



Integrating Skype for SIP with UC500

Version 1.1

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1 Overview

1.1 Introduction

This application note goes over setting up the Skype for SIP beta service on the Cisco UC500.

NOTE: The Skype for SIP service is still in beta, it should NOT be used as the primary interface for PSTN access on the UC500. Further information on UC500 SIP Trunking is available at:

<https://www.myciscocommunity.com/servlet/JiveServlet/previewBody/1559-102-2-3949/SBCS-SIPTrunk-Wiki-012009.pdf>

1.2 Scope

This document is only focused on the Skype for SIP configuration on UC500 via Cisco Configuration Assistant (CCA). It does NOT go over configuration for all other features on the UC500. It is assumed that the user has training and/or experience with the Cisco UC500 and CCA solution. For additional information, please click on the below:

- [CCA](#)
- [UC500](#)

1.3 Revision Control

Release	Release Date	Changes to this Version
1.0	09/28/09	First draft

1.4 Restrictions

- Skype for SIP cannot be used on a UC500 that is already using SIP trunking to another service provider at this time
- Skype for SIP only supports voice calls to and from the PSTN (based on SkypeIn / SkypeOut) or to and from Skype clients to the UC500, other types of calls such as fax, modem or video are not supported at this time.
- Skype for SIP does not support emergency number calling at this time

2 UC500 Overview

2.1 Product Description

Cisco's UC500 is a purpose built appliance for small business solutions that provides IP PBX, voicemail, switching, VPN, firewall & optional wireless functionality. Further information is available at:

<http://www.cisco.com/go/uc500>

2.2 Securing the UC500

The recommendation is to ensure that the firewall is enabled on the UC500 and access passwords are changed from the default to something more secure using the CCA tool. In addition, CCA provides voice security & toll fraud prevention, at multiple levels as below:

1. Inbound SIP messages are only allowed from IP address or host names of the SIP proxy or registrar servers configured on the SIP Trunk page on CCA. With CCA 2.1, there is an option to add additional IP addresses based on the customer need by going to Configure > Voice > Trunks > SIP Trunk > Advanced.
2. Inbound calls only work to the predefined DID's or external numbers configured using inbound dialplan on CCA, SIP calls to any numbers not defined in the dialplan from the internet will fail.
3. Pre defined Class of Restriction (COR) to enable access control for different classes of users. International number dialing, for example, may be restricted to specific phones.

It is strongly recommended that the UC500 be configured using CCA 2.1 release for this deployment.

2.3 Quality of Service (QoS)

QoS is extremely important when deploying Skype for SIP from the UC500 as there are multiple aspects to consider:

1. Customer LAN
If using SBCS solution components such as Cisco IP Phones, ESW 500 switches and the UC500 – the LAN QoS is automatically enabled using Cisco smart defaults and CCA
2. UC500 WAN interface
With CCA 2.1, you can enable QoS on the WAN interface of the UC500 to prioritize SIP Trunk traffic over data and shape the traffic to the upstream bandwidth on the internet link.
3. Internet connection
QoS on the Internet connection or the WAN link depends on the SLA with the ISP.
Note: without QoS guarantees, voice quality may not always be optimal.

3 Requirements

3.1 Hardware Requirements

The hardware list includes a UC500, required Cisco IP phones, and any other components from the SBCS solution such as switches, access points etc.

3.2 Skype for SIP account

You will need a Skype for SIP account to make / receive calls. If you do not have a beta account – please visit the Skype for SIP website below to request one:

<http://www.skype.com/business/products/pbx-systems/sip/>

Also note that you will have to create a Skype account, buy DID numbers (SkypeIn) and also Skype credits to call out to the PSTN (SkypeOut) using the Business Control Panel (BCP). For any Skype account information, please refer to the support instructions on the Skype website.

3.3 Software Requirements

Below are the software requirements for this setup (Click on link to download software)

Software	Versions
UC500 Software Pack	7.0(3)
CCA Release (Click on Download Software)	2.1
Skype for SIP CCA XML template	2.0

4 Configuration

The UC500 must be configured with the Cisco Configuration Assistant (CCA 2.1 release).

4.1 Physical Setup

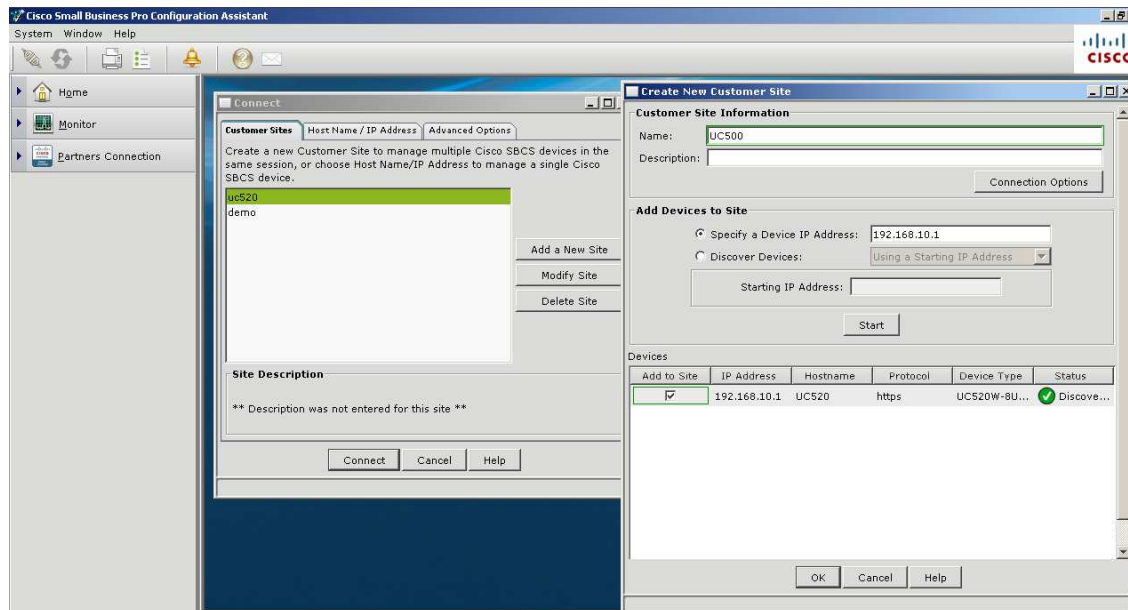
Please refer to the “Getting Started Guide” for instructions about physically connecting the devices in an SBCS solution.

http://www.cisco.com/en/US/docs/net_mgmt/cisco_configuration_assistant/version2.0/quick/guide/English/ccags.html

4.2 Launch CCA

Launch the CCA tool from a PC connected to the UC500. The Connect screen will be displayed. Select *Add a New site*, then enter the *Name & Device IP address* (UC500 IP address) and *Start* the configuration process. Once the UC500 is discovered hit *Ok* and then *Connect*.

