Introduction

This document describes general information to collect for Cisco IP Phones that experience registration issues when integrated with Cisco Unified Communications Manager (CUCM). This document does not explain steps to troubleshoot specific issues.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Internet Protocol (IP)
- Voice Over Internet Protocol (VOIP) signaling protocols
- The registration process for Cisco IP Phones

NOTE: The IP Phone, SCCP & SIP Phone Registration Process with CUCM is a great document to review.

Components Used

This document is not restricted to specific software and hardware versions.

Important Questions

- For phones that show unregistered, are they able to make and receive calls? If yes, check the
registration status from the webpage of the other CUCM nodes and check the status of the phone in RIS DC.

**NOTE:** If the phones are able to make and receive calls use the command below on each node to see the status of the phone in RIS DC.

```
show risdb query phone
```

If the issue deemed to be a false status of unregistered, restart the RIS DC service. Due to the architecture of the RIS DC it may be necessary to restart the CallManager service as well.

- How many phones are impacted and what is the total number of phones?
- If only a subset of phones are affected, what do they have in common (i.e. model, protocol, firmware version, on the same switch/blade, at the same site…)?
- Does the phone have a shared line?
- Are the phones connected to the network with a Virtual Private Network (VPN)?
- Does the issue happen at the same time of day each time it happens?
- Are any security checks performed in the network (i.e. port scanners)?
- Do you have any firewalls between the phone and the CUCM?
- Are you doing SIP inspection on any devices in the path between the phone and the CUCM?
- How many phones are in the same subnet and how many IP addresses are available for lease to that subnet?
- Are configured to use Session Initiation Protocol (SIP) over Transmission Control Protocol (TCP) or User Datagram Protocol (UDP)?
- Are the phones using a secure or non-secure Device Security Profile? If the phones have a secure profile, did they have an Locally Significant Certificate (LSC) installed before applying the secure profile to the phone’s configuration?

**NOTE:** Phones will not register if they are using a secure Decive Security Profile without an LSC installed. Refer to the CUCM Generating LSC Certificates for Secure Phones document for more information.

- Is anyone logged into the problem phone(s) via extension mobility? If yes, does the protocol (SCCP/SIP) of the device profile match that of the phone and does the same behavior exist after logging out?
- Did anything change? Anything at all, regardless of how significant the change might be and regardless of what the change was. Any and all new changes (new configurations, new software, new hardware) should be acknowledged.

**Data From The phone**
• Document the message on the phone’s screen when the issue occurs. It is typical for a message to be displayed on the phone's screen so be sure to check this.

• Check to see if the phone has an LSC installed as this is required if the customer is using a secure Device Security Profile

79XX

Press the settings button on the phone > push keypad button number 4 > push keypad button number 4 again > document whether the LSC says installed or not installed

78XX / 88XX / 99XX

Press the settings button on the phone > select Admin Settings > push keypad button number 2 > document whether the LSC says installed or not installed

- Get a packet capture (pcap) from the phone

  TIP: Much of the information below this point requires web access to be enabled on the phone. Even if a phone isn’t registered it may be possible to modify the settings on the phone so enable webaccess, span to pc port, and SSH Access then attempt to access the web page.

  NOTE: Check the Expires field in the SIP register message found in the pcap if the phones are using SIP.

  The default value for the Expires field when the REGISTER message is sent from the phone to the primary CallManager is 120 seconds. When the phone is sending a REGISTER message, known as a "keep alive" message, to it's secondary CallManager server the expires field is 0.

• Document the debug messages on the phone

• Check for cores on the phone and download them if they are there. Be sure to also gather the output of show show core-dump from the CLI of the phone if cores were found on the web interface of the phone.

  NOTE: As of November 9th, 2016 only the phone developers have access to the tool for reviewing phone core files. If further analysis of the core is needed, open a Technical Assistance Center (TAC) case in order to engage the phone developers.

• Gather the CDP Neighbor information from the Network page located in the Network statistics section
• Get the console logs from the phone. If the phone supports the Problem Report Tool (PRT) feature it is recommended to use the PRT.

NOTE: This support forum document displays how to use strace to print the debugs to the terminal; however, you may need to use show strace. Some phones use sdump instead of strace or show strace.

strace or sdump commands are like typing terminal monitor on a Cisco router.

TIP: It is best to gather the console logs from the Command Line Interface (CLI) of the phone as many phones have limited space and their logs are overwritten quickly.

If the phone has an auxiliary port, plug a console cable into the phone for capturing debugs even if the phone reboots.

TIP: It is best to log your terminal session to a text file. Here is how to do log to a text file with putty and here is how to do it with SecureCRT.

**Data From The Switch**

The phone accesses the network via a switch. Identify the switch the phone is attached to and gather the data listed below.

• Gather running configuration using show run

• Gather show proc cpu hist

• Gather the output of show log
Data From The CUCM

- Get the directory number (DN) of the phone.
  
  **NOTE**: If there is no DN and the phone uses the Session Initiation Protocol (SIP), the phone will not register.

- **Get the phone’s configuration file**

- **Get pcaps from the CUCM servers**

- Use the Real Time Monitoring Tool (RTMT) to collect logs and the pcap from the CUCM servers. Be sure to select all servers when collecting the logs.

  **TIP**: Depending on the environment/symptoms you may want to collect some or all of the following log types:


- Gather the output of **show itl** and **show ctl** from all TFTP servers in the CUCM cluster.

- Gather the output of these commands from the CUCM publisher:
  Determine if the cluster is in mixed-mode:

  ```sql
  run sql select paramname,paramvalue from processconfig where paramname='ClusterSecurityMode'
  ```

  Determine if the rollback parameter is set to true:

  ```sql
  run sql select paramname,paramvalue from processconfig where paramname='RollBackToPreGrayback'
  ```

  Determine if database replication is healthy:

  ```bash
  utils dbreplication runtimestate
  ```

  **NOTE**: If the cluster is not in mixed-mode, the output will look like this:

  ```bash
  admin:run sql select paramname,paramvalue from processconfig where paramname='ClusterSecurityMode'
  paramname paramvalue
  =============== ===========
  ClusterSecurityMode 0
  ```

  **NOTE**: If the rollback parameter is set to false, the output will look like this:

  ```bash
  admin:run sql select paramname,paramvalue from processconfig where paramname='RollBackToPreGrayback'
  paramname paramvalue
  ```
Review The Phone Logs

- Search the phone logs for these strings:
  - Fail
  - Err
  - Error
  - Exception
  - newUnregReason=
  - Lastoutofservice
  - Fallback
  - socket error=
  - opvvlan
  - JAVA-sipio-
  - REGISTERED
  - Network_detect_change_task
  - tftpAddr1=
  - Locked out:
  - VPN.: (NOTE: Make sure you are searching with regex for this one or the "." will be analyzed as a literal instead of a special character)

Review The CUCM Logs

Search the CUCM logs for the following:

- The MAC address of the phone
- The IP address of the phone

TIP: If you see error messages the explanation of the reason codes may be in the Error and System Messages Documents.

Additional Links

Endpoints FAQ

Security By Default

Cisco IP Phone Firmware Support Policy

Search the Cisco Live repository
Logs and PCAP For Practical Application

I already registered some phones and collected the logs/pcaps. To review the files click here.