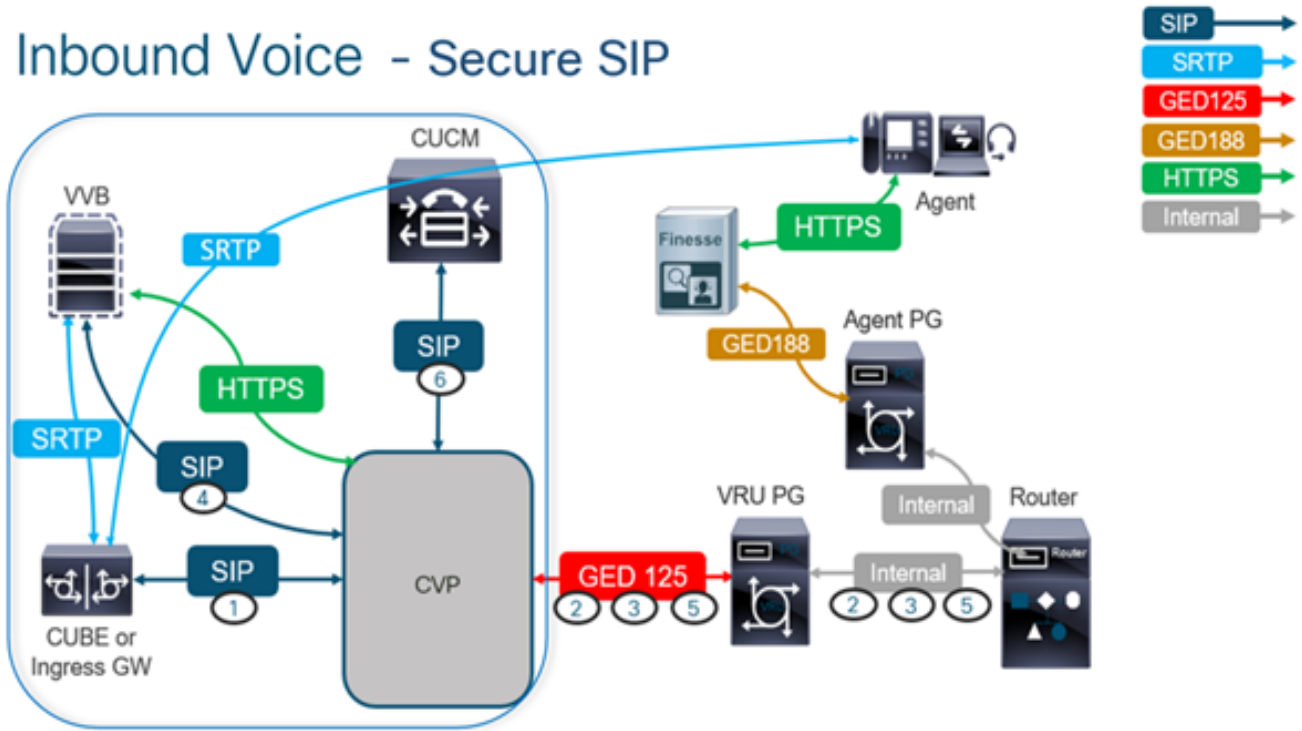
使用的组件

本文档中的信息基于Package Contact Center Enterprise(PCCE)、CVP、CVVB和CUCM版本12.6，但它也适用于早期版本。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

配置

下图显示了联系中心综合呼叫流程中参与SIP信令的组件。当语音呼叫进入系统时，首先通过入口网关或CUBE，因此在CUBE上开始安全SIP配置。接下来，配置CVP、CVVB和CUCM。



任务1.CUBE安全配置

在本任务中，配置CUBE以保护SIP协议消息。

所需的配置：

- 为SIP用户代理(UA)配置默认信任点
- 修改拨号对等体以使用传输层安全(TLS)

步骤：

1. 打开与CUBE的安全外壳(SSH)会话。
2. 运行这些命令以使SIP堆栈使用CUBE的证书颁发机构(CA)证书。CUBE建立从/到CUCM(198.18.133.3)和CVP(198.18.133.13)的SIP TLS连接。

```
conf t sip-ua transport tcp tls v1.2 crypto signaling remote-addr 198.18.133.3 255.255.255.255 trustpoint ms-ca-name crypto signaling remote-addr 198.18.133.13 255.255.255.255 trustpoint ms-ca-name exit
```

```
CC-VCUBE (config)#sip-ua
CC-VCUBE (config-sip-ua)#transport tcp tls v1.2
CC-VCUBE (config-sip-ua)#crypto signaling remote-addr 198.18.133.3 255.255.255.255 trustpoint ms-ca-name
CC-VCUBE (config-sip-ua)#crypto signaling remote-addr 198.18.133.13 255.255.255.255 trustpoint ms-ca-name
CC-VCUBE (config-sip-ua)#exit
CC-VCUBE (config)#
```

3. 运行这些命令以启用对CVP的传出拨号对等体上的TLS。在本示例中，拨号对等体标记6000用于将呼叫路由到CVP。

Conf t dial-peer voice 6000 voip session target ipv4:198.18.133.13:5061 session transport tcp tls exit

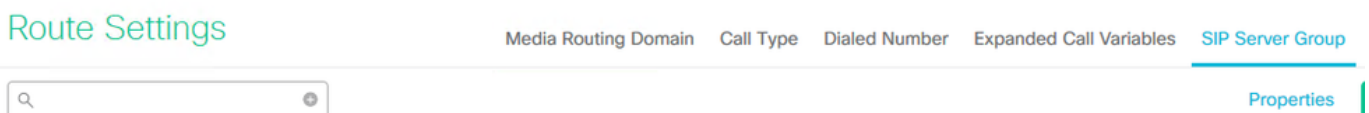
```
CC-VCUBE#
CC-VCUBE#Conf t
Enter configuration commands, one per line. End with CNTL/Z.
CC-VCUBE(config)#dial-peer voice 6000 voip
CC-VCUBE(config-dial-peer)#session target ipv4:198.18.133.13:5061
CC-VCUBE(config-dial-peer)#session transport tcp tls
CC-VCUBE(config-dial-peer)#
CC-VCUBE(config-dial-peer)#exit
CC-VCUBE(config)#
```

任务2.CVP安全配置

在本任务中，配置CVP呼叫服务器以保护SIP协议消息(SIP TLS)。

步骤：

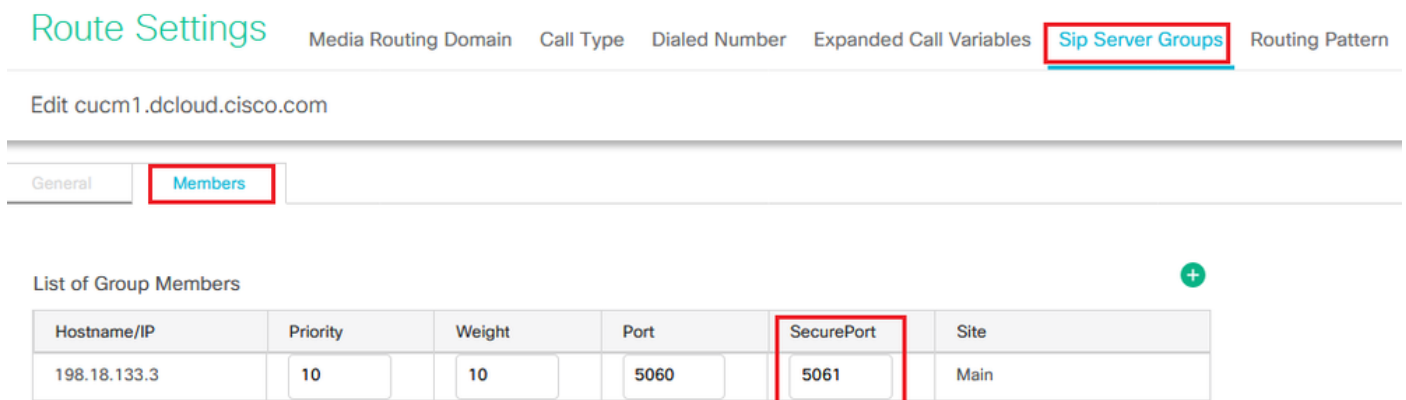
1. 登录到UCCE Web Administration.
2. 导航至 Call Settings > Route Settings > SIP Server Group.



根据您的配置，您为CUCM、CVVB和CUBE配置了SIP服务器组。您需要将所有安全SIP端口设置为5061。在本示例中，使用以下SIP服务器组：

- cucm1.dcloud.cisco.com 对于CUCM
- vvb1.dcloud.cisco.com 适用于CVVB
- cube1.dcloud.cisco.com 对于CUBE

3. 点击 cucm1.dcloud.cisco.com 然后在 **Members** 选项卡，其中显示了SIP服务器组配置的详细信息。设置 SecurePort 到 5061 并点击 Save 。



4. 点击 vvb1.dcloud.cisco.com 然后在 **Members** 选项卡。将SecurePort设置为 5061 并点击 Save.

