



# Cisco UC500 SIP Trunking

## Troubleshooting Inbound Call failures over UC500 SIP trunks

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# 1. Introduction

This document goes over common issues seen when inbound calls fail over the SIP trunks into the UC500



## 2. Prerequisites

- UC500 has been setup via CCA for SIP trunking configuration
- Understand SIP debugs from UC500 based on [http://www.cisco.com/en/US/tech/tk652/tk701/technologies\\_configuration\\_example09186a0080672b8b.shtml](http://www.cisco.com/en/US/tech/tk652/tk701/technologies_configuration_example09186a0080672b8b.shtml)
- Troubleshooting logs have been gathered per <https://www.myciscocommunity.com/docs/DOC-15534>

## 3. Versions

- Using UC500 SW Pack 8.0 or higher
- Using CCA version 2.1 or higher

## 4. Common Scenarios

### 4.1. No SIP logs generated for inbound calls

#### Problem Description

The troubleshooting log generated shows no incoming SIP INVITE messages from the SIP trunk service provider – for example there is no debug output similar to the below snip which shows an incoming SIP INVITE message into the UC500

```
014287: //-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:  
Received:  
INVITE sip:4085551000@200.1.1.1;transport=udp SIP/2.0  
....
```

#### Scenarios:

##### 4.1.1. Gathering log at the right time

Make sure the log was gathered when a failed inbound call was attempted. If the log was not gathered at the right time, then the

appropriate SIP messages would not show up in the log

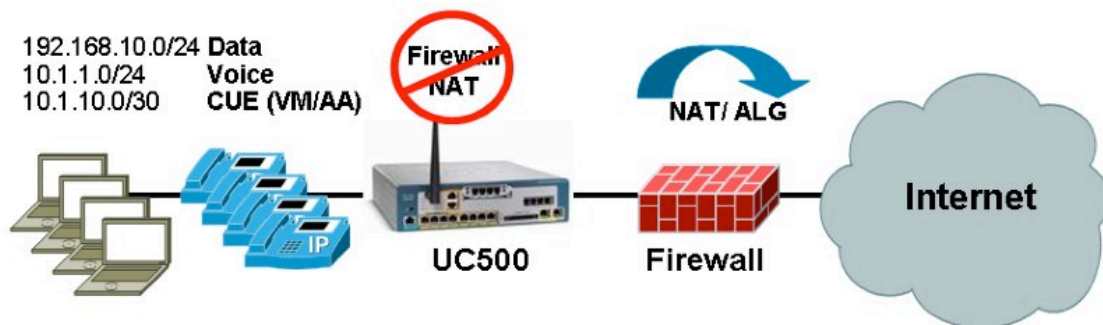
#### 4.1.2. SIP Registration

Ensure the DID (PSTN numbers) are correctly registered to the SIP Trunk service provider by going to **Monitor > Telephony > SIP Trunk Status** and look at the **SIP Register** portion – below example shows the number is not registered which may explain why inbound calls fail. For more, check the **Troubleshooting SIP Registration** issues document.

Figure 1. SIP Registration Status

Line	peer	expires(sec)	registered	P-Associated-URI
4085551000	20026	174	no	

#### 4.1.3. External firewall is deployed in front of UC500



- If there is an external firewall deployed in front of the UC500, ensure that the firewall is setup to allow SIP traffic (usually UDP port 5060) between the SIP trunk service provider & UC500 WAN IP address. Note if the firewall device is a SR520, CCA does take care of this configuration.
- If inbound calls work only after an outbound call is made, this implies that the external firewall may have a timeout associated with allowing inbound SIP traffic; once the timer expires all inbound SIP traffic will be blocked by the external firewall. Ensure this timeout is set high enough such that a SIP Register message can be sent out by the UC500 before this expires

Please check the application note below for more information:

<https://www.myciscocommunity.com/docs/DOC-1519>

#### 4.1.4. UC500 is the external firewall

- If using CCA, the UC500 firewall is appropriately configured to allow SIP traffic between the SIP trunk Service provider and UC500.
- If the SIP trunk service provider proxy server uses a hostname or DNS (for example sipconnect.org) instead of an IP address, make sure the UC500 is connected to the Internet and can access a DNS server that can resolve the hostname or DNS. If the SIP trunk configuration via CCA was applied prior to the UC500 having Internet connectivity, need to re enter the SIP trunk information and apply the configuration via CCA once the UC500 has Internet connectivity.

