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Let's go

Troubleshooting Webex Calling Premises-based PSTN

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Agenda

- Webex Calling PSTN Architecture
- CUBE SIP Registration
- Call Routing
- SIP Troubleshooting
- Voice Quality

Webex Calling PSTN Architecture

Webex Calling PSTN Options

Connection Type

Choose the connection type for all phone numbers associated with Cisco Live Test.

Cisco PSTN

Cisco-provided PSTN provides a bundled Cisco solution that simplifies your cloud calling experience with easy PSTN ordering and full support from Cisco and our Partners.

Cloud Connected PSTN

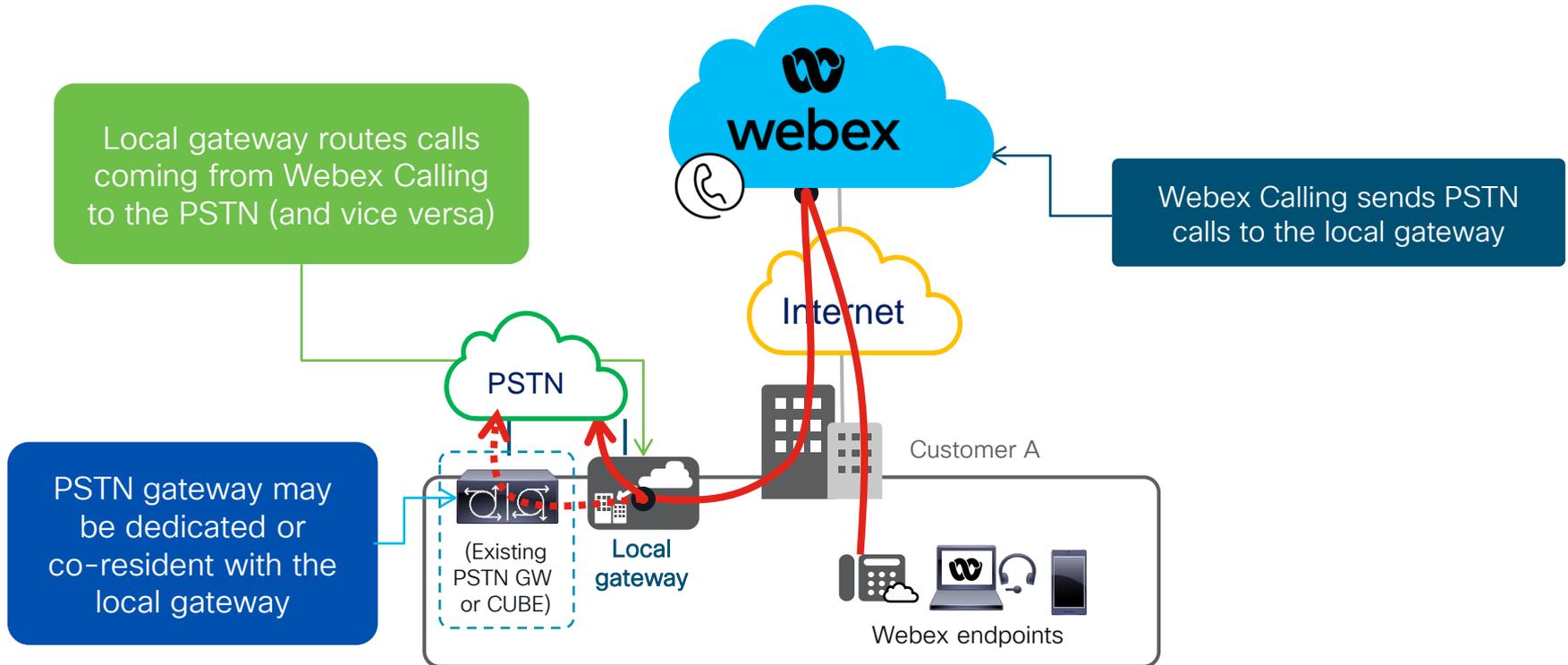
Select Cisco Cloud Connected PSTN partners that provide flexible global PSTN solutions fully integrated with Cisco's Webex Calling cloud.

Premises-based PSTN (formerly local gateway)

Bring Your Own Carrier by interconnecting any Service Provider's PSTN with a premises-based local gateway that tightly integrates to Cisco's Webex Calling cloud.

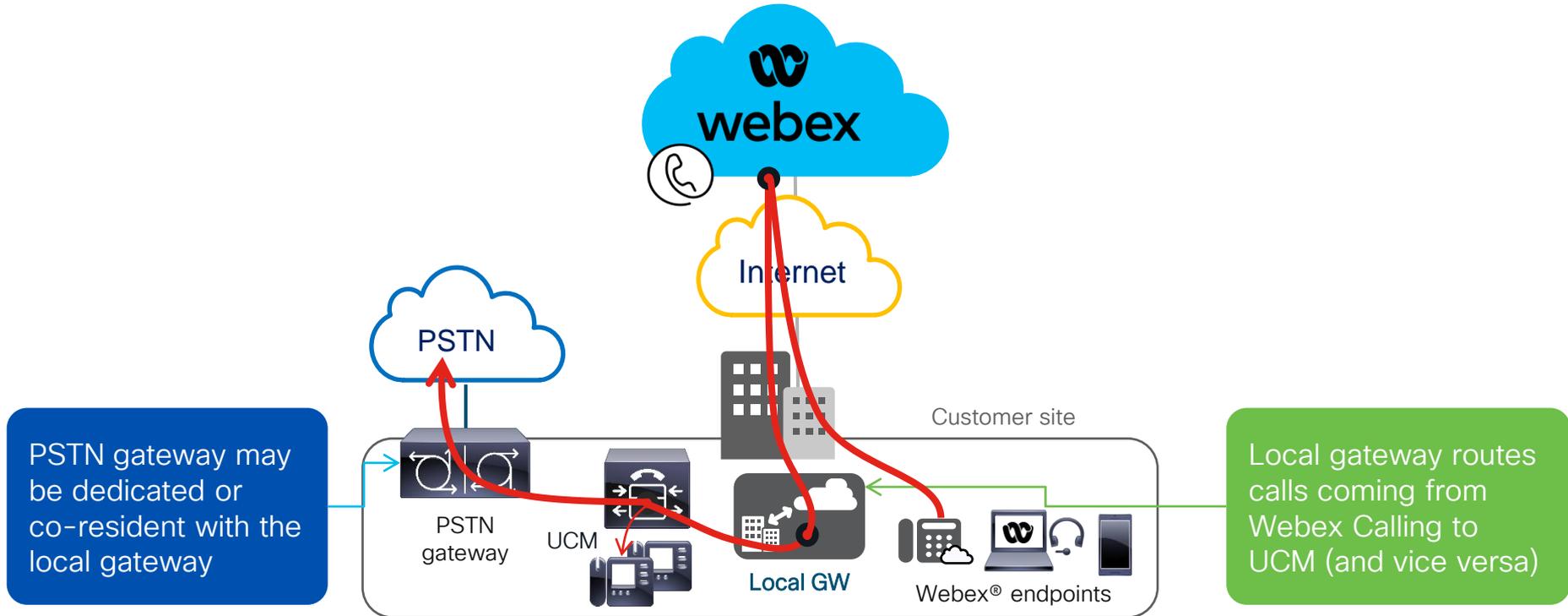
Premises-based PSTN Deployment Models

Single Site with and without separate PSTN gateway



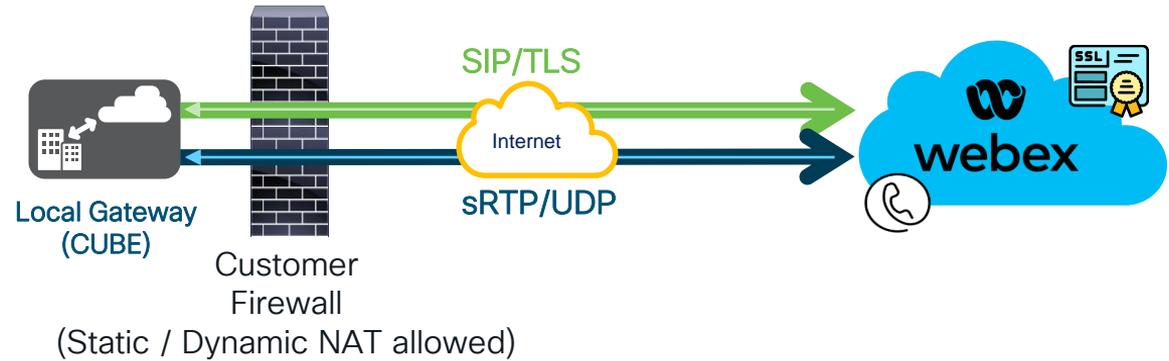
Premises-based PSTN Deployment Models

Single Site with UCM Integration

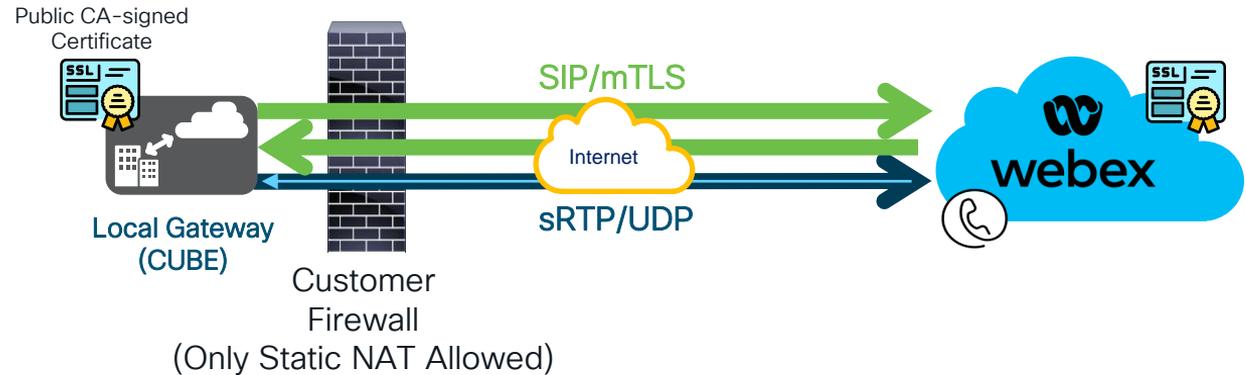


Local Gateway Connection Options

Registration-Based



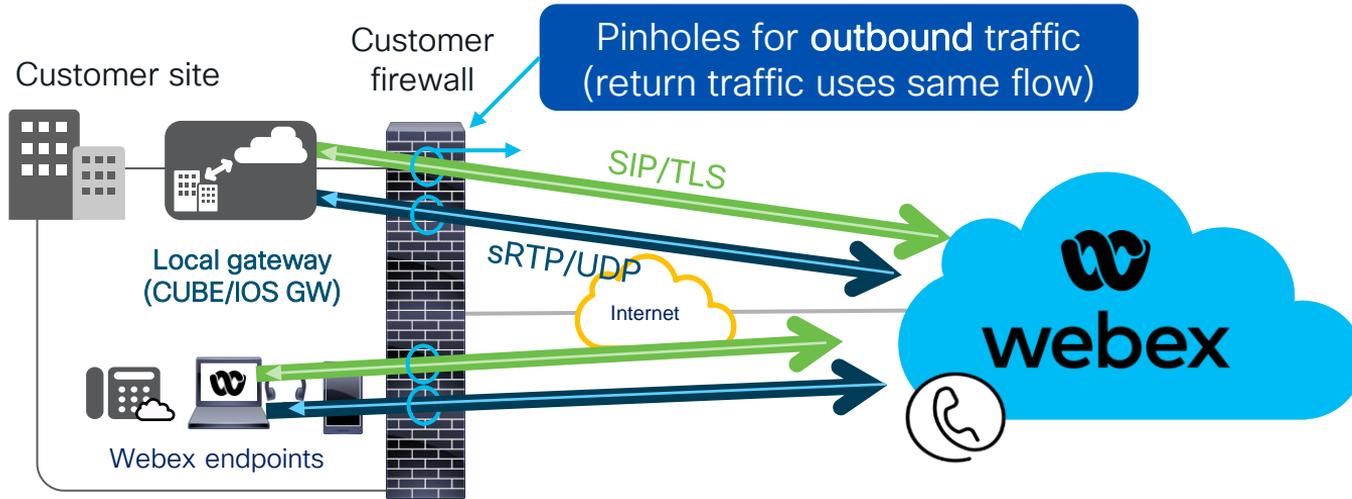
Certificate-Based



Registration-Based Local Gateway: CUBE SIP Registration

CUBE as a local gateway

Firewall and NAT traversal

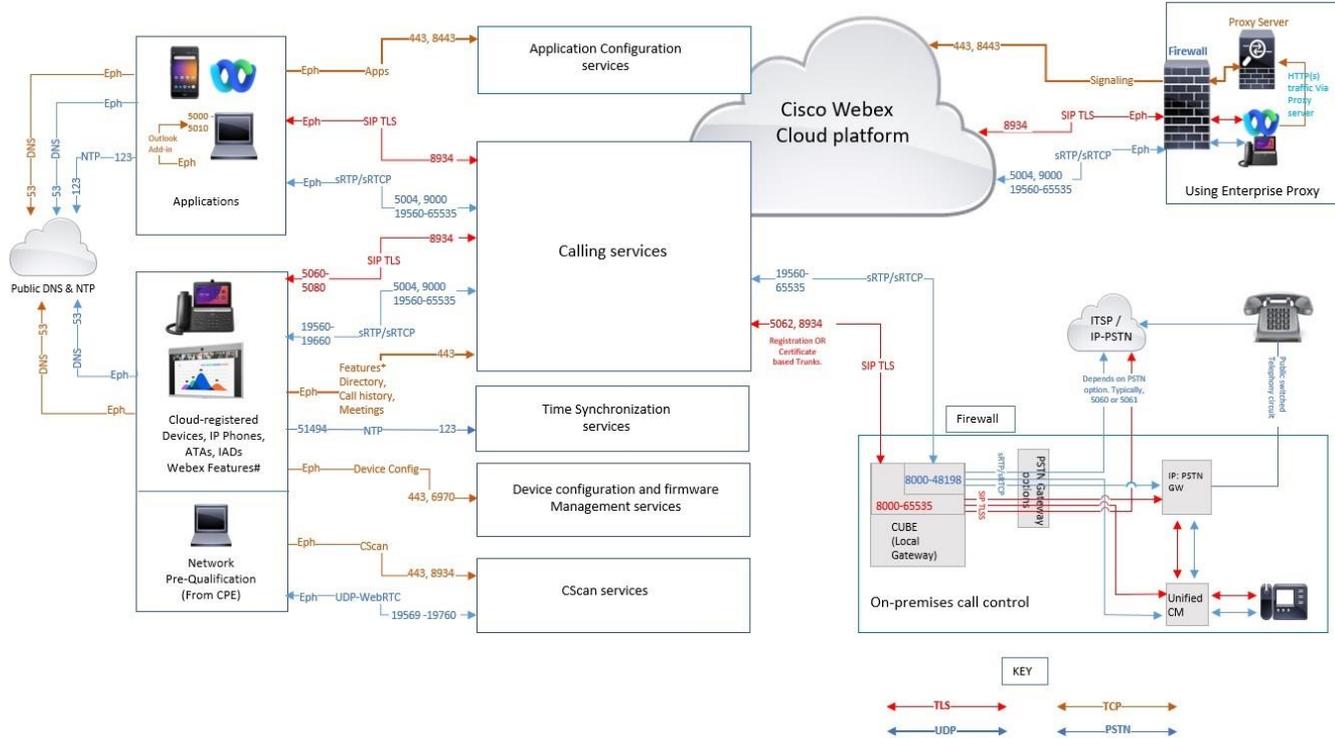


- In most cases, the local gateway and endpoints can sit on the **internal** customer network using private IP addresses (with NAT and PAT)
- Firewall needs to allow **outbound** traffic (SIP, RTP/UDP, HTTP) to specific IP addresses/ports (see updated Webex Calling port reference guide)

CUBE as a local gateway Firewall and NAT traversal



<https://help.webex.com/en-us/article/b2exve/Port-Reference-Information-for-Cisco-Webex-Calling>



CUBE as a local gateway

Firewall and NAT traversal

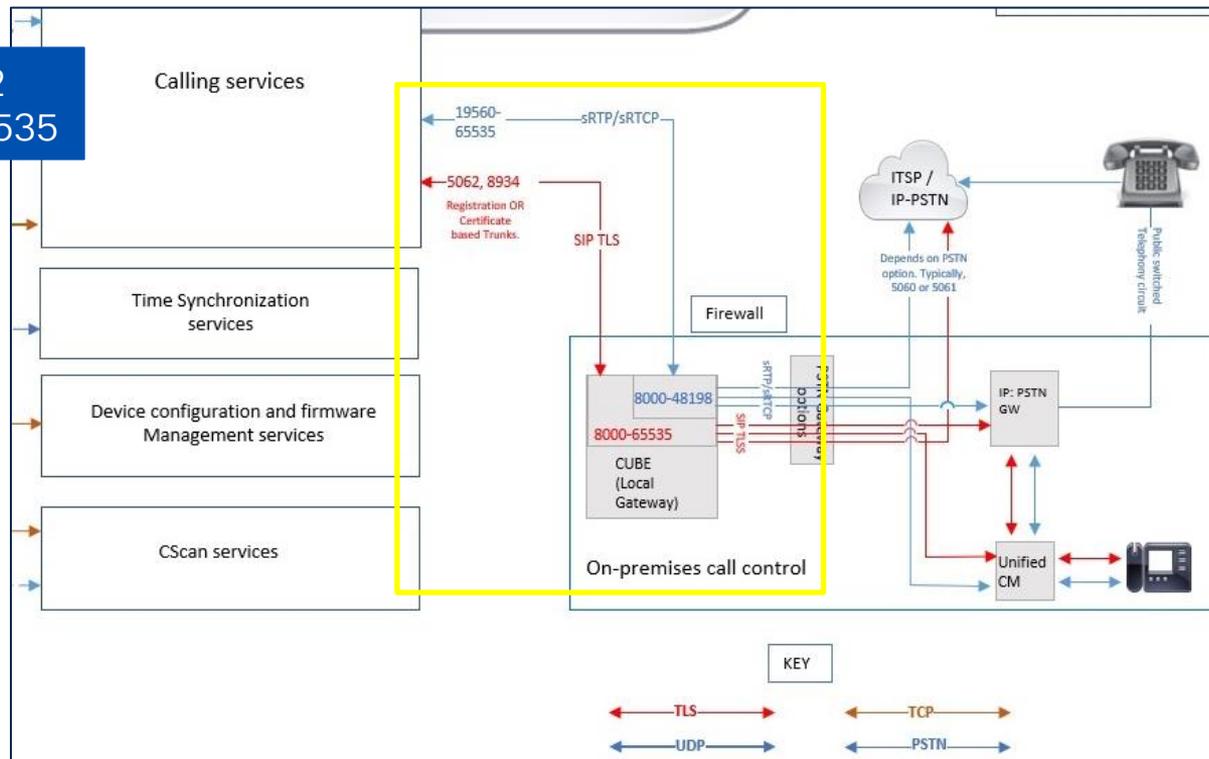


<https://help.webex.com/en-us/article/b2exve/Port-Reference-Information-for-Cisco-Webex-Calling>

- Permit TCP port 8934 or 5062
- Permit UDP ports 19560 - 65535

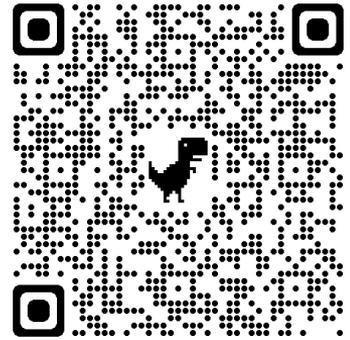
• Access to DNS

• Access to NTP



CUBE Configuration Guide

<https://help.webex.com/en-us/article/jr1i3r/Configure-Local-Gateway-on-IOS-XE-for-Webex-Calling>



Configure Local Gateway on Cisco IOS XE for Webex Calling

⊖ In this article

Local Gateway configuration

After you configure Webex Calling Local Gateway to Webex Calling. The media between the cloud. The media between the

Local Gateway configuration

There are two options to configure

- Registration-based trunk
- Certificate-based trunk

Registration-based Local Gateway

Certificate-based Local Gateway

Perform reference platform configuration

Configure registration-based trunk

Configure Local Gateway without IP PBX

Configure Local Gateway with an existing Unified CM environment

Monitor and troubleshoot Local Gateway with diagnostic signatures

Manage and validate Cisco IOS XE Gateways through Control Hub

CUBE Configuration

```
voice class tenant 200
  registrar dns:12013670.us10.bclid.webex.com scheme sips expires 240
  refresh-ratio 50 tcp tls
  credentials number svr-rtm-dmz-cube8a5913_LGU username
  svr-rtm-dmz-cube8a2637_LGU password 0 Password123 realm BroadWorks
  authentication username svr-rtm-dmz-cube8a2637_LGU password 0
  Password123 realm BroadWorks
  authentication username svr-rtm-dmz-cube8a2637_LGU password 0
  Password123 realm 12013670.us10.bclid.webex.com
  no remote-party-id
  sip-server dns:12013670.us10.bclid.webex.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:ch05.sipconnect-us.bclid.webex.com
  privacy-policy passthru
```

svs-rtm-dmz-cube8a

Trunk > Details

Status
● Online

Registrar Domain
12013670.us10.bclid.webex.com

Trunk Group OTG/DTG
svs-rtm-dmz-cube8a2637_lgu

Line/Port
svs-rtm-dmz-cube8a5913_LGU@12013670.us10.bclid.webex.com

Outbound Proxy Address
ch05.sipconnect-us.bclid.webex.com

Authentication Information
Retrieve the username and password for this trunk group. If the password is retrieved, a new password is generated. If the password is not retrieved, the current password is saved.

Retrieve Username and Reset Password

Authentication Information
Record the username and password below. If you lose this information, you need to reset the password again.

Username
svs-rtm-dmz-cube8a2637_LGU

Password
Password123

Done

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.

Managed Gateway – Config Validation

Calling > Managed Gateways

Calling

Numbers Locations Virtual Lines New Call Routing **Managed Gateways** Features PSTN Orders >>

Q svsl × All Gateways ▾ 1 Gateway(s) Events History Add Gateway

Gateway Name	Version	Connector Status	Service	Assigned to	Actions
svs-rtp-dmz-cube8a	17.9.2	● Online	Local Gateway	Trunk: svs-rtp-dmz-cube8a	...