Edit vvb1.dcloud.cisco.com

General

Members

List of Group Members



| Hostname/IP | Priority | Weight | Port | SecurePort | Site |
|------------------------|----------|--------|------|------------|------|
| vvb1.dcloud.cisco.c... | 10 | 10 | 5060 | 5061 | Main |

任务3.CVVB安全配置

在本任务中，配置CVVB以保护SIP协议消息(SIP TLS)。

步骤：

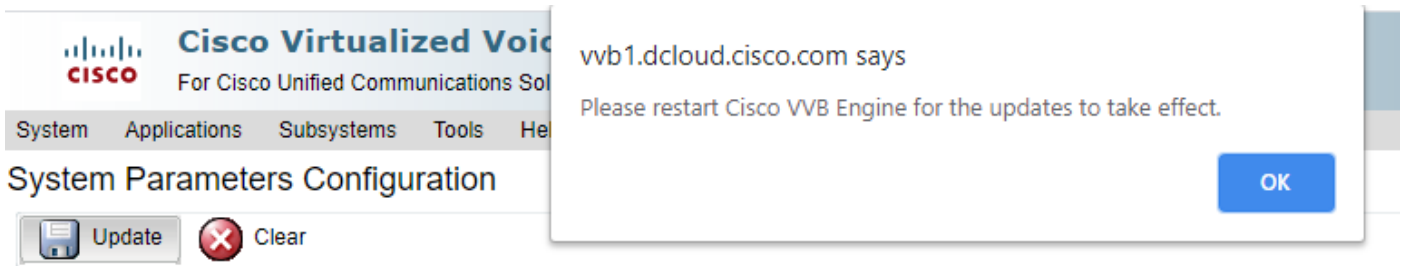
1. 登录到 **Cisco VVB Administration** 页码。
2. 导航至 **System > System Parameters**。

The screenshot shows the Cisco Virtualized Voice Browser Administration interface. The top navigation bar includes 'System', 'Applications', 'Subsystems', 'Tools', and 'Help'. The 'System Parameters' menu is highlighted, and a dropdown menu is open showing 'System Parameters' and 'Logout'. The main header reads 'Cisco Virtualized Voice Browser Administration' with the tagline 'For Cisco Unified Communications Solutions'. Below the header, it states 'System version: 12.5.1.10000-24'.

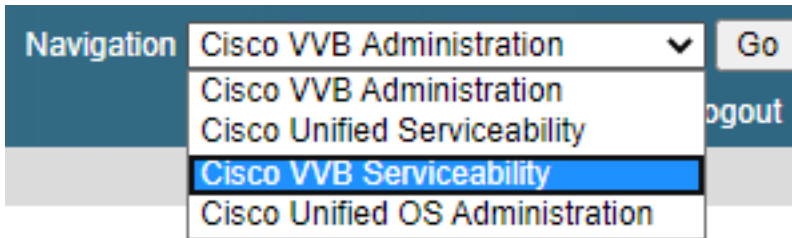
3. 如果 **Security Parameters** 部分，选择 **Enable** 对于 **TLS(SIP)**。保留 **Supported TLS(SIP) version** 作为 **TLSv1.2**。

| Security Parameters | Parameter Name | Parameter Value | Suggested Value |
|---------------------|--|---|---------------------------------------|
| | TLS(SIP) | <input type="radio"/> Disable <input checked="" type="radio"/> Enable | Disable |
| | Supported TLS(SIP) Versions | TLSv1.2 | TLSv1.2 |
| | ▶ Cipher Configuration | | TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 |
| | S RTP [Crypto Suite : AES_CM_128_HMAC_SHA1_32] | <input checked="" type="radio"/> Disable <input type="radio"/> Enable <input type="checkbox"/> Allow RTP (Mixed mode) | Disable |

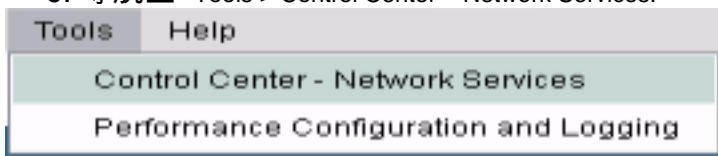
4. 单击更新。点击 **OK** 提示重新启动CVVB引擎时。



5. 这些更改需要重新启动Cisco VVB引擎。要重新启动VVB引擎，请导航至 Cisco VVB Serviceability ?? 然后单击 Go.



6. 导航至 Tools > Control Center – Network Services.



7. 选择 Engine 并点击 Restart.

Control Center - Network Services

Start Stop **Restart** Refresh

Status

i Ready

Select Server

Server * vvb1

| System Services | |
|----------------------------------|-------------------------|
| | Service Name |
| <input type="radio"/> | Perfmon Counter Service |
| <input type="radio"/> | ▼Cluster View Daemon |
| | ▶Manager Manager |
| <input checked="" type="radio"/> | ▼Engine |
| | ▶Manager Manager |
| | ▶Subsystem Manager |

任务4.CUCM安全配置

要保护CUCM上的SIP消息，请执行以下配置：

- 将CUCM安全模式设置为混合模式
- 为CUBE和CVP配置SIP中继安全配置文件
- 将SIP中继安全配置文件关联到各自的SIP中继
- 安全代理与CUCM的设备通信

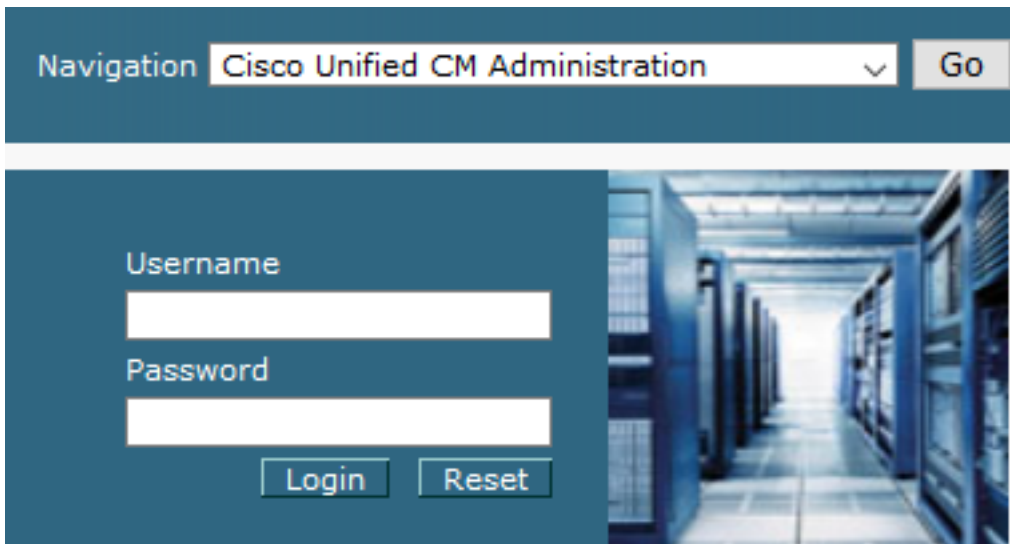
将CUCM安全模式设置为混合模式

CUCM支持两种安全模式：

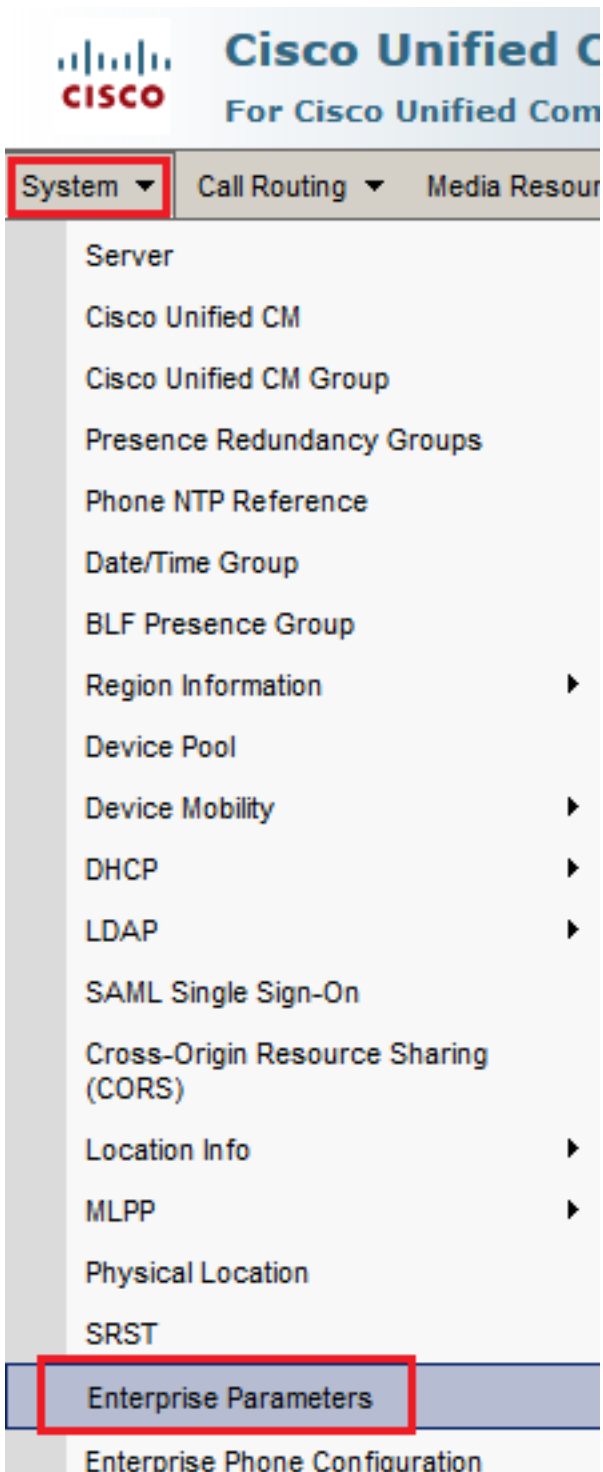
- 非安全模式 (默认模式)
- 混合模式 (安全模式)

步骤：

1. 要将安全模式设置为混合模式，请登录 Cisco Unified CM Administration 接口。



2. 成功登录CUCM后，导航至 [System > Enterprise Parameters](#).