Figure 4.2 Initial Launch and Connect Screen



4.3 Telephony Setup Wizard (TSW)

As of CCA version 2.0, when a UC500 is in its default configuration, CCA will attempt to run the “Telephony Setup Wizard”. The Wizard does not support configuration of SIP Trunks but its recommended you use the wizard to configure the below:

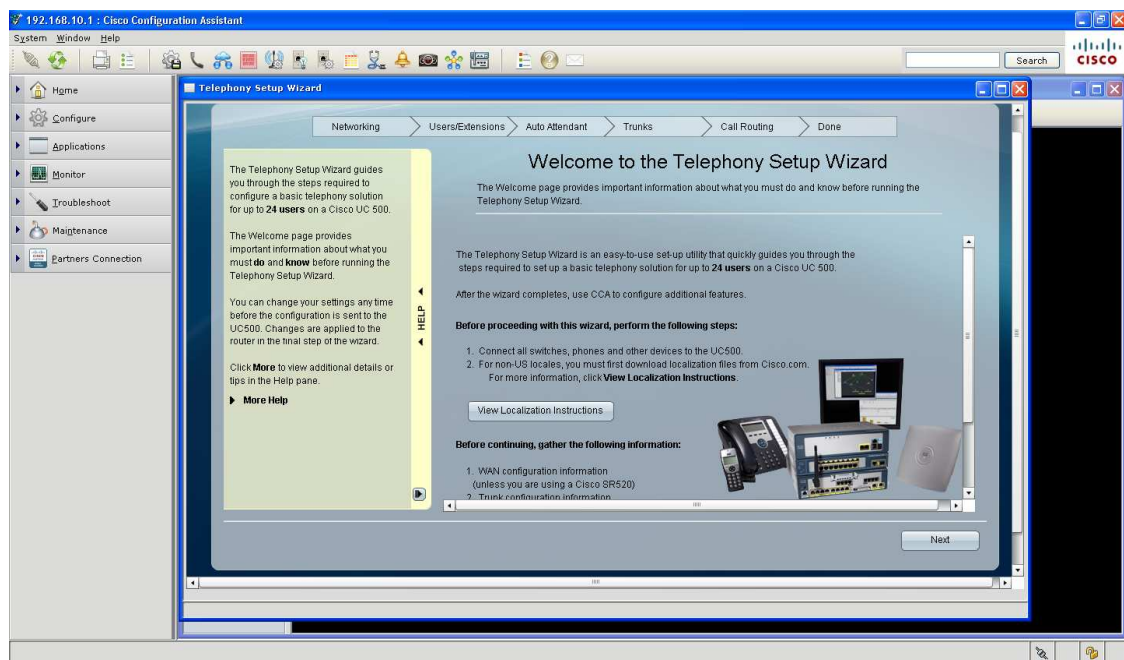
- System settings such as timezone, WAN connection, LAN subnets (for voice & data)
- Internal phone system dial plan (users, phones, extensions, hunt groups, voicemail & autoattendant pilots.
- Autoattendant configuration
- Analog, BRI or T1 Trunks (need at least one FXO trunk enabled, even if there is no analog line required).

Note SIP Trunks configuration is in section 4.6 below

For more information on TSW, please visit link below:

<https://www.mycisco.com/docs/DOC-10492>

Figure 4.3 Wizard Screen

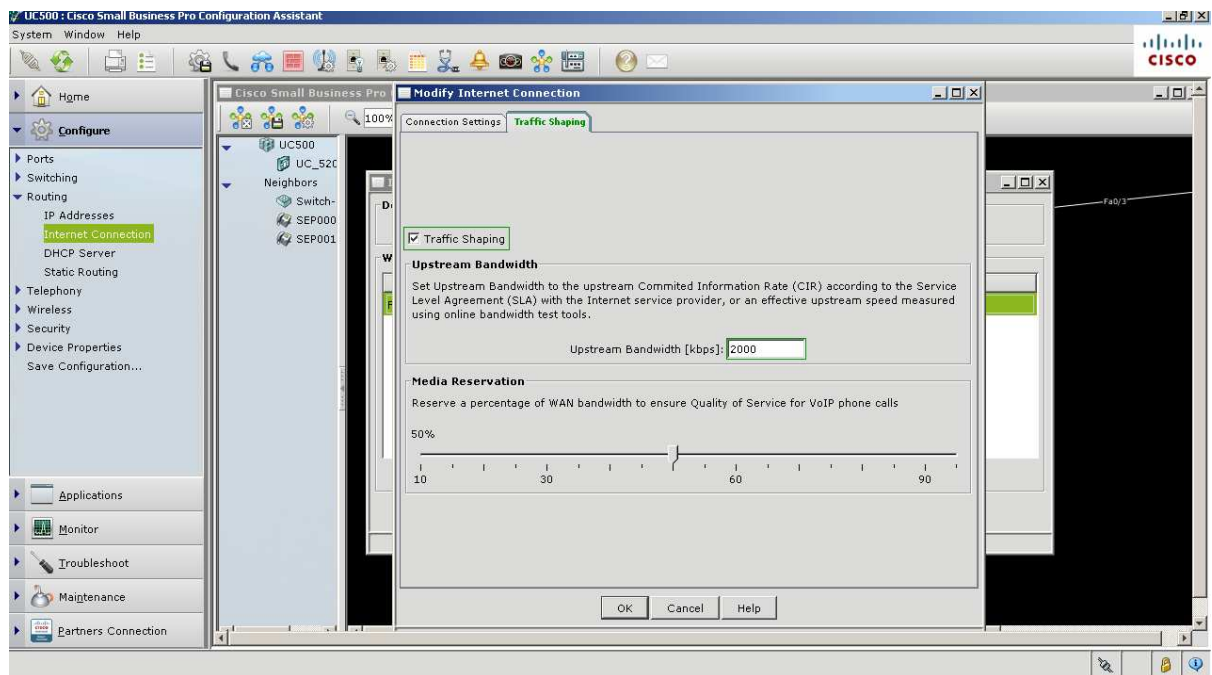


NOTE: If the UC500 was configured previously, the TSW will not launch. You can launch this from *Home* tab on the left.

