

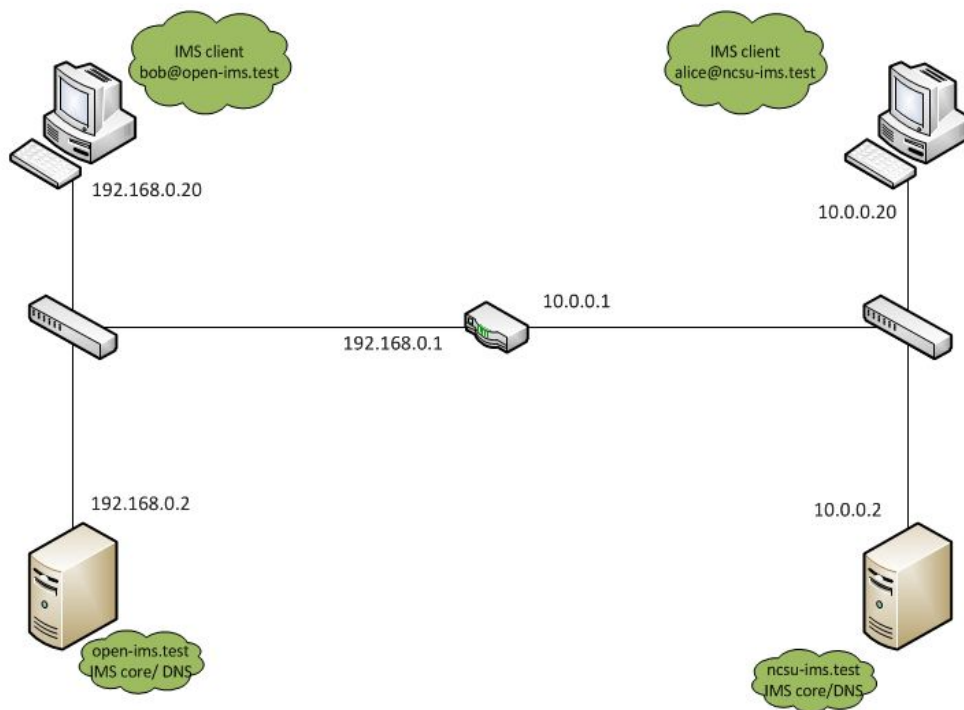
Multi-domain IMS - Group 7

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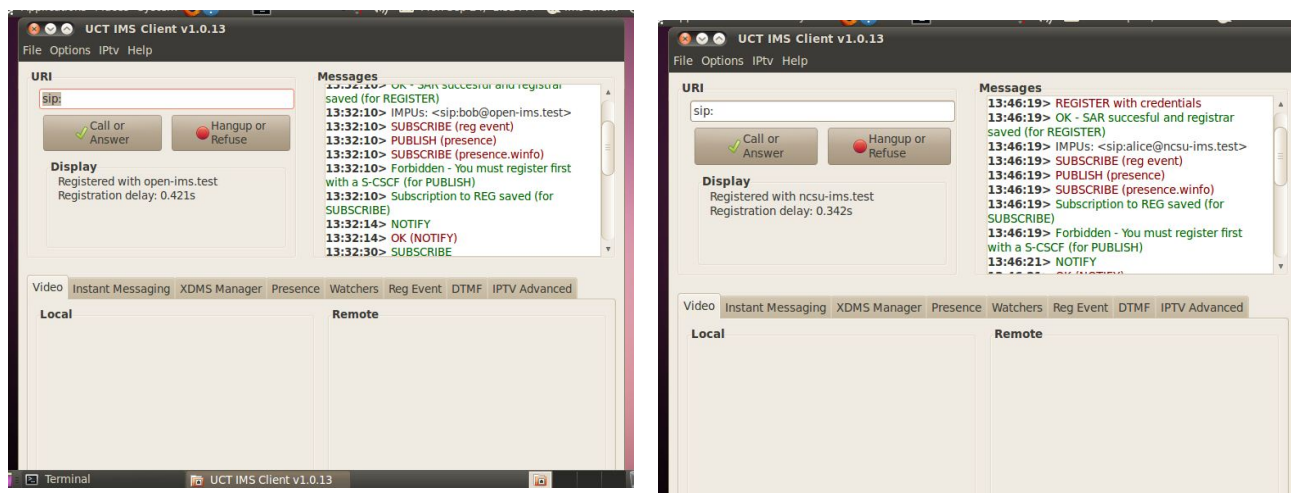
Professor Perros