Local Gateway Service

Trunk [svs-rtp-dmz-cube8a](#)

Config Validation Validation completed on Jan 31, 2023, 10:56:39 PM

[Validate](#) [View results](#)

Managed Gateway

- Requires Gateway Connector be installed on Local Gateway
- Performs basic configuration validation
- Not all configuration is checked today
- Can miss some misconfiguration such as invalid password (it cannot see what your password is)

```
svs-rtp-dmz-cube8a#sh run | beg codec  
voice class codec 99  
  codec preference 1 g711ulaw  
  codec preference 2 g711alaw
```

Validated Configuration

Report Date : June 5, 2023 7:16 AM
6 sections validated, 1 section(s) have issues.

- sip-ua**
No issues found
- voice service voip**
No issues found
- dial-peer voice 200201 voip (Webex Calling dial-peer found, validated for inbound and outbound calling)**
1 misconfigured
Misconfigured: 'voice-class codec <tag>' found but required class commands are missing/misconfigured.

Reference configuration

```
dial-peer voice 200201 voip  
  description Inbound/Outbound Webex Calling  
  max-conn 250  
  destination-pattern BAD.BAD  
  session protocol sipv2  
  session target sip-server  
  destination dpq 100  
  incoming uri request 200  
  voice-class codec 99  
  voice-class stun-usage 200
```

Managed Gateway

- Requires Gateway Connector be installed on Local Gateway
- Performs basic configuration validation
- Not all configuration is checked today
- Can miss some misconfiguration such as invalid password (it cannot see what your password is)

```
svs-rtp-dmz-cube8a#sh run | beg codec
voice class codec 99
  codec preference 1 g711ulaw
  codec preference 2 g711alaw
  codec preference 3 opus
```

Report Date : June 5, 2023 7:24 AM

6 sections validated, 0 section(s) have issues.

 **sip-ua**
No issues found

 **voice service voip**
No issues found

 **dial-peer voice 200201 voip (Webex Calling dial-peer found, validated for inbound and outbound calling)**
No issues found

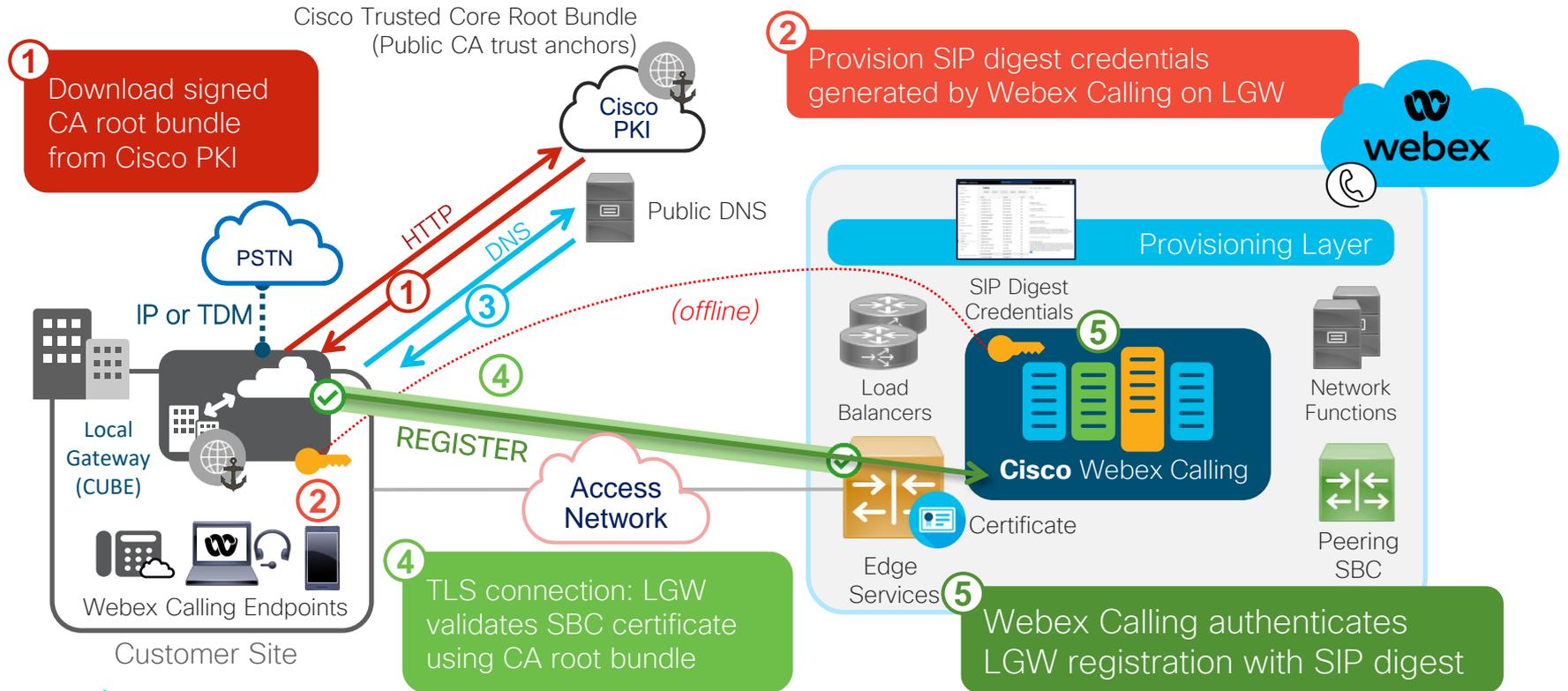
 **global**
No issues found

 **voice class sip-profiles 200**
No issues found

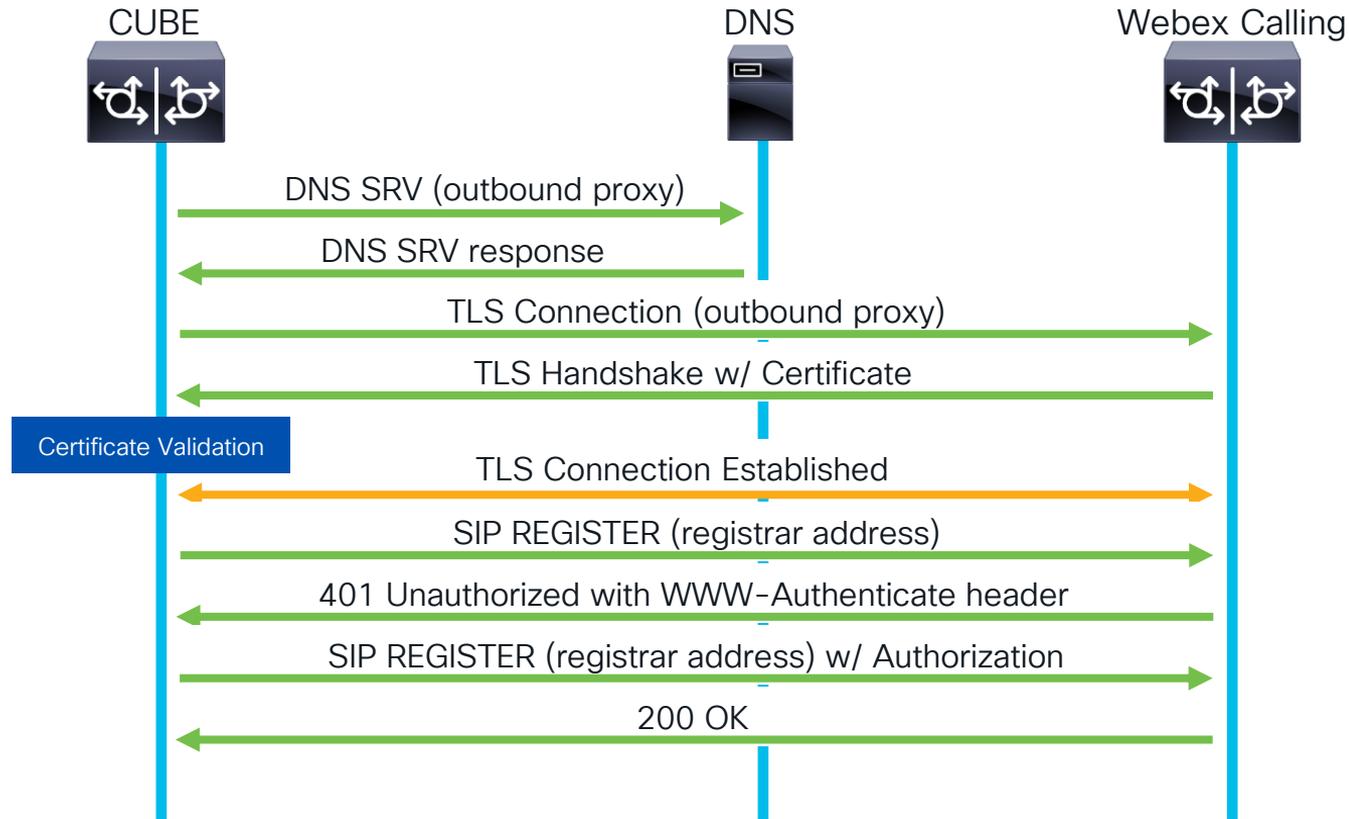
 **voice class tenant 200**
No issues found

CUBE Onboarding and Registration

Registration-based Trunks



CUBE Registration Process



Troubleshooting DNS Issues

```
> dig SRV _sips._tcp.ch05.sipconnect-us.bclld.webex.com
```

```
;; ANSWER SECTION:
```

```
_sips._tcp.ch05.sipconnect-us.bclld.webex.com. 300 IN SRV 10 50 8934 sipconnect01ac-us.bclld.webex.com.  
_sips._tcp.ch05.sipconnect-us.bclld.webex.com. 300 IN SRV 5 50 8934 sipconnect02ac-us.bclld.webex.com.
```

```
> dig A sipconnect02ac-us.bclld.webex.com
```

```
;; ANSWER SECTION:
```

```
sipconnect02ac-us.bclld.webex.com. 5 IN A 139.177.65.12
```

```
> dig A sipconnect01ac-us.bclld.webex.com
```

```
;; ANSWER SECTION:
```

```
sipconnect01ac-us.bclld.webex.com. 5 IN A 139.177.64.12
```

Troubleshooting DNS Issues

```
CUBE#show sip-ua statistics | beg SIP Global
```

```
SIP Global Counters:
```

<File Id,	Line:	Count	First Occurrence	Most Recent Occurrence
Message>				
0x12	, 1155	: 5	May 27 2022 09:38:00	Jun 02 2022 20:53:59
DNS Query failed for query_type:%d				

Troubleshooting DNS Issues

CUBE#**debug ip domain**

```
*May 31 17:29:22.434: DNS: detail: cdns_get_first_hop: dst 64.102.6.247, intf NULL
*May 31 17:29:23.435: DNS: detail: iter_operate: iterator[module 1] operate: extstate:module_wait_reply event:module_event_noreply
*May 31 17:29:23.435: DNS: info: log_name_typeclass: iterator operate: query _sips._tcp.12013670.us10.bcld.webex.com. SRV IN
*May 31 17:29:23.435: DNS: info: log_name_typeclass: processQueryTargets: _sips._tcp.12013670.us10.bcld.webex.com. SRV IN
*May 31 17:29:23.435: DNS: info: log_name_typeclass: sending query: _sips._tcp.12013670.us10.bcld.webex.com. SRV IN
*May 31 17:29:23.435: DNS: detail: log_name_addr: sending to target: <.> 64.102.6.247#53
*May 31 17:29:23.435: DNS: detail: cdns_get_first_hop: dst 64.102.6.247, intf NULL
*May 31 17:29:25.435: DNS: detail: cdns_get_first_hop: dst 64.102.6.247, intf NULL
*May 31 17:29:27.436: DNS: detail: iter_operate: iterator[module 1] operate: extstate:module_wait_reply event:module_event_noreply
*May 31 17:29:27.436: DNS: info: log_name_typeclass: iterator operate: query _sips._tcp.12013670.us10.bcld.webex.com. SRV IN
*May 31 17:29:27.436: DNS: info: log_name_typeclass: processQueryTargets: _sips._tcp.12013670.us10.bcld.webex.com. SRV IN
*May 31 17:29:27.436: DNS: detail: can_have_last_resort: configured forward servers failed -- returning SERVFAIL
*May 31 17:29:27.436: DNS: detail: error_response: return error response SERVFAIL
```

Registrar Domain

12013670.us10.bcld.webex.com

Trunk Group OTG/DTG

svs-rtp-dmz-cube8a2637_lgu

Line/Port

svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcld.webex.com

Outbound Proxy Address

ch05.sipconnect-us.bcld.webex.com

Troubleshooting DNS Issues

CUBE#**debug ip domain**

```
*May 31 17:27:04.713: DNS: detail: cdns_get_rr_type: converting name kind 2000 to type 33
*May 31 17:27:04.713: DNS: detail: read_forwards: Forward zone server list:
*May 31 17:27:04.713: DNS: info: delegpt_log: DelegationPoint<.>: 0 names (0 missing), 1 addrs (0 result, 1 avail) parentNS
*May 31 17:27:04.713: DNS: detail: val_operate: validator[module 0] operate: extstate:module_state_initial event:module_event_new
*May 31 17:27:04.713: DNS: info: log_nametypeclass: validator operate: query _sips._tcp.ch05.sipconnect-us.bcld.webex.com. SRV IN
*May 31 17:27:04.713: DNS: detail: iter_operate: iterator[module 1] operate: extstate:module_state_initial event:module_event_pass
*May 31 17:27:04.714: DNS: info: log_nametypeclass: resolving _sips._tcp.ch05.sipconnect-us.bcld.webex.com. SRV IN
*May 31 17:27:04.714: DNS: info: log_nametypeclass: finishing processing for _sips._tcp.ch05.sipconnect-us.bcld.webex.com. SRV IN
*May 31 17:27:04.714: DNS: detail: val_operate: validator[module 0] operate: extstate:module_wait_module event:module_event_moddone
*May 31 17:27:04.714: DNS: info: log_nametypeclass: validator operate: query _sips._tcp.ch05.sipconnect-us.bcld.webex.com. SRV IN
*May 31 17:27:04.714: DNS: detail: cdns_new_nametype: new nametype 0x80007F39A6FE2CE0
*May 31 17:27:04.714: DNS: detail: cdns_get_rr_type: converting name kind 4 to type 1
*May 31 17:27:04.714: DNS: detail: read_forwards: Forward zone server list:
*May 31 17:27:04.714: DNS: info: delegpt_log: DelegationPoint<.>: 0 names (0 missing), 1 addrs (0 result, 1 avail) parentNS
*May 31 17:27:04.715: DNS: detail: val_operate: validator[module 0] operate: extstate:module_state_initial event:module_event_new
*May 31 17:27:04.715: DNS: info: log_nametypeclass: validator operate: query sipconnect02ac-us.bcld.webex.com. A IN
*May 31 17:27:04.715: DNS: detail: iter_operate: iterator[module 1] operate: extstate:module_state_initial event:module_event_pass
*May 31 17:27:04.715: DNS: info: log_nametypeclass: resolving sipconnect02ac-us.bcld.webex.com. A IN
*May 31 17:27:04.715: DNS: info: log_nametypeclass: finishing processing for sipconnect02ac-us.bcld.webex.com. A IN
*May 31 17:27:04.715: DNS: detail: val_operate: validator[module 0] operate: extstate:module_wait_module event:module_event_moddone
*May 31 17:27:04.715: DNS: info: log_nametypeclass: validator operate: query sipconnect02ac-us.bcld.webex.com. A IN
*May 31 17:27:04.715: DNS: detail: cdns_new_nametype: new nametype 0x80007F39AF441638
*May 31 17:27:04.715: DNS: detail: cdns_nametype_free: deleting nametype 0x80007F39AF441638
*May 31 17:27:04.715: DNS: detail: cdns_nametype_free: deleting nametype 0x80007F39A6FE2CE0
```

Check TCP Session Establishment

```
svs-rtp-dmz-cube8a#show tcp brief numeric
```

TCB	Local Address	Foreign Address	(state)
7F39A6F861A8	64.102.250.135.50993	139.177.65.12.8934	ESTAB

Check TCP Session Establishment - Failure

```
svs-rtp-dmz-cube8a#debug ip tcp transactions address 139.177.65.12
May 26 13:41:30.135: TCP: Setting Keepalive interval and retries to 60 and 4
May 26 13:41:30.135: tcp_uniqueport: using ephemeral max 55000
May 26 13:41:30.139: TCP: Setting Keepalive interval and retries to 60 and 4
May 26 13:41:30.139: tcp_uniqueport: using ephemeral max 55000
May 26 13:41:30.139: Reserved port 20588 in Transport Port Agent for TCP IP type 1
May 26 13:41:30.140: TCP0: Connection to 139.177.65.12:8934, advertising MSS 536
May 26 13:41:30.140: TCP0: state was CLOSED -> SYNSENT [20588 -> 139.177.65.12 (8934)]
May 26 13:41:30.140: Released port 20588 in Transport Port Agent for TCP IP type 1 delay 240000
May 26 13:41:30.141: TCP0: state was SYNSENT -> CLOSED [20588 -> 139.177.65.12 (8934)]
May 26 13:41:30.141: TCP0: bad seg from 139.177.65.12 -- closing connection: port 20588 seq 0 ack
19785811 rcvnxt 0 rcvwnd 0 len 0
May 26 13:41:30.141: TCP0: connection closed - remote sent RST
May 26 13:41:30.141: TCB7F5EFFA41B78 getting property TCP_VRFTABLEID (20)
May 26 13:41:30.141: TCB 0x7F5EFFA41B78 destroyed
```

TLS Handshake Failure

- TLS Handshake failure will display a Syslog message:

```
Jan 24 08:11:50.364: %SIP-2-TLS_HANDSHAKE_FAILED: TLS handshake failure - remote_addr= 139.177.65.12, remote_port=8934
```

Verify TLS Connection

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

```
Total active connections      : 1
No. of send failures          : 1
No. of remote closures       : 0
No. of conn. failures        : 0
No. of inactive conn. ageouts : 0
Max. tls send msg queue size of 1, recorded for 139.177.65.12:8934
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
- * Connections with SIP OAuth ports

```
Remote-Agent:139.177.65.12, Connections-Count:1
```

Remote-Port	Conn-Id	Conn-State	WriteQ-Size	Local-Address	TLS-Version	Cipher	Curve	Tenant
8934	7	Established	0	64.102.250.135:50993	TLSv1.2	ECDHE-RSA-AES256-GCM-SHA384	P-521	0

```
----- SIP Transport Layer Listen Sockets -----
```

Conn-Id	Local-Address	Tenant
0	[0.0.0.0]:5061:	0
6	[64.102.250.135]:5061:Internet	0



Local Gateway Trustpool Update

- The default trustpool bundle does not include the “DigiCert Root CA” certificate needed for validating the server-side certificate during TLS connection establishment to BroadCloud
- Download the latest “Cisco Trusted Core Root Bundle” from <http://www.cisco.com/security/pki/>

Check

```
CUBE#show crypto pki trustpool | include DigiCert
```

Update

```
CUBE #configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
LocalGateway(config)#crypto pki trustpool import clean url
http://www.cisco.com/security/pki/trs/ios_core.p7b
Reading file from http://www.cisco.com/security/pki/trs/ios_core.p7b
Loading http://www.cisco.com/security/pki/trs/ios_core.p7b
% PEM files import succeeded.
LocalGateway(config)#end
```

Verify

```
CUBE #show crypto pki trustpool | include DigiCert
cn=DigiCert Global Root CA
o=DigiCert Inc
cn=DigiCert Global Root CA
o=DigiCert Inc
```

TLS Connection Setup

voice class tenant 200

```
registrar dns:12013670.us10.bclid.webex.com scheme sips expires 240 refresh-ratio 50 tcp tls
credentials number svr-rtp-dmz-cube8a5913_LGU username svr-rtp-dmz-cube8a2637_LGU password 6 <removed> ...
authentication username svr-rtp-dmz-cube8a2637_LGU password 6 <removed> realm BroadWorks
authentication username svr-rtp-dmz-cube8a2637_LGU password 6 <removed> realm 12013670.us10.bclid.webex.com
no remote-party-id
sip-server dns:12013670.us10.bclid.webex.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:ch05.sipconnect-us.bclid.webex.com
privacy-policy passthru
```

sip-ua

transport tcp tls v1.2

crypto signaling default trustpoint dummyTp cn-san-validate server

- Source IP is based on the **bind control** configuration. Source port is ephemeral
 - **TLS version** and **crypto trustpoint** and **CN/SAN validation** is configured under sip-ua
- Note:** The crypto trustpoint is needed for TLS to work even though a local client certificate (i.e. mTLS) is not required for the connection to be setup

Showing SIP registration status

```
CUBE#show sip-ua register status
```

```
Tenant: 200
```

```
----- Registrar-Index 1 -----  
Line                peer      expires(sec)  reg survival  P-Associ-URI  
=====            =====  =====  
svs-rtp-dmz-cube8a5913_LGU    -1          56           no  normal
```

Troubleshooting Registration Issues

```
CUBE#debug ccsip message
```

```
CUBE#debug ccsip non-call
```

```
*Jun  2 20:00:55.047: //-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
```

```
Sent:
```

```
REGISTER sip:12013670.us10.bcld.webex.com:5061 SIP/2.0
```

```
Via: SIP/2.0/TLS 64.102.250.135:5061;branch=z9hG4bK37F2657
```

```
From: <sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcld.webex.com;otg=svs-rtp-dmz-cube8a2637_lgu>;tag=3229010F-153
```

```
To: <sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcld.webex.com>
```

```
Date: Thu, 02 Jun 2022 20:00:55 GMT
```

```
Call-ID: ABBD84C-E03E11EC-8005C535-8219C882
```

```
User-Agent: Cisco-SIPGateway/IOS-17.8.1a
```

```
Max-Forwards: 70
```

```
Timestamp: 1654200055
```

```
CSeq: 3028 REGISTER
```

```
Contact: <sip:svs-rtp-dmz-cube8a5913_LGU@64.102.250.135:5061;transport=tls>
```