4.4 WAN QoS Configuration:

Once the Telephony Setup Wizard has completed the basic system configuration, go to *Configure > Routing > Internet Connection*, select the interface and click *Modify*, then click on *Traffic Shaping* tab to configure QoS settings for the WAN connection. On the Traffic Shaping tab, check *Enable Traffic Shaping*, enter the appropriate upstream bandwidth for your WAN connection in Kbps and reserve the appropriate bandwidth for Skype for SIP calls over the WAN.

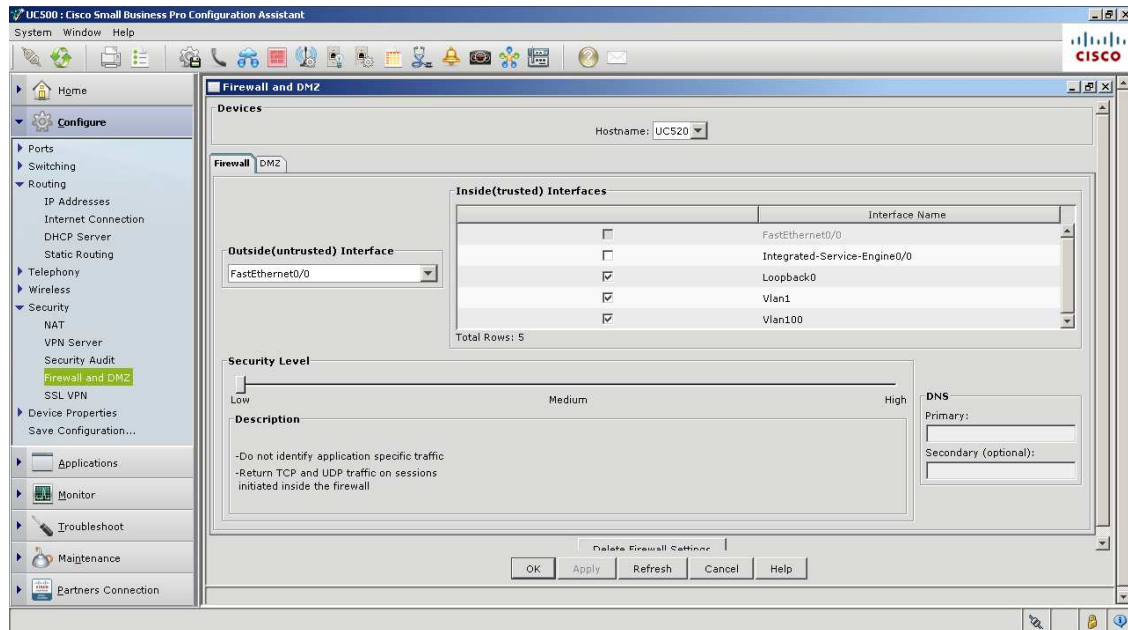
Figure 4.4 QoS Configuration



4.5 Configuring Firewall on the UC500

Navigate to *Security > Firewall and DMZ*. The Firewall settings can be set via CCA to either HIGH, MEDIUM or LOW levels based on the desired customer requirement. Please ensure the firewall is always enabled – if the UC500 is not the firewall device in the network, you can disable the firewall but be sure to have the appropriate restrictions on your upstream firewall device to restrict traffic to the UC500.