Introduction

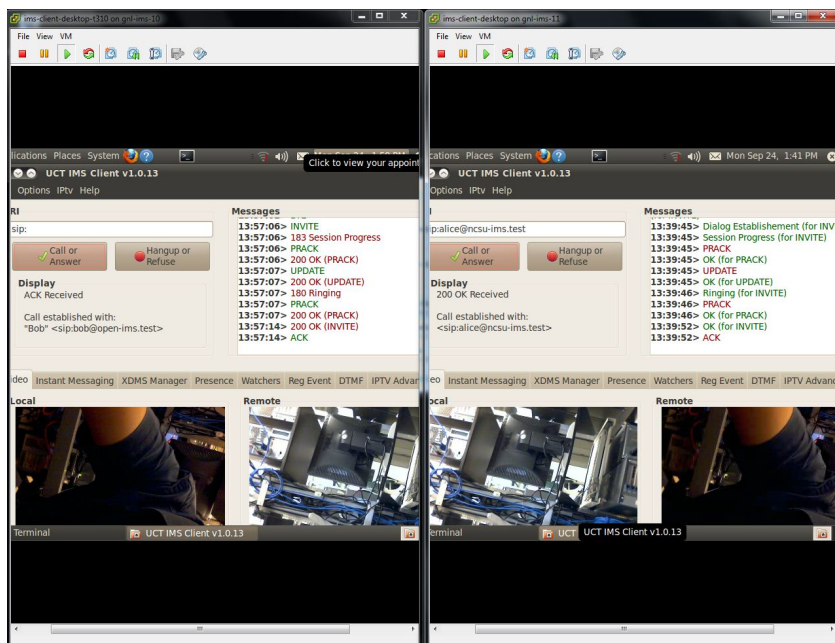
By setting up the logical network portrayed in the figure below we can simulate relationships between IMS cores and clients located on two separate domains. Screen shots of packet captures are taken during User Agent registration and the SIP session.



The screenshots below depict clients alice and bob registering with their respective IMS core network.



After the session setup signalling one can observe in two different vmware client windows; the client applications running on both bob and alice have messaging, voice, and video capability.



1. In one of the clients observe a SIP/XML NOTIFY message, what is the value in the aor field in the xml part of the message, give screen shots.

Value in aor field: sip:alice@ncsu-ims.test

310Capture [Wireshark 1.6.7]

Filter: sip

Time	Source	Destination	Protocol	Length	Info
8 56.660101	10.0.0.20	10.0.0.2	SIP	721	Request: REGISTER sip:ncsu-ims.test
9 56.782304	10.0.0.2	10.0.0.20	SIP	1040	Status: 200 OK - SAR succesful and registrar saved
0 56.862110	10.0.0.20	10.0.0.2	SIP	447	Request: SUBSCRIBE sip:alice@ncsu-ims.test
1 56.863181	10.0.0.2	10.0.0.20	SIP	676	Status: 200 Subscription to REG saved
2 56.867342	10.0.0.20	10.0.0.2	SIP/XML	743	Request: PUBLISH sip:alice@ncsu-ims.test
3 56.867618	10.0.0.2	10.0.0.20	SIP	596	Status: 403 Forbidden - You must register first with a
4 56.867915	10.0.0.20	10.0.0.2	SIP	456	Request: SUBSCRIBE sip:alice@ncsu-ims.test
5 57.369370	10.0.0.20	10.0.0.2	SIP	456	Request: SUBSCRIBE sip:alice@ncsu-ims.test
6 58.380636	10.0.0.20	10.0.0.2	SIP	456	Request: SUBSCRIBE sip:alice@ncsu-ims.test
8 59.221792	10.0.0.2	10.0.0.20	SIP/XML	1072	Request: NOTIFY sip:alice@10.0.0.20:5060
9 59.222310	10.0.0.20	10.0.0.2	SIP	400	Status: 200 OK
0 60.423969	10.0.0.20	10.0.0.2	SIP	456	Request: SUBSCRIBE sip:alice@ncsu-ims.test
4 64.429309	10.0.0.20	10.0.0.2	SIP	456	Request: SUBSCRIBE sip:alice@ncsu-ims.test