3. 在 Security Parameters 部分，检查是否 Cluster Security Mode 设置为 0。



4. 如果集群安全模式设置为0，则表示集群安全模式设置为非安全。您需要从CLI启用混合模式。

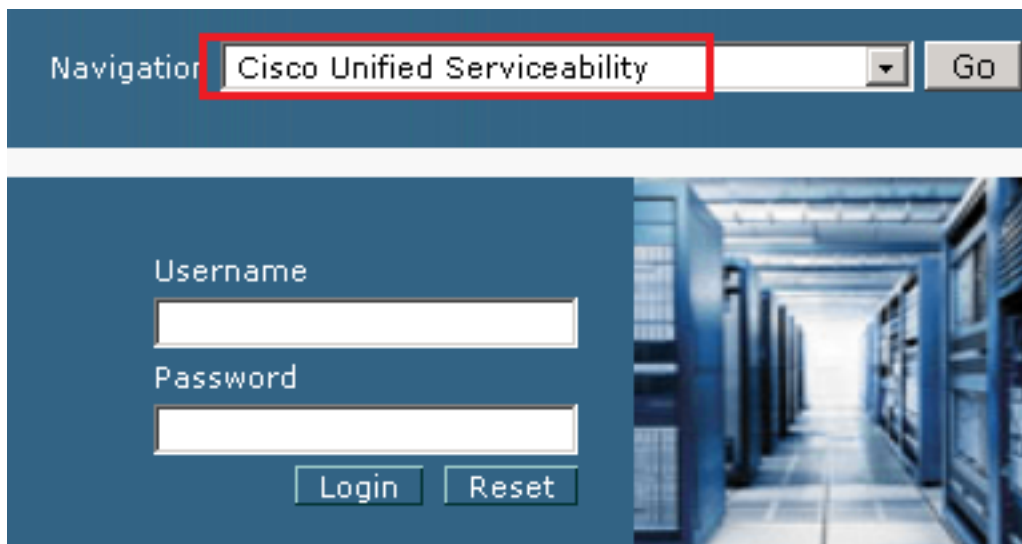
5. 打开到CUCM的SSH会话。

6. 通过SSH成功登录CUCM后，请运行以下命令：`utils ctl set-cluster mixed-mode`

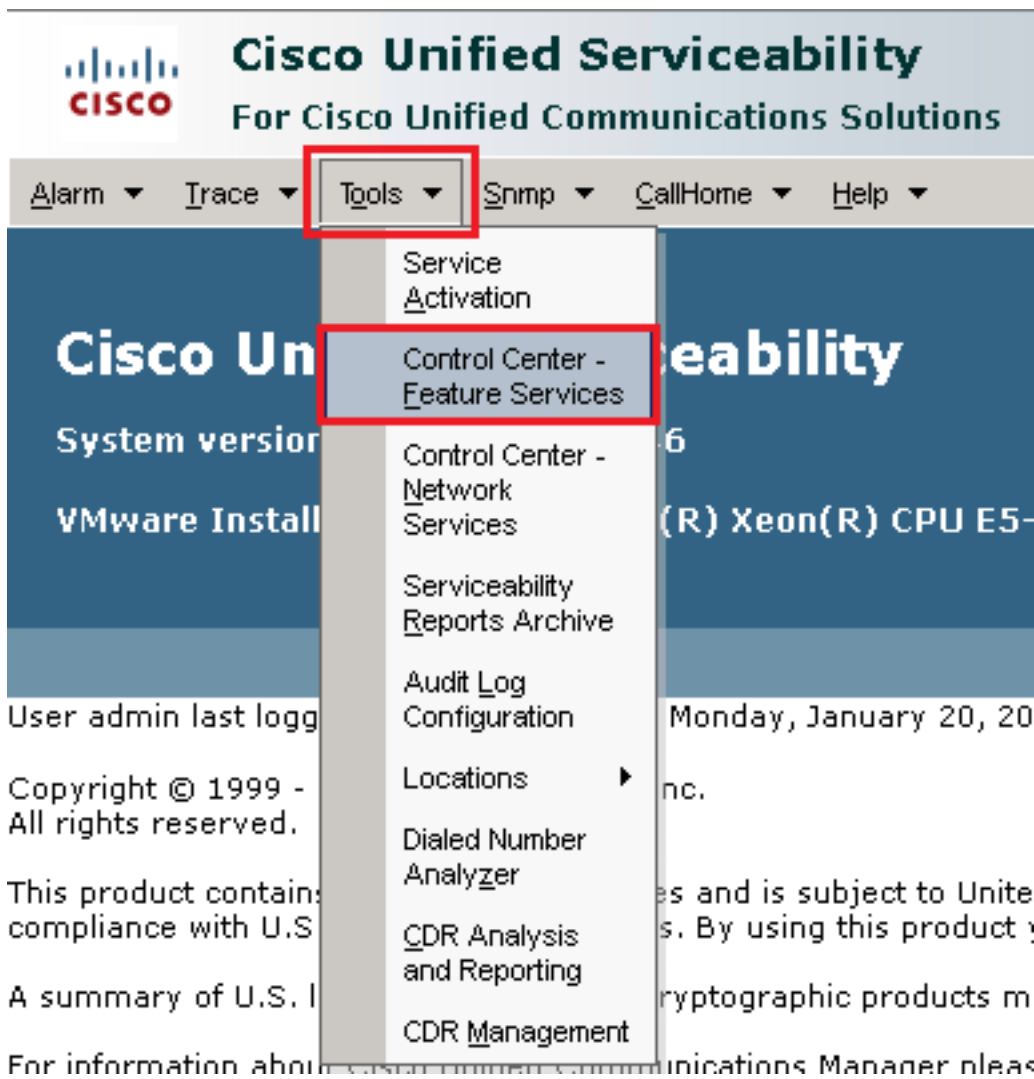
7. 类型 `y` 并在出现提示时单击Enter。此命令将集群安全模式设置为混合模式。


```
admin:utils ctl set-cluster mixed-mode
This operation will set the cluster to Mixed mode. Auto-registration is enabled on at least one CM node. Do you want to continue? (y/n): y
Moving Cluster to Mixed Mode
Cluster set to Mixed Mode
Please restart Cisco CallManager service and Cisco CTIManager services on all the nodes in the cluster that run these services.
admin:
```

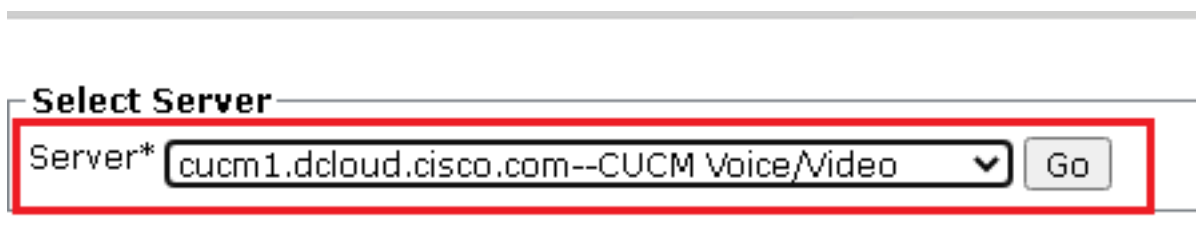
8. 要使更改生效，请重新启动 Cisco CallManager 和 Cisco CTIManager 服务。
9. 要重新启动服务，请导航并登录 Cisco Unified Serviceability.



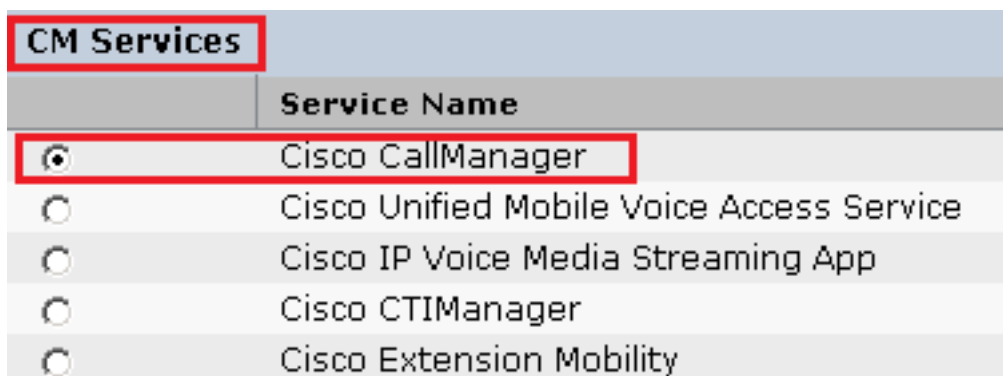
10. 成功登录后，导航至 Tools > Control Center – Feature Services.



11. 选择服务器，然后单击 Go.



12. 在CM服务下，选择 Cisco CallManager ?? 然后单击 Restart 按钮。



13. 确认弹出消息，然后单击 ok.等待服务成功重新启动。

Restarting Service. It may take a while... Please wait for the page to refresh.
If you see Starting/Stopping state, refresh the page after sometime to show the right status.



14. 成功重新启动 Cisco CallManager，选择思科 CTIManager ?? 然后单击 Restart 按钮重启 Cisco CTIManager 服务。

| CM Services | |
|----------------------------------|---|
| | Service Name |
| <input type="radio"/> | Cisco CallManager |
| <input type="radio"/> | Cisco Unified Mobile Voice Access Service |
| <input type="radio"/> | Cisco IP Voice Media Streaming App |
| <input checked="" type="radio"/> | Cisco CTIManager |
| <input type="radio"/> | Cisco Extension Mobility |

15. 确认弹出消息，然后单击 OK.等待服务成功重新启动。

Restarting Service. It may take a while... Please wait for the page to refresh.
If you see Starting/Stopping state, refresh the page after sometime to show the right status.



