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Introduction

This document describes how to configure the Cisco Unified Border Element (CUBE) as a phone proxy so the phone can register to the Cisco Unified Communications Manager (CUCM) from a public network. The communication between the phone and the CUBE is secure in this deployment.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

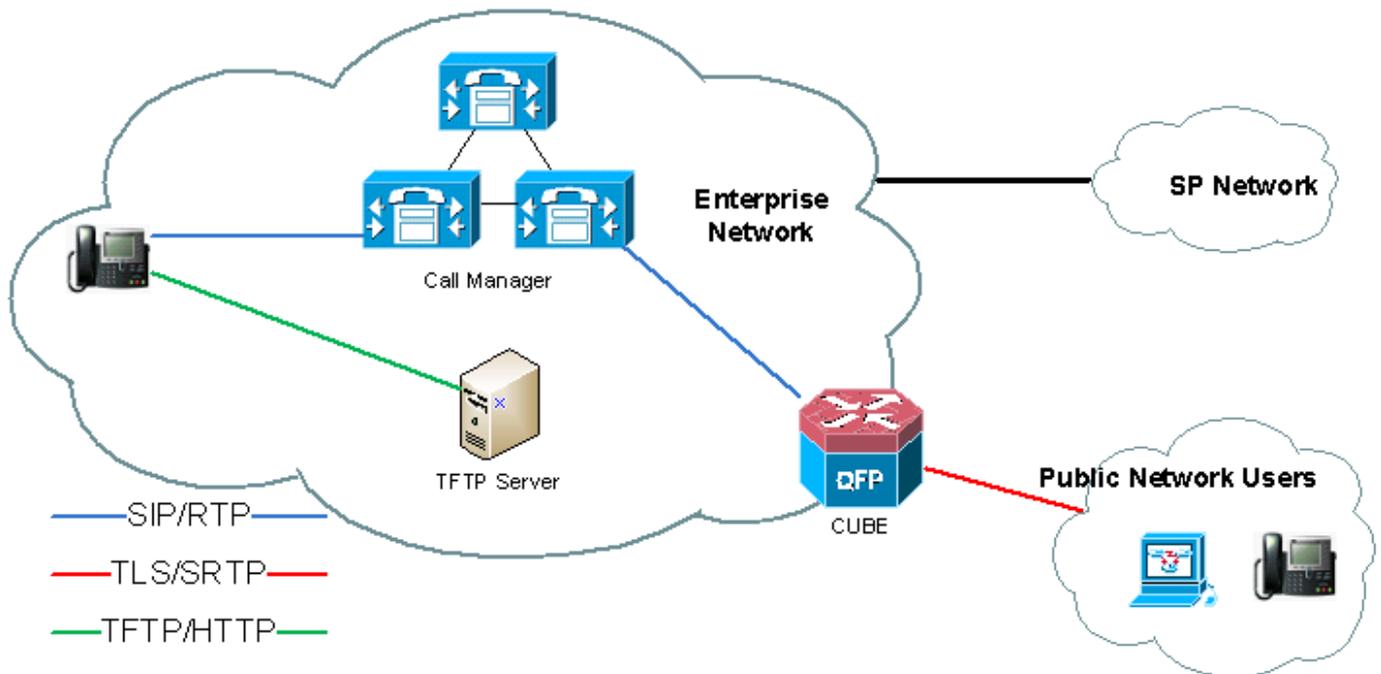
- Certificate management on CUCM and CUBE

Components Used

- CUBE running Cisco IOS version 15.3 or 15.4
- CUCM
- IP Phone in the public network

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Network Diagram



Legend:

Phone -----(DP1) CUBE (DP2) ----- CUCM
 ACCESS-CUBE-IP-ADDR CORE-CUBE-IP-ADDR CUCM-IP-ADDR

DP1 - Dial-peer 1 which is facing the internet/public network

DP2 - Dial-peer 2 which is facing the internal network, i.e. CUCM

IP Addresses used in this document:

ACCESS-CUBE-IP-ADDR - 172.18.110.120 (the interface the remote IP phones will connect to)
 CORE-CUBE-IP-ADDR - 10.50.209.100 (the internal address CUBE uses to connect to CUCM)
 CUCM-IP-ADDR - 10.50.209.215 (CUCM server IP address)