XML Structure:

```

<?xml
  version="1.0"
  ?>
  <reginfo
    xmlns="urn:ietf:params:xml:ns:reginfo"
    version="0"
    state="full">
    <registration
      aor="sip:alice@ncsu-ims.test"
      id="0xb59da070"
      state="active">
      <contact
        </reginfo>
  </reginfo>

```

Frame (frame), 1072 bytes

Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021

Profile: Default

2. In one of the servers observe the SIP/SDP Invite message and find

2a) From and To values

From Value: sip:bob@open-ims.test

To Value: <sip:alice@ncsu-ims.test>

310Capture [Wireshark 1.6.7]

Filter: sip Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
79	104.842037	10.0.0.2	10.0.0.20	SIP	1075	Request: SUBSCRIBE sip:alice@10.0.0.20:5060;line=
80	104.842447	10.0.0.20	10.0.0.2	SIP	821	Status: 101 Dialog Establishment
81	104.843043	10.0.0.2	10.0.0.20	SIP	544	Status: 101 Dialog Establishment
82	106.842403	10.0.0.2	10.0.0.20	SIP	561	Status: 408 Request Timeout
157	409.096764	10.0.0.2	10.0.0.20	SIP	757	Request: SUBSCRIBE sip:alice@10.0.0.20:5060;line=
158	409.097197	10.0.0.20	10.0.0.2	SIP	543	Status: 500 Retry Later
186	503.071768	192.168.0.2	10.0.0.2	SIP/SDP	211	Request: INVITE sip:alice@ncsu-ims.test, with ses
187	503.077633	10.0.0.2	192.168.0.2	SIP	677	Status: 100 trying -- your call is important to i
189	503.079801	10.0.0.2	10.0.0.20	SIP/SDP	593	Request: INVITE sip:alice@10.0.0.20:5060;line=d9t
190	503.081416	10.0.0.20	10.0.0.2	SIP	640	Status: 100 Trying
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session descri

▶ Via: SIP/2.0/UDP 192.168.0.20:5060;rport=5060;branch=z9hG4bK263495718

▼ From: "Bob" <sip:bob@open-ims.test>;tag=110779413

SIP Display info: "Bob"

▼ SIP from address: sip:bob@open-ims.test

SIP from address User Part: bob

SIP from address Host Part: open-ims.test

SIP tag: 110779413

▼ To: <sip:alice@ncsu-ims.test>

▼ SIP to address: sip:alice@ncsu-ims.test

SIP to address User Part: alice

SIP to address Host Part: ncsu-ims.test

Call-ID: 68805301

▶ CSeq: 20 INVITE

0000 00 0c 29 86 a9 72 00 0c 29 28 94 77 08 00 45 10 ..)...r...)(.w..E.

0010 02 43 1e f4 00 b9 40 11 44 d8 0a 00 00 02 0a 00 .C....@. D.....

0020 00 14 35 39 33 36 20 52 54 50 2f 41 56 50 20 33 ..5936 R TP/AVP 3

0030 20 30 20 31 30 31 0d 0a 62 3d 41 53 3a 36 34 0d 0 101.. b=AS:64.