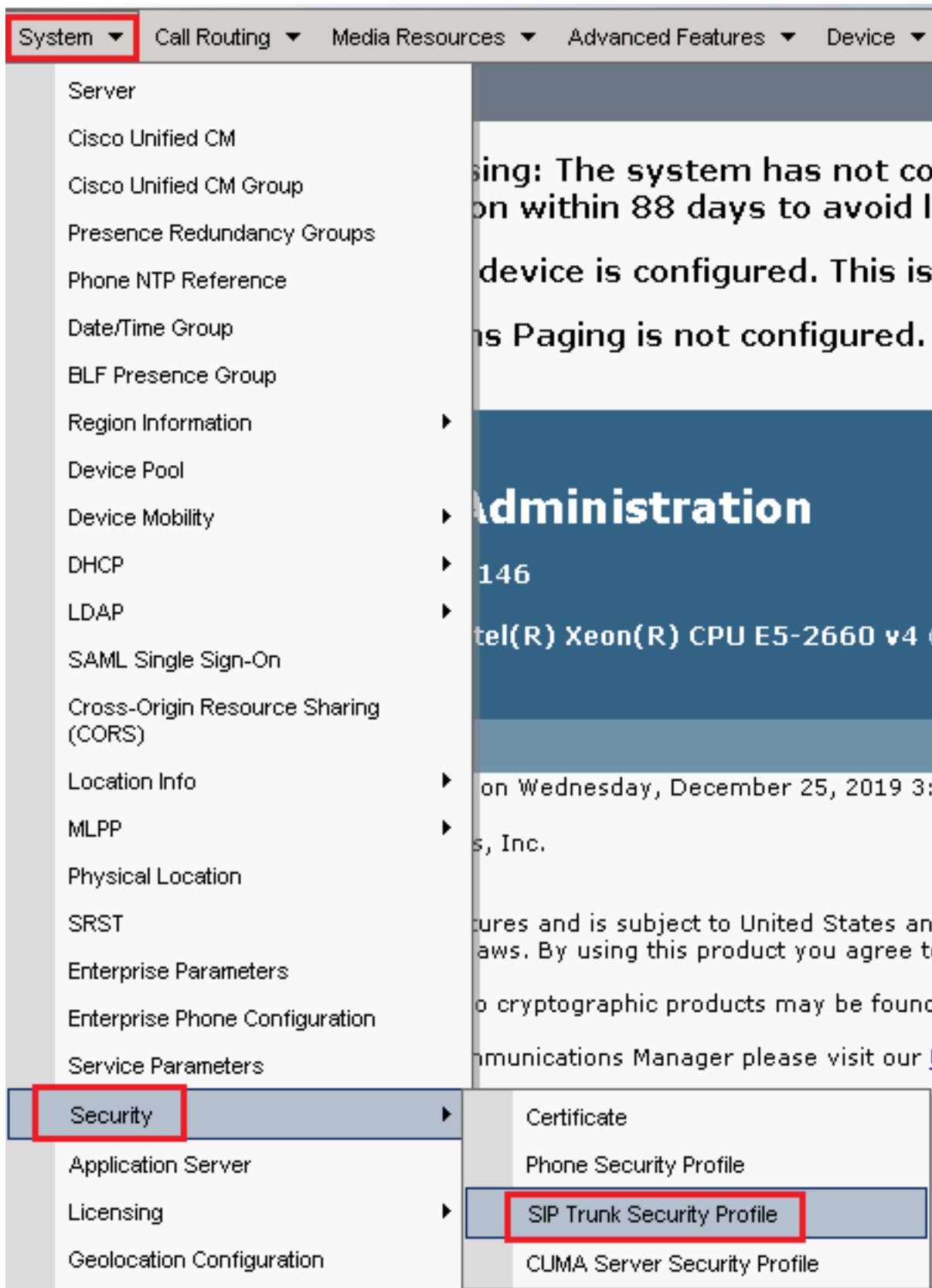
16. 服务成功重新启动后，验证集群安全模式是否设置为混合模式，然后按照步骤5中的说明导航到CUCM管理。然后检查 Cluster Security Mode.现在必须设置为 1.

| Security Parameters | |
|---|----------|
| Cluster Security Mode * | 1 |
| Cluster SIPOAuth Mode * | Disabled |

为CUBE和CVP配置SIP中继安全配置文件

步骤：

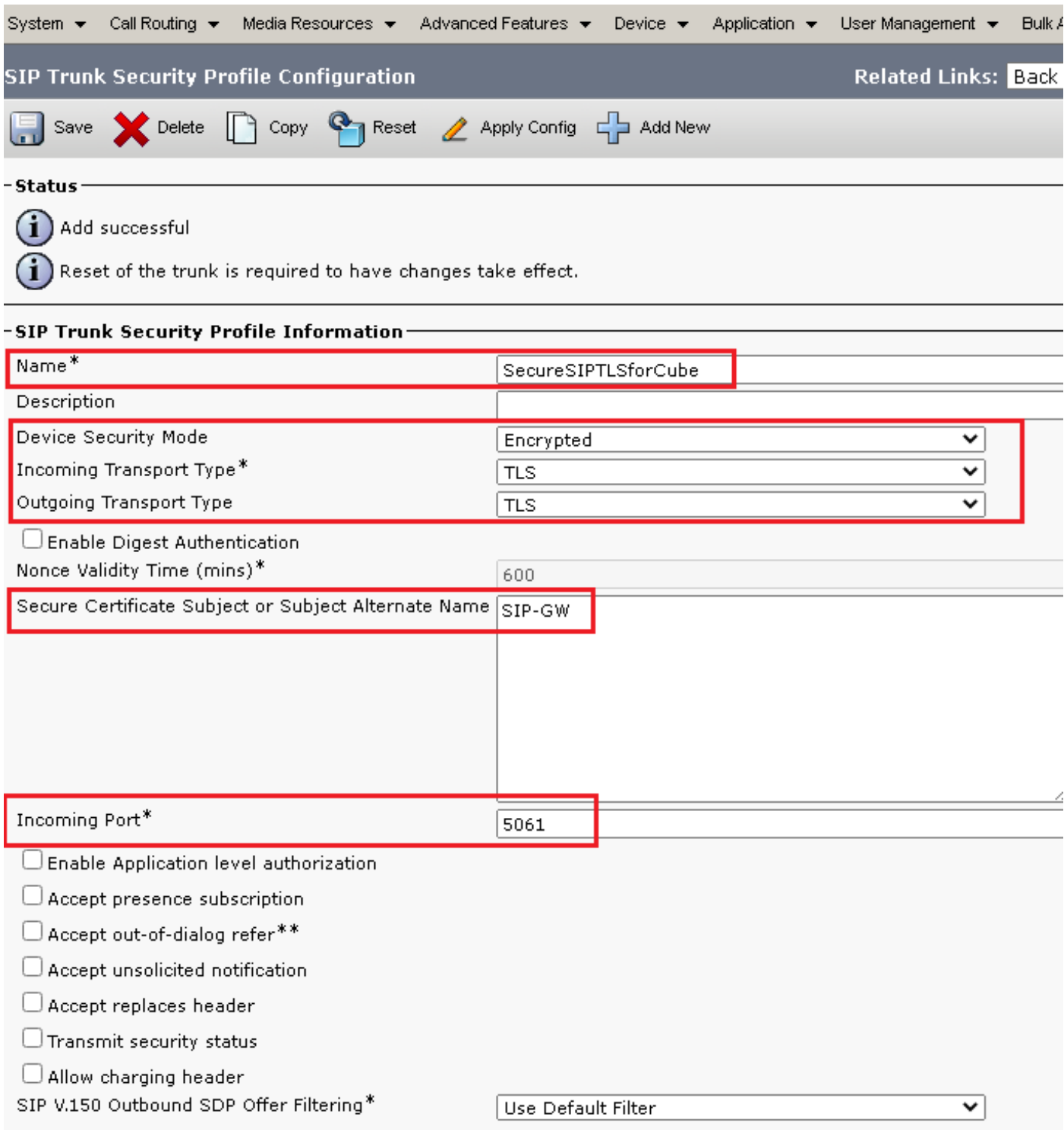
1. 登录到 CUCM administration 接口.
2. 成功登录CUCM后，导航至 System > Security > SIP Trunk Security Profile 以便为CUBE创建设备安全配置文件。



3. 在左上角，单击 **Add New** 以便添加新配置文件。



4. 配置 SIP Trunk Security Profile 如本图所示，然后单击 Save 位于页面左下角的 Save 它。



5. 确保已设置 Secure Certificate Subject or Subject Alternate Name CUBE证书的公用名(CN)，因为它必须匹配

6.单击 Copy 按钮并更改 Name 到 SecureSipTLSforCVP 和 Secure Certificate Subject CVP呼叫服务器证书的 CN , 因为它必须匹配。点击 Save 按钮。

Status

- Add successful
- Reset of the trunk is required to have changes take effect.

SIP Trunk Security Profile Information

Name* SecureSIPTLSforCvp

Description

Device Security Mode Encrypted

Incoming Transport Type* TLS

Outgoing Transport Type TLS

Enable Digest Authentication

Nonce Validity Time (mins)* 600

Secure Certificate Subject or Subject Alternate Name cvp1.dcloud.cisco.com

Incoming Port* 5061

Enable Application level authorization

Accept presence subscription

Accept out-of-dialog refer**

Accept unsolicited notification

Accept replaces header

Transmit security status

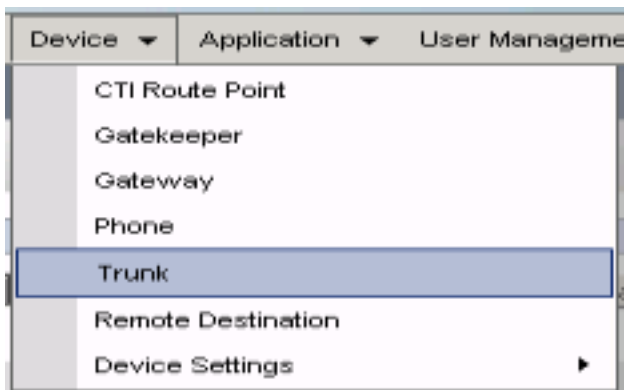
Allow charging header

SIP V.150 Outbound SDP Offer Filtering* Use Default Filter

将SIP中继安全配置文件关联到各自的SIP中继

步骤：

1. 在CUCM Administration页面上，导航至 Device > Trunk.