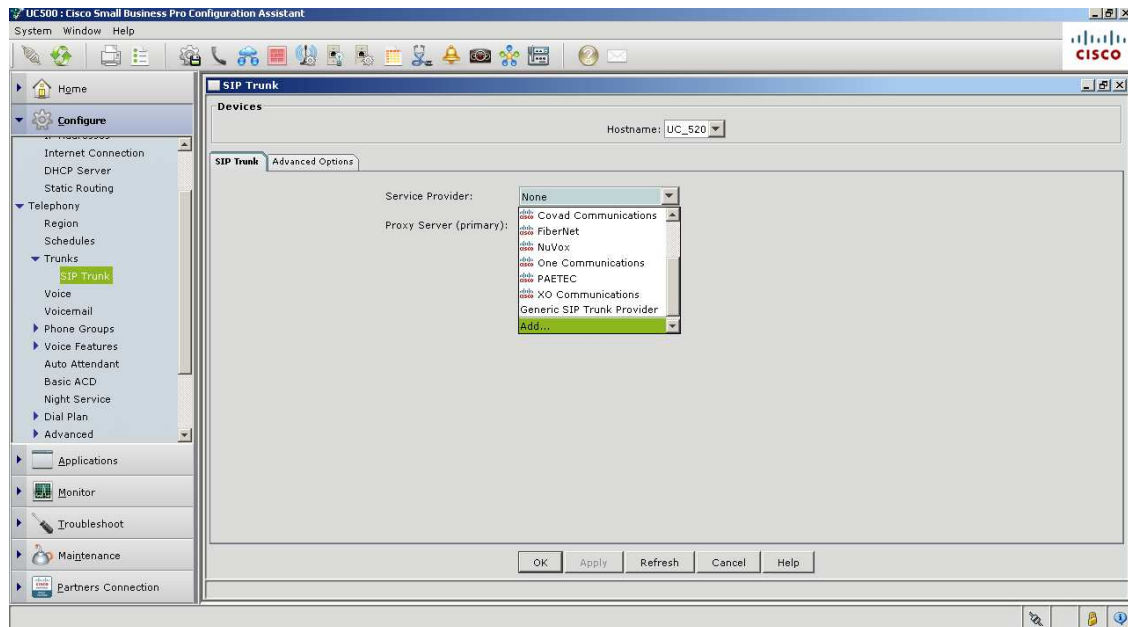
Figure 4.5 Firewall Configuration



4.6 Configure SIP Trunking

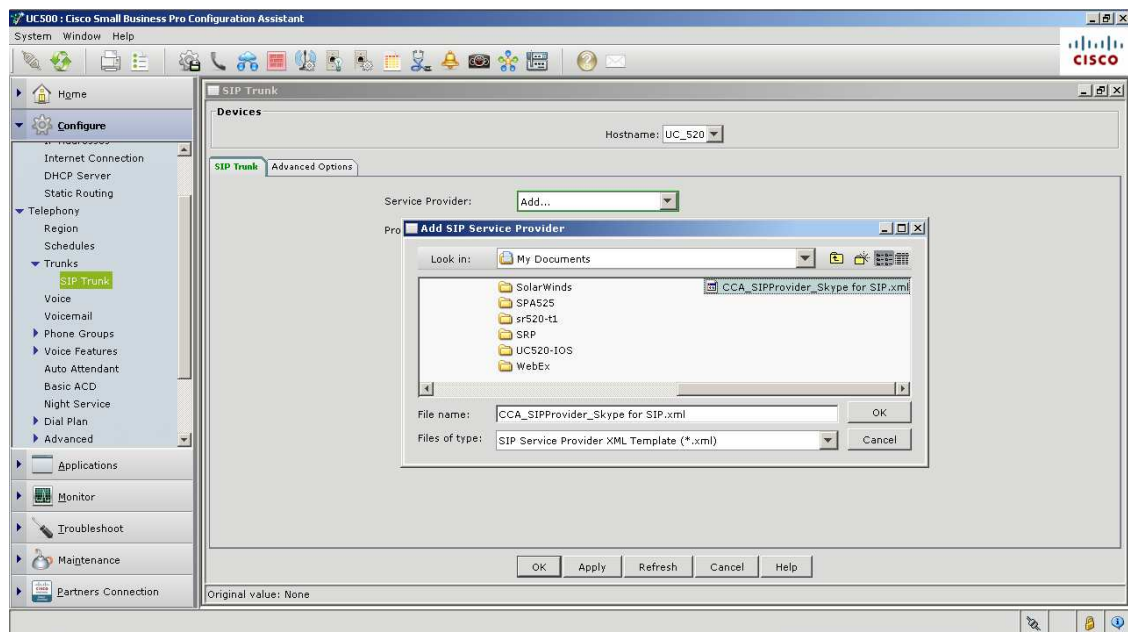
- a. Navigate to *Configure > Telephony > Trunks > SIP Trunk*. On the Service Provider drop down, scroll down to the bottom and select *Add*.

Figure 4.6.1 SIP Trunk pulldown



- b. A dialog box will come up as below – navigate to the appropriate folder at where you placed the [Skype for SIP XML](#) file from Section 3 and hit OK

Figure 4.6.2 SIP Trunk XML file import



- c. The SIP Trunk service provider drop down will have Skype for SIP an option. Select that and enter various fields based on your SIP trunk account as below:

Proxy Server (primary): sip.skype.com (Skype for SIP address)

Registrar Server: sip.skype.com (same as above)

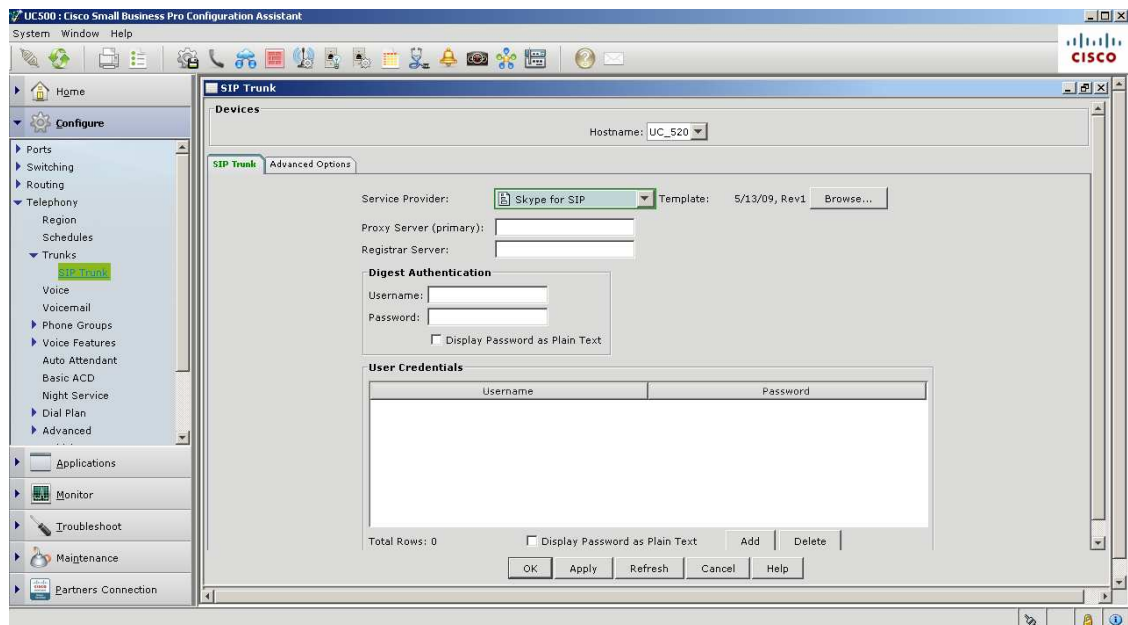
Digest Authentication: Enter SIP User & password from Skype for SIP account

SIP Domain name: any valid domain name for the system

User Credentials: Click Add and enter SIP User & password from Skype for SIP account

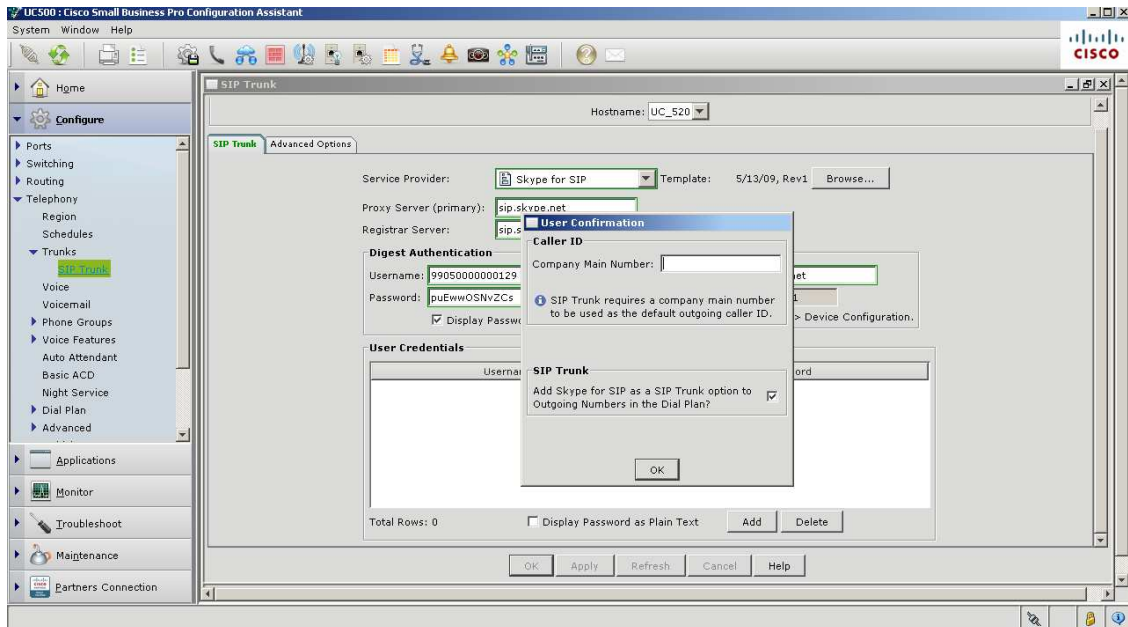
Click “OK” when complete.