## 4.2. Inbound Calls have no audio or one way audio

### Problem Description

Inbound calls can be setup to the UC500 but the calls have no audio or one way audio. This is usually seen when an external firewall and / or NAT router is deployed in front of the UC500.

### Scenario

The issue is the NAT / firewall router does not translate all the internal IP addresses in the SIP message from the UC500 to an external IP address that is routable. Example snip below:

```
o=CiscoSystemsSIP-GW-UserAgent
s=SIP Call
c=IN IP4 10.1.1.1
t=0 0
m=audio 54472 RTP/AVP 0 101
c=IN IP4 100.100.100.1
```

The IP address in red is the private IP address on the UC500, which should really have been translated by the external firewall or NAT device to 100.100.100.1.

### Solution

The solution is to add the below to the UC500 configuration:

```
voice class sip-profiles 1
  request ANY sdp-header Connection-Info remove
  response ANY sdp-header Connection-Info remove
!
voice service voip
  sip
    sip-profiles 1
```

CCA 2.2.3 and higher will support this by default on the UC500. Refer to this thread for further info <https://www.myciscocommunity.com/message/35353#9759>

### 4.3. Inbound calls fail with SIP “500 Internal Server Error Message”

#### Problem Description

The log for inbound SIP calls on the UC500 shows the UC500 responding to a received INVITE with a 500 Internal Server Error Message:

```
//-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Received:
INVITE sip:4085251000@100.1.1.1;transport=udp SIP/2.0
From: <sip:16505251000@200.1.1.1:5060>;tag=b9d5ed0
To: <sip: 4085251000@100.1.1.1>
Call-ID: 36-69c1de50-b9d5ed0-13c4-4b1d4938-6100ebee
CSeq: 1 INVITE
```

..... SNIPPED .....

```
//-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Sent:
SIP/2.0 500 Internal Server Error
From: <sip:16505251000@200.1.1.1:5060>;tag=b9d5ed0
To: <sip: 4085251000@100.1.1.1>;tag=24B5C0-C54
Call-ID: 36-69c1de50-b9d5ed0-13c4-4b1d4938-6100ebee
CSeq: 1 INVITE
Allow-Events: telephone-event
Reason: Q.850;cause=63
Server: Cisco-SIPGateway/IOS-12.x
Content-Length: 0
```

#### Scenarios

##### 4.3.1. Invite with multiple Via headers

This issue is ONLY see if both below conditions are met

1. Running UC500 SW pack 8.0.0 / IOS is 15.0(1)XA **AND**
2. Inbound SIP INVITE has multiple VIA headers as in RED below:

```
//-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Received:
INVITE sip:4085251000@100.1.1.1;transport=udp SIP/2.0
From: <sip:16505251000@200.1.1.1:5060>;tag=b9d5ed0
To: <sip: 4085251000@100.1.1.1>
Call-ID: 36-69c1de50-b9d5ed0-13c4-4b1d4938-6100ebee
```

```
CSeq: 1 INVITE
Via: SIP/2.0/UDP 201.1.1.1:5060;
Via: SIP/2.0/UDP 202.1.1.1:5060;
```

### Verification:

Gather advanced debug logs (per step 2 on <https://www.myciscocommunity.com/docs/DOC-15534>) for one such failed call - logs should show below error:

```
//-1/xxxxxxxxxxxx/SIP/Error/sippmh_parse_via_ext: Syntax error at %s
//-1/2EA20BDB801D/SIP/Error/sipSPIMatchSrcIpGroup: Via header not found
```

### Solution:

- This is a known issue, which requires upgrade to UC500 SW Pack 8.0.1 or higher on [UC500 software pack download page](#)

#### 4.3.2. IP address in Via header is not allowed on UC500

The UC500 is setup to accept SIP requests only from specific SIP proxy servers based on what is configured on the SIP trunk tab for SIP Proxy server(s) & registrar server by default. If the SIP message comes in from a SIP server that is not allowed on the UC500, the UC500 would reject the call with “500 Internal Server Error” as below:

```
//-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Received:
INVITE sip:4085251000@100.1.1.1;transport=udp SIP/2.0
From: <sip:16505251000@200.1.1.1:5060>;tag=b9d5ed0
To: <sip: 4085251000@100.1.1.1>
Call-ID: 36-69c1de50-b9d5ed0-13c4-4b1d4938-6100ebee
CSeq: 1 INVITE
Via: SIP/2.0/UDP 201.1.1.1:5060;
Via: SIP/2.0/UDP 202.1.1.1:5060;

..... SNIPPED .....

Sent:
SIP/2.0 500 Internal Server Error
Reason: Q.850;cause=63
Date: Fri, 11 Sep 2009 08:46:01 GMT
From: <sip:16505251000@200.1.1.1:5060>;tag=b9d5ed0
To: <sip: 4085251000@100.1.1.1>; tag=b5ac5fd
Call-ID: 36-69c1de50-b9d5ed0-13c4-4b1d4938-6100ebee
CSeq: 1 INVITE
```