2. 搜索CUBE中继。在本示例中，CUBE中继名称为 vCube。点击 Find。

Trunks (1 - 5 of 5)

Find Trunks where Device Name begins with vCube Find Clear Filter

| | Name | Description | Calling Search Space | Device Pool | Route Pattern | Partition |
|--------------------------|-------|-------------|----------------------|----------------------------|---------------------------------|-----------|
| <input type="checkbox"/> | vCUBE | dCloud_CSS | dCloud_DP | cloudcherry.sip.twilio.com | dCloud_PT | |
| <input type="checkbox"/> | vCUBE | dCloud_CSS | dCloud_DP | 7800 | PSTN_Incoming_Numbers | |
| <input type="checkbox"/> | vCUBE | dCloud_CSS | dCloud_DP | 6016 | PSTN_Incoming_Numbers | |
| <input type="checkbox"/> | vCUBE | dCloud_CSS | dCloud_DP | 7019 | PSTN_Incoming_Numbers | |
| <input type="checkbox"/> | vCUBE | dCloud_CSS | dCloud_DP | 44413XX | Robot Agent Remote Destinations | |

3. 点击vCUBE以打开vCUBE中继配置页面。

4. 向下滚动到 SIP Information 部分，并更改 Destination Port 到 5061。

5. Change (更改) SIP Trunk Security Profile 到 SecureSIPTLSForCube。

SIP Information

Destination

Destination Address is an SRV

| | Destination Address | Destination Address IPv6 | Destination Port |
|----|---------------------|--------------------------|------------------|
| 1* | 198.18.133.226 | | 5061 |

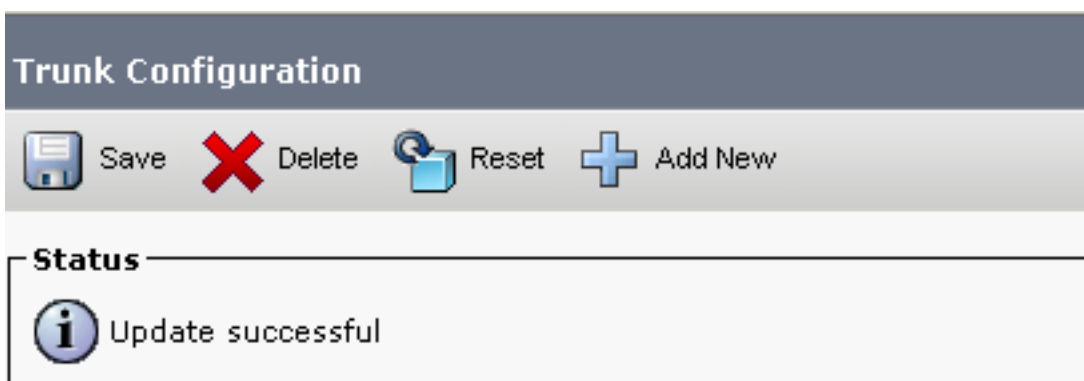
MTP Preferred Originating Codec* 711ulaw

BLF Presence Group* Standard Presence group

SIP Trunk Security Profile* SecureSIPTLSforCube

Rerouting Calling Search Space < None >


6. 点击 Save 然后 Rest 为了 Save 并应用更改。



The configuration changes will not take effect on the trunk until a reset is performed. Use the Reset button or Job Scheduler to execute the reset.

OK

7. 导航至 Device > Trunk，并搜索CVP中继。在本示例中，CVP中继名称为 cvp-SIP-Trunk。点击 Find。

| Trunks (1 - 1 of 1) | | | | |
|----------------------------------|---|---------------|----------------------|-------------|
| Find Trunks where | | | | |
| Device Name | | begins with | cvp | Find |
| Clear Filter | | | | |
| Select item or enter search text | | | | |
| <input type="checkbox"/> | Name ^ | Description | Calling Search Space | Device Pool |
| <input type="checkbox"/> |  CVP-SIP-Trunk | CVP-SIP-Trunk | dCloud_CSS | dCloud_DP |

8. 点击 CVP-SIP-Trunk 以打开CVP中继配置页面。

9. 向下滚动到 SIP Information 部分，并更改 Destination Port 到 5061。

10. Change (更改) SIP Trunk Security Profile 到 SecureSIPTLSForCvp。

SIP Information

Destination

Destination Address is an SRV

| Destination Address | Destination Address IPv6 | Destination Port |
|---------------------|--------------------------|------------------|
| 1* 198.18.133.13 | | 5061 |





MTP Preferred Originating Codec* 711ulaw

BLF Presence Group* Standard Presence group


SIP Trunk Security Profile* SecureSIPTLSforCvp

11. 点击 Save 然后 Rest 为了 save 并应用更改。

Trunk Configuration

 Save  Delete  Reset  Add New

Status

 Update successful

The configuration changes will not take effect on the trunk until a reset is performed. Use the Reset button or Job Scheduler to execute the reset.

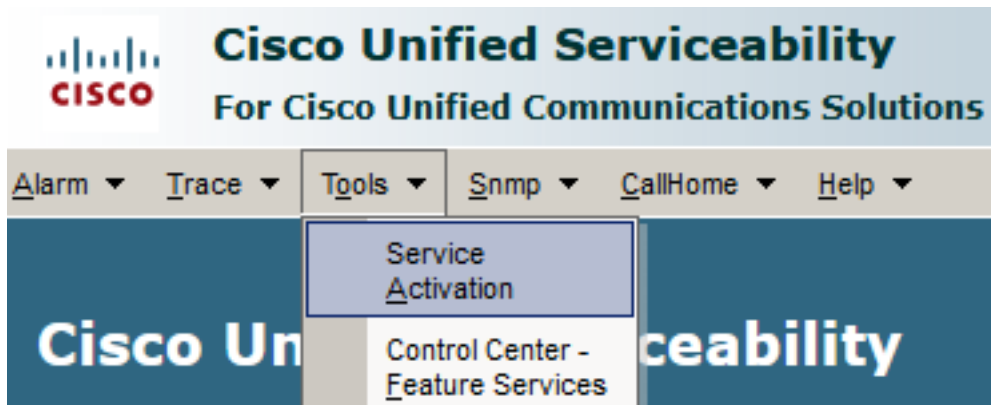
OK

安全代理与CUCM的设备通信

要启用设备的安全功能，必须安装本地重要证书(LSC)并为该设备分配安全配置文件。LSC拥有终端的公钥，该公钥由证书授权代理功能(CAPF)私钥签名。默认情况下，它不会安装在电话上。

步骤：

1. 登录到 Cisco Unified Serviceability Interface.
2. 导航至 Tools > Service Activation.



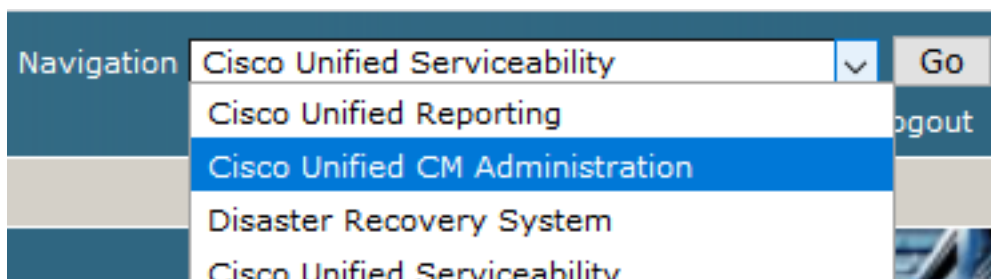
3. 选择CUCM服务器并单击 Go .



4. 检查 Cisco Certificate Authority Proxy Function 并点击 Save 激活服务。点击 Ok 确认。

| Security Services | | |
|-------------------------------------|--|-------------------|
| | Service Name | Activation Status |
| <input checked="" type="checkbox"/> | Cisco Certificate Authority Proxy Function | Deactivated |
| <input type="checkbox"/> | Cisco Certificate Enrollment Service | Deactivated |

5. 确保服务已激活，然后导航至 Cisco Unified CM Administration.



6. 成功登录CUCM管理后，导航至 System > Security > Phone Security Profile 为代理设备创建设备安全配置文件。



Cisco Unified CM Administration

For Cisco Unified Communications Solutions

System ▾

Call Routing ▾

Media Resources ▾

Advanced Features ▾

Devi

Server

Cisco Unified CM

Cisco Unified CM Group

Presence Redundancy Groups

Phone NTP Reference

Date/Time Group

BLF Presence Group

Region Information ▶

Device Pool

Device Mobility ▶

DHCP ▶

LDAP ▶

SAML Single Sign-On

Cross-Origin Resource Sharing (CORS)

Location Info ▶

MLPP ▶

Physical Location

SRST

Enterprise Parameters

Enterprise Phone Configuration

Service Parameters

Security ▶

Application Server

Licensing ▶

Geolocation Configuration

device is configured. The
as Paging is not configur

Administration

7

tel(R) Xeon(R) CPU E5-2660

on Friday, December 20, 2019 10

s, Inc.

ures and is subject to United Stat
aws. By using this product you ac

o cryptographic products may be

munications Manager please visit

our [Technical Support](#) web site.