Figure 4.6.3 SIP Trunk parameters



- d. CCA will prompt to enter a *main trunk number* - enter the SIP Username as the main trunk number for now & check the box to add Skype for SIP to the outgoing dialplan, then hit *OK*

Figure 4.6.4 SIP Trunk main number



4.7 Inbound Dialplan Configuration

After the voice configuration is saved, navigate to *Configure > Telephony > Dial Plan > Incoming* and select the *Direct Dialing* tab. This has two sections:

1. *Direct Dial to Internal Extensions* – which is direct mapping between external PSTN number and internal extension

In the “**Direct Dialing to Internal User Extensions**” section, click on **Add**. In the dialog box, enter below:

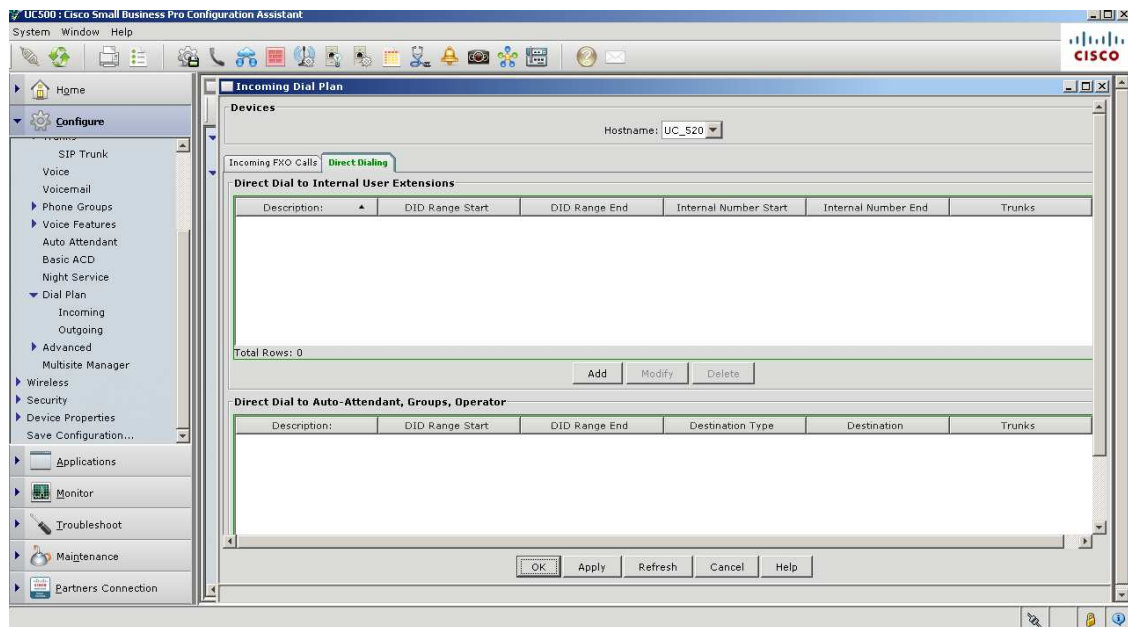
Enter a **Description** such as DID-SIP

Enter **DID range start / end** as the Skype for SIP numbers (9905.....)

Pick **Internal Extension Start / End Numbers** which are the internal extensions on the system

Click **OK**

Figure 4.7.1 Inbound Dialplan to extensions



Additional DIDs if purchased from Skype can be added and mapped to internal extensions as required.

2. *Direct Dial to Auto Attendant, Groups, Operator* – which is mapping one or more external PSTN numbers to a single internal extension (eg. operator)

In the “**Direct Dialing to Auto Attendant, Groups, Operator**” section, click on **Add**. In the dialog box, enter below:

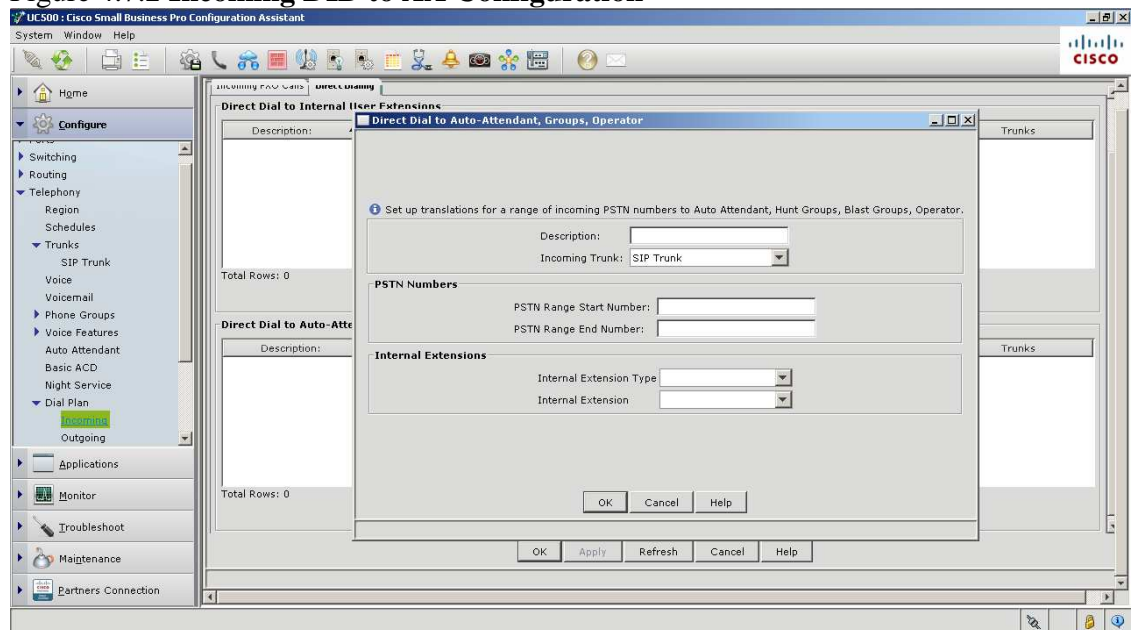
Enter a **Description** such as AA-SIP

Enter **DID range start / end** as the Skype for SIP number

Pick **Internal Number Extension Type** as Auto attendant

Click **OK**

Figure 4.7.2 Incoming DID to AA Configuration



NOTE: If this is going to an AA, you need to add the below CLI to the UC500 in config mode as a workaround for now, there will be a change added to push this in via CCA in a later release:

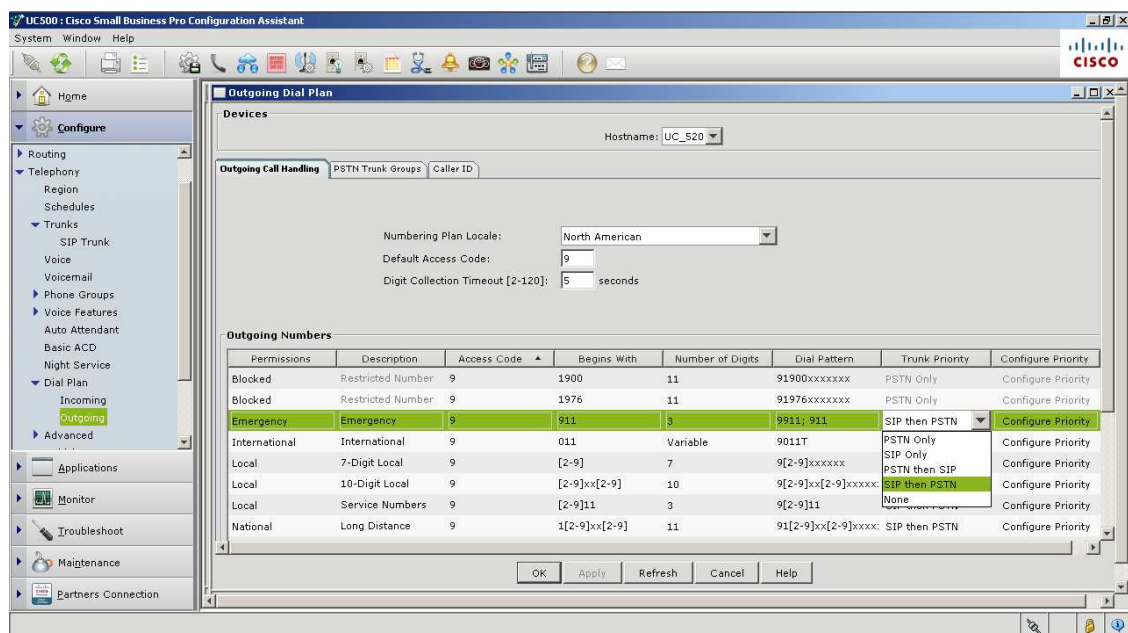
```
voice translation-rule 411
 rule 1 /^9905\{.....\}/ /9905\1/
 rule 2 /^9\{.*\}/ /ABCD9\1/
```

4.8 Outgoing Dialplan

Navigate to *Configure > Telephony > Dial Plan > Outgoing* and setup the appropriate preferences for outbound dialing. As Skype for SIP does not support emergency numbers it is recommended to change the *Trunk Priority* to *PSTN only* for emergency calls.

Similar configuration would apply to any dial patterns that you do not want to route over the Skype for SIP network. Also, it may make sense to change the access code for calls over Skype for SIP to use 8 instead of 9.

Figure 4.8.1 Outgoing Dialplan Configuration

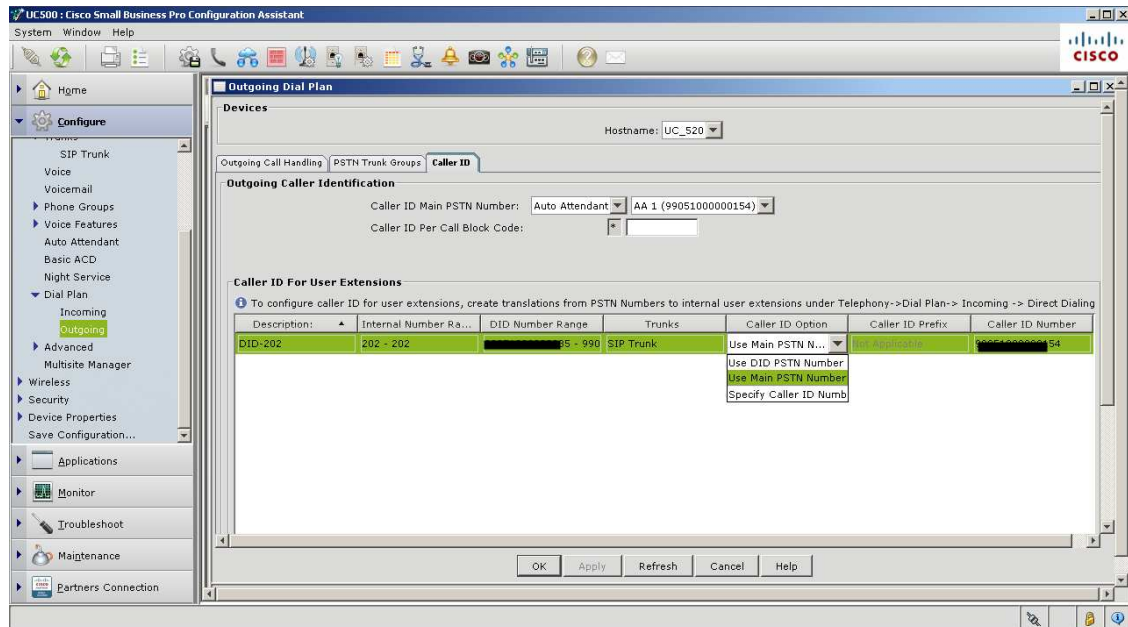


Once done – click “OK” at the bottom.

4.9 Outbound Caller ID

Make sure the Caller ID on *Telephony > Dial Plan > Outgoing > Caller ID* tab is setup to **Use Main PSTN number** under the *Caller ID option* field. Using any other option is not supported at this time.