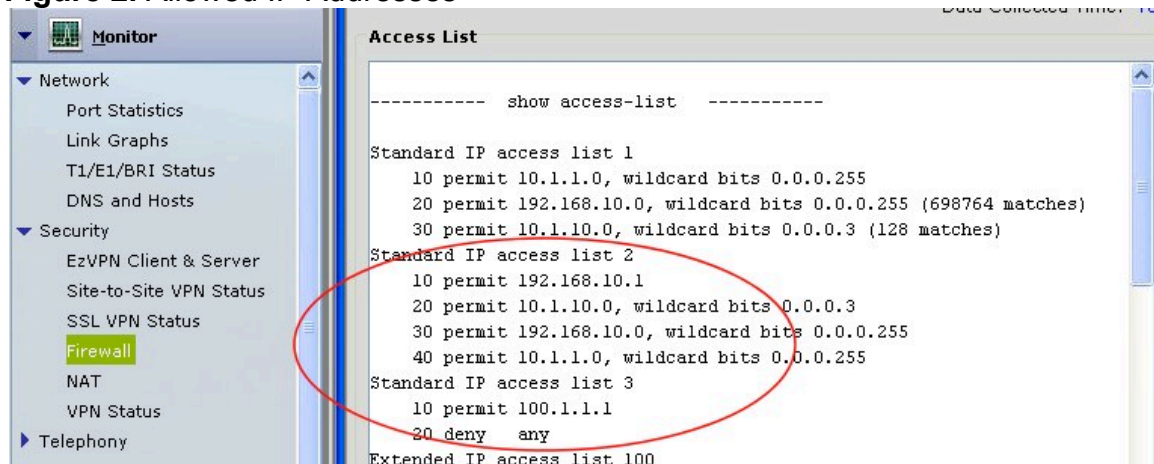
## Verification:

The IP address in the last (or bottom most when looking at debug) Via header in the SIP Invite (highlighted in RED) is what must be allowed on the UC500 – all other Via header can be ignored. To check the list of the allowed IP addresses for the UC500 SIP trunk, check **Monitor > Security > Firewall** and look at the IP addresses permitted in “Standard IP access list 2” & “Standard IP access list 3”. As seen below, the allowed IP addresses are:

- 10.1.10.0 /30
- 192.168.10.0 /24
- 10.1.1.0 /24
- 100.1.1.1
- All other IP addresses are denied

This implies the IP in the last Via header 202.1.1.1 is not in the allowed list and hence all SIP messages from that IP address are rejected.