Certificate

Phone Security Profile

SIP Trunk Security Profile

CUMA Server Security Profile

7. 查找与您的座席设备类型对应的安全配置文件。在本示例中，使用软件电话，因此选择 Cisco Unified Client Services Framework - Standard SIP Non-Secure Profile。点击 Copy 以便复制此配置文件。

Phone Security Profile (1 - 1 of 1) Rows per Page 50

Find Phone Security Profile where Name contains client Find Clear Filter + -

| Name | Description | Copy |
|---|---|------|
| Cisco Unified Client Services Framework - Standard SIP Non-Secure Profile | Cisco Unified Client Services Framework - Standard SIP Non-Secure Profile | |

8. 将配置文件重命名为 Cisco Unified Client Services Framework - Secure Profile 更改此图中所示的参数，然后单击 Save 在页面左上角。

System Call Routing Media Resources Advanced Features Device Application User

Phone Security Profile Configuration

Save Delete Copy Reset Apply Config Add New

Status

Add successful

Phone Security Profile Information

Product Type: Cisco Unified Client Services Framework
Device Protocol: SIP

Name* Cisco Unified Client Services Framework - Secure Profile
Description Cisco Unified Client Services Framework - Secure Profile
Device Security Mode Encrypted
Transport Type* TLS

TFTP Encrypted Config
 Enable OAuth Authentication

Phone Security Profile CAPF Information

Authentication Mode* By Null String
Key Order* RSA Only
RSA Key Size (Bits)* 2048
EC Key Size (Bits) < None >

Note: These fields are related to the CAPF Information settings on the Phone Configuration page.

Parameters used in Phone

SIP Phone Port* 5061

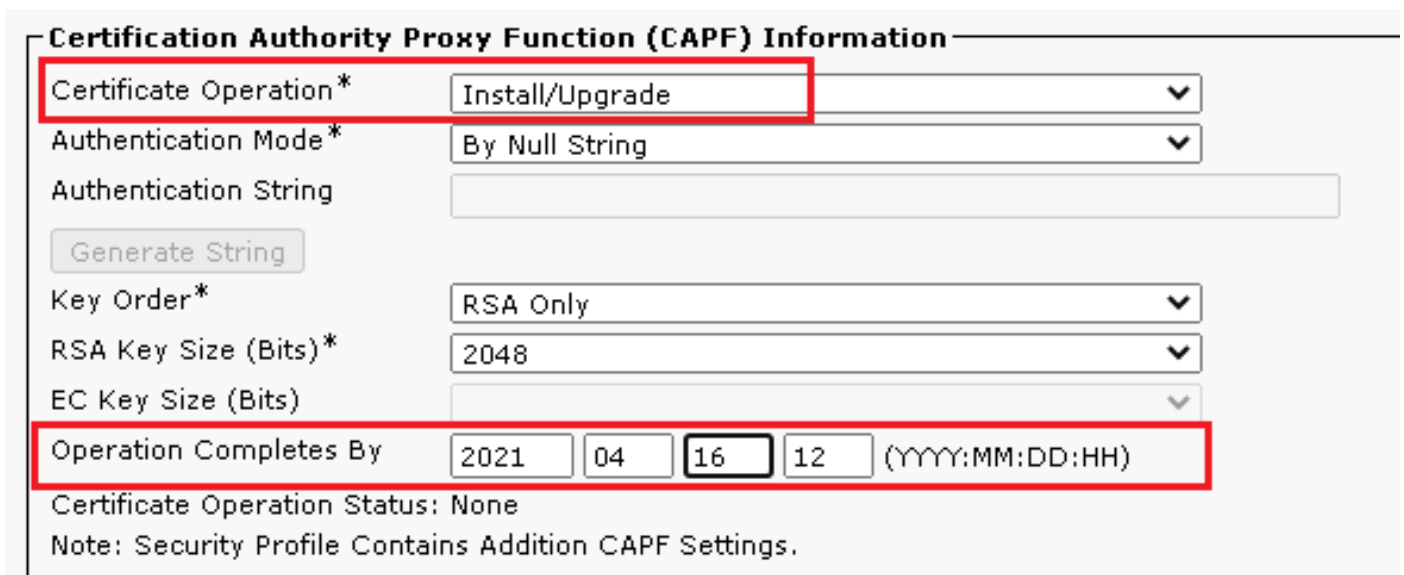
Save Delete Copy Reset Apply Config Add New

9. 成功创建电话设备配置文件后，导航至 Device > Phone.

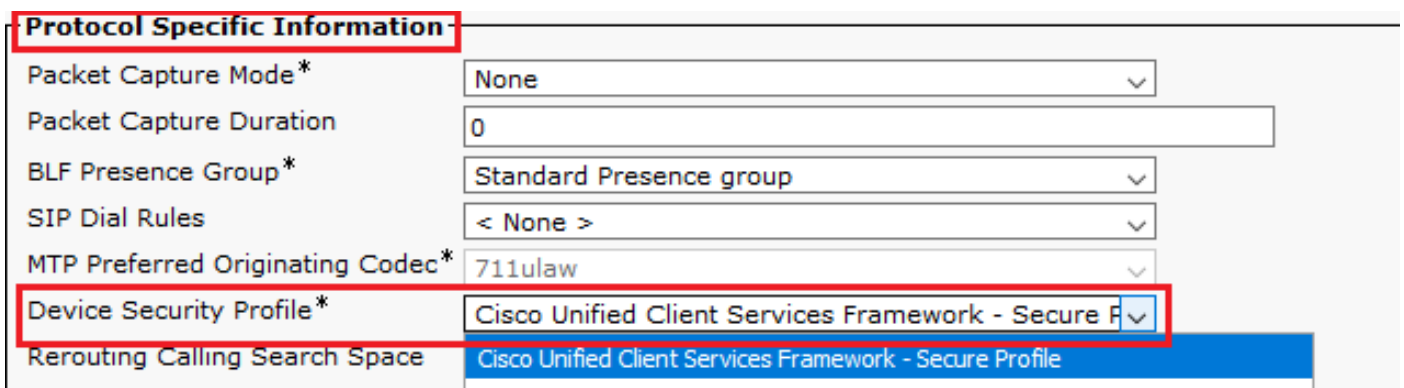


10. 点击 Find 要列出所有可用电话，请单击座席电话。

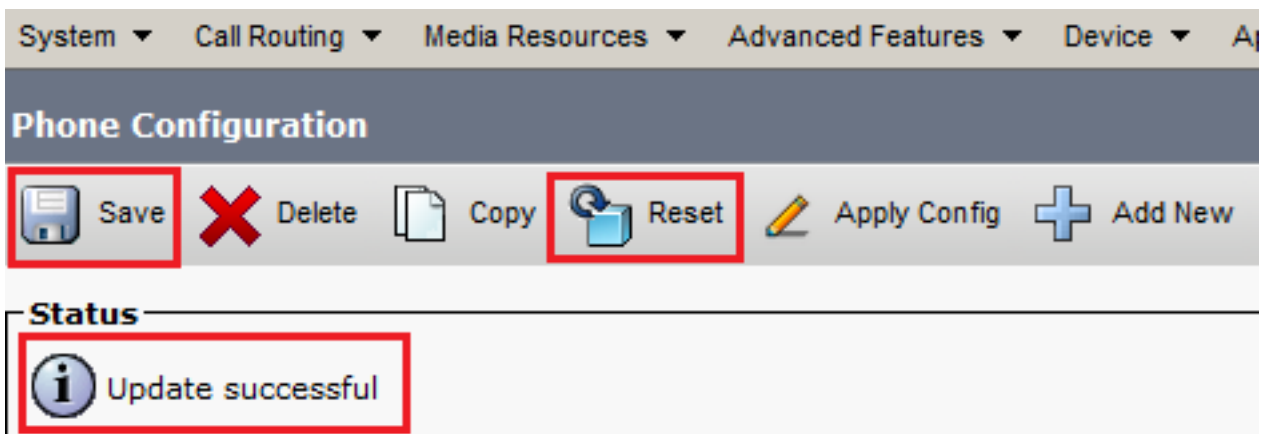
11. 座席电话配置页面打开。查找 Certification Authority Proxy Function (CAPF) Information 部分。要安装 LSC，请设置 Certificate Operation 到 Install/Upgrade 和 Operation Completes by 到任何未来日期。



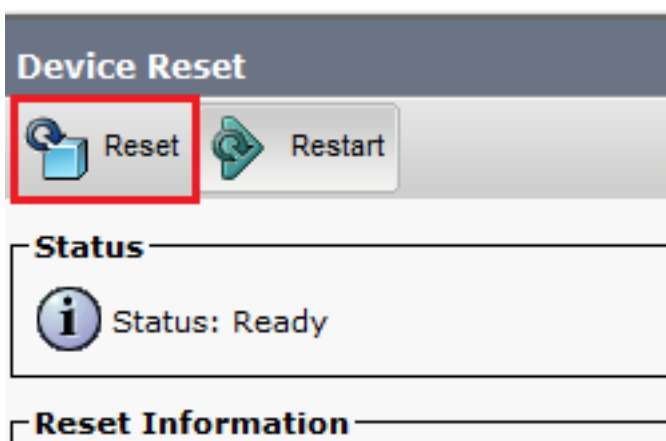
12. 查找 Protocol Specific Information 部分。Change (更改) Device Security Profile 到 Cisco Unified Client Services Framework – Secure Profile.