Figure 4.9 Outbound Caller ID



4.10 Save Configuration

Click on the “Save” button on the CCA top bar to save the configuration on the UC500:



This completes the CCA configuration for Skype for SIP Trunking.

4.11 Next Steps

Site specific requirements for other features can now be configured – please refer to the CCA administration guide below for more information:

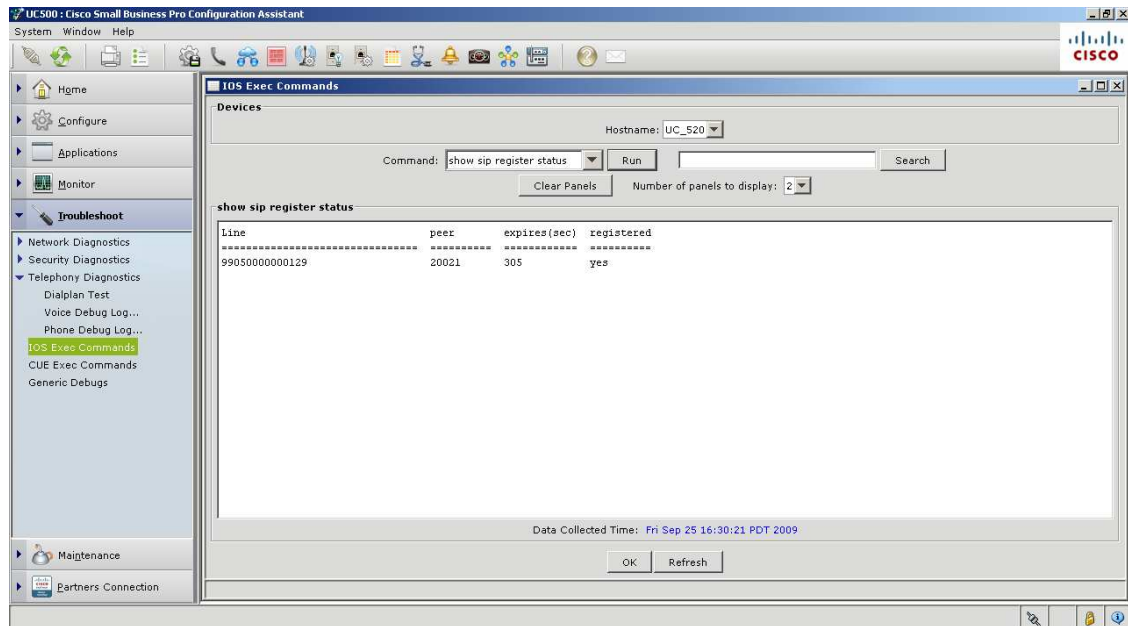
http://www.cisco.com/en/US/docs/net_mgmt/cisco_configuration_assistant/version2_1/administration_guide/cca21_sbc_admin_guide.pdf

5 Troubleshooting

The most common issues with SIP trunking on the UC500 are misconfiguration errors. Some common issues are listed below along with the best practices for troubleshooting:

5.1 Checking SIP registration status

On CCA, go to *Troubleshoot > IOS Exec Commands* and enter “show sip register status” in the field for *Command*, then click *Run*. If the value for “**registered**” is “**yes**” implies registration is working fine. If this is no, you need to debug this per the section 5.3.



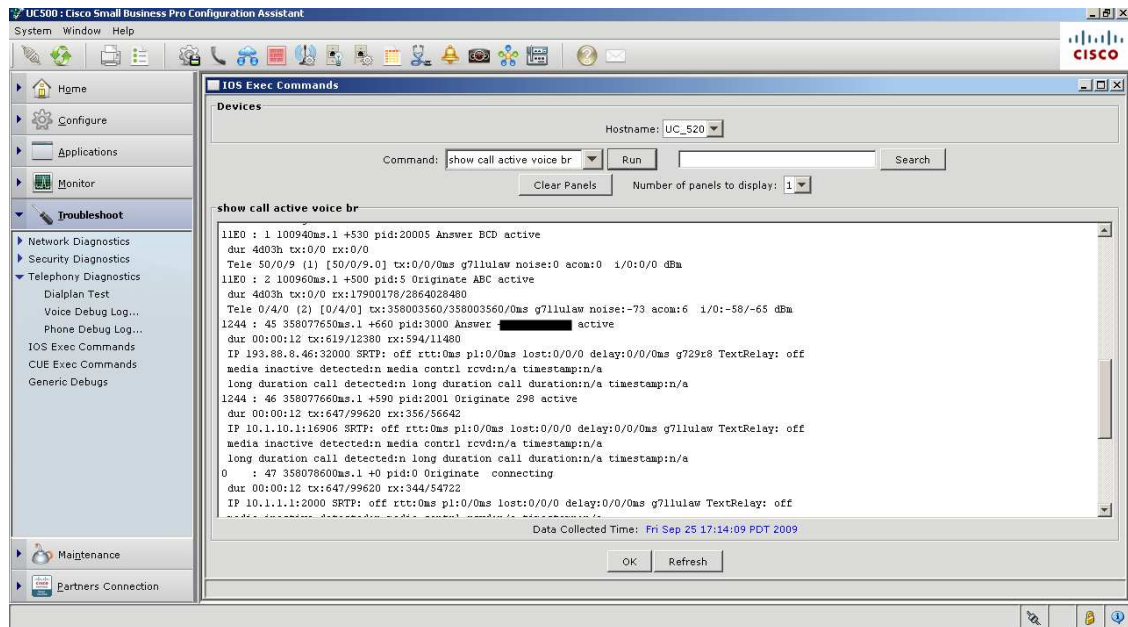
The screenshot shows the Cisco Small Business Pro Configuration Assistant (CCA) interface. The 'IOS Exec Commands' window is open, displaying the command 'show sip register status' and its output. The output is a table with the following data:

Line	peer	expires(sec)	registered
9905000000129	20021	305	yes

The table indicates that the SIP registration for line 9905000000129 is successful, as the 'registered' column shows 'yes'. The 'Data Collected Time' is 'Fri Sep 25 16:30:21 PDT 2009'.