**Figure 2.** Allowed IP Addresses

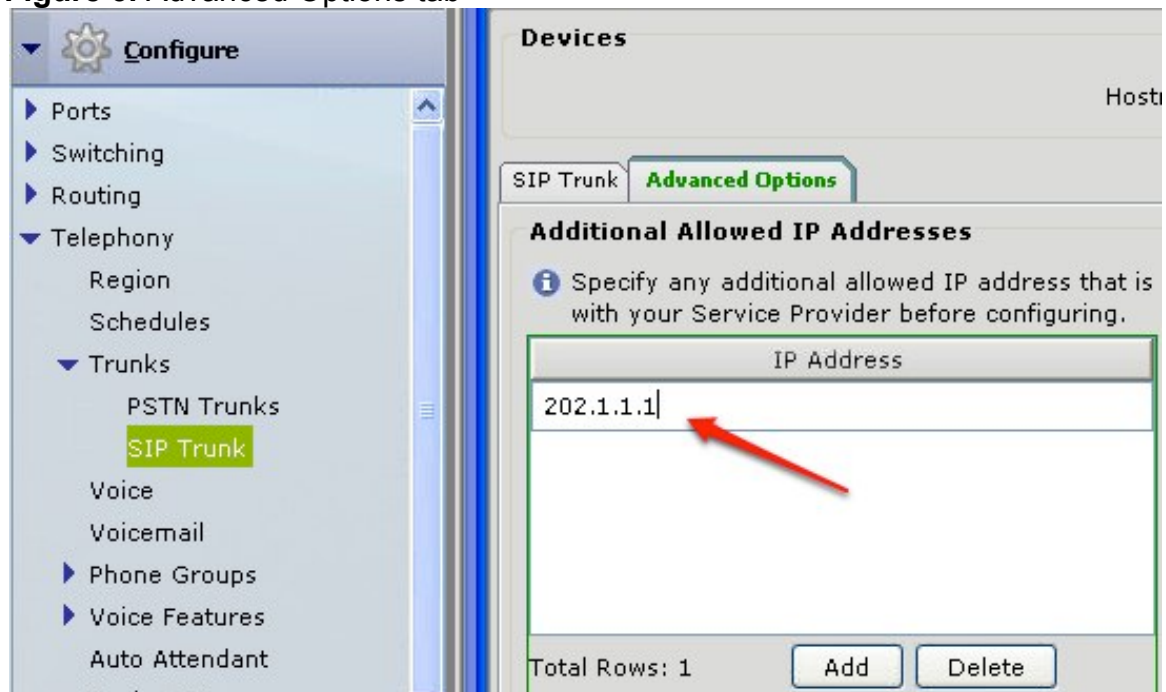


```
----- show access-list -----
Standard IP access list 1
 10 permit 10.1.1.0, wildcard bits 0.0.0.255
 20 permit 192.168.10.0, wildcard bits 0.0.0.255 (698764 matches)
 30 permit 10.1.10.0, wildcard bits 0.0.0.3 (128 matches)
Standard IP access list 2
 10 permit 192.168.10.1
 20 permit 10.1.10.0, wildcard bits 0.0.0.3
 30 permit 192.168.10.0, wildcard bits 0.0.0.255
 40 permit 10.1.1.0, wildcard bits 0.0.0.255
Standard IP access list 3
 10 permit 100.1.1.1
 20 deny any
Extended IP access list 100
```

## Solution:

Add the IP address from the last Via header in the SIP Invite message to the list of allowed IP addresses by going to **Configure > Telephony > Trunks > SIP trunk** and click on the **Advanced Options** tab to add the IP address.

Figure 3. Advanced Options tab



#### 4.3.3. Ensure Inbound Dialplan is setup for the appropriate PSTN numbers

The UC500 is setup to only accept calls, which match a configured, DID from the SIP trunk service provider for toll fraud security purposes. This DID configuration is done on CCA via **Configuration > Telephony > Dialplan > Incoming > Direct Dialing** tab. In this example, the DID sent by the SIP Trunk service provider is +14085551000 (in red below) but the call is rejected as the DID configured in CCA is 4085551000 (missing the 1). Another example would be that the DID was not even configured on UC500.

```
//-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Received:
INVITE sip:14085551000@100.1.1.1:5060 SIP/2.0
From: <sip:16505251000@200.1.1.1:5060>;tag=b9d5ed0
To: <sip:4085251000@100.1.1.1>
Call-ID: MTK2YjdmMWMY
CSeq: 102 INVITE

//-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Sent:
SIP/2.0 500 Internal Server Error
From: <sip:16505251000@200.1.1.1:5060>;tag=b9d5ed0
To: <sip:4085251000@100.1.1.1>
Call-ID: MTK2YjdmMWMY
CSeq: 102 INVITE
Reason: Q.850;cause=127
```



## Verification:

This can be verified by going to CCA and navigating to **Troubleshoot > Telephony Diagnostics > Dial Plan Test > Inbound** and entering the DID number in the “DID Number” Field as seen in the debug log. As you can see, there is no match found in **Fig 4** for 14085551000 (which is what the SIP Trunk service provider sent to the UC500) but a match is found for the 4085551000 in **Fig 5**.

**Figure 4.** No matching destination found

The screenshot shows the Cisco CCA interface for Troubleshoot > Telephony Diagnostics > Dial Plan Test > Inbound. The "Incoming Call" section has "DID Number" selected with the value "14085551000" entered in the text box. The "Find Destination" button is visible. Below, the "Destination" section shows "Result: No Matching Destination Found".