```
Expires: 240
```

```
Supported: path
```

```
Content-Length: 0
```

Troubleshooting Registration Issues

*Jun 2 20:00:55.097: //12502/000000000000/SIP/Msg/ccsipDisplayMsg:

Received:

SIP/2.0 401 Unauthorized

Via:SIP/2.0/TLS 64.102.250.135:5061;branch=z9hG4bK37F2657

From:<sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bclld.webex.com;otg=svs-rtp-dmz-cube8a2637_lgu>;tag=3229010F-153

To:<sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bclld.webex.com>;tag=139819501-1654200075749

Call-ID:ABBD84C-E03E11EC-8005C535-8219C882

CSeq:3028 REGISTER

Session-ID:84b3c5760080414f9684277168c26d0b;remote=13a947af00804b4dba1347ec16e6cc55

WWW-Authenticate: DIGEST

realm="BroadWorks", qop="auth", nonce="BroadWorksXl3xh0jboTdvjlnkBW", algorithm=MD5

Contact:<sip:svs-rtp-dmz-cube8a5913_LGU@64.102.250.135:5061;transport=tls>;expires=120

Content-Length:0

Troubleshooting Registration Issues

*Jun 2 20:00:55.098: //-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:

Sent:

REGISTER sip:12013670.us10.bclld.webex.com:5061 SIP/2.0

Via: SIP/2.0/TLS 64.102.250.135:5061;branch=z9hG4bK37F32160

From: <sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bclld.webex.com;otg=svs-rtp-dmz-cube8a2637_lgu>;tag=3229010F-153

To: <sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bclld.webex.com>

Date: Thu, 02 Jun 2022 20:00:55 GMT

Call-ID: ABBD84C-E03E11EC-8005C535-8219C882

User-Agent: Cisco-SIPGateway/IOS-17.8.1a

Max-Forwards: 70

Timestamp: 1654200055

CSeq: 3029 REGISTER

Contact: <sip:svs-rtp-dmz-cube8a5913_LGU@64.102.250.135:5061;transport=tls>

Expires: 240

Supported: path

Authorization: Digest username="svs-rtp-dmz-cube8a2637_LGU", realm="BroadWorks", uri="sips:12013670.us10.bclld.webex.com:5061", response="3e5fb6c7664832a0de686e9fd9defcf3", nonce="BroadWorksXl3xh0jboTdvjlnkBW", cnonce="59C09EF6", qop=auth, algorithm=MD5,nc=00000001

Content-Length: 0

Troubleshooting Registration Issues

```
*Jun  2 20:00:55.146: //12502/000000000000/SIP/Msg/ccsipDisplayMsg:
Received:
SIP/2.0 401 Unauthorized
Via:SIP/2.0/TLS 64.102.250.135:5061;branch=z9hG4bK37F32160
From:<sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcld.webex.com;otg=svs-rtp-dmz-
cube8a2637_lgu>;tag=3229010F-153
To:<sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcld.webex.com>;tag=187893186-1654200075798
Call-ID:ABBD84C-E03E11EC-8005C535-8219C882
CSeq:3029 REGISTER
Session-ID:84b3c5760080414f9684277168c26d0b;remote=13a947af00804b4dba1347ec16e6cc55
Content-Length:0
```

Troubleshooting Registration Issues

Control Hub > Calling > Call Routing > Trunk > *select trunk*

Authentication Information

Retrieve the username and password for **CUBE LGW**. Each time authentication information is retrieved, a new password is generated. During the password generation, PSTN is disrupted until the new password is saved.

[Retrieve Username and Reset Password](#)

Authentication Information



Retrieving authentication information generates a new password and disrupts PSTN service for locations using this trunk until the password reset is completed. Do you want to continue?

No

Yes

Authentication Information

Record the username and password below. If you lose this information, you need to reset the password again.

Username

svs-rtp-dmz-cube8a2637_LGU 

Password

NewPassword 

Done

Troubleshooting Registration Issues

```
CUBE(config)#voice class tenant 200
CUBE(config-class)#$svs-rtp-dmz-cube8a5913_LGU username svs-rtp-dmz-cube8a2637_LGU password 0
NewPassword realm BroadWorks
Updating password
```

```
CUBE(config-class)# authentication username svs-rtp-dmz-cube8a2637_LGU password 0 NewPassword
realm BroadWorks
Updating username/password for realm BroadWorks
```

```
CUBE(config-class)# authentication username svs-rtp-dmz-cube8a2637_LGU password 0 NewPassword
realm 12013670.us10.bcld.webex.com
Updating username/password for realm 12013670.us10.bcld.webex.com
```

```
svs-rtp-dmz-cube8a(config-class)#end
```

Troubleshooting Registration Issues

```
*Jun  2 20:10:55.744: //-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Sent:
REGISTER sip:12013670.us10.bcl.d.webex.com:5061 SIP/2.0
Via: SIP/2.0/TLS 64.102.250.135:5061;branch=z9hG4bK37FC26BD
From: <sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcl.d.webex.com;otg=svs-rtp-dmz-
cube8a2637_lgu>;tag=32322B88-25CD
To: <sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcl.d.webex.com>
Date: Thu, 02 Jun 2022 20:10:55 GMT
Call-ID: ABBD84C-E03E11EC-8005C535-8219C882
User-Agent: Cisco-SIPGateway/IOS-17.8.1a
Max-Forwards: 70
Timestamp: 1654200655
CSeq: 3038 REGISTER
Contact: <sip:svs-rtp-dmz-cube8a5913_LGU@64.102.250.135:5061;transport=tls>
Expires: 240
Supported: path
Content-Length: 0
```

Troubleshooting Registration Issues

```
*Jun  2 20:10:55.793: //12507/000000000000/SIP/Msg/ccsipDisplayMsg:
Received:
SIP/2.0 401 Unauthorized
Via:SIP/2.0/TLS 64.102.250.135:5061;branch=z9hG4bK37FC26BD
From:<sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcld.webex.com;otg=svs-rtp-dmz-
cube8a2637_lgu>;tag=32322B88-25CD
To:<sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcld.webex.com>;tag=45425073-1654200676460
Call-ID:ABBD84C-E03E11EC-8005C535-8219C882
CSeq:3038 REGISTER
Session-ID:7a89fbce008049b78a69e029c3dcf14d;remote=982680ab00804b63afafa55ec45f8f8b
WWW-Authenticate:DIGEST
realm="BroadWorks",qop="auth",nonce="BroadWorksXl3xgdeu4T9663sfBW",algorithm=MD5
Contact:<sip:svs-rtp-dmz-cube8a5913_LGU@64.102.250.135:5061;transport=tls>;expires=120
Content-Length:0
```

Troubleshooting Registration Issues

```
*Jun  2 20:10:55.795: //-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Sent:
REGISTER sip:12013670.us10.bclld.webex.com:5061 SIP/2.0
Via: SIP/2.0/TLS 64.102.250.135:5061;branch=z9hG4bK37FD946
From: <sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bclld.webex.com;otg=svs-rtp-dmz-
cube8a2637_lgu>;tag=32322B88-25CD
To: <sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bclld.webex.com>
Date: Thu, 02 Jun 2022 20:10:55 GMT
Call-ID: ABBD84C-E03E11EC-8005C535-8219C882
User-Agent: Cisco-SIPGateway/IOS-17.8.1a
Max-Forwards: 70
Timestamp: 1654200655
CSeq: 3039 REGISTER
Contact: <sip:svs-rtp-dmz-cube8a5913_LGU@64.102.250.135:5061;transport=tls>
Expires: 240
Supported: path
Authorization: Digest username="svs-rtp-dmz-
cube8a2637_LGU", realm="BroadWorks", uri="sips:12013670.us10.bclld.webex.com:5061", response="84ee9
b374977c02315e6c75579a47175", nonce="BroadWorksXl3xgdeu4T9663sfBW", cnonce="D193A761", qop=auth, al
gorithm=MD5, nc=00000001
Content-Length: 0
```

Troubleshooting Registration Issues

*Jun 2 20:10:55.843: //12507/000000000000/SIP/Msg/ccsipDisplayMsg:

Received:

SIP/2.0 200 OK

Via:SIP/2.0/TLS 64.102.250.135:5061;branch=z9hG4bK37FD946

From:<sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcld.webex.com;otg=svs-rtp-dmz-cube8a2637_lgu>;tag=32322B88-25CD

To:<sip:svs-rtp-dmz-cube8a5913_LGU@12013670.us10.bcld.webex.com>;tag=656451609-1654200676510

Call-ID:ABBD84C-E03E11EC-8005C535-8219C882

CSeq:3039 REGISTER

Session-ID:7a89fbce008049b78a69e029c3dcf14d;remote=982680ab00804b63afafa55ec45f8f8b

Allow-Events:call-info,line-seize,dialog,message-summary,as-feature-event,x-broadworks-hoteling,x-broadworks-call-center-status,conference

Contact:<sip:svs-rtp-dmz-cube8a5913_LGU@64.102.250.135:5061;transport=tls>;q=0.5;expires=120

Path:<sip:10.71.132.84:5060;transport=udp;lr>;x-bw-nat="64.102.250.135:50993;transport=tls"

Content-Length:0

Troubleshooting Registration Issues

```
svs-rtp-dmz-cube8a#show sip-ua register status
```

```
Tenant: 200
```

```
----- Registrar-Index 1 -----  
Line                peer          expires(sec)  reg survival  P-Associ-URI  
=====            =====  
svs-rtp-dmz-cube8a5913_LGU  -1          30           yes normal
```

Response Error Code	Resolution
404 User Not Found	Check “number” configured under credentials is correct
401 Unauthorized	Check ”realm” is configured to “BroadWorks”
	Check “username”, “password” under credentials is correct
403 Authentication Failure	Check “username”, “password” under credentials is correct

Certificate- Based Local Gateway: Troubleshooting Peering



CUBE Onboarding and Registration

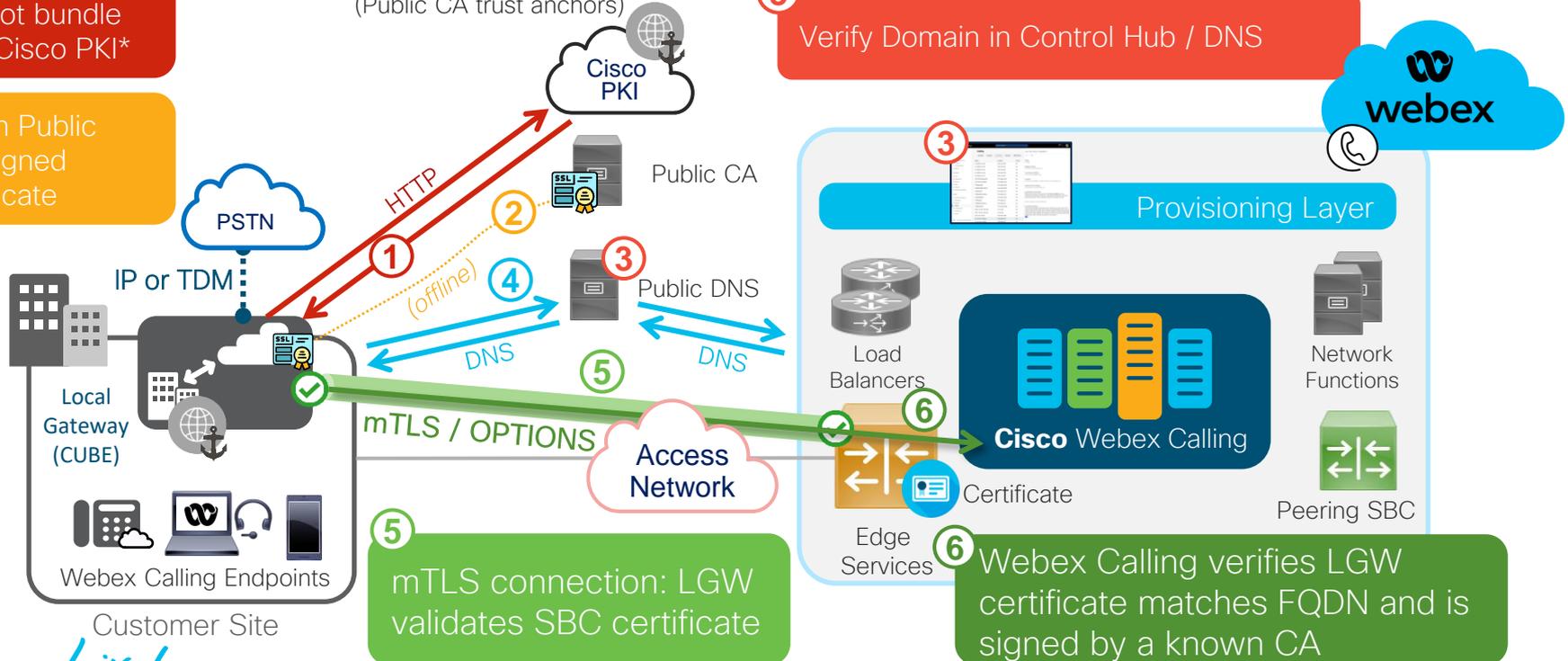
Certificate-Based Trunks

1 Download signed CA root bundle from Cisco PKI*

2 Obtain Public CA-signed Certificate

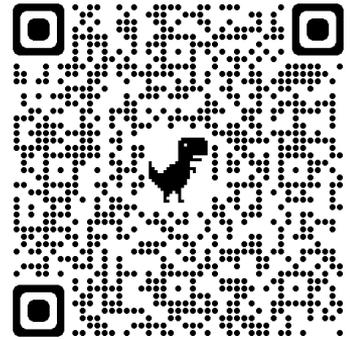
3 Verify Domain in Control Hub / DNS

Cisco Trusted Core Root Bundle
(Public CA trust anchors)



CUBE Configuration Guide

<https://help.webex.com/en-us/article/jr1i3r/Configure-Local-Gateway-on-IOS-XE-for-Webex-Calling>



Configure Local Gateway on Cisco IOS XE for Webex Calling

⊖ In this article

Local Gateway configuration

Registration-based Local Gateway

Certificate-based Local Gateway

After you configure Webex Calling Local Gateway to Webex Calling cloud. The media between the Local Gateway and the Webex Calling cloud.

Local Gateway configuration

There are two options to configure Local Gateway:

- Registration-based Local Gateway
- Certificate-based Local Gateway

Perform reference platform configuration

Configure certificate-based trunk

Configure Local Gateway without IP PBX

Configure Local Gateway with an existing Unified CM environment

Monitor and troubleshoot Local Gateway with diagnostic signatures

Configuring 3rd Party SBCs

https://www.webex.com/content/dam/wbx/us/aag/webex_calling_third_party_sbc_support_cm-5753.pdf

Device Type

Select Device
▼

- Cisco Unified Border Element
- Oracle Session Border Controller
- AudioCodes Session Border Control...
- Ribbon Session Border Controller

Enter hostname

SBC Vendor		AudioCodes
SBC models supported	<ul style="list-style-type: none"> Mediant 500 Gateway & E-SBC Mediant 800B/C Gateway & E-SBC Mediant 1000B Gateway & E-SBC 	<ul style="list-style-type: none"> Mediant 2600 E-SBC Mediant 4000/B SBC Mediant 9000, 9030, 9080 SBC Mediant Software SBC (VE/SE/CE)
Software version supported	7.40A.250.440 or later	
Resources	<ul style="list-style-type: none"> AudioCodes Cisco Community Post Configure AudioCodes SBC Contact AudioCodes 	

SBC Vendor		Oracle
SBC models supported	<ul style="list-style-type: none"> AP 1100 AP 3900 AP 4600 AP 6300 AP 6350 	<ul style="list-style-type: none"> AP 3950 (Starting from SBC 9.0 version) AP 4900 (Starting from SBC 9.0 version) VME Oracle SBC on Public Cloud
Software version supported	SBC 9.0 Software	
Resources	<ul style="list-style-type: none"> Oracle Cisco Community Post Configuration guide Contact: cgbu_alliances_ww_grp@oracle.com 	

SBC Vendor		Ribbon
SBC models supported	Supported today: <ul style="list-style-type: none"> SBC Core 5000 Series SBC Core 7000 SBC Core SWe 	Certification planned for CY Q1 2023: <ul style="list-style-type: none"> SBC Edge 1000 SBC Edge 2000 SBC SWeEdge
Software version supported	Ribbon SBC Core SWe V10.01.00	
Resources	<ul style="list-style-type: none"> Ribbon Cisco Communities Post Configure Ribbon Core SBC Contact Ribbon 	

Control Hub Status for Certificate-Based Trunks

- Check Control Hub for status / warnings / errors

<https://help.webex.com/en-us/article/n0xb944/Configure-Trunks,-Route-Groups,-and-Dial-Plans-for-Webex-Calling>

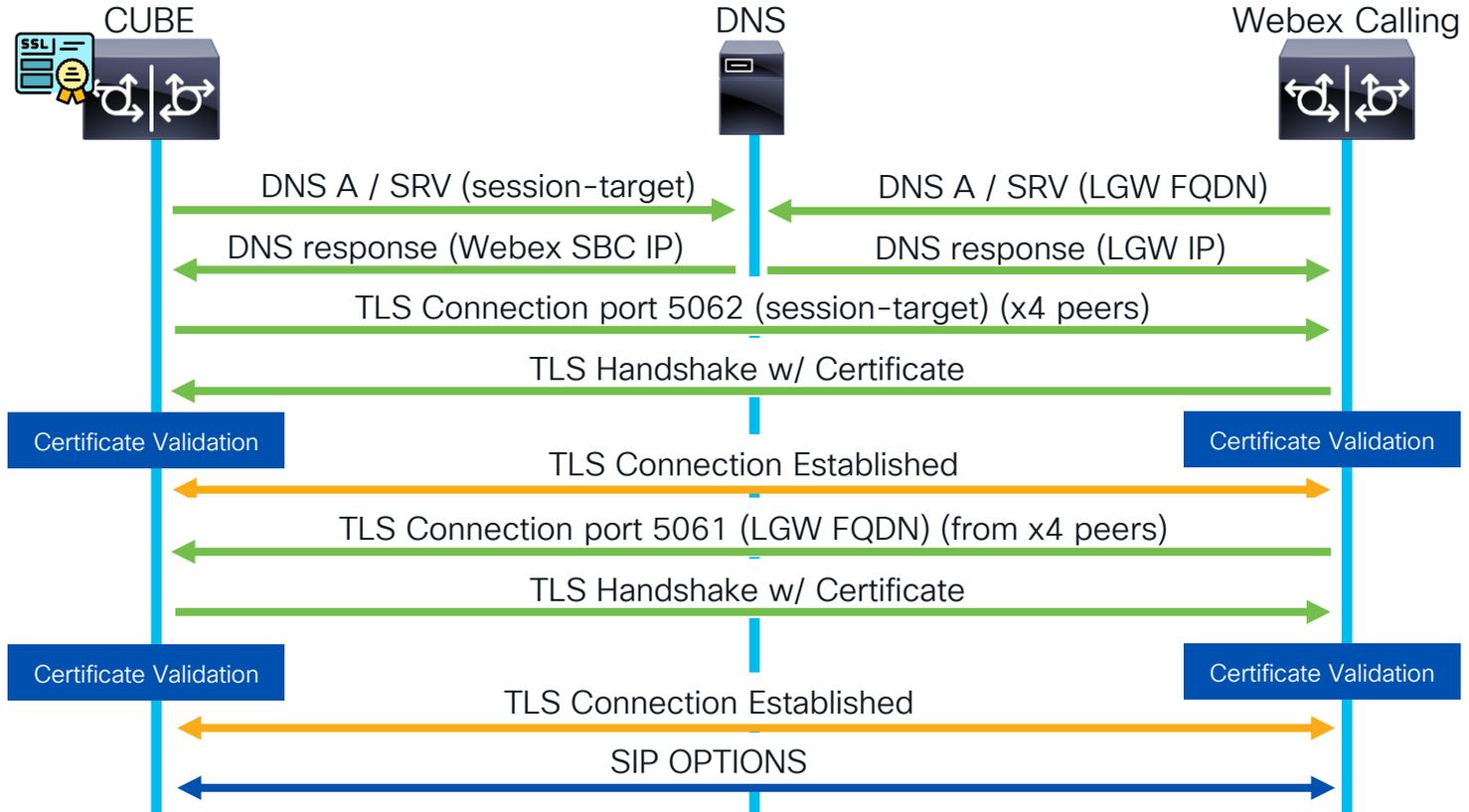
Troubleshooting ^		
SI No.	Error Description	Action
1.	TLS Connection to Local Gateway failed due to DNS resolution failure of the FQDN configured for your gateway	Verify the DNS configurations for the SRV /FQDN configured and ensure they are resolvable
2.	TLS Connection to Local Gateway failed due to a transport issue	Verify that the resolved IP addresses and port to the Local Gateway are valid

Control Hub Status for Certificate-Based Trunks

<https://help.webex.com/en-us/article/n0xb944/Configure-Trunks,-Route-Groups,-and-Dial-Plans-for-Webex-Calling>

TLS Connection to Local Gateway failed due to DNS resolution failure of the FQDN configured for your gateway
TLS Connection to Local Gateway failed due to a transport issue
TLS Connection to Local Gateway failed as the gateway's certificate is signed by an invalid Certificate Authority
TLS Connection to Local Gateway failed as the gateway's certificate has expired
TLS Connection to Local Gateway failed as the gateway's certificate has been issued by an expired Certificate Authority
TLS Connection to Local Gateway failed as the FQDN configured for your gateway is missing from CN or SAN
SIP options sent to the Local Gateway received no response
TLS connection from Local Gateway to Webex Calling failed due to an invalid gateway certificate
TLS connection from Local Gateway to Webex Calling failed as we were unable to trust the Certificate Authority
TLS connection from Local Gateway to Webex Calling failed due to expired certificates in the chain
TLS connection and SIP options from Local Gateway to Webex Calling have failed
SIP options response from the Local Gateway indicates a Server error or Service Unavailable
TLS Connection to Local Gateway failed as Local gateway's certificate has been revoked
TLS Connection from Local Gateway to Webex Calling failed as the gateway's certificate has been revoked
TLS Connection from Local Gateway to Webex Calling failed as the gateway's certificate has expired
TLS Connection from Local Gateway to Webex Calling failed due to a certificate error
TLS Connection to Local Gateway from Webex Calling failed due to a certificate error

CUBE Certificated-Based Peering Process



Check TCP Session Establishment

Calling

Numbers Locations **Call Routing** Features PSTN Orders Service Settings Client Settings

Trunk Route Group Dial Plans Verify Call Routing Zone Trusted Network Edge

Trunk

SIP trunks provide connectivity to a customer-owned PSTN service and to an on-premises IP PBX deployment. These were previously accessed via the

Name	Location	Trunk Type	In Use
svs-rtp-cube7a	RTP	Registration based	Yes
svs-rtp-dmz-cube9a	RTP	Certificate based	No
Test	RTP	Registration based	Yes

svs-rtp-dmz-cube9a

Trunk > Details

Status ⓘ

- Offline

⚠ TLS connection and SIP options from Local Gateway to Webex Calling have failed. [Learn more](#)

Trunk Type
Certificate based

Device
Cisco Unified Border Element

FQDN
svs-rtp-dmz-cube9a.cube.ecatslab.com:5061

Max concurrent calls

Webex Calling edge proxy address (FQDN)
peering1.us.sipconnect.bclid.webex.com:5062
peering2.us.sipconnect.bclid.webex.com:5062
peering3.us.sipconnect.bclid.webex.com:5062
peering4.us.sipconnect.bclid.webex.com:5062

Webex Calling edge proxy address (SRV)
us01.sipconnect.bclid.webex.com

Check TCP Session Establishment