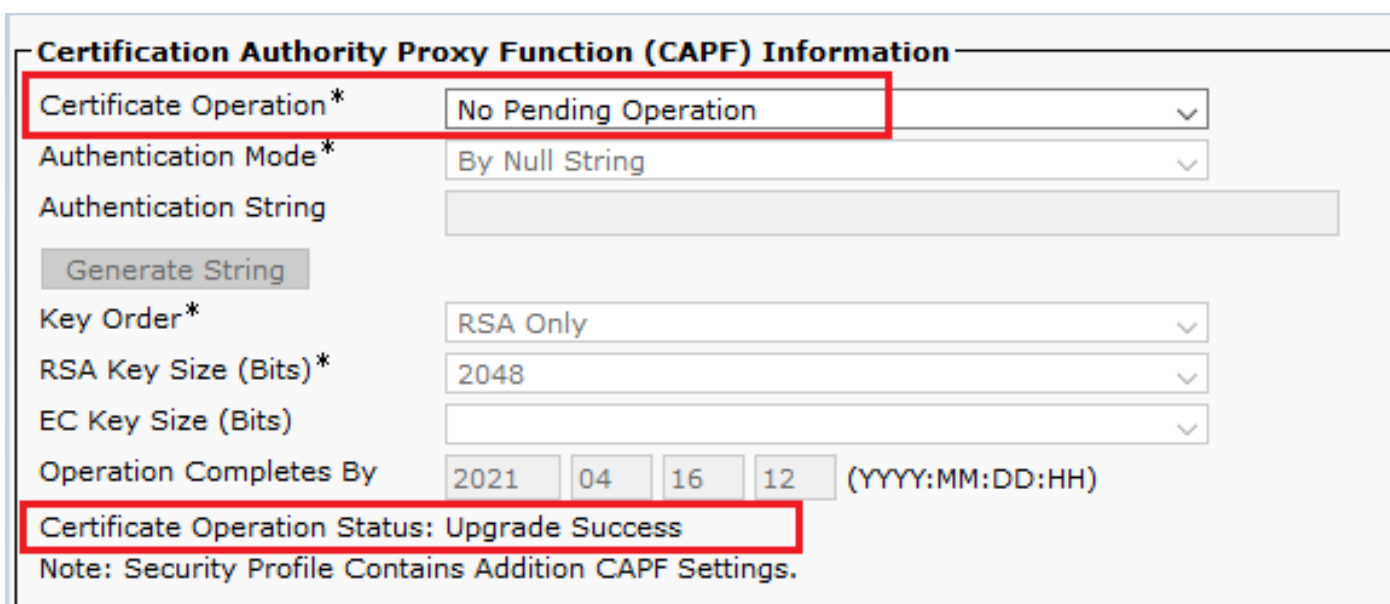
13. 点击 Save 在页面左上角。确保更改已成功保存，然后单击 Reset.



14. 系统将打开一个弹出窗口，单击 **Reset** 确认操作。



15. 代理设备再次向CUCM注册后，刷新当前页面并验证LSC是否安装成功。检查 **Certification Authority Proxy Function (CAPF) Information** 部分，**Certificate Operation** 必须设置为 **No Pending Operation**，和 **Certificate Operation Status** 设置为 **Upgrade Success**。



16. 请参阅步骤。7-13，以保护要用于保护CUCM的SIP的其他代理设备。

验证

要验证SIP信令是否受到适当保护，请执行以下步骤：

1. 打开到vCUBE的SSH会话，运行命令 `show sip-ua connections tcp tls detail`，并确认当前未与CVP(198.18.133.13)建立TLS连接。

```
CC-VCUBE#show sip-ua connections tcp tls detail
Total active connections      : 1
No. of send failures         : 0
No. of remote closures       : 34
No. of conn. failures        : 0
No. of inactive conn. ageouts : 12
TLS client handshake failures : 0
TLS server handshake failures : 0

-----Printing Detailed Connection Report-----
Note:
** Tuples with no matching socket entry
- Do 'clear sip <tcp[tls]/udp> conn t ipv4:<addr>:<port>'
  to overcome this error condition
++ Tuples with mismatched address/port entry
- Do 'clear sip <tcp[tls]/udp> conn t ipv4:<addr>:<port> id <connid>'
  to overcome this error condition

Remote-Agent:198.18.133.3, Connections-Count:1
  Remote-Port Conn-Id Conn-State WriteQ-Size Local-Address TLS-Version
  =====
      44868      49 Established          0          -      TLSv1.2

Remote-Agent:198.18.133.13, Connections-Count:0

----- SIP Transport Layer Listen Sockets -----
Conn-Id          Local-Address
=====
0                [0.0.0.0]:5061;
```



注意：此时，在CUCM(198.18.133.3)上仅启用一个与CUCM的SIP选项的活动TLS会话。如果未启用SIP选项，则不存在SIP TLS连接。

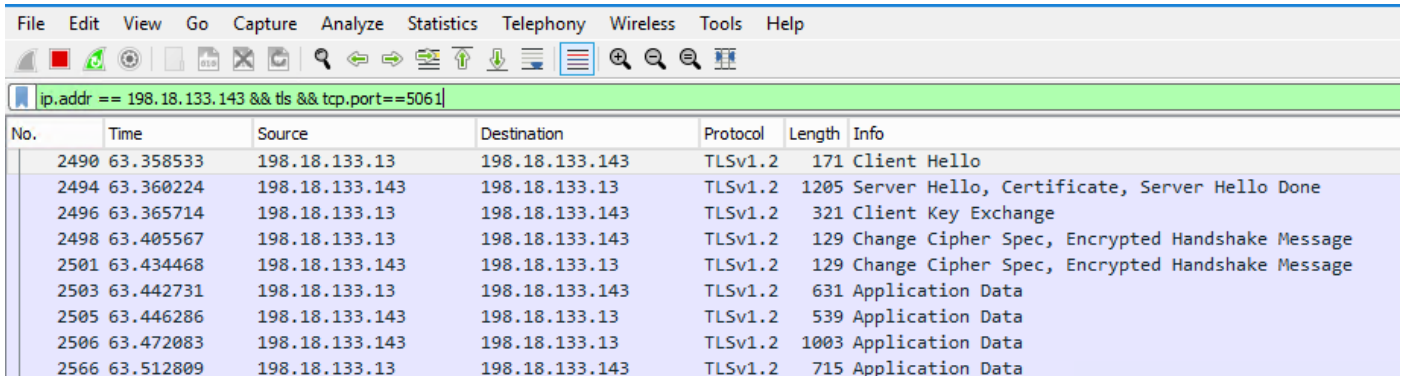
2. 登录到CVP并启动Wireshark。
3. 拨打联系中心号码。
4. 导航到CVP会话；在Wireshark上，运行此过滤器以使用CUBE检查SIP信令：
`ip.addr == 198.18.133.226 && tls && tcp.port==5061`

| No. | Time | Source | Destination | Protocol | Length | Info |
|------|-----------|----------------|----------------|----------|--------|--|
| 2409 | 63.180370 | 198.18.133.226 | 198.18.133.13 | TLSv1.2 | 173 | Client Hello |
| 2411 | 63.183691 | 198.18.133.13 | 198.18.133.226 | TLSv1.2 | 1153 | Server Hello, Certificate, Server Hello Done |
| 2414 | 63.188871 | 198.18.133.226 | 198.18.133.13 | TLSv1.2 | 396 | Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message |
| 2415 | 63.202820 | 198.18.133.13 | 198.18.133.226 | TLSv1.2 | 60 | Change Cipher Spec |
| 2416 | 63.203063 | 198.18.133.13 | 198.18.133.226 | TLSv1.2 | 123 | Encrypted Handshake Message |
| 2419 | 63.207380 | 198.18.133.226 | 198.18.133.13 | TLSv1.2 | 614 | Application Data |
| 2421 | 63.255349 | 198.18.133.13 | 198.18.133.226 | TLSv1.2 | 635 | Application Data |
| 2508 | 63.495508 | 198.18.133.13 | 198.18.133.226 | TLSv1.2 | 1067 | Application Data |
| 2565 | 63.505008 | 198.18.133.226 | 198.18.133.13 | TLSv1.2 | 587 | Application Data |

检查：是否已建立SIP over TLS连接？如果是，输出确认CVP和CUBE之间的SIP信号是安全的。

5.检查CVP和CVVB之间的SIP TLS连接。在同一Wireshark会话中，运行此过滤器：

```
ip.addr == 198.18.133.143 && tls && tcp.port==5061
```



The image shows a Wireshark interface with a filter applied: `ip.addr == 198.18.133.143 && tls && tcp.port==5061`. The packet list table below shows the following details:

| No. | Time | Source | Destination | Protocol | Length | Info |
|------|-----------|----------------|----------------|----------|--------|---|
| 2490 | 63.358533 | 198.18.133.13 | 198.18.133.143 | TLSv1.2 | 171 | Client Hello |
| 2494 | 63.360224 | 198.18.133.143 | 198.18.133.13 | TLSv1.2 | 1205 | Server Hello, Certificate, Server Hello Done |
| 2496 | 63.365714 | 198.18.133.13 | 198.18.133.143 | TLSv1.2 | 321 | Client Key Exchange |
| 2498 | 63.405567 | 198.18.133.13 | 198.18.133.143 | TLSv1.2 | 129 | Change Cipher Spec, Encrypted Handshake Message |
| 2501 | 63.434468 | 198.18.133.143 | 198.18.133.13 | TLSv1.2 | 129 | Change Cipher Spec, Encrypted Handshake Message |
| 2503 | 63.442731 | 198.18.133.13 | 198.18.133.143 | TLSv1.2 | 631 | Application Data |
| 2505 | 63.446286 | 198.18.133.143 | 198.18.133.13 | TLSv1.2 | 539 | Application Data |
| 2506 | 63.472083 | 198.18.133.143 | 198.18.133.13 | TLSv1.2 | 1003 | Application Data |
| 2566 | 63.512809 | 198.18.133.13 | 198.18.133.143 | TLSv1.2 | 715 | Application Data |