**Figure 5.** Matching destination found

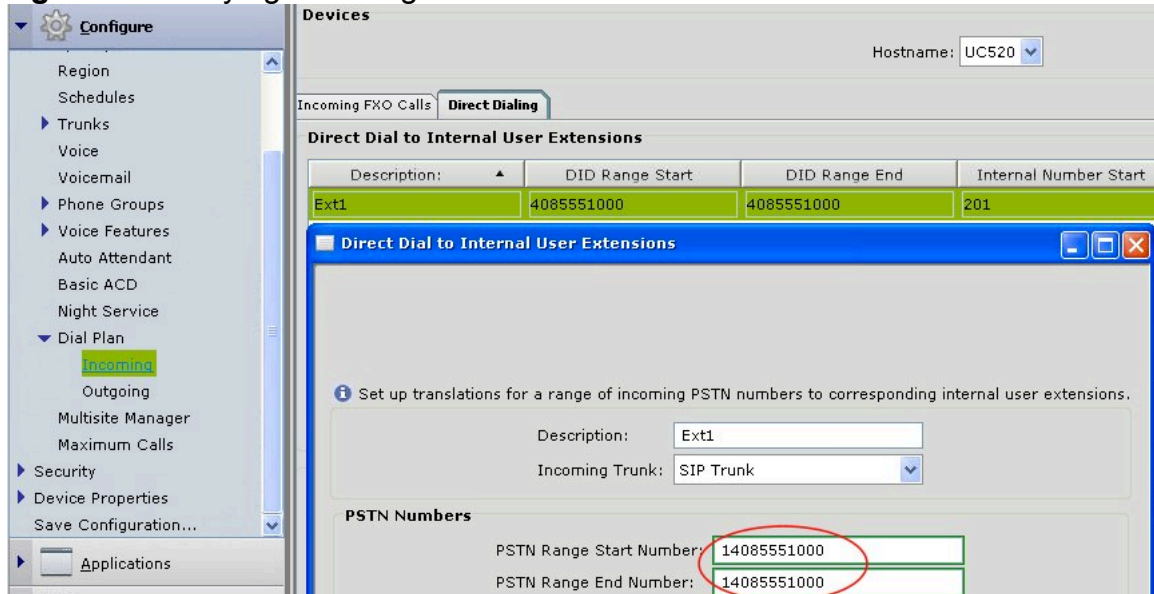
The screenshot shows the Cisco CCA interface for Troubleshoot > Telephony Diagnostics > Dial Plan Test > Inbound. The "Incoming Call" section has "DID Number" selected with the value "4085551000" entered in the text box. The "Find Destination" button is visible. Below, the "Destination" section shows "Result: Matching Destination Found".

Extension Number	Extension Type
201	User (201)

## Solution:

Configure the appropriate DID number by going to **Configure > Telephony > Dialplan > Incoming > Direct Dialing** tab and modifying the DID value as shown in **Fig 6**.

Figure 6. Modifying DID range



#### 4.3.4. Routing based on TO header

In some cases, SIP trunk service providers send the actual DID or called number (4085551001 in this example) in the “TO Header” of the SIP INVITE message (in RED below) and only send the main number (4085551000 in this example) of the SIP trunk in the Request URI (in BLACK below). This may either cause the UC500 to route all calls to the extension mapped to the main DID number (4085551000 in this example) or result in the UC500 sending back a 500 Internal Server Error message as shown below.

```
//-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Received:
INVITE sip:14085551000@100.1.1.1:5060 SIP/2.0
From: <sip:16505251000@200.1.1.1:5060>;tag=b9d5ed0
To: <sip: 4085251001@100.1.1.1>
Call-ID: MTK2YjdmMWMY
CSeq: 102 INVITE

//-1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
Sent:
SIP/2.0 500 Internal Server Error
From: <sip:16505251000@200.1.1.1:5060>;tag=b9d5ed0
To: <sip: 4085251000@100.1.1.1>
Call-ID: MTK2YjdmMWMY
CSeq: 102 INVITE
Reason: Q.850;cause=127
```

**Solution:**

Routing based on the TO header in a SIP INVITE is not per the SIP RFC (RFC3261) or the SIPConnect 1.1 specification. The only option is to have the SIP trunk service provider use the Request URI instead of the TO header for routing calls into the UC500.

## 5. Where to go from here

This document covers the most common scenarios seen for inbound calls failing with SIP trunks on the UC500. If your issue persists even after going through the above, there are multiple options available:

- Look for other tips and tricks on the [UC500 SIP trunking page](#)
- Post a message on the [Cisco Small Business Support Community forum](#)
- Open a case with [Cisco support](#)