

# Troubleshooting fax issues

This article will help you troubleshoot some of the most common issues encountered with faxes.

Faxes can be sent over audio stream (G711 for example) or using t38, which is generally recommended. When involved in a fax transmission, VoipNow can be the **receiver**, the **sender** or **just a proxy** between two fax machines sending/receiving the fax. No matter what role VoipNow plays, the messages exchanged by the parties involved in the setup and transmission of the fax are similar.

The scenario below describes what happens when a fax message is sent to a VoipNow extension by an external party. In our example, VoipNow is the receiver and has the fax center enabled.

## Step-by-step guide

### If the fax is not received

Let's see what you should do if the fax is not received.

1. Verify the settings: the DID must be assigned to the correct extension, the fax must be enabled on the extension, you need to have enough disk space for faxes, etc.
2. If you've got all that covered, take a tcpdump capture of the fax. For fax transmission over t38, VoipNow uses udp ports 4000-5999 as defined in /etc/asterisk/udptl.conf:

```
udptlstart=4000
udptlend=5999
```

The other party may use different ports. So, the best way to capture a fax is to use a tcpdump command with a udp filter.

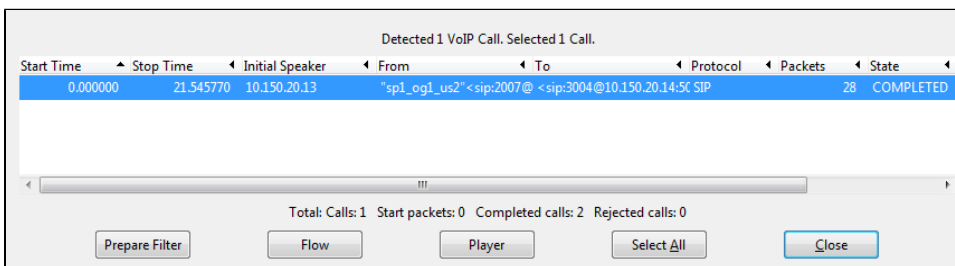
```
tcpdump -nni any -s 0 udp -w /usr/local/voipnow/admin/htdocs/fax.pcap
```

The correct sequence is: 1) start the capture; 2) send the fax; 3) wait for it to work or fail; 4) stop the capture.

3. Once the capture is done, you can download it with from the VoipNow server where it has been taken.

```
https://<VoipNow_IP>/fax.pcap
```

4. Open the capture using Wireshark. Go to **Telephony >> Voip Calls** and you will see a list of all the calls in the capture. You can identify the fax by the phone numbers used for sending / receiving the fax message. In our case, it was a fax from 2007 to 3004.



| Start Time | Stop Time | Initial Speaker | From                    | To                       | Protocol | Packets | State     |
|------------|-----------|-----------------|-------------------------|--------------------------|----------|---------|-----------|
| 0.000000   | 21.545770 | 10.150.20.13    | 'spi_og1_us2'<spi:2007@ | <spi:3004@10.150.20.14:5 | SIP      | 28      | COMPLETED |

Total: Calls: 1 Start packets: 0 Completed calls: 2 Rejected calls: 0

Prepare Filter Flow Player Select All Close

5. Select the fax and click **Flow**. In our example, we have a fax answered by VoipNow, so we only have one leg of this call: between the caller and the VoipNow server. If 3004 had been assigned to a fax machine, we would have had a second leg: from 2007 to the extension assigned to 3004. In such cases, select both legs of the call and then click **Flow**.
6. You will see a graph showing the SIP and t38 negotiation between the two parties, the sender (10.150.20.13) and the receiver (10.150.20.14).

## The Flow

Here are some screenshots of the entire flow. For a better view, we split the capture of the call.

1. First the call is established over SIP, as a regular voice call. Then VoipNow generates a re-INVITE for t38 and the caller accepts it.

| Time                       | 10.150.20.13                            | 10.150.20.14 | Comment  |
|----------------------------|---|--------------|--|
| 2015-02-11 15:08:05.934029 | INVITE SDP (g711U g711A g722 teleph     |              | SIP From: "sp1_og1_us2" <sip:2007@10.150.20.13 To: <sip:3004@10.150.20.14-5060 |
| 2015-02-11 15:08:05.953142 | 100 trying -- your call is important to |              | SIP Status   |
| 2015-02-11 15:08:05.953531 | INVITE SDP (g711U g711A g722 te         |              | SIP Request  |
| 2015-02-11 15:08:05.956919 | 100 Trying                              |              | SIP Status   |
| 2015-02-11 15:08:07.984808 | 200 OK SDP (g711U g711A g722 te         |              | SIP Status   |
| 2015-02-11 15:08:07.986545 | 200 OK SDP (g711U g711A g722 teleph     |              | SIP Status   |
| 2015-02-11 15:08:07.996380 | ACK                                     |              | SIP Request  |
| 2015-02-11 15:08:07.999505 | ACK                                     |              | SIP Request  |
| 2015-02-11 15:08:08.488115 | INVITE SDP (t38)                        |              | SIP Request  |
| 2015-02-11 15:08:08.491643 | 100 trying -- your call is imp          |              | SIP Status   |
| 2015-02-11 15:08:08.492081 | INVITE SDP (t38)                        |              | SIP Request  |
| 2015-02-11 15:08:08.494920 | 100 trying -- your call is important to |              | SIP Status   |
| 2015-02-11 15:08:08.500103 | 200 OK SDP (t38)                        |              | SIP Status   |
| 2015-02-11 15:08:08.500874 | 200 OK SDP (t38)                        |              | SIP Status   |
| 2015-02-11 15:08:08.501683 | ACK                                     |              | SIP Request  |