```
svs-rtp-dmz-cube8a#show tcp brief numeric
```

TCB	Local Address	Foreign Address	(state)	
7F6EB38F1DB0	10.81.2.20.5060	172.18.106.58.41601	ESTAB	} CUBE to UCM
7F6E47C940B8	10.81.2.20.5060	172.18.106.59.35575	ESTAB	
7F6EB38C24D8	10.81.2.20.5060	172.18.106.60.44110	ESTAB	
7F6EB38C12E8	64.102.250.137.5061	139.177.65.53.8934	ESTAB	} WxC to CUBE
7F6E47E0BA68	64.102.250.137.5061	139.177.64.54.8934	ESTAB	
7F6E47E85BE8	64.102.250.137.5061	139.177.64.53.8934	ESTAB	
7F6E47E5BDC8	64.102.250.137.5061	139.177.65.54.8934	ESTAB	
7F6E47DE2CB0	64.102.250.137.21819	139.177.65.54.5062	ESTAB	} CUBE to WxC
7F6E48DD75E0	64.102.250.137.11636	139.177.65.53.5062	ESTAB	
7F6E47E7FCB8	64.102.250.137.39113	139.177.64.53.5062	ESTAB	
7F6E47D92AD8	64.102.250.137.48188	139.177.64.54.5062	ESTAB	

Check TCP Session Establishment

```
svs-rtp-dmz-cube9a#deb ip tcp transactions port 5062
```

```
TCP special event debugging is on
```

```
*Nov 21 20:53:14.864: TCP: Setting Keepalive interval and retries to 60 and 4
```

```
*Nov 21 20:53:14.864: tcp_uniqueport: using ephemeral max 55000
```

```
*Nov 21 20:53:14.864: Reserved port 54086 in Transport Port Agent for TCP IP type 1
```

```
*Nov 21 20:53:14.864: TCP: sending SYN, seq 3703836424, ack 0
```

```
*Nov 21 20:53:14.864: TCP0: Connection to 135.84.175.164:5062, advertising MSS 536
```

```
*Nov 21 20:53:14.865: TCP0: state was CLOSED -> SYNSENT [54086 -> 135.84.175.164(5062)]
```

```
*Nov 21 20:53:14.891: Released port 54086 in Transport Port Agent for TCP IP type 1 delay 240000
```

```
*Nov 21 20:53:14.891: TCP0: state was SYNSENT -> CLOSED [54086 -> 135.84.175.164(5062)]
```

```
*Nov 21 20:53:14.891: TCP0: bad seg from 135.84.175.164 -- closing connection: port 54086 seq  
2075661766 ack 3703836425 rcvnext 0 rcvwnd 0 len 0
```

```
*Nov 21 20:53:14.891: TCP0: connection closed - remote sent RST
```

```
*Nov 21 20:53:14.891: TCB7F6E47D97548 getting property TCP_VRFTABLEID (20)
```

```
*Nov 21 20:53:14.891: TCB 0x7F6E47D97548 destroyed
```

TLS Handshake Failure

- TLS Handshake failure will display a Syslog message:

```
Nov 22 21:45:31.712: %SIP-2-TLS_HANDSHAKE_FAILED: TLS handshake failure - remote_addr=139.177.64.53, remote_port=5062
```

- Control Hub will show TLS Connection errors on Trunk Configuration (**Calling** > **Call Routing** > **Trunk** > **Trunk Info**)

Status ⓘ

● Impaired

⚠ TLS Connection to Local Gateway failed as the gateway's certificate is signed by an invalid Certificate Authority. [Learn more](#)

Trunk Type

Certificate based

Verify Correct Certificate Configured

```
sip-ua
transport tcp tls v1.2
crypto signaling default trustpoint CUBE_CA_CERT
```

```
crypto pki trustpoint CUBE_CA_CERT
enrollment terminal pem
serial-number none
subject-name CN=svs-rtp-dmz-cube9a.cube.ecatslab.com
subject-alt-name svs-rtp-dmz-cube9a.cube.ecatslab.com
revocation-check none
rsa-keypair svs-rtp-dmz-cube9a
```

svs-rtp-dmz-cube9a 

[Trunk](#) > [Details](#)

Status ⓘ

● Online

Trunk Type

Certificate based

Device

Cisco Unified Border Element

FQDN

svs-rtp-dmz-cube9a.cube.ecatslab.com:5061

Verify CA is trusted by Webex

<https://help.webex.com/en-us/article/WBX9000008850/What-Root-Certificate-Authorities-are-Supported-for-Calls-to-Cisco-Webex-Audioand-Video-Platforms>

Supported Root Certificate Authorities:

Fingerprint (SHA1)	Subject	Date Added
b1bc968bd4f49d622aa89a81f2150152a41d829c	C=BE/O=GlobalSign nv-sa/OU=Root CA/CN=GlobalSign Root CA	January 1st, 2016
ca3afbcf1240364b44b216208880483919937cf7	C=BM/O=QuoVadis Limited/CN=QuoVadis Root CA 2	January 1st, 2016
590d2d7d884f402e617ea562321765cf17d894e9	C=DE/O=T-Systems Enterprise Services GmbH/OU=T-Systems Trust Center/CN=T-TeleSec GlobalRoot Class 3	January 1st, 2016



Verify CA is trusted by Webex

```
svs-rtp-dmz-cube9a#show crypto pki certificates
```

Certificate

```
Status: Available
Certificate Serial Number (hex): 00FADBC625153DAA0...
Certificate Usage: General Purpose
Issuer:
  cn=Sectigo RSA Domain Validation Secure Server CA
  o=Sectigo Limited
  l=Salford
  st=Greater Manchester
  c=GB
```

Subject:

```
Name: svs-rtp-dmz-cube9a.cube.ecatslab.com
cn=svs-rtp-dmz-cube9a.cube.ecatslab.com
```

Validity Date:

```
start date: 19:00:00 EST Nov 20 2022
end date: 18:59:59 EST Dec 22 2023
```

```
Associated Trustpoints: CUBE_CA_CERT
```

```
Storage: nvram:SectigoRSADo#A910.cer
```

svs-rtp-dmz-cube9a

[Trunk](#) > [Details](#)

Status ⓘ

● Online

Trunk Type

Certificate based

Device

Cisco Unified Border Element

FQDN

svs-rtp-dmz-cube9a.cube.ecatslab.com:5061

Verify CA is trusted by Webex

```
svs-rtp-dmz-cube9a#show crypto pki certificates
```

Certificate

```
Status: Available  
Certificate Serial Number (hex): 00FADEBC625153DAA0...  
Certificate Usage: General Purpose
```

Issuer:

```
cn=Sectigo RSA Domain Validation Secure Server CA  
o=Sectigo Limited  
l=Salford  
st=Greater Manchester  
c=GB
```

Subject:

```
Name: svs-rtp-dmz-cube9a.cube.ecatslab.com  
cn=svs-rtp-dmz-cube9a.cube.ecatslab.com
```

Validity Date:

```
start date: 19:00:00 EST Nov 20 2022  
end date: 18:59:59 EST Dec 22 2023
```

```
Associated Trustpoints: CUBE_CA_CERT
```

```
Storage: nvram:SectigoRSADo#A910.cer
```

CA Certificate

```
Status: Available  
Certificate Serial Number (hex): 7D5B51...  
Certificate Usage: Signature  
Issuer:
```

```
cn=USERTrust RSA Certification Authority  
o=The USERTRUST Network  
l=Jersey City  
st=New Jersey  
c=US
```

Subject:

```
cn=Sectigo RSA Domain Validation Secure Server CA  
o=Sectigo Limited  
l=Salford  
st=Greater Manchester  
c=GB
```

CRL Distribution Points:

```
http://crl.usertrust.com/USERTrustRSA...
```

Validity Date:

```
start date: 20:00:00 EDT Nov 1 2018  
end date: 18:59:59 EST Dec 31 2030
```

```
Associated Trustpoints: CUBE_CA_CERT
```

```
Storage: nvram:USERTrustRSA#DA7CA.cer
```

Verify CA is trusted by Webex

CA Certificate

Status: Available
Certificate Serial Number (hex): 7D5B5126B476BA11DB7...
Certificate Usage: Signature
Issuer:

```
cn=USERTrust RSA Certification Authority
o=The USERTRUST Network
l=Jersey City
st=New Jersey
c=US
```

Subject:
cn=**Sectigo RSA Domain Validation Secure Server CA**
o=Sectigo Limited
l=Salford
st=Greater Manchester
c=GB
CRL Distribution Points:
<http://crl.usertrust.com/USERTrustRSACertification...>
Validity Date:
start date: 20:00:00 EDT Nov 1 2018
end date: 18:59:59 EST Dec 31 2030
Associated Trustpoints: CUBE_CA_CERT Intermediate_CA2
Storage: nvram:USERTrustRSA#DA7CA.cer

CA Certificate

```
Status: Available
Certificate Serial Number (hex): 3972...
Certificate Usage: Signature
Issuer:
  cn=AAA Certificate Services
  o=Comodo CA Limited
  l=Salford
  st=Greater Manchester
  c=GB
Subject:
  cn=USERTrust RSA Certification Autho...
  o=The USERTRUST Network
  l=Jersey City
  st=New Jersey
  c=US
CRL Distribution Points:
  http://crl.comodoca.com/AAACertific...
Validity Date:
  start date: 20:00:00 EDT Mar 11 201...
  end date: 18:59:59 EST Dec 31 202...
Associated Trustpoints: Intermediate_...
Storage: nvram:AAACertifica#3595CA.ce...
```

Verify CA is trusted by Webex

CA Certificate

Status: Available
Certificate Serial Number (hex): 3972443AF922B751D..
Certificate Usage: Signature
Issuer:

```
cn=AAA Certificate Services  
o=Comodo CA Limited  
l=Salford  
st=Greater Manchester  
c=GB
```



Subject:

```
cn=USERTrust RSA Certification Authority  
o=The USERTRUST Network  
l=Jersey City  
st=New Jersey  
c=US
```

CRL Distribution Points:

```
http://crl.comodoca.com/AAACertificateServices.crl
```

Validity Date:

```
start date: 20:00:00 EDT Mar 11 2019  
end date: 18:59:59 EST Dec 31 2028
```

Associated Trustpoints: Intermediate_CA

Storage: nvram:AAACertifica#3595CA.cer

CA Certificate

Status: Available
Certificate Serial Number (hex): 01
Certificate Usage: Signature
Issuer:

```
cn=AAA Certificate Services  
o=Comodo CA Limited  
l=Salford  
st=Greater Manchester  
c=GB
```

Subject:

```
cn=AAA Certificate Services  
o=Comodo CA Limited  
l=Salford  
st=Greater Manchester  
c=GB
```

CRL Distribution Points:

```
http://crl.comodoca.com/AAACertificat  
http://crl.comodo.net/AAACertificat
```

Validity Date:

```
start date: 19:00:00 EST Dec 31 200  
end date: 18:59:59 EST Dec 31 202
```

Associated Trustpoints: Root_CA_CERT

Storage: nvram:AAACertifica#1CA.cer

Verify CA is trusted by Webex

CA Certificate

Status: Available
Certificate Serial Number (hex): 01
Certificate Usage: Signature
Issuer:

```
cn=AAA Certificate Services  
o=Comodo CA Limited  
l=Salford  
st=Greater Manchester  
c=GB
```

Subject:

```
cn=AAA Certificate Services  
o=Comodo CA Limited  
l=Salford  
st=Greater Manchester  
c=GB
```



Self-signed indicates Root CA

CRL Distribution Points:

```
http://crl.comodoca.com/AAACertificateServices.crl  
http://crl.comodo.net/AAACertificateServices.crl
```

Validity Date:

```
start date: 19:00:00 EST Dec 31 2003  
end date: 18:59:59 EST Dec 31 2028
```

Associated Trustpoints: **Root_CA_CERT**

show crypto pki trustpoints Root_CA_CERT status

Verify CA is trusted by Webex

Associated Trustpoints: **Root_CA_CERT**

```
svs-rtp-dmz-cube9a#show crypto pki trustpoints Root_CA_CERT status
```

```
Trustpoint Root_CA_CERT:
```

```
Issuing CA certificate configured:
```

```
Subject Name:
```

```
cn=AAA Certificate Services,o=Comodo CA Limited,l=Salford,st=Greater Manchester,c=GB
```

```
Fingerprint MD5: 497904B0 EB8719AC 47B0BC11 519B74D0
```

```
Fingerprint SHA1: D1EB23A4 6D17D68F D92564C2 F1F16017 64D8E349
```

```
State:
```

```
Keys generated ..... No
```

```
Issuing CA authenticated ..... Yes
```

```
Certificate request(s) ..... None
```

<https://help.webex.com/en-us/article/WBX9000008850/What-Root-Certificate-Authorities-are-Supported-for-Calls-to-Cisco-Webex-Audioand-Video-Platforms>

d1eb23a46d17d68fd92564c2f1f1601764d8e349	C=GB/ST=Greater Manchester/L=Salford/O=Comodo CA Limited/CN=AAA Certificate Services	August 3, 2018
---	--	----------------------

Verify TLS Connections

```
svs-rtp-dmz-cube9a#show sip-ua connections tcp tls detail
```

```
Total active connections      : 8
No. of send failures          : 4
No. of remote closures       : 105
No. of conn. failures        : 1595
No. of inactive conn. ageouts : 0
Max. tls send msg queue size of 3, recorded for 139.177.65.53:8934
TLS client handshake failures : 0
TLS server handshake failures : 0
```

```
Remote-Agent:139.177.65.54, Connections-Count:2
```

Remote-Port	Conn-Id	Conn-State	WriteQ-Size	Local-Address	TLS-Version	Cipher	Curve	Tenant
5062	1658	Established	0	64.102.250.137:21819	TLSv1.2	ECDHE-RSA-AES256-GCM-SHA384	P-256	0
8934	1715	Established	0	64.102.250.137:5061	TLSv1.2	ECDHE-RSA-AES256-GCM-SHA384	P-256	0

```
Remote-Agent:139.177.64.53, Connections-Count:2
```

Remote-Port	Conn-Id	Conn-State	WriteQ-Size	Local-Address	TLS-Version	Cipher	Curve	Tenant
5062	1657	Established	0	64.102.250.137:39113	TLSv1.2	ECDHE-RSA-AES256-GCM-SHA384	P-256	0
8934	1717	Established	0	64.102.250.137:5061	TLSv1.2	ECDHE-RSA-AES256-GCM-SHA384	P-256	0

```
Remote-Agent:139.177.64.54, Connections-Count:2
```

Remote-Port	Conn-Id	Conn-State	WriteQ-Size	Local-Address	TLS-Version	Cipher	Curve	Tenant
5062	1659	Established	0	64.102.250.137:48188	TLSv1.2	ECDHE-RSA-AES256-GCM-SHA384	P-256	0
8934	1714	Established	0	64.102.250.137:5061	TLSv1.2	ECDHE-RSA-AES256-GCM-SHA384	P-256	0

```
Remote-Agent:139.177.65.53, Connections-Count:2
```

Remote-Port	Conn-Id	Conn-State	WriteQ-Size	Local-Address	TLS-Version	Cipher	Curve	Tenant
5062	1660	Established	0	64.102.250.137:11636	TLSv1.2	ECDHE-RSA-AES256-GCM-SHA384	P-256	0
8934	1716	Established	0	64.102.250.137:5061	TLSv1.2	ECDHE-RSA-AES256-GCM-SHA384	P-256	0

Successful Connection from Control Hub

svs-rtp-dmz-cube9a 

[Trunk](#) > [Details](#)

Status 

- Online

Trunk Type
Certificate based

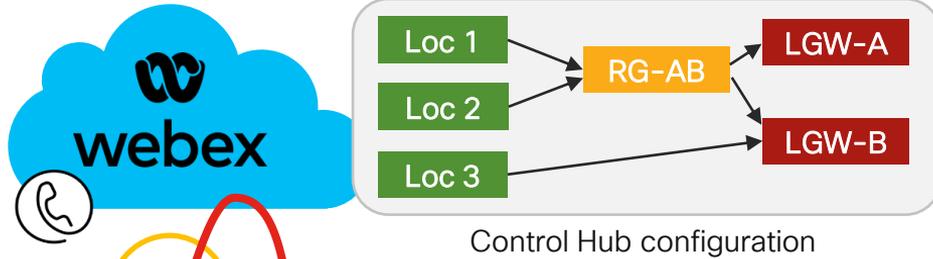
Device
Cisco Unified Border Element

FQDN
svs-rtp-dmz-cube9a.cube.ecatslab.com:5061

CUBE Call Routing

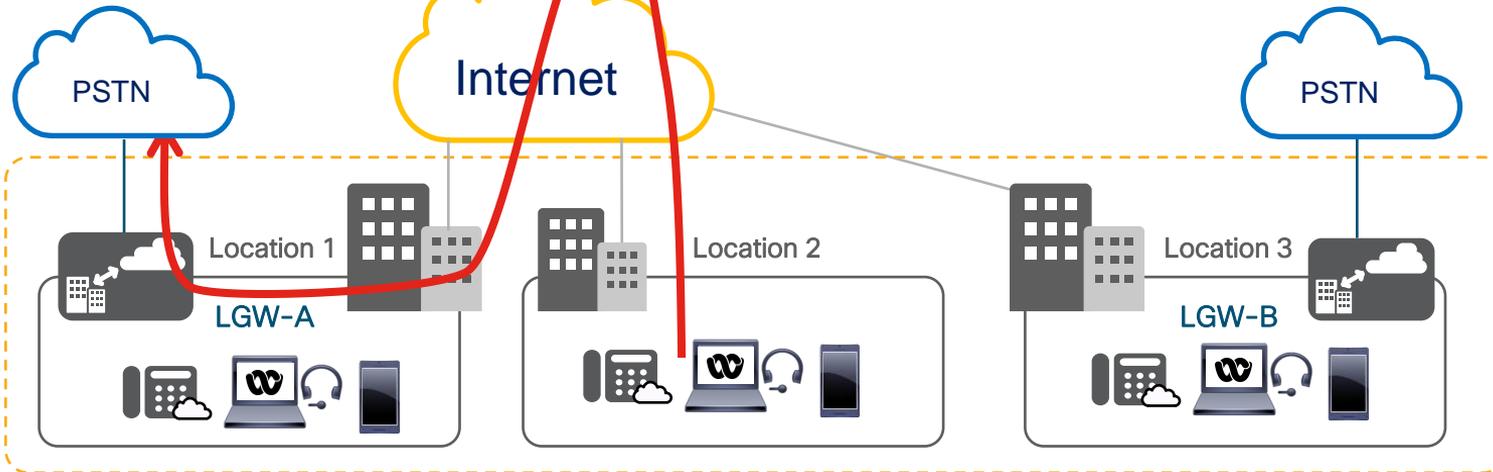
Premises-based PSTN Deployment Models

Multi-site with Multiple Local Gateways



Multiple locations can use the same Trunk / Route Group

One Trunk or Route Group must be assigned to each location



PSTN Connection and Main Number selection

Calling > Locations > Select Location

Calling connection

PSTN connection ⓘ Premises-based PSTN [Manage](#) ←

Main number ⓘ

Select a number ▾ ←

⚠ You will not be able to make or receive calls until this number is added

Emergency calling

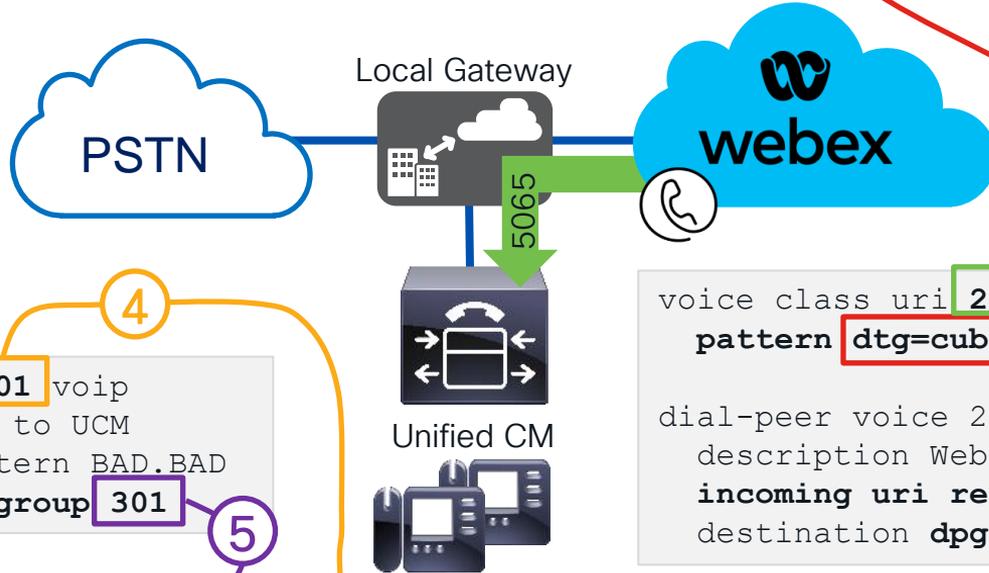
Callback number ⓘ ⚠ This Location's main number not selected. >

Emergency call notification ⓘ Off >

Enhanced emergency calling ⓘ ⚠ Off >

Dial Peer Matching

```
INVITE sip:+18008001180@64.102.250.133:5061;  
transport=tls;dtg=cube7958_lgu SIP/2.0
```