5.2 Checking SIP Active Call Status

On CCA, go to *Troubleshoot > IOS Exec Commands* and enter “show call active voice brief” in the field for *Command*, then click *Run*. You can view the current calls by looking for the called / calling numbers:

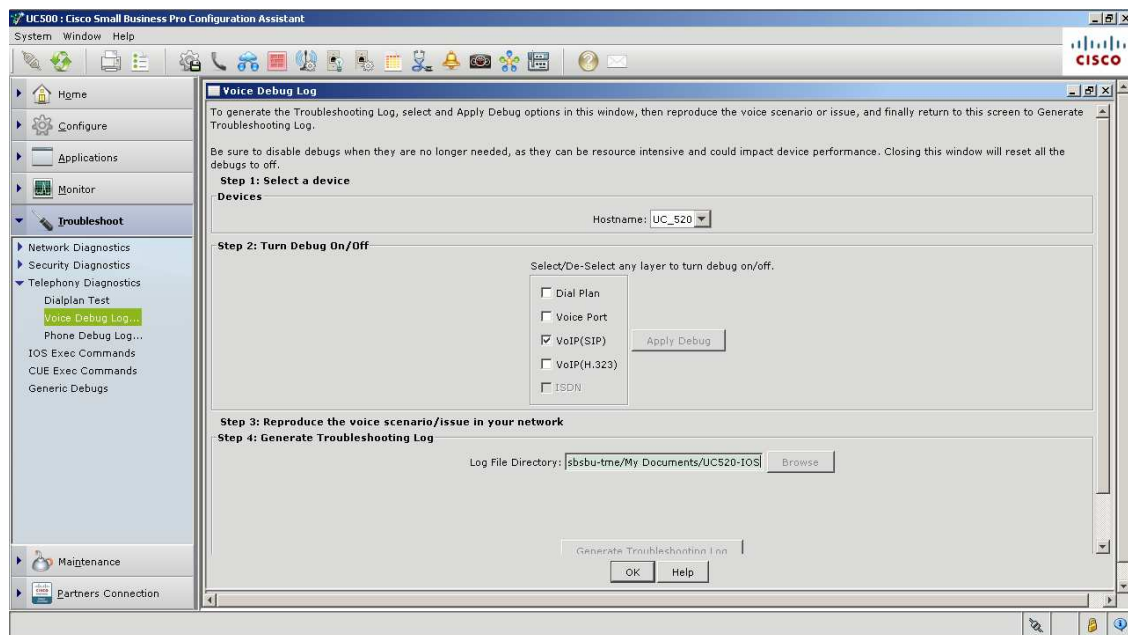


The screenshot shows the Cisco Small Business Pro Configuration Assistant (CCA) interface. The main window is titled "IOS Exec Commands" and displays the command "show call active voice br" entered in the "Command" field. The "Run" button has been clicked, and the output of the command is displayed in a text area. The output shows several active SIP calls with details such as duration, time, and call status. The "Data Collected Time" is shown as "Fri Sep 25 17:14:09 PDT 2009".

```
show call active voice br
11E0 : 1 100940ms.1 +590 pid:20005 Answer BCD active
dur 4803h tx:0/0 rx:0/0
Tele 50/0/9 (1) [50/0/9.0] tx:0/0/0ms g711ulaw noise:0 acom:0 1/0:0/0 dBm
11E0 : 2 100960ms.1 +500 pid:5 Originate ABC active
dur 4403h tx:0/0 rx:17900178/2864028480
Tele 0/4/0 (2) [0/4/0] tx:358003560/358003560/0ms g711ulaw noise:-73 acom:6 1/0:-58/-65 dBm
1244 : 45 358077650ms.1 +660 pid:3000 Answer ██████████ active
dur 00:00:12 tx:619/12380 rx:594/11480
IP 193.88.8.46:32000 SRTP: off rtt:0ms pl:0/0ms lost:0/0/0 delay:0/0/0ms g729r8 TextRelay: off
media inactive detected:n media ctrl rcvd:n/a timestamp:n/a
long duration call detected:n long duration call duration:n/a timestamp:n/a
1244 : 46 358077660ms.1 +590 pid:2001 Originate 298 active
dur 00:00:12 tx:647/99620 rx:356/56642
IP 10.1.10.1:16906 SRTP: off rtt:0ms pl:0/0ms lost:0/0/0 delay:0/0/0ms g711ulaw TextRelay: off
media inactive detected:n media ctrl rcvd:n/a timestamp:n/a
long duration call detected:n long duration call duration:n/a timestamp:n/a
0 : 47 358078600ms.1 +0 pid:0 Originate connecting
dur 00:00:12 tx:647/99620 rx:344/54722
IP 10.1.1.1:2000 SRTP: off rtt:0ms pl:0/0ms lost:0/0/0 delay:0/0/0ms g711ulaw TextRelay: off
media inactive detected:n media ctrl rcvd:n/a timestamp:n/a
Data Collected Time: Fri Sep 25 17:14:09 PDT 2009
```

5.3 Gathering SIP Debug logs on the UC500

If calls are not being able to be placed to / from the UC500 to the SIP or the registration has failed, go to *Troubleshoot > Telephony Diagnostics > Voice Debug Log*. Select device, check *VoIP (SIP)* and click *Apply Debug*. Make the failed call or the event, save log file to *Log File Directory* and click on *Generate Troubleshooting Log*. Then click OK to disable debug logging.



Common areas to check for registration issues:

- Make sure registrar server is correct
- Make sure the authentication is correct
- Make sure the registrar server is reachable (especially if using DNS)

Common areas to check for call failures:

- If no inbound or outbound calls are successful DNS resolution may not be working
 - From CCA, attempt to ping the DNS server
 - Check DNS server addresses.
- If no inbound or outbound calls are successful DNS resolution may not be working or registration may have failed

6 Technical Assistance

Cisco UC500

The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco Support Community is the best place to look for tips, tricks and even call support:

<https://www.myciscocommunity.com/community/smallbizsupport>

Skype for SIP

For questions concerning the Skype for SIP service, please refer to the following URL:

<http://www.skype.com/business/support/>

7 Disclaimer:

This configuration guide is offered as a convenience only, and any specifications and information regarding the product in this guide are subject to change at any time. All statements, information, and recommendations in this guide are believed to be accurate at the time of publication but are presented without warranty of any kind, express or implied, and are provided “AS IS”. Users take full responsibility for the application of the specifications and information in this guide. In no event shall Cisco or its suppliers be liable for any indirect, special, consequential, or incidental damages, including, without limitation, lost profits or loss or damage arising out of the use or inability to use this guide, even if Cisco or its suppliers have been advised of the possibility of such damage.