2. If the operation is successful, the negotiation over t38 begins. If the operation fails, the fax either won't be sent, or it will be sent over an audio stream.

At this point, you should check the following:

- If the first INVITE is rejected by the VoipNow server, ensure that the caller sends the fax to the correct DID; check if 10.150.20.13 is in the accept list of the channel where 3004 is placed. If the call fails here, then this is not a fax-related issue, because regular calls would not work either.
- If the t38 re-INVITE is rejected with an "Unsupported media" message, then the sender may not support t38. Make sure t38 is enabled on their side.

If our example would have been about an outgoing fax, then the first INVITE would have been sent by VoipNow. If you don't see it in the capture, you might be having configuration issues like bad outgoing routing rules, channel costs, and so on. An Asterisk log will help you identify the exact issue.

- If things so far went OK, this is when the t38 negotiation starts:

|                            |                                       |  |
|----------------------------|---------------------------------------|--|
| 2015-02-11 15:08:08.502220 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:08.504239 | ACK                                   | SIP Request  |
| 2015-02-11 15:08:08.704100 | ced                                   | t38:t30 Ind:ced  |
| 2015-02-11 15:08:09.133638 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:09.334705 | cng                                   | t38:t30 Ind:cng  |
| 2015-02-11 15:08:11.748389 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:11.823835 | v21-preamble                          | t38:t30 Ind:v21-preamble                                     |
| 2015-02-11 15:08:13.180463 | DIS DSR:ITU-T V.27 ter, V.29 and V.17 | t38:v21:HDLC:Digital Identification Signal                   |
| 2015-02-11 15:08:13.208598 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:13.283551 | v21-preamble                          | t38:t30 Ind:v21-preamble                                     |
| 2015-02-11 15:08:13.409212 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:14.920409 | TSI Num: sp1_og1_us2 2007             | t38:v21:HDLC:Transmitting Subscriber Identification          |
| 2015-02-11 15:08:15.197151 | DCS DSR:14 400 bit/s, ITU-T V.17      | t38:v21:HDLC:Digital Command Signal                          |
| 2015-02-11 15:08:15.423269 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:15.573890 | v17-14400-long-training               | t38:t30 Ind:v17-14400-long-training                          |
| 2015-02-11 15:08:16.980786 | t4-non-ecm-data:v17-14400             | t38:t4-non-ecm-data:v17-14400 Duration: 1.61s No packet lost |
| 2015-02-11 15:08:18.665457 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:18.690785 | v21-preamble                          | t38:t30 Ind:v21-preamble                                     |
| 2015-02-11 15:08:19.798005 | CFR                                   | t38:v21:HDLC:Confirmation To Receive                         |
| 2015-02-11 15:08:19.899118 | v17-14400-short-training              | t38:t30 Ind:v17-14400-short-training                         |
| 2015-02-11 15:08:19.999728 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:20.050696 | t4-non-ecm-data:v17-14400             | t38:t4-non-ecm-data:v17-14400 Duration: 3.57s No packet lost |
| 2015-02-11 15:08:23.724612 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:23.875231 | v21-preamble                          | t38:t30 Ind:v21-preamble                                     |
| 2015-02-11 15:08:24.981579 | EOP                                   | t38:v21:HDLC:End Of Procedure                                |
| 2015-02-11 15:08:25.083853 | v21-preamble                          | t38:t30 Ind:v21-preamble                                     |
| 2015-02-11 15:08:25.185605 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:26.191076 | MCF                                   | t38:v21:HDLC:Message Confirmation                            |
| 2015-02-11 15:08:26.292476 | v21-preamble                          | t38:t30 Ind:v21-preamble                                     |
| 2015-02-11 15:08:26.393091 | no-signal                             | t38:t30 Ind:no-signal  |
| 2015-02-11 15:08:27.398889 | DCN                                   | t38:v21:HDLC:Disconnect                                      |

It's not necessary for the t38 negotiation to happen between the same IPs as the SIP signalling. The two parties can establish this negotiation between different IPs. These IP addresses are mentioned in the "Connection Information" header in the SDP from the t38 INVITE/200OK.

The fax flow is the following:

- Troubleshooting fax issues
- Troubleshooting font-related fax issues
- Troubleshooting fax session failures caused by incorrect negotiation of T38FaxMaxDatagram parameter
- How to use email2fax
- Troubleshooting fax calls