```
dial-peer voice 301 voip  
description WxC to UCM  
destination-pattern BAD.BAD  
session server-group 301
```

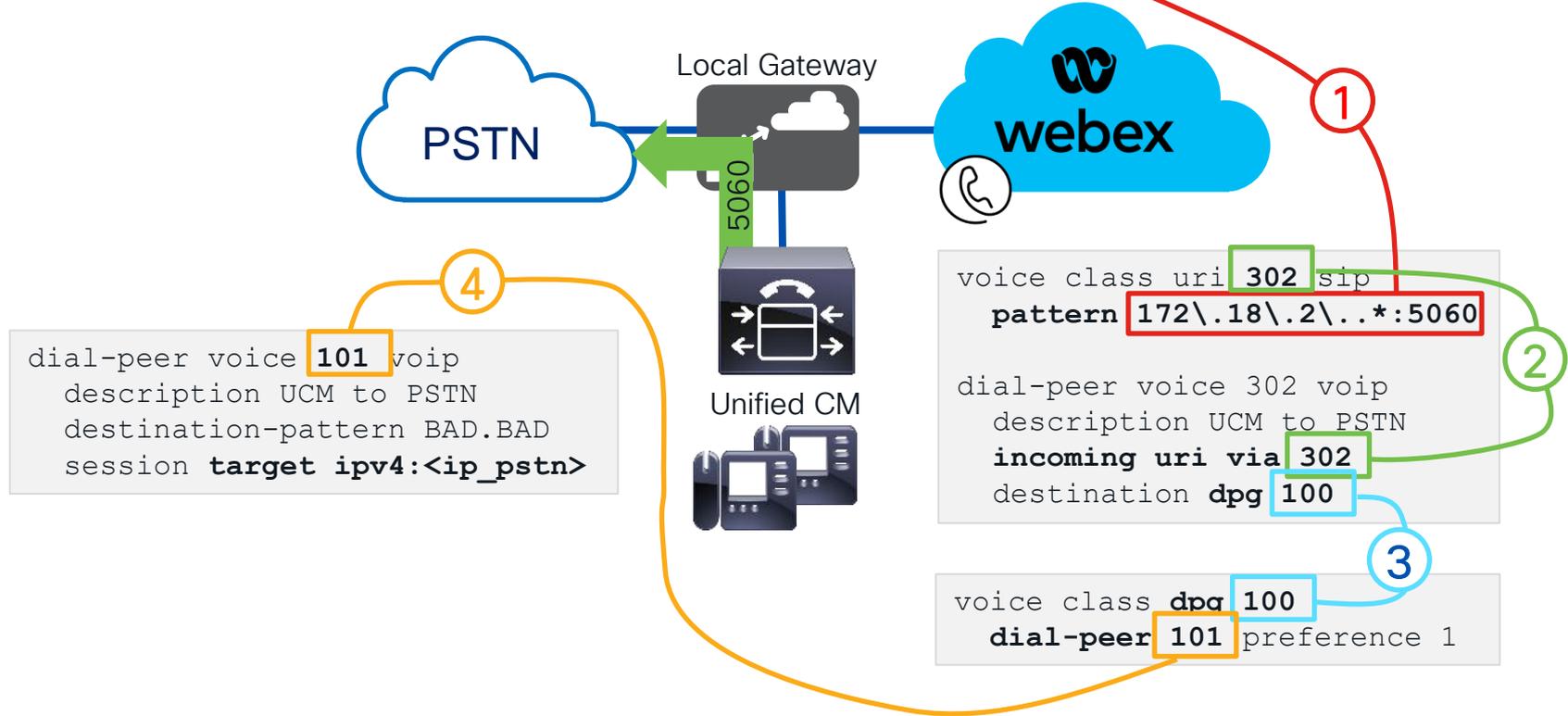
```
voice class server-group 301  
ipv4 <ucm-node-1> port 5065  
ipv4 <ucm-node-2> port 5065  
ipv4 <ucm-node-3> port 5065
```

```
voice class uri 200 sip  
pattern dtg=cube7958_lgu  
  
dial-peer voice 200202 voip  
description Webex Calling  
incoming uri request 200  
destination dpg 300
```

```
voice class dpg 300  
dial-peer 301 preference 1
```

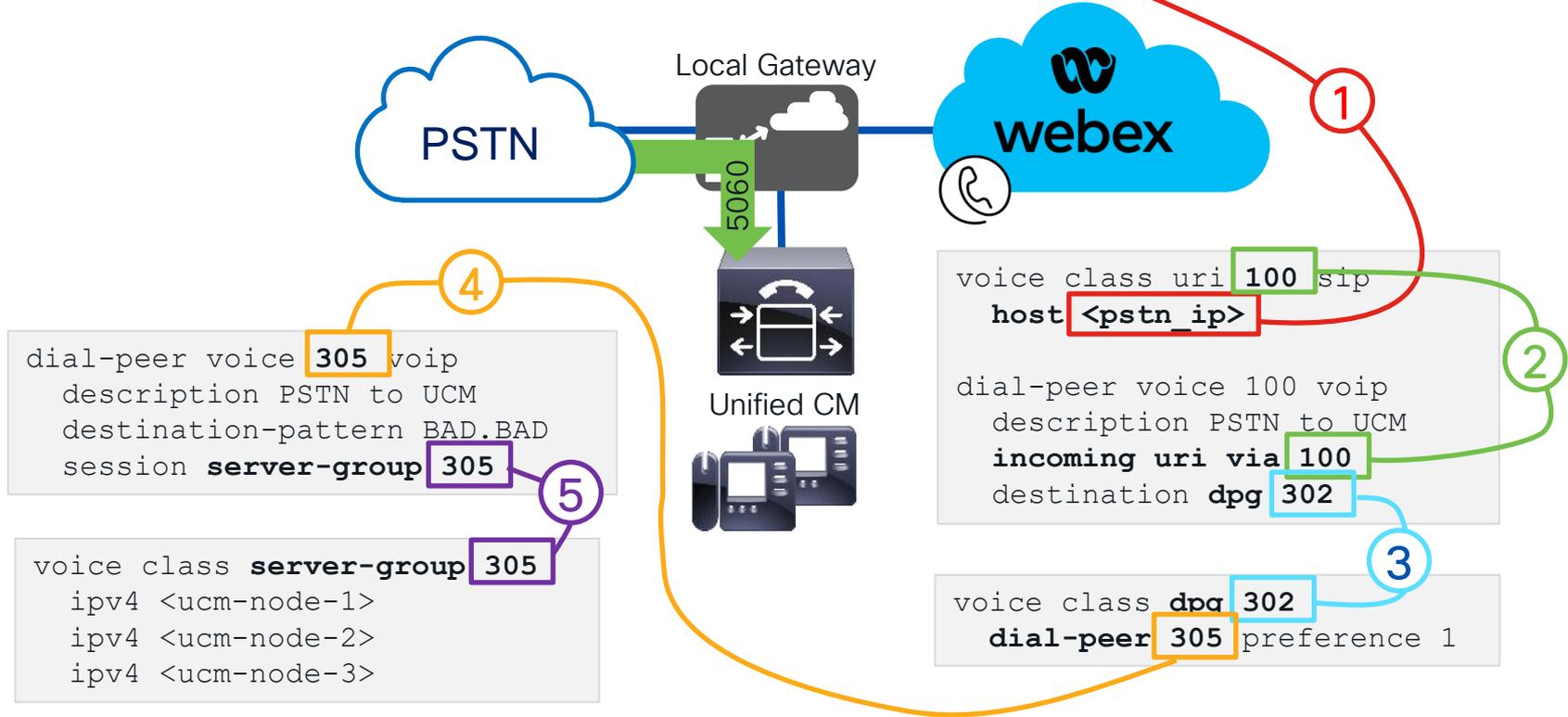
Dial Peer Matching

```
INVITE sip:+18008001180@172.19.54.10:5060;transport=...  
Via: SIP/2.0/TCP 172.18.2.20:5060 branch=z9hG4bK247e...
```



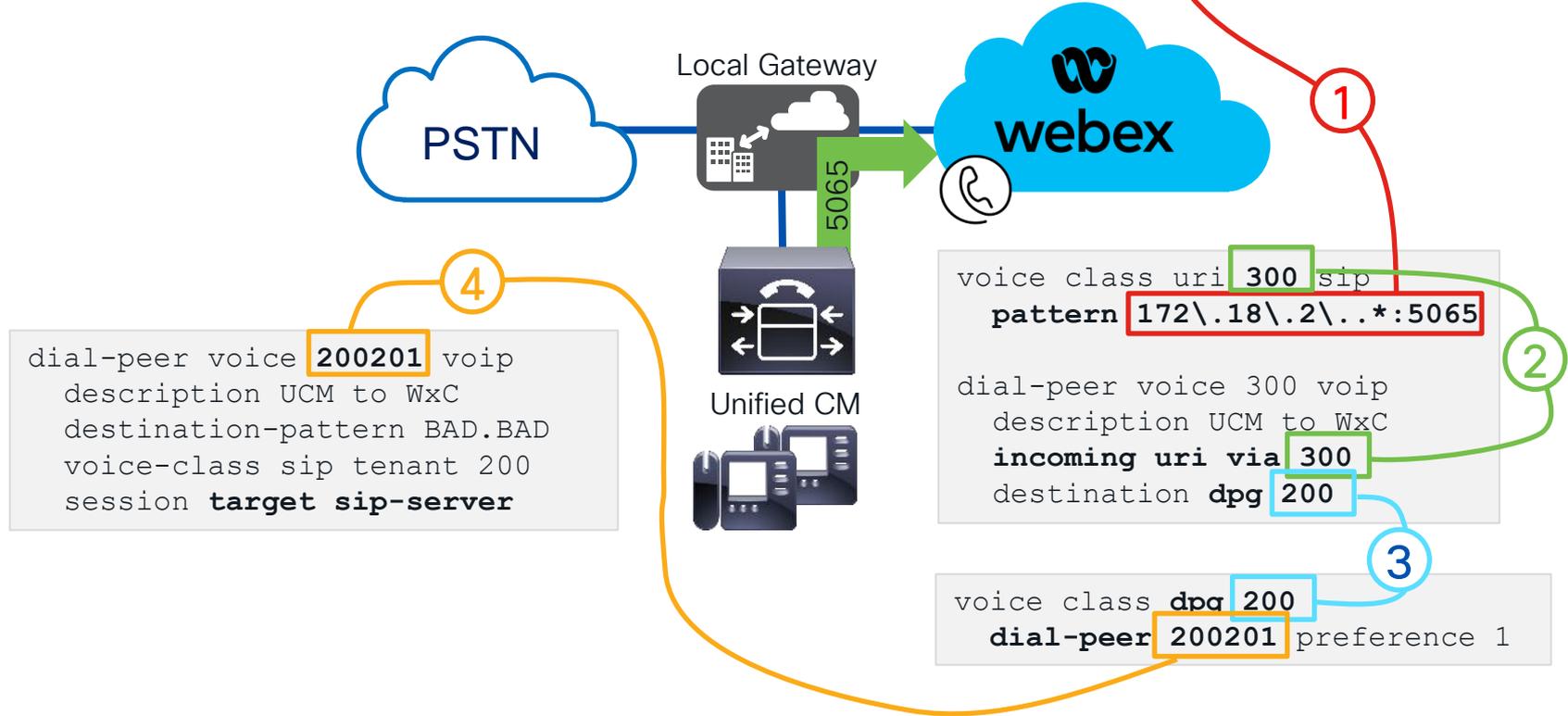
Dial Peer Matching

```
INVITE sip:+19195552345@64.102.2.123:5060;transport=...
Via: SIP/2.0/TCP <pstn_ip>:5060;branch=z9hG4bK247e...
```



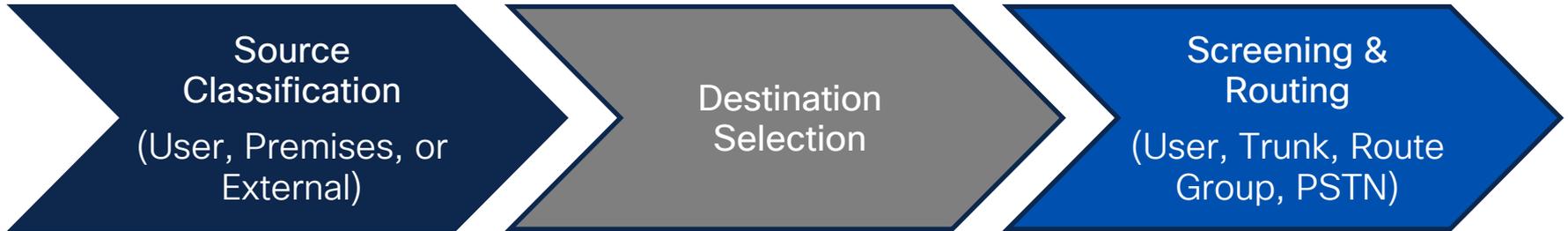
Dial Peer Matching

```
INVITE sip:+19195552345@86194638.us10.bcld.webex.com...  
via: SIP/2.0/TCP 172.18.2.20:5065 branch=z9hG4bK247e...
```

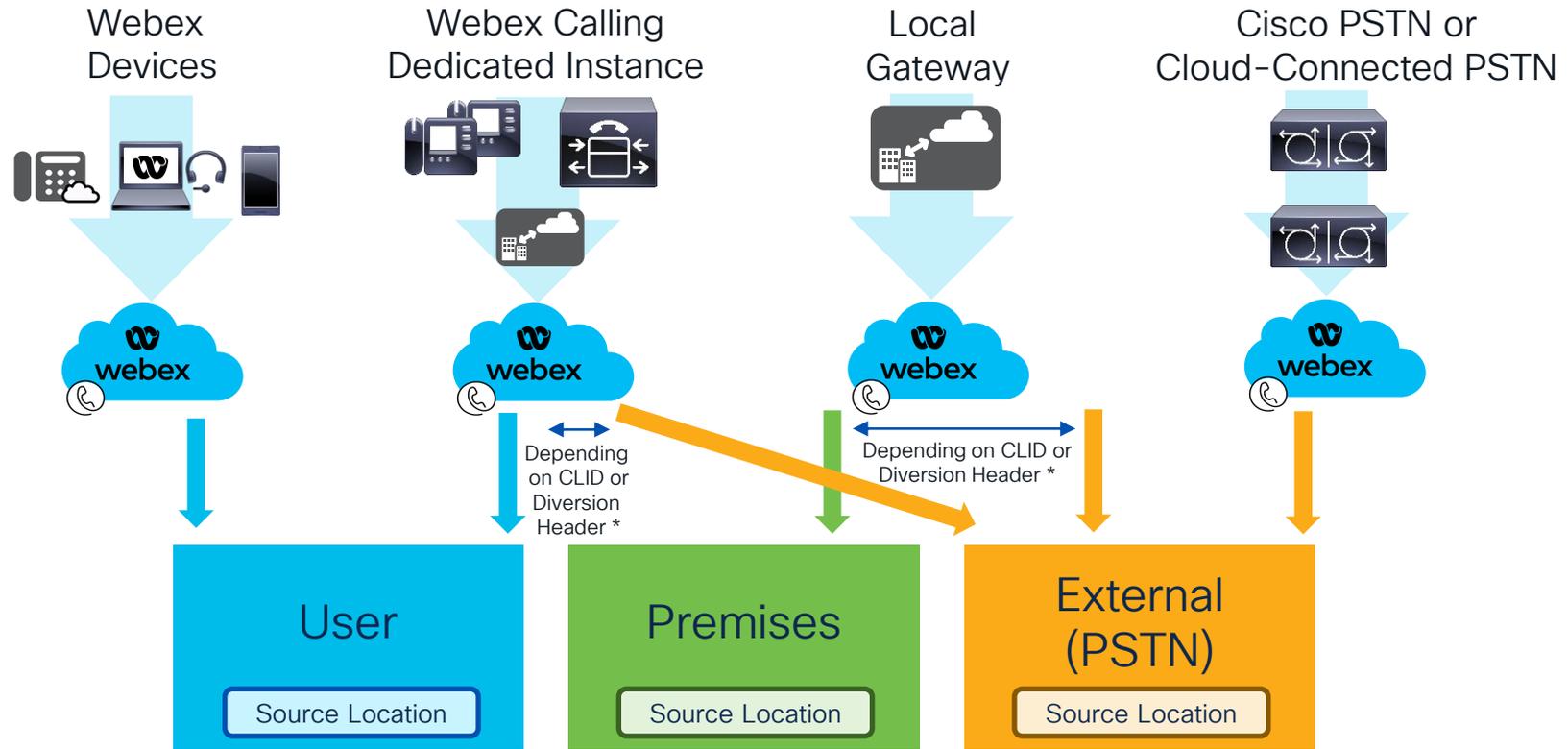


Webex Calling call routing overview

- Call Routing undergoes three distinct phases



Webex Calling Source Classification



* Depends on incoming calling party number, presence of Diversion header, number of dialed digits, and configuration settings

Call Routing Configuration – Service Settings

Call Routing between Webex Calling and premises

Unknown Numbers Handling

Choose a configuration that determines the call routing behavior for unknown numbers in Webex Calling.

Standard behavior

This is the default and recommended option to achieve the best level of interoperability with an on-premises PBX.

[Show Details](#) ▾

Legacy behavior (not recommended)

This option provides backwards compatibility for the legacy Local Gateway behavior and is not recommended when Dial Plans are configured for the organization.

[Show Details](#) ▾

Caller ID Format for Calls from and to On-premises

Check your PBX settings to see which caller ID format to use for calls routed between Webex Calling and your PBX.

E.164 phone number

ESN (Location routing prefix + user extension)

When this option is selected:

Outgoing calls processed by Webex Calling are routed only if the destination number matches one of the following:

- Webex Calling numbers defined for this Organization
- Dial Plans defined for this Organization
- Virtual Extensions defined for this Organization
- Country-specific PSTN numbering plan of the caller's Location
- Dialed number length of 2-6 digits - only if the caller's Location has the "Calls to On-Premises Extensions" setting enabled

Calls to other destinations fail.

Incoming calls received by Webex Calling from a Trunk are treated as "premises" calls if the caller identity matches one of the following:

- Dial Plans defined for this Organization
- Calling number length of 2-6 digits - only if the Trunk's Location has the "Calls to On-Premises Extensions" setting enabled

All other incoming calls are treated as "external".

When this option is selected:

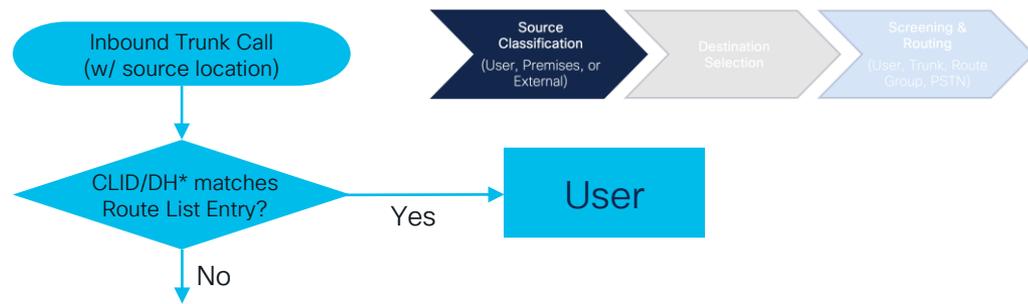
Outgoing calls processed by Webex Calling that do not match any of the items listed for outgoing calls in Standard Behavior above are routed to the Trunk or Route Group specified by the Premises-based PSTN setting of the caller's Location. Only applicable to Locations using Premises-based PSTN.

Incoming calls received by Webex Calling from a Trunk are treated as "premises" calls, regardless of caller identity. May result in undesirable behavior with caller ID, screening, etc.

Source Classification



Source Classification



Number in Diversion header used if present, if not number in From header is used