Known issues with CUBE Phone Proxy deployments

- [CSCup83118](#) : KPML dialing fails for CUCM Lineside SIP phones.
 Solution: This is fixed in Cisco IOS versions 15.3(3)M6, 15.4(3)M1 and 15.4(3)S1.
- [CSCup85001](#) : CUCM Lineside features needs to support hostnames for CUCM cluster.
 Solution: This is fixed in Cisco IOS versions 15.4(3)M1 and 15.4(3)S1.
- [CSCun86062](#) : TS:SS:XE3.13: CUBE phone-proxy does not follow PKCS1 form CTL signature
 Solution: This is fixed in Cisco IOS versions 15.3(3)M4, 15.3(3)S4 and 15.4(3)M1.

Note: Certain phones like 78XX/88XX phones will only work in non-secure mode (TCP only)

Note: CUCM cannot have a SIP trunk pointing to the core-address on the CUBE.
Registrations will be rejected with the error code 405 from CUCM, with Warning: 399 cucm9 SIP trunk disallows REGISTER.

Configure

Note: The configuration differs between Cisco IOS versions 15.3 and 15.4. There are specific sections for each IOS version. However, there is a common configuration set as well for both IOS versions, which are covered first.

Common Configuration

1. Create a selfsigned certificate on CUBE.

Note: CUBE Phone Proxy only supports 1024 bit encryption. No other encryption size has been tested to work.

2. Import the CUCM identity and the Manufacturing_CA certificate to the CUBE.

Use the callmanager.pem file for this step.

In CUCM, navigate to **Cisco Unified OS Administration > Security > Certificate Management**. Copy & paste the CallManager.pem to notepad.

On the CUBE, add the trustpoint and import the certificate by using the terminal.

3. Perform the same procedure elucidated in Step 2 for the Cisco_Manufacturing_CA certificate.

Configure Cisco IOS version 15.3

1. Create the CTL file.
2. Add the Cube Service, Call Flow, Header Passing and Message manipulation configuration (SIP Profiles).
3. Create the Phone Proxy.
4. Create the Access and Core dialpeers.

Complete working configuration for Cisco IOS version 15.3

Configure Cisco IOS version 15.4

Note: The configuration is different depending on the version of the Cisco IOS running on the CUBE. On IOS 15.3, the sip-profiles have to be configured and on IOS version 15.4, the **extension cucm** command has to be input. This command automatically builds the sip-profiles for the CUBE without having them in the running configuration.

1. Create the CTL file.
2. Add the Cube Service, Call Flow and Message manipulation configuration.
3. Create the Phone Proxy.
4. Create the Access and Core dialpeers.

Complete working configuration for Cisco IOS version 15.4

Troubleshoot

Debugs required:

Phone Proxy

```
debug voice phone-proxy detail
debug voice phone-proxy all
```

SIP

```
debug ccsip message
```

Crypto and SSL debugs for certificate issues

Caution: Do not enable the TCP debugs when the router has a lot of traffic going through it.

```
debug ip tcp packet
debug ip tcp transactions
```

```
debug ssl openssl errors
debug ssl openssl msg
debug ssl openssl ext>
debug ssl openssl states
```

```
debug crypto pki api
debug crypto pki callbacks
debug crypto pki messages
debug crypto pki scep
debug crypto pki server
debug crypto pki transactions
debug crypto pki validation
```

Show commands

show sip registration passthrough status

Additional Troubleshooting Notes

Modifying the CTL file

In order to make changes to CTL files, first unlink the Phone Proxy feature.

Note: Whenever the CTL file is modified, the CTL files previously installed to all phones must be deleted.

IP Address 0.0.0.0

It is possible that the phone proxy debugs show that the address-rewrite is adding 0.0.0.0. If this happens, check the CUCM cluster to make sure that it is using IP addresses instead of hostnames.

Non-working snippet:

Working snippet:

CUCM Throws Error 405

While debugging SIP registrations, CUCM can reject the phone's registration with the following error:

The issue is that the registrations are trying to use an IP address that CUCM has assigned to a SIP trunk. To resolve the issue delete the SIP trunk in CUCM or change the IP address used in CUBE call routing for that SIP trunk in CUCM.