检查：是否已建立SIP over TLS连接？如果是，输出确认CVP和CVVB之间的SIP信号是安全的。

6.您还可以从CUBE验证与CVP的SIP TLS连接。导航到vCUBE SSH会话，并运行此命令以检查安全SIP信号：

```
show sip-ua connections tcp tls detail
```

```

CC-VCUBE#show sip-ua connections tcp tls detail
Total active connections      : 2
No. of send failures         : 0
No. of remote closures      : 0
No. of conn. failures        : 0
No. of inactive conn. ageouts : 0
TLS client handshake failures : 0
TLS server handshake failures : 0

-----Printing Detailed Connection Report-----
Note:
** Tuples with no matching socket entry
  - Do 'clear sip <tcp[tls]/udp> conn t ipv4:<addr>:<port>'
    to overcome this error condition
++ Tuples with mismatched address/port entry
  - Do 'clear sip <tcp[tls]/udp> conn t ipv4:<addr>:<port> id <connid>'
    to overcome this error condition

Remote-Agent:198.18.133.3, Connections-Count:1
  Remote-Port Conn-Id Conn-State  WriteQ-Size Local-Address TLS-Version
  =====
      38896      2 Established      0           -           TLSv1.2

Remote-Agent:198.18.133.13, Connections-Count:1
  Remote-Port Conn-Id Conn-State  WriteQ-Size Local-Address TLS-Version
  =====
      5061      3 Established      0           -           TLSv1.2

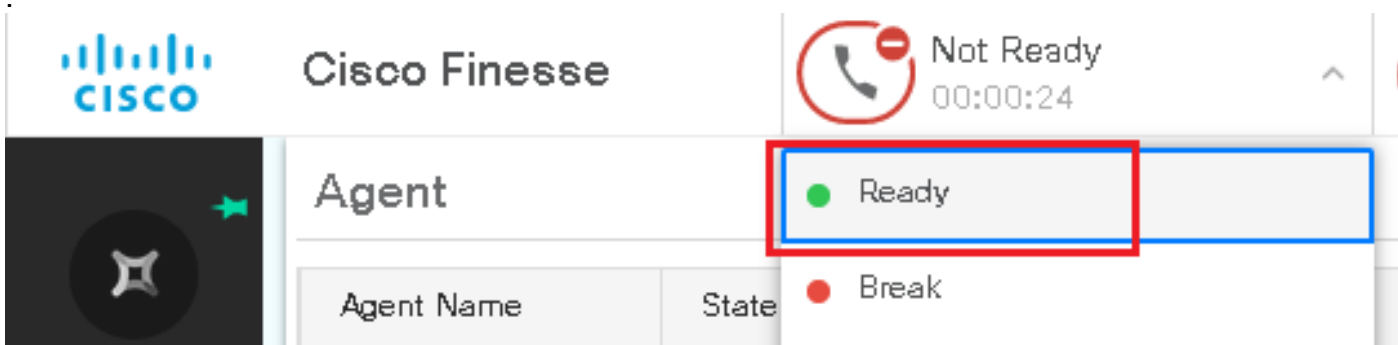
----- SIP Transport Layer Listen Sockets -----
  Conn-Id          Local-Address
  =====
      0            [0.0.0.0]:5061:

```

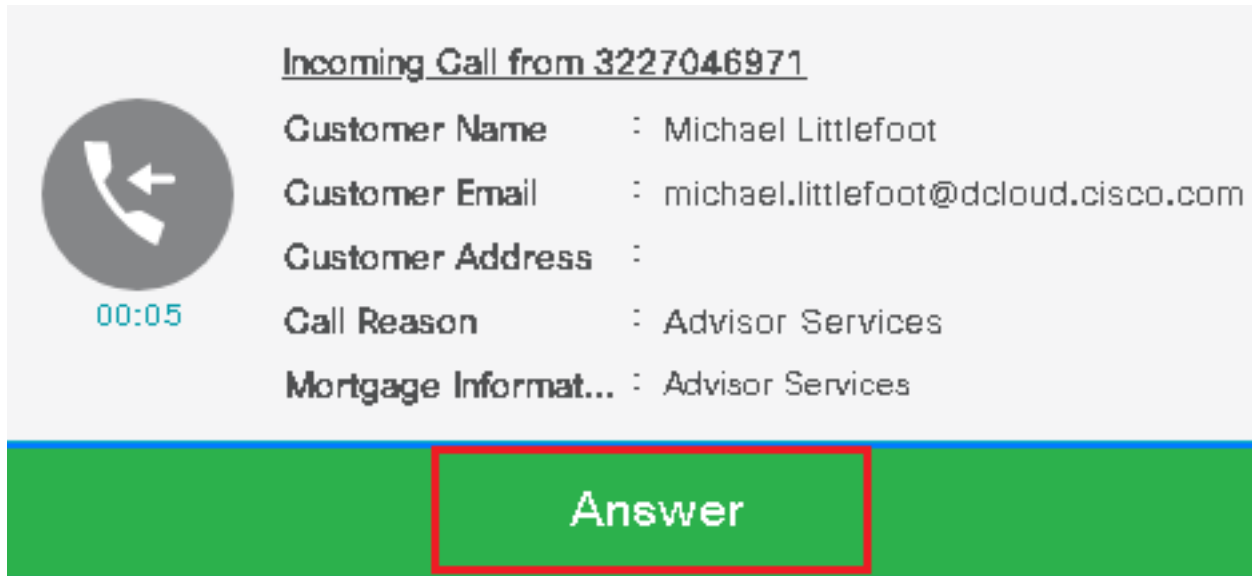
检查：是否与CVP建立了SIP over TLS连接？如果是，输出确认CVP和CUBE之间的SIP信号是安全的。

7.此时，呼叫处于活动状态，您听到保留音乐(MOH)，因为没有座席可以应答呼叫。

8.使座席能够应答呼叫。



9.座席将被保留，并且呼叫被路由到他/她。点击 Answer 接听电话。



Incoming Call from 3227046971

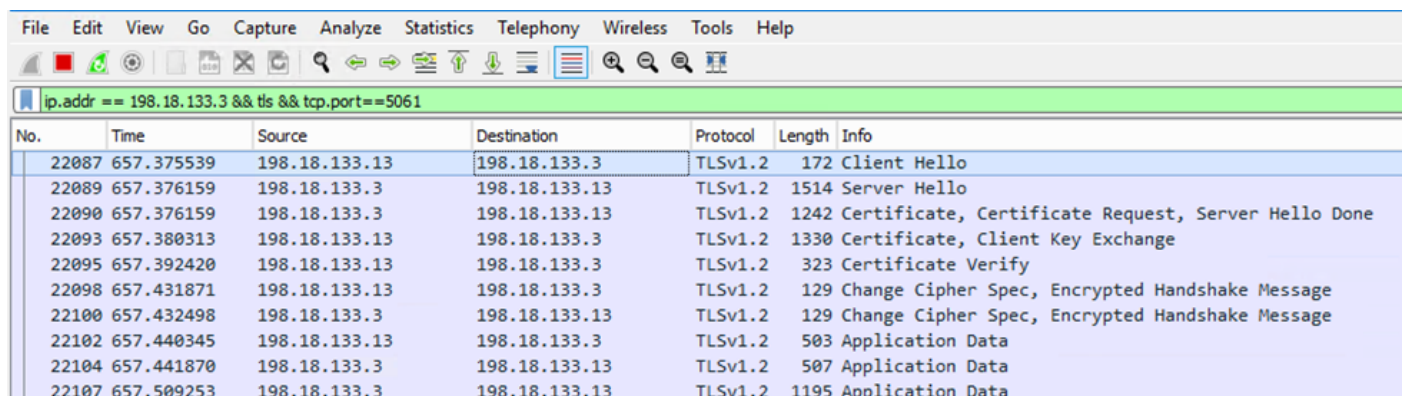
Customer Name : Michael Littlefoot
Customer Email : michael.littlefoot@dcloud.cisco.com
Customer Address :
Call Reason : Advisor Services
Mortgage Informat... : Advisor Services

00:05

Answer

10.呼叫连接到座席。

11.为了验证CVP和CUCM之间的SIP信号，请导航到CVP会话，并在Wireshark中运行此过滤器：
ip.addr == 198.18.133.3 && tls && tcp.port==5061



| No. | Time | Source | Destination | Protocol | Length | Info |
|-------|------------|---------------|---------------|----------|--------|---|
| 22087 | 657.375539 | 198.18.133.13 | 198.18.133.3 | TLSv1.2 | 172 | Client Hello |
| 22089 | 657.376159 | 198.18.133.3 | 198.18.133.13 | TLSv1.2 | 1514 | Server Hello |
| 22090 | 657.376159 | 198.18.133.3 | 198.18.133.13 | TLSv1.2 | 1242 | Certificate, Certificate Request, Server Hello Done |
| 22093 | 657.380313 | 198.18.133.13 | 198.18.133.3 | TLSv1.2 | 1330 | Certificate, Client Key Exchange |
| 22095 | 657.392420 | 198.18.133.13 | 198.18.133.3 | TLSv1.2 | 323 | Certificate Verify |
| 22098 | 657.431871 | 198.18.133.13 | 198.18.133.3 | TLSv1.2 | 129 | Change Cipher Spec, Encrypted Handshake Message |
| 22100 | 657.432498 | 198.18.133.3 | 198.18.133.13 | TLSv1.2 | 129 | Change Cipher Spec, Encrypted Handshake Message |
| 22102 | 657.440345 | 198.18.133.13 | 198.18.133.3 | TLSv1.2 | 503 | Application Data |
| 22104 | 657.441870 | 198.18.133.3 | 198.18.133.13 | TLSv1.2 | 507 | Application Data |
| 22107 | 657.509253 | 198.18.133.3 | 198.18.133.13 | TLSv1.2 | 1195 | Application Data |

检查：是否所有与CUCM(198.18.133.3)的SIP通信都通过TLS?如果是，输出确认CVP和CUCM之间的SIP信号是安全的。

故障排除

如果未建立TLS，请在CUBE上运行以下命令以启用debug TLS进行故障排除：

- Debug ssl openssl errors
- Debug ssl openssl msg
- Debug ssl openssl states

关于此翻译

思科采用人工翻译与机器翻译相结合的方式将此文档翻译成不同语言，希望全球的用户都能通过各自的语言得到支持性的内容。

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