```
INVITE sip:89943702@peering3.us.sipconnect.bcld.webex.com:5062 SIP/2.0
Via: SIP/2.0/TLS 64.102.250.137:5061;branch=z9hG4bK8BF831C1E
From: <sip:+19194766200@64.102.250.137>;tag=FD340CF9-200D
To: <sip:89943702@peering3.us.sipconnect.bcld.webex.com>
Call-ID: 2EB7BD48-EF7111ED-B8429147-F554AD62@64.102.250.137
Supported: timer,resource-priority,replaces
Min-SE: 1800
User-Agent: Cisco-SIPGateway/IOS-17.10.1a
Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER, SUBSCRIBE, NOTIFY, INFO, REGISTER
CSeq: 101 INVITE
Contact: <sip:+19194766200@svs-rtp-dmz-cube9a.cube.ecatslab.com:5061;transport=tls>
Diversion: <sip:89915678@svs-rtp-dmz-cube9a.cube.ecatslab.com>
Expires: 180
Max-Forwards: 68
... snip ...
```

* CLID = Calling Party ID
DH = SIP Diversion Header

Source Classification

Org-wide Configuration

Standard behavior

This is the default and recommended option to achieve the best level of interoperability with an on-premises PBX.

[Show Details](#) ▾

Legacy behavior (not recommended)

This option provides backwards compatibility for the legacy Local Gateway behavior and is not recommended when Dial Plans are configured for the organization.

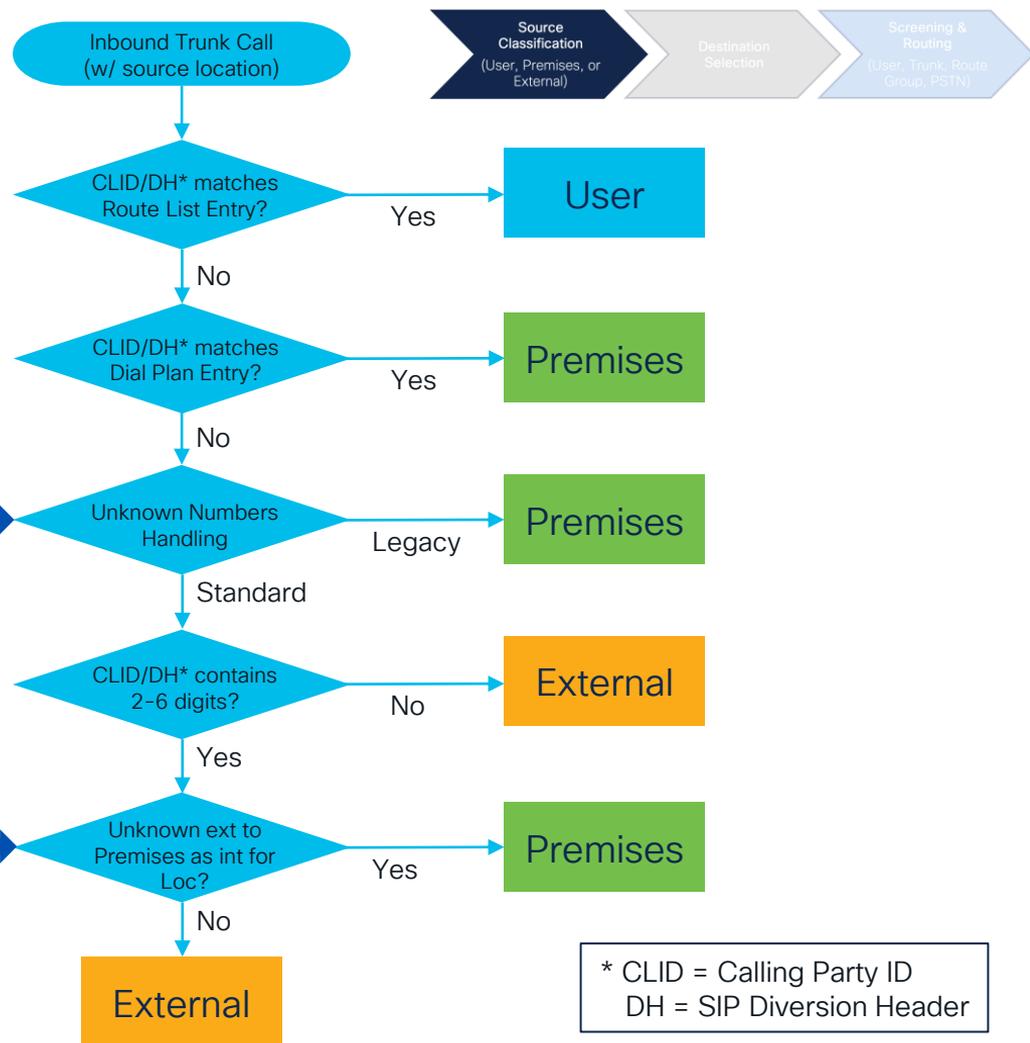
Trunk Location Configuration

Calls to On-Premises Extensions

If some users in this location are registered to a PBX, enable this setting to route unknown extensions (digits that match with the extension length) to the PBX.

Enable routing unknown extensions to the Premises as internal calls

VNT Alpha RG ▾





Routing overview

2) Destination selection

Routing overview

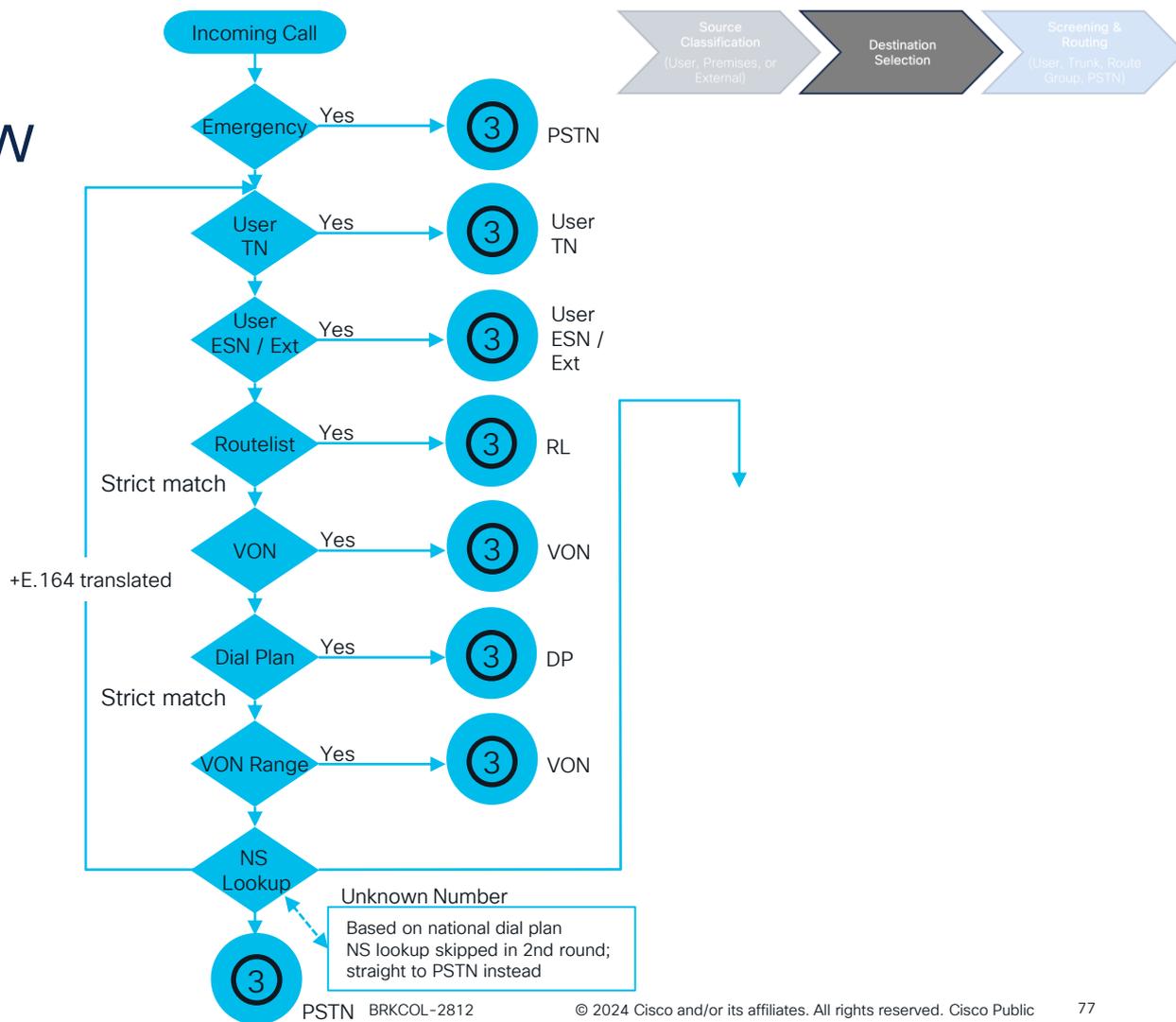
2) Destination selection

Dialed number might be translated to +E.164 based on national numbering plan.

For example:

9011496100123 → +496100123

If number is translated, then go back to check for +E.164 matches



Country Calling Plans

<https://help.webex.com/en-us/article/757iyo/Dial-plans-by-country>



- NS Lookup uses calling plan for the country of the Location
- Call Type tagging used for call restrictions (covered later)

Netherlands

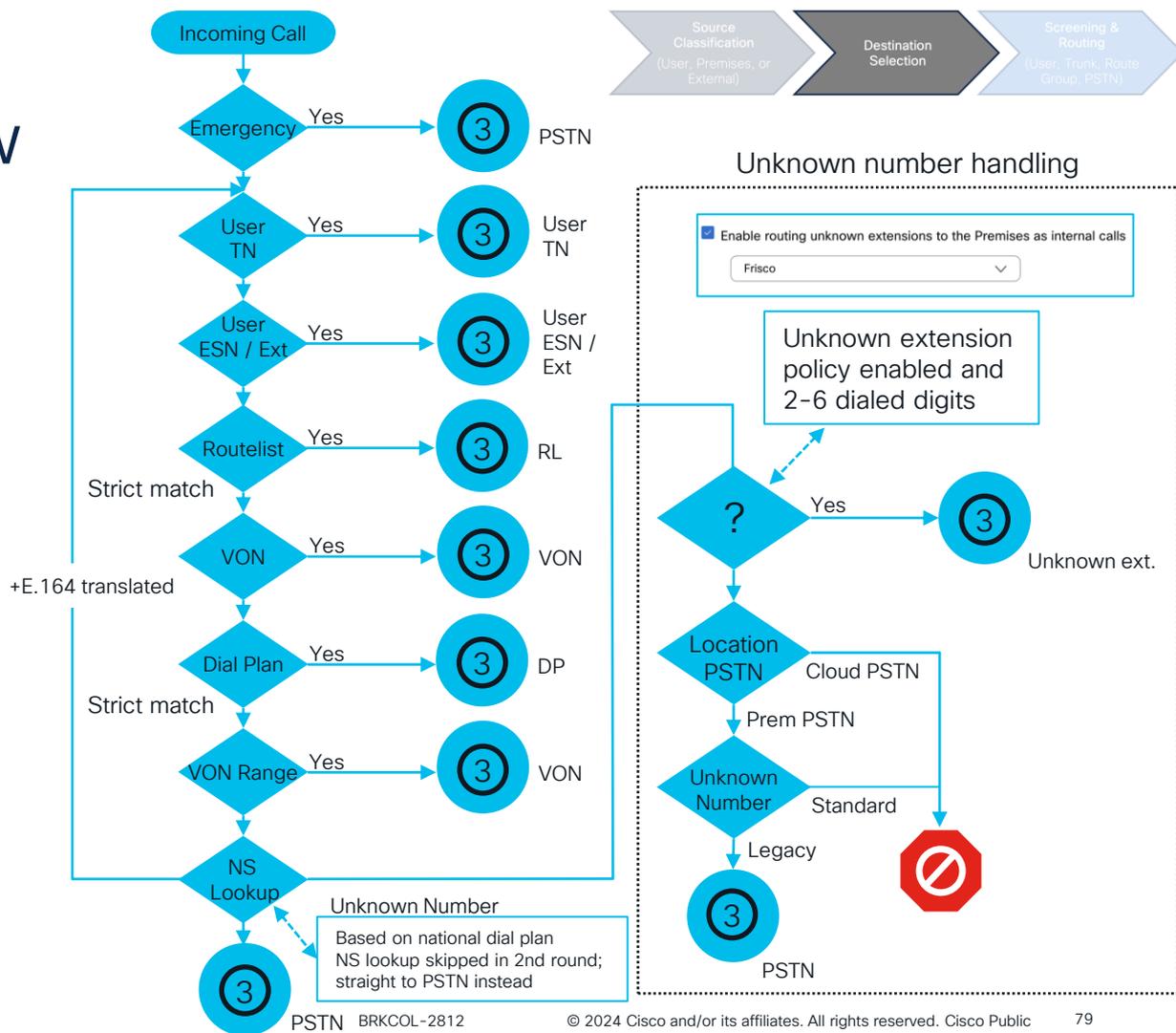
Outbound calling plan

Table 185. Netherlands outbound calling plan

Country code	Digit map	Call type	Description
31	18xx	Chargeable Directory Assistance	Directory Assistance
31	116xxx	Chargeable Directory Assistance	European Harmonized Services
31	00xxxxx.	International	International Destinations
31	xxxxxx	Local	Local Calls
31	xxxxxxx	Local	Local Calls
31	084xxxxxxx	Premium Services I	Personal Assistant Services

Routing overview

2) Destination selection



Call Routing between Webex Calling and premises

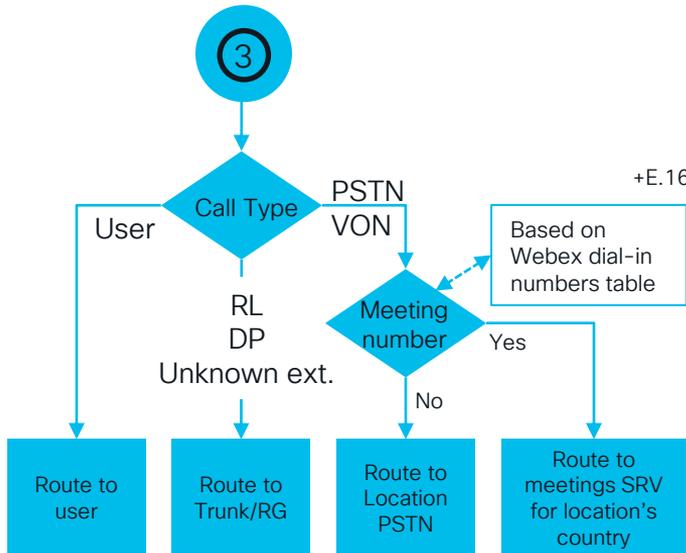
Unknown Numbers Handling
Choose a configuration that determines the call routing behavior for unknown numbers in Webex Calling.

- Standard behavior**
This is the default and recommended option to achieve the best level of interoperability with an on-premises PBX.
[Show Details](#)
- Legacy behavior (not recommended)**
This option provides backwards compatibility for the legacy Local Gateway behavior and is not recommended when Dial Plans are configured for the organization.
[Show Details](#)

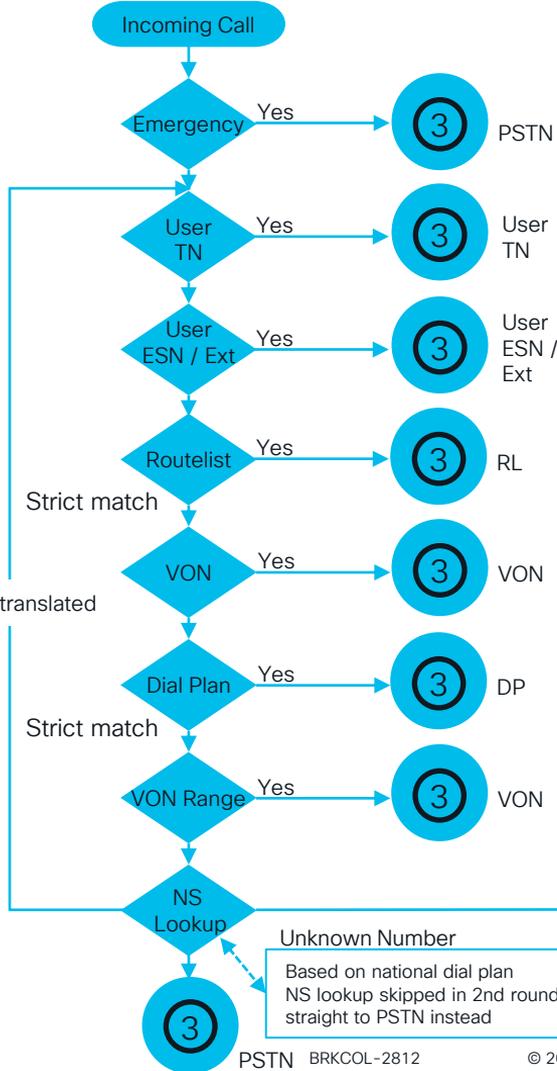


Routing overview

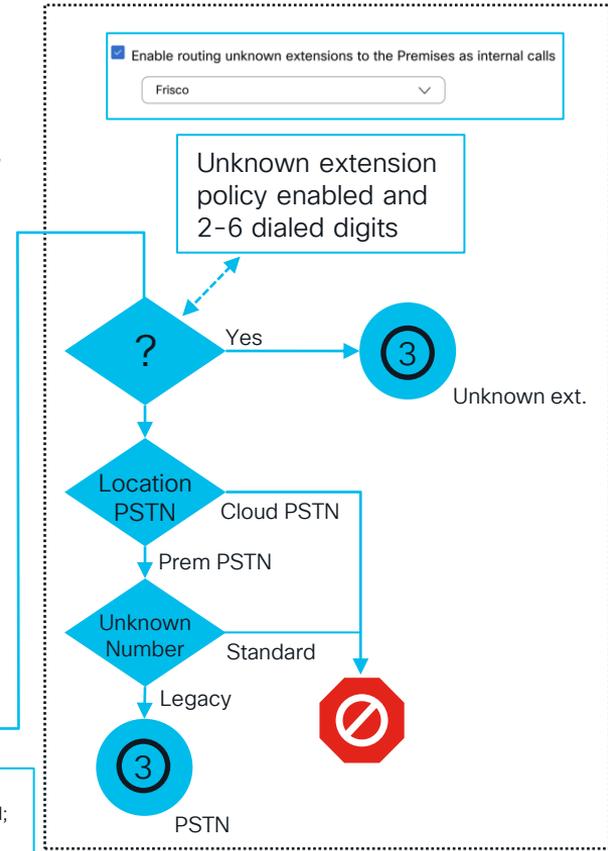
- 2) Destination selection
- 3) Block or allow based on calling permissions and route



+E.164 translated



Unknown number handling





Screening and Routing

From \ To	User (TN)	User (ESN/Ext)	Trunk (RL)	Trunk (DP or unknown ext)	PSTN / VON
User	✓	✓	✓	✓	✓
Premises	✓	✓	✓	✓	✗
External	✓	✗	✓	✗	✗

Screening and Routing

From \ To	User (TN)	User (ESN/Ext)	Trunk (RL)	Trunk (DP or unknown ext)	PSTN / VON
User	✓	✓	✓	✓	✓
Premises	✓	✓	✓	✓	✗
External	✓	✗	✓	✗	✗

- Calls from Webex Calling users (including DI users) can be routed anywhere

Screening and Routing

From \ To	User (TN)	User (ESN/Ext)	Trunk (RL)	Trunk (DP or unknown ext)	PSTN / VON
User	✓	✓	✓	✓	✓
Premises	✓	✓	✓	✓	✗
External	✓	✗	✓	✗	✗

- Calls from On-Premises Users can be routed anywhere except for the PSTN

Screening and Routing

From \ To	User (TN)	User (ESN/Ext)	Trunk (RL)	Trunk (DP or unknown ext)	PSTN / VON
User	✓	✓	✓	✓	✓
Premises	✓	✓	✓	✓	✗
External	✓	✗	✓	✗	✗

- Calls from PSTN can only route to User TN's (including DI users). Calls from PSTN cannot call ESN / Extension.

Call Routing Troubleshooting Tool

Calling > Call Routing > Verify Call Routing

- Select Source (User or Trunk and Number)
- Enter Destination
- Tool performs a live route lookup

The screenshot shows the Cisco Call Routing Troubleshooting Tool interface. At the top, there are navigation tabs: Numbers, Locations, Virtual Lines (with a 'New' button), Call Routing (selected), and Managed Gateways. Below these are sub-tabs: Trunk, Route Group, Dial Plans, Verify Call Routing (selected), Zone, and Trusted Network Edge. The main content area is titled 'Verify How Calls Are Routed' and includes a descriptive paragraph: 'Verify your call routing by choosing a cloud user or premises trunk and entering a number or URI that a user will be translated (assuming that your on-premises configuration is correct).' Under the heading 'Select Call Source', there are two radio buttons: 'Select from Users list' (selected) and 'Select from Trunk list'. Below this is a dropdown menu labeled 'Select a user'. Under the heading 'Select Call Destination', there is a text input field labeled 'Enter a number or URI'. At the bottom, there are two buttons: 'See Routing Result' and 'Clear All'.

Call Routing Troubleshooting Tool

- Example call from User to PSTN

Verify How Calls Are Routed

Verify your call routing by choosing a cloud user or premises trunk and entering a number or URI that a user would dial. The routing result shows how a call will be translated (assuming that your on-premises configuration is correct).

Select Call Source

Select from Users list Select from Trunk list

Paul Giralt (+19199940111) ▾

Select Call Destination

8008001180 ✕

[See Routing Result](#) [Clear All](#)

The call to +18008001180 routes to an external number.

From		To (Initial routing destination)
Paul Giralt (+19199940111) VNT Alpha RTP	→	via Premises-based PSTN using VNT Alpha RG

SIP Troubleshooting on CUBE

Understanding the Session Initiation Protocol (SIP)

- Watch Chapter 2 from **DGTL-BRKUCC-2932** on Cisco Live On-Demand Library – <https://ciscolive.com/on-demand>

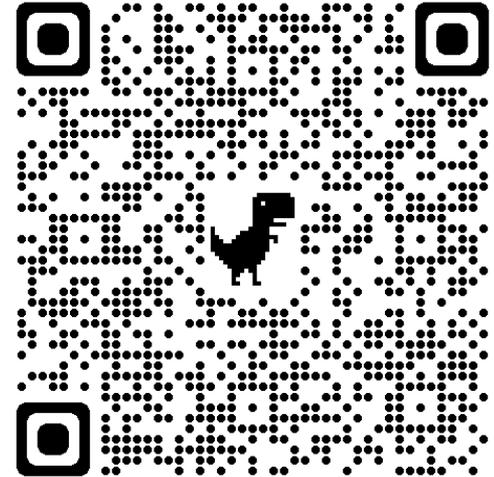
Q On-Demand Library Featured Sessions Learning Maps Upcoming Events

On-Demand Library

Explore a free collection of on-demand sessions from our global Cisco Live events.

Here are the topics covered in each chapter:

- **Chapter 1 – Introduction:** A brief introduction and overview of the agenda.
- **Chapter 2 – SIP Protocol Overview:** An overview of the SIP protocol. Examination of requests, responses, response codes, media establishment, early offer / delayed offer / early media, and DTMF relay.
- **Chapter 3 – Troubleshooting Tools:** An examination of the various troubleshooting tools available to help diagnose issues with SIP sessions.
- **Chapter 4 – Trace Configuration:** A quick overview of enabling and extracting SIP signaling from Unified CM, Expressway, and CUBE.
- **Chapter 5 – Case Studies – Part 1:** Detailed walk-through of two real-world case studies and examination of the SIP signaling as well as root cause determination.
- **Chapter 6 – Case Studies – Part 2:** Additional case studies with focus on live-demonstration of the troubleshooting tools and how they can be used to troubleshoot a problem.



Make sure you log in after going to the above site

CUBE VOIP Trace Feature

```
voice service voip
  trace
```

- Logs debugs for individual calls automatically
- VOIP Trace is enabled by default from IOS-XE 17.4.1, 17.3.2
- VOIP Trace captures:
 - SIP messages for SIP Trunk to Trunk calls
 - Events and API calls from SIP layer to other layers in CUBE
 - SIP Errors
 - Call Control (unified communication call flows processed by CUBE)
 - FSM (Finite State Machines) states and events
 - Dial peer matched
 - RTP ports allocated
- Will not log REGISTER, OPTIONS, SUBSCRIBE/NOTIFY, INFO

VOIP Trace - Configuration

Memory allocated for VOIP Trace is configurable:

```
CUBE(conf-serv-trace)#memory-limit ?  
<10-1000> Specify maximum memory limit in MB  
platform Use 10 percent of available memory
```

```
Router#show processes memory
```

```
Processor Pool Total: 8039169484 Used: 403977744 Free: 7635191740  
reserve P Pool Total: 102404 Used: 88 Free: 102316  
lsmpi_io Pool Total: 6295128 Used: 6294296 Free: 832
```

VOIP Trace – Show commands

```
CUBE#show
all
call-id
correla
cover-k
session
sip-cal
statist
```

Executing
performa

```
CUBE#sh v
Display
This may
Continue
```

The screenshot shows a Google search interface with the query "cover buffer". The search results are categorized under "Images for cover buffer" and include several images of different types of buffer pads: blue circular pads, a white circular pad, a blue and white circular pad, and a black cylindrical pad. Below the images is a "View all" button. The search results also include a Walmart product listing for "Buffer Pad Covers" with a price of \$19.99. The listing includes a small image of a yellow and white buffer pad and a description: "Shop for Buffer Pad Covers at Walmart.com. Save money. ... HEVIRGO Polishing Bonnet Buffer Pad Cover Sponge Polisher for Car Paint Care..."

I impact the

VOIP Trace - Cover Buffer - Search-Key

```
----- Cover Buffer -----  
Search-key = 9898:4000:9972  
Timestamp = *Aug 26 16:30:59.361  
Buffer-Id = 1  
CallID = 9972  
Peer-CallID = 9973  
Correlator = 3  
Called-Number = 4000  
Calling-Number = 9898  
SIP CallID = 01e60dfa9d8442848336d79e3155a8a1  
SIP Session ID = 87003120822b5dbd8fd80f62d8e57c48  
GUID = 5BB91F5FA6F3
```

```
----- Cover Buffer -----  
Search-key = 9898:4000:9973  
Timestamp = *Aug 26 16:30:59.366  
Buffer-Id = 2  
CallID = 9973  
Peer-CallID = 9972  
Correlator = 3  
Called-Number = 4000  
Calling-Number = 9898  
SIP CallID = 5BBA3059-E6F011EA-A6F9946B-7389E770@10.65.105.50  
SIP Session ID = 4849c736509352fa919b340231ffe741  
GUID = 5BB91F5FA6F3
```

- Search key is added in each cover buffer and for each call leg
- Search key is a combination of **Calling number**, **Called number** and **call-id**

In-leg

Search-key : 9898 : 4000 : 9972

Out-leg

Search-key : 9898 : 4000 : 9973

VOIP Trace - Cover Buffer - Search-Key

- To find a call, search for calling or called number
 - show voip trace cover-buffer | include <calling or called number>
 - show voip trace cover-buffer | section <calling or called number>
- Detailed call information can be filtered further using the call-id from the search-key
 - show voip trace call-id <call-id>

VOIP Trace – Tip!

- Create aliases to make finding and showing calls easier.