Frame (593 bytes) Reassembled IPv4 (2039 bytes)

Frame (frame), 593 bytes Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default

(b) Connection Network Type
Connection Network Type: IN

310Capture [Wireshark 1.6.7]

Filter: sip

Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
81	104.843043	10.0.0.2	10.0.0.20	SIP	544	Status: 101 Dialog Establishment
82	106.842403	10.0.0.2	10.0.0.20	SIP	561	Status: 408 Request Timeout
157	409.096764	10.0.0.2	10.0.0.20	SIP	757	Request: SUBSCRIBE sip:alice@10.0.0.20:5060;line=
158	409.097197	10.0.0.20	10.0.0.2	SIP	543	Status: 500 Retry Later
186	503.071768	192.168.0.2	10.0.0.2	SIP/SDP	211	Request: INVITE sip:alice@ncsu-ims.test, with se
187	503.077633	10.0.0.2	192.168.0.2	SIP	677	Status: 100 trying -- your call is important to
189	503.079801	10.0.0.2	10.0.0.20	SIP/SDP	593	Request: INVITE sip:alice@10.0.0.20:5060;line=d9t
190	503.081416	10.0.0.20	10.0.0.2	SIP	640	Status: 100 Trying
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session descri
196	503.225069	10.0.0.2	192.168.0.2	SIP/SDP	90	Status: 183 Session Progress, with session descri
197	503.610522	192.168.0.2	10.0.0.2	SIP/SDP	1392	Request: PRACK sip:alice@10.0.0.20:5060, with se

▶ Owner/Creator, Session Id (o): - 0 0 IN IP4 192.168.0.20

Session Name (s): IMS Call

▼ Connection Information (c): IN IP4 192.168.0.20

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 192.168.0.20

▶ Time Description, active time (t): 0 0

▶ Media Description, name and address (m): audio 15936 RTP/AVP 3 0 101

▶ Bandwidth Information (b): AS:64

▶ Media Attribute (a): rtpmap:3 GSM/8000

▶ Media Attribute (a): rtpmap:0 PCMU/8000

▶ Media Attribute (a): rtpmap:101 telephone-event/8000

▶ Media Attribute (a): fmp:101 0-11

0000 00 0c 29 86 a9 72 00 0c 29 28 94 77 08 00 45 10 ..)...(.w..E.

0010 02 43 1e f4 00 b9 40 11 44 d8 0a 00 00 02 0a 00 .C....@. D.....

0020 00 14 35 39 33 36 20 52 54 50 2f 41 56 50 20 33 ..5936 R TP/AVP 3

0030 20 30 20 31 30 31 0d 0a 62 3d 41 53 3a 36 34 0d 0 101.. b=AS:64.

Frame (593 bytes) Reassembled IPv4 (2039 bytes)

Frame (frame), 593 bytes Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default

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(2c & 2d) Address and Address Type?

Address: 192.168.0.20

Address Type: IP4

310Capture [Wireshark 1.6.7] 11:12 AM networkbeans

Filter: sip Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
81	104.843043	10.0.0.2	10.0.0.20	SIP	544	Status: 101 Dialog Establishment
82	106.842403	10.0.0.2	10.0.0.20	SIP	561	Status: 408 Request Timeout
157	409.096764	10.0.0.2	10.0.0.20	SIP	757	Request: SUBSCRIBE sip:alice@10.0.0.20:5060;line=
158	409.097197	10.0.0.20	10.0.0.2	SIP	543	Status: 500 Retry Later
186	503.071768	192.168.0.2	10.0.0.2	SIP/SDP	211	Request: INVITE sip:alice@ncsu-ims.test, with se
187	503.077633	10.0.0.2	192.168.0.2	SIP	677	Status: 100 trying -- your call is important to u
189	503.079801	10.0.0.2	10.0.0.20	SIP/SDP	593	Request: INVITE sip:alice@10.0.0.20:5060;line=d9t
190	503.081416	10.0.0.20	10.0.0.2	SIP	640	Status: 100 Trying
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session descri
196	503.225069	10.0.0.2	192.168.0.2	SIP/SDP	90	Status: 183 Session Progress, with session descri
197	503.610522	192.168.0.2	10.0.0.2	SIP/SDP	1392	Request: PRACK sip:alice@10.0.0.20:5060, with se