```
alias exec fc show voip trace cover-buffer | section  
alias exec sc show voip trace call-id
```

- Usage:
 - To find a call by calling / called number:

```
CUBE#fc 9195551234
```

- To show the call details based on call-id:

```
CUBE#sc 37298
```

VOIP Trace – Show VOIP Trace Statistics

VOIP trace statistics displays extensive information about the status, memory consumption, errored or failure calls, successful calls etc..

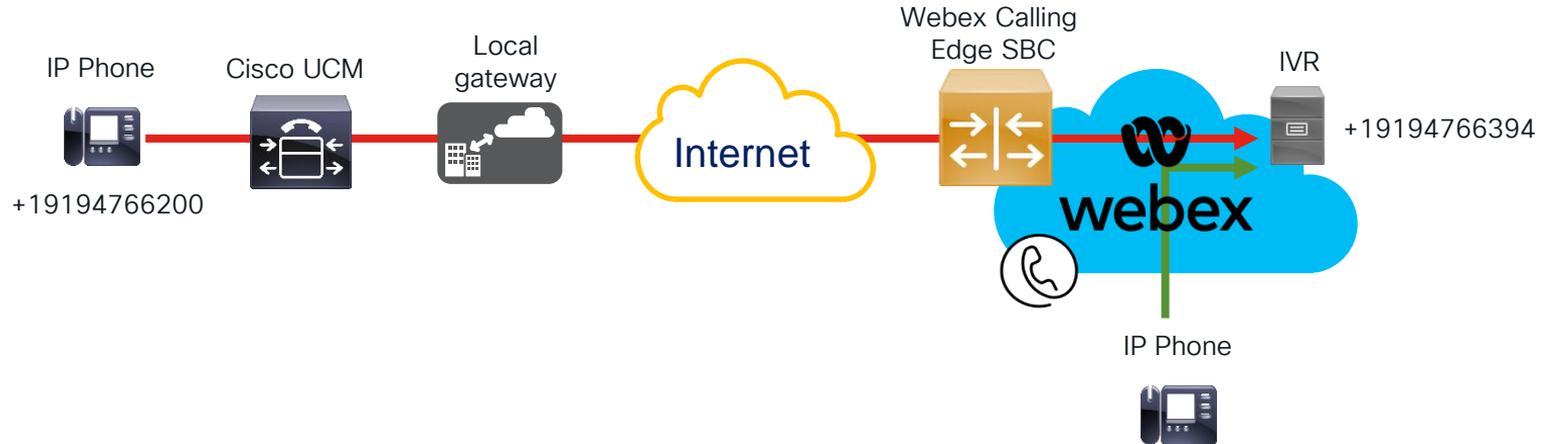
```
Router#show voip trace statistics
```

```
VoIP Trace Statistics
```

```
Tracing status           : ENABLED at *Sep 12 06:44:02.349
Memory limit configured  : 803209216 bytes
Memory consumed          : 254550928 bytes (31%)
Total call legs dumped   : 2
Oldest trace dumped      : *Sep 12 07:29:21.077 Search-key: 9898:30000:64
Latest trace dumped      : *Sep 12 07:29:21.010 Search-key: 9898:30000:63
Total call legs captured : 11858
Total call legs available : 11858
Oldest trace available   : *Sep 12 06:57:23.923, Search-key: 5250001:4720001:11
Latest trace available   : *Sep 13 05:08:25.353, Search-key: 19074502232:30000:13177
Total traces missed      : 0
```

Case Study: Calls not ringing destination

- Scenario: Calling from UCM phone to Webex Calling IVR number
 - User gets ring back continuously - Call is never answered
 - Call from Webex Calling registered phone works



Case Study : Calls not ringing destination

```
CUBE#show voip trace cover-buffers | section \+19194766394
```

```
Search-key      = +19194766200:+19194766394:13542
Timestamp       = *Jun  3 03:10:43.063
Buffer-Id       = 13
CallID          = 13542
Peer-CallID     = 13543
Correlator      = NA
Called-Number   = +19194766394
Calling-Number  = +19194766200
SIP CallID     = cc4e5980-1ee100ed-33f97f9-3b6a12ac@172.18.106.59
SIP Session ID = d443532f00804a2bb4c1dcb68423024d
GUID           = CC4E59800000
Tenant         = 300
Search-key      = +19194766200:+19194766394:13543
Timestamp       = *Jun  3 03:10:43.067
Buffer-Id       = 14
CallID          = 13543
Peer-CallID     = 13542
Correlator      = NA
Called-Number   = +19194766394
Calling-Number  = +19194766200
SIP CallID     = 96A29B58-E22111EC-8290C535-8219C882@64.102.250.135
SIP Session ID = 377caecb00105000a000ac7e8ab6043b
GUID           = CC4E59800000
Tenant         = 200
```

```
CUBE#show voip trace call-id 13542
```



Save output to .txt file

Case Study: Calls not ringing destination

Collaboration Solutions Analyzer - <https://cway.cisco.com/csa/>

1

Log Analyzer

Upload logs from your collaboration devices to automatically detect, troubleshoot and resolve issues.

Upload files

2

Include 'show ver' and 'show run' in the file in addition to traces

3

<input type="checkbox"/>	Filename	Product type
<input type="checkbox"/>	cover buffer test.txt	37 KB CUBE

Run analysis

Upload and analyze files

For Contact Center analysis you can also use [CCSM tool](#).

No files found in the user sandbox. Start by uploading them below.

cover buffer test.txt
35.7 KB

1 Selected (Total: 35.7 KB)

Upload

Delete all

Case Study: Calls not ringing destination

Collaboration Solutions Analyzer - <https://cway.cisco.com/csa/>

Log overview

Calls

🔍 Search

From DN / URI	To DN / URI	CallId	SIP Call-Id	Peer Call-Id	GUID	Call initiated (UTC)	Call end (UTC)	Log Duration (sec)	Disconnect reason
+19194766200	+19194766394	13542	cc4e5980-1ee100ed-33f97f9-3b6a12ac@172.18.106.59	13543	CC4E59800000	2022-06-03 03:10:43	2022-06-03 03:11:04	21 seconds	16
+19194766200	+19194766394	13543	96A29B58-E22111EC-8290C535-8219C882@64.102.250.135	13542	CC4E59800000	2022-06-03 03:10:43	2022-06-03 03:11:04	21 seconds	16

1-2 of 2

Prev

1

Next

Showing

10

Case Study: Calls not ringing destination

SIP - outgoing SIPP menu Ladder tags Use for signaling and ladder

General information

SIP call leg type	Call
From	+19194766200@12013670.us10.bcld.webex.com
To	+19194766394@12013670.us10.bcld.webex.com
Signaling source	64.102.250.135 : 5061
Signaling destination	139.177.65.12 : 8934
Call ID	96A29B58-E22111EC-8290C535-8219C882@64.102.250.135
VRF	Internet
Call leg connects	✘

Dial-peer information

Dial-peer tag	200201
Dial-peer configuration	<pre>description Inbound/Outbound Webex Calling max-conn 250 destination-pattern BAD.BAD session protocol sipv2 session target sip-server destination dpg 300 incoming uri request 200 voice-class codec 99 voice-class stun-usage 200 no voice-class sip localhost voice-class sip tenant 200 dtmf-relay rtp-nte srtp no vad</pre>

i No RTP streams linked for this call leg

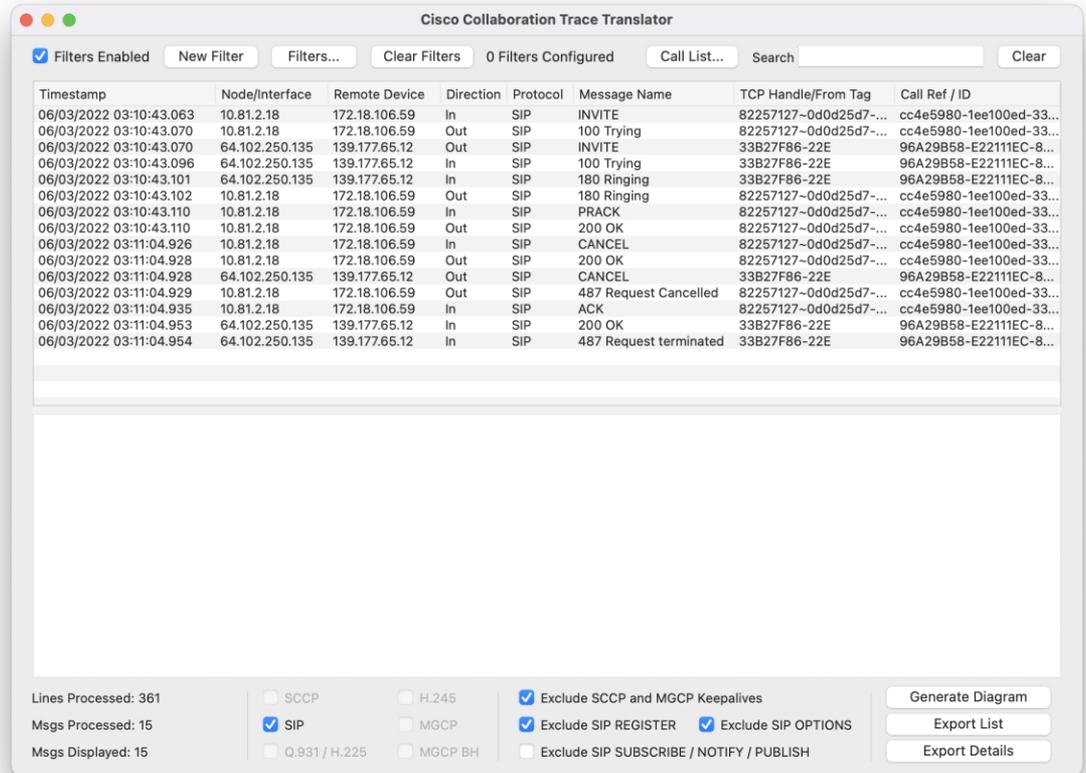
Case Study: Calls not ringing destination



Case Study: Calls not ringing destination

Use TranslatorX – translatorx.org

- Copy Text debug output from CLI and Paste into TranslatorX



The screenshot shows the Cisco Collaboration Trace Translator interface. The main window displays a table of SIP messages. The table has columns for Timestamp, Node/Interface, Remote Device, Direction, Protocol, Message Name, TCP Handle/From Tag, and Call Ref / ID. The messages show a sequence of events: INVITE, 100 Trying, 180 Ringing, PRACK, 200 OK, CANCEL, 200 OK, CANCEL, 487 Request Cancelled, ACK, 200 OK, and 487 Request terminated.

Timestamp	Node/Interface	Remote Device	Direction	Protocol	Message Name	TCP Handle/From Tag	Call Ref / ID
06/03/2022 03:10:43.063	10.81.2.18	172.18.106.59	In	SIP	INVITE	82257127-0d0d25d7-...	cc4e5980-1ee100ed-33...
06/03/2022 03:10:43.070	10.81.2.18	172.18.106.59	Out	SIP	100 Trying	82257127-0d0d25d7-...	cc4e5980-1ee100ed-33...
06/03/2022 03:10:43.070	64.102.250.135	139.177.65.12	Out	SIP	INVITE	33B27F86-22E	96A29B58-E2211EC-8...
06/03/2022 03:10:43.096	64.102.250.135	139.177.65.12	In	SIP	100 Trying	33B27F86-22E	96A29B58-E2211EC-8...
06/03/2022 03:10:43.101	64.102.250.135	139.177.65.12	In	SIP	180 Ringing	33B27F86-22E	96A29B58-E2211EC-8...
06/03/2022 03:10:43.102	10.81.2.18	172.18.106.59	Out	SIP	180 Ringing	82257127-0d0d25d7-...	cc4e5980-1ee100ed-33...
06/03/2022 03:10:43.110	10.81.2.18	172.18.106.59	In	SIP	PRACK	82257127-0d0d25d7-...	cc4e5980-1ee100ed-33...
06/03/2022 03:10:43.110	10.81.2.18	172.18.106.59	Out	SIP	200 OK	82257127-0d0d25d7-...	cc4e5980-1ee100ed-33...
06/03/2022 03:11:04.926	10.81.2.18	172.18.106.59	In	SIP	CANCEL	82257127-0d0d25d7-...	cc4e5980-1ee100ed-33...
06/03/2022 03:11:04.928	10.81.2.18	172.18.106.59	Out	SIP	200 OK	82257127-0d0d25d7-...	cc4e5980-1ee100ed-33...
06/03/2022 03:11:04.928	64.102.250.135	139.177.65.12	Out	SIP	CANCEL	33B27F86-22E	96A29B58-E2211EC-8...
06/03/2022 03:11:04.929	10.81.2.18	172.18.106.59	Out	SIP	487 Request Cancelled	82257127-0d0d25d7-...	cc4e5980-1ee100ed-33...
06/03/2022 03:11:04.935	10.81.2.18	172.18.106.59	In	SIP	ACK	82257127-0d0d25d7-...	cc4e5980-1ee100ed-33...
06/03/2022 03:11:04.953	64.102.250.135	139.177.65.12	In	SIP	200 OK	33B27F86-22E	96A29B58-E2211EC-8...
06/03/2022 03:11:04.954	64.102.250.135	139.177.65.12	In	SIP	487 Request terminated	33B27F86-22E	96A29B58-E2211EC-8...

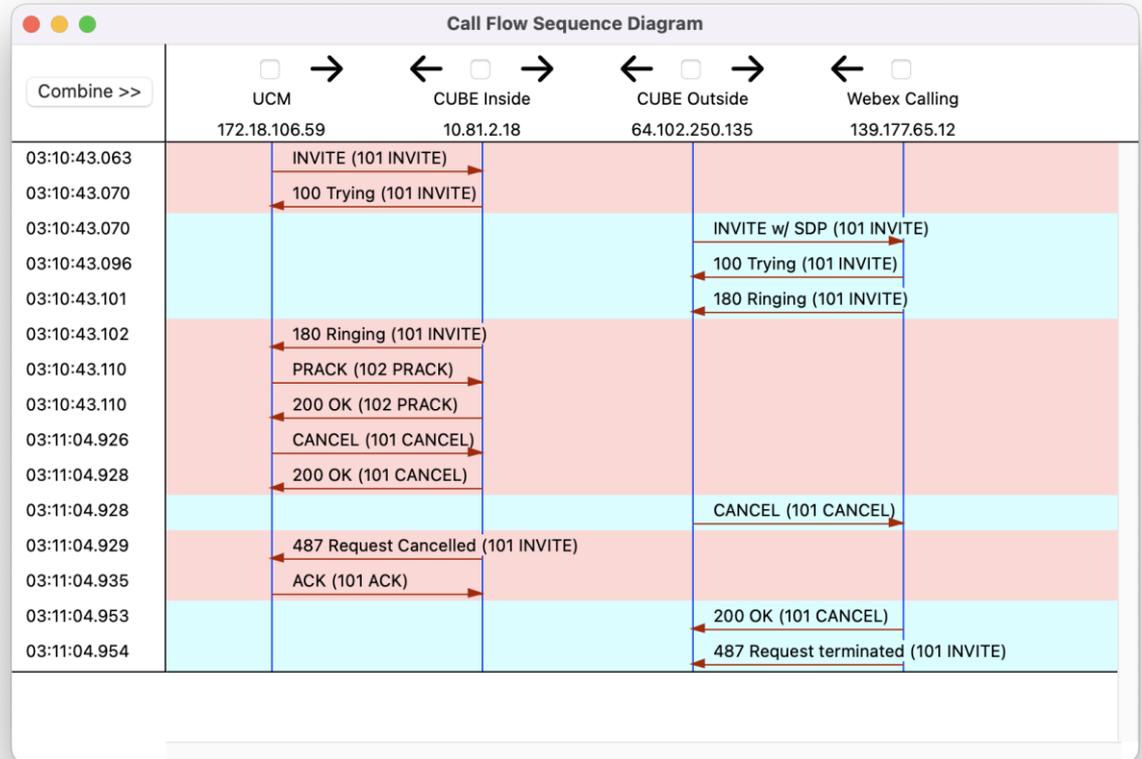
At the bottom of the interface, there are statistics and filtering options:

- Lines Processed: 361
- Msgs Processed: 15
- Msgs Displayed: 15
- Filtering options: SCCP, H.245, Exclude SCCP and MGCP Keepalives, SIP, MGCP, Exclude SIP REGISTER, Exclude SIP OPTIONS, Q.931 / H.225, MGCP BH, Exclude SIP SUBSCRIBE / NOTIFY / PUBLISH
- Buttons: Generate Diagram, Export List, Export Details

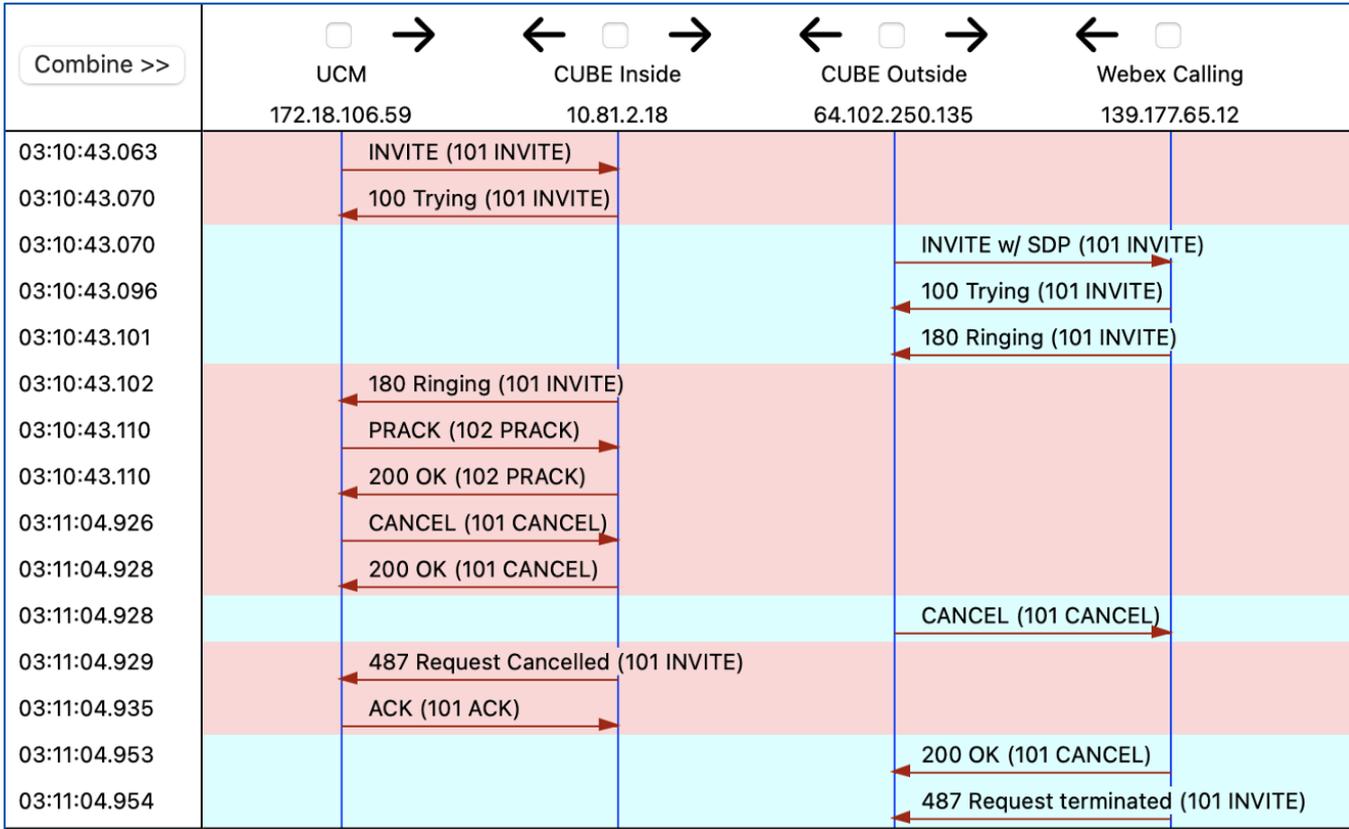
Case Study : Calls not ringing destination

Use TranslatorX – translatorx.org

- Click “Generate Diagram” button



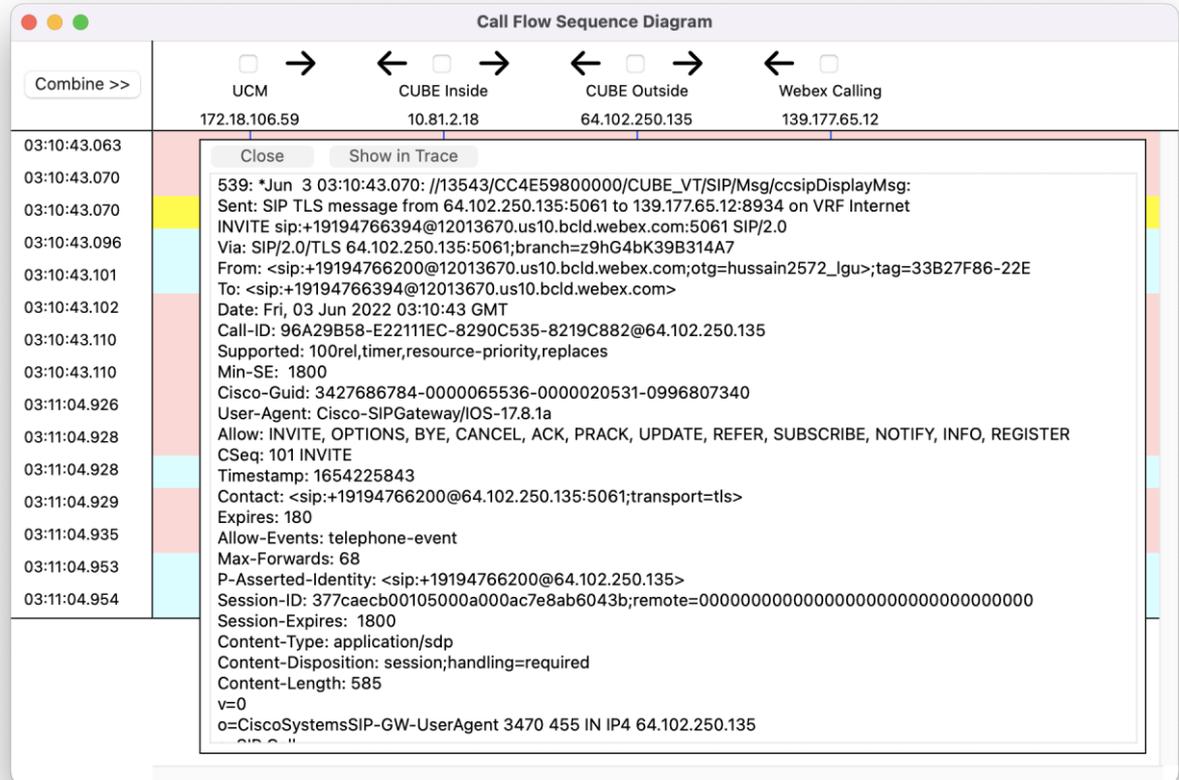
Case Study : Calls not ringing destination



Case Study: Calls not ringing destination

Use TranslatorX – translatorx.org

- Click on outbound INVITE to Webex Calling



Case Study: Calls not ringing destination

Use TranslatorX – translatorx.org

- Examine 180 Ringing coming from Webex Calling

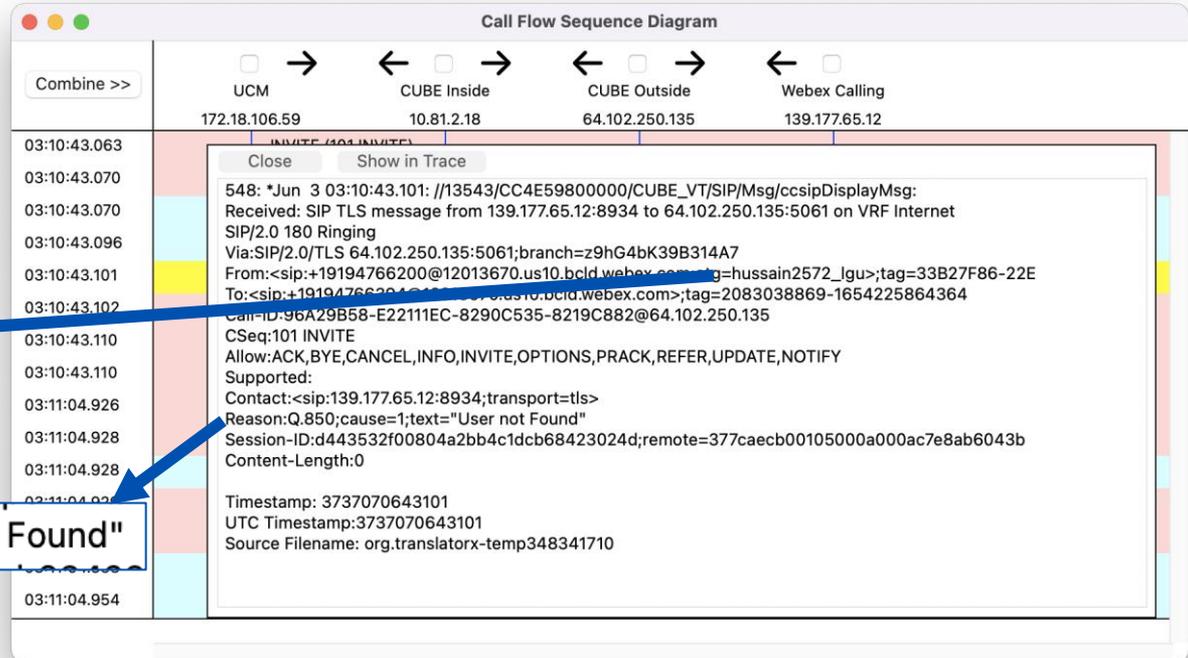
The screenshot displays a 'Call Flow Sequence Diagram' with four participants: UCM (172.18.106.59), CUBE Inside (10.81.2.18), CUBE Outside (64.102.250.135), and Webex Calling (139.177.65.12). A timeline on the left shows timestamps from 03:10:43.063 to 03:11:04.954. A detailed SIP message log is shown, including headers like 'Via: SIP/2.0/TLS 64.102.250.135:5061;branch=z9hG4bK39B314A7' and 'To: <sip:+19194766394@12013670.us10.bcld.webex.com>;tag=2083038869-1654225864364'. The 'Reason' header is highlighted with a blue box and a blue arrow pointing to it: 'Reason:Q.850;cause=1;text="User not Found"'. Other headers include 'Content-Length:0', 'Timestamp: 3737070643101', and 'Source Filename: org.translatorx-temp348341710'.

Reason:Q.850;cause=1;text="User not Found"

Case Study: Calls not ringing destination

Use TranslatorX – translatorx.org

- Examine 180 Ringing coming from Webex Calling



...;otg=hussain2572_lgu>

Reason:Q.850;cause=1;text="User not Found"

Case Study: Calls not ringing destination

```
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=hussain2572_lgu>"
rule 30 request ANY sip-header P-Asserted-Identity modify "sips:(.*)" "sip:\1"
```

svs-rtp-dmz-cube8a

Trunk > Details

Status
● Online

Registrar Domain
12013670.us10.bclid.webex.com

Trunk Group OTG/DTG
svs-rtp-dmz-cube8a2637_lgu

Case Study: Calls not ringing destination

```
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=svs-rtp-dmz-cube8a2637_lgu>"
rule 30 request ANY sip-header P-Asserted-Identity modify "sips:(.*)" "sip:\1"
```

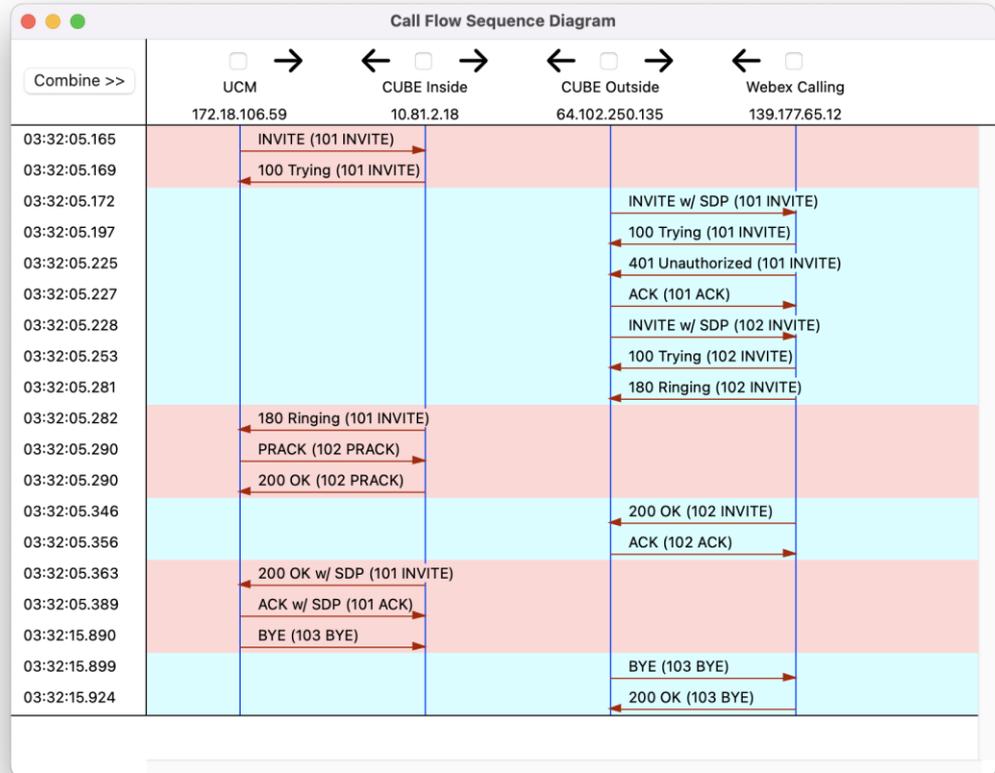


The screenshot shows a configuration page for a trunk group named 'svs-rtp-dmz-cube8a'. The page has a breadcrumb trail 'Trunk > Details'. The status is 'Online' with a green dot. The Registrar Domain is '12013670.us10.bclid.webex.com'. A blue box highlights the 'Trunk Group OTG/DTG' section, which contains the value 'svs-rtp-dmz-cube8a2637_lgu'.

Case Study: Calls not ringing destination

Use TranslatorX – translatorx.org

- After fixing the otg configuration in the SIP profile



CUBE not responding to OPTIONS

CUBE#**debug ccsip all**

*Jun 3 01:58:05.255: //-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:

Received:

OPTIONS sip:64.102.250.135:5061;transport=tls SIP/2.0

Via:SIP/2.0/TLS 139.177.65.12:8934;branch=z9hG4bKBroadworksSSE.-64.102.250.135V11176-0-100-1997318647-1654221506418-

From:<sip:139.177.65.12>;tag=1997318647-1654221506418-

To:<sip:64.102.250.135>

Call-ID:SSE015826418030622-1947046482@139.177.65.12

CSeq:100 OPTIONS

Max-Forwards:0

Content-Length:0

*Jun 3 01:58:05.255: //-1/xxxxxxxxxxxx/SIP/Info/verbose/4096/ccsip_new_msg_preprocessor: Checking Invite Dialog

*Jun 3 01:58:05.260: //-1/xxxxxxxxxxxx/SIP/Info/verbose/8192/sipSPIIpTrustSilentDiscard: sipSPIIpTrustSilentDiscard: called for method [101]

*Jun 3 01:58:05.260: //-1/xxxxxxxxxxxx/SIP/Info/info/8192/sipSPIIpTrustSilentDiscard: Message from untrusted ip address. Silently discard

CUBE not responding to OPTIONS

```
voice service voip
ip address trusted list
ipv4 172.18.106.0 255.255.255.0
ipv4 139.177.72.0 255.255.254.0
ipv4 23.89.1.128 255.255.255.128
ipv4 23.89.33.0 255.255.255.0
ipv4 23.89.40.0 255.255.255.128
ipv4 23.89.76.128 255.255.255.128
ipv4 52.26.82.0 255.255.255.0
ipv4 85.119.56.0 255.255.254.0
ipv4 128.177.14.0 255.255.255.0
ipv4 128.177.36.0 255.255.255.0
ipv4 135.84.168.0 255.255.248.0
ipv4 139.177.64.0 255.255.248.0
ipv4 150.253.209.128 255.255.255.128
ipv4 170.72.0.128 255.255.255.128
ipv4 170.72.17.128 255.255.255.128
ipv4 170.72.29.0 255.255.255.0
ipv4 170.72.82.0 255.255.255.128
ipv4 185.115.196.0 255.255.252.0
ipv4 199.19.196.0 255.255.254.0
ipv4 199.19.199.0 255.255.255.0
ipv4 199.59.64.0 255.255.248.0
```

IP Subnets for Webex Calling Services

23.89.1.128/25	23.89.33.0/24	23.89.40.0/25
23.89.76.128/25	52.26.82.54/24	85.119.56.0/23
128.177.14.0/24	128.177.36.0/24	135.84.168.0/21
139.177.64.0/21	139.177.72.0/23	150.253.209.128/25
170.72.0.128/25	170.72.17.128/25	170.72.29.0/24
170.72.82.0/25	185.115.196.0/22	199.19.196.0/23
199.19.199.0/24	199.59.64.0/21	

<https://help.webex.com/en-us/article/b2exve/Port-Reference-Information-for-Cisco-Webex-Calling>



Troubleshooting from Webex Control Hub

webex Control Hub

Search

99 ?

Overview
Alerts center

Troubleshooting

Meetings & Calls | Live Meetings | Status | Video Mesh | Admin Activities | Connected UC | Logs >>

Q +19199940111 x | 1 Calls

Last 7 Days | 5/30/2023 → 6/05/2023 | (GMT -07:00) America/Los_A... v

+19199940111

Qua...	Ser...	Start Time	Meeting / ...	Name	Host / Caller	Part...	Durati...	Site / ...	Conference / Call ID
Good		2023-06-05 09:5...	+19199940111	Paul Giralt → 800800...	Paul Giralt	2	00:28	VNT ...	SSE1657560680506...

Troubleshooting from Webex Control Hub

webex Control Hub

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?

- [Overview](#)
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- [Workspaces](#)
- [Devices](#)
- [Apps](#)
- [Account](#)
- [Organization Settings](#)
- SERVICES**
- [Updates & Migrations](#)

Meetings & Calls > Paul Giralt → +18008001180
Actions

💡 **1 insight found** [Click here for more details.](#)

ICE
Path Optimization by ICE did not occur as the round trip time on the default path via cloud was the same or better than any optimized path.

Hop Detail

Paul Giralt	Metric	+18008001180
Webex App (Mac)	Endpoint	CUBE
-/43.7.0.26331	Hardware/Version	IOS/17.9.2a
VNT Alpha RTP	Location	VNT Alpha RTP
-	MAC address	-
10.5.226.115	Local IP	-
136.179.21.69	Public IP	64.102.250.135
Las Vegas, NV, US	Geolocation	Raleigh, NC, US
switch ltd	ISP	cisco systems inc.
Wi-Fi	Connection	-
PCMU	Audio Codec	-
pgiralt@cisco.com	Email ID	-
SSE165756068050623496614208@10.71...	Call ID	BW165756192050623893152344@10.21...

Call Details

Calling Date: 06/05/2023
 Calling Time: 09:57 am - 09:58 am (28 seconds)
 (GMT -07:00)
 America/Los_Angeles

Session Type: Webex Call
 Participants: 2
 Caller Name: Paul Giralt
 Caller Number: +19199940111
 Audio: VoIP
 Video: No
 Path Optimization: No Optimization
 Calling Type: Toll Free
 Call Ended by: Paul Giralt
 Dialed Digits: 8008001180

Chart Legend

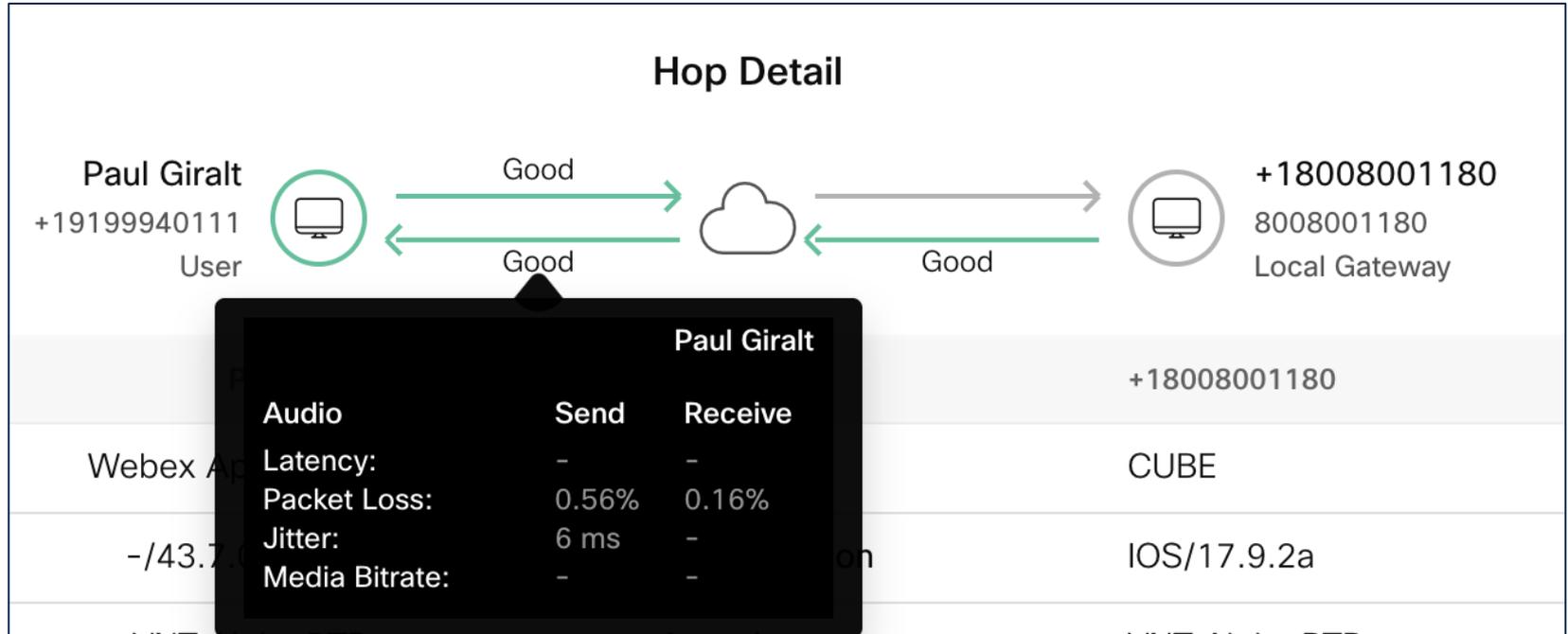
Signal Quality ○
— Good
— Poor
— Not Available

BRKCOL-2812

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Troubleshooting from Webex Control Hub



1 insight found [Click here for more details.](#)

ICE Path Optimization by ICE did not occur as the round trip time on the default path via cloud was the same or better than any optimized path.

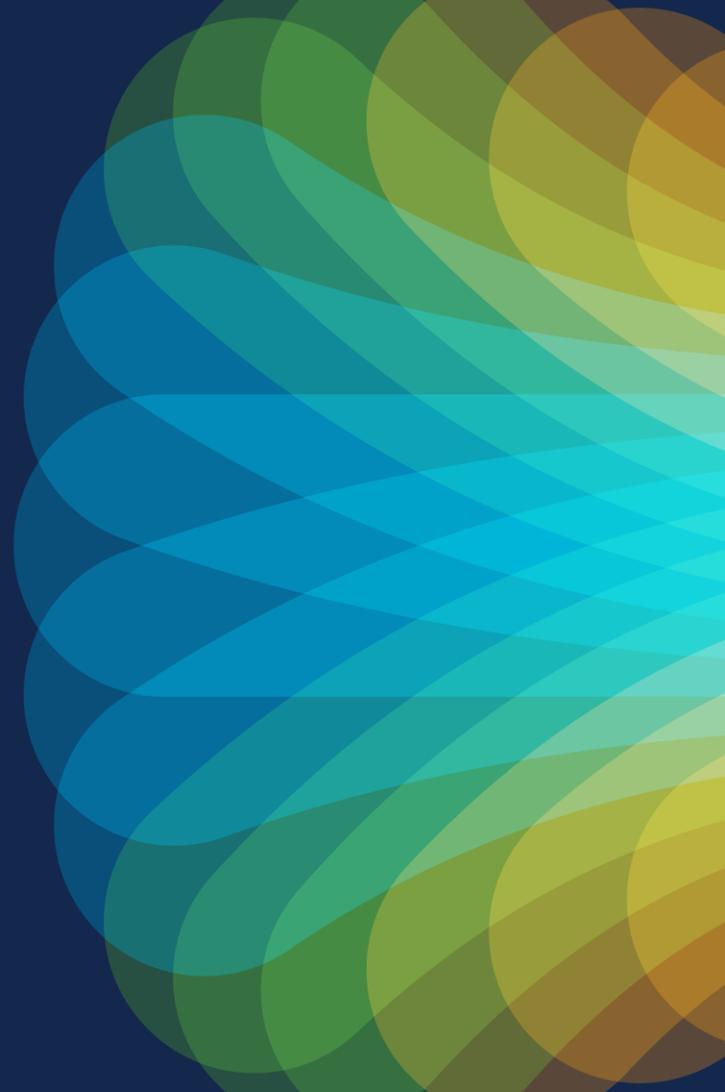
Local Gateway Troubleshooting Demo



The bridge to possible

Thank you

CISCO *Live!*



The Cisco Live! logo features the word "CISCO" in a bold, black, sans-serif font, followed by "Live!" in a black, cursive script font. The background of the entire image is a vibrant, multi-colored abstract pattern of overlapping, wavy bands in shades of red, orange, yellow, green, and blue, creating a sense of motion and energy.

CISCO *Live!*

Let's go