► Owner/Creator, Session Id (o): - 0 0 IN IP4 192.168.0.20
Session Name (s): IMS Call
▼ Connection Information (c): IN IP4 192.168.0.20
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 192.168.0.20
► Time Description, active time (t): 0 0
► Media Description, name and address (m): audio 15936 RTP/AVP 3 0 101
▼ Bandwidth Information (b): AS:64
Bandwidth Modifier: AS [Application Specific (RTP session bandwidth)]
Bandwidth Value: 64 kb/s
► Media Attribute (a): rtpmap:3 GSM/8000
► Media Attribute (a): rtpmap:0 PCMU/8000

0000 00 0c 29 86 a9 72 00 0c 29 28 94 77 08 00 45 10 ..)...(.w..E.
0010 02 43 1e f4 00 b9 40 11 44 d8 0a 00 00 02 0a 00 .C...@. D.....
0020 00 14 35 39 33 36 20 52 54 50 2f 41 56 50 20 33 ..5936 R TP/AVP 3
0030 20 30 20 31 30 31 0d 0a 62 3d 41 53 3a 36 34 0d 0 101.. b=AS:64.

Frame (593 bytes) Reassembled IPv4 (2039 bytes)

File: "/home/networkbeans/Down... Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default

(2e) What is the Bandwidth Value?

Bandwidth value : 64kb/s

310Capture [Wireshark 1.6.7]

Filter: sip Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
81	104.843043	10.0.0.2	10.0.0.20	SIP	544	Status: 101 Dialog Establishment
82	106.842403	10.0.0.2	10.0.0.20	SIP	561	Status: 408 Request Timeout
157	409.096764	10.0.0.2	10.0.0.20	SIP	757	Request: SUBSCRIBE sip:alice@10.0.0.20:5060;line=
158	409.097197	10.0.0.20	10.0.0.2	SIP	543	Status: 500 Retry Later
186	503.071768	192.168.0.2	10.0.0.2	SIP/SDP	211	Request: INVITE sip:alice@ncsu-ims.test, with se
187	503.077633	10.0.0.2	192.168.0.2	SIP	677	Status: 100 trying -- your call is important to u
189	503.079801	10.0.0.2	10.0.0.20	SIP/SDP	593	Request: INVITE sip:alice@10.0.0.20:5060;line=d9f
190	503.081416	10.0.0.20	10.0.0.2	SIP	640	Status: 100 Trying
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session descri
196	503.225069	10.0.0.2	192.168.0.2	SIP/SDP	90	Status: 183 Session Progress, with session descri
197	503.610522	192.168.0.2	10.0.0.2	SIP/SDP	1392	Request: PRACK sip:alice@10.0.0.20:5060, with ses

► Connection Information (c): IN IP4 192.168.0.20
► Time Description, active time (t): 0 0
► Media Description, name and address (m): audio 15936 RTP/AVP 3 0 101
▼ Bandwidth Information (b): AS:64
 Bandwidth Modifier: AS [Application Specific (RTP session bandwidth)]
 Bandwidth Value: 64 kb/s
► Media Attribute (a): rtpmap:3 GSM/8000
► Media Attribute (a): rtpmap:0 PCMU/8000
► Media Attribute (a): rtpmap:101 telephone-event/8000
► Media Attribute (a): fmp:101 0-11
► Media Attribute (a): curr:qos local none
► Media Attribute (a): curr:qos remote none
► Media Attribute (a): des:qos mandatory local sendrecv

0000 00 0c 29 86 a9 72 00 0c 29 28 94 77 08 00 45 10 ..).r..)(.w..E.
0010 02 43 1e f4 00 b9 40 11 44 d8 0a 00 00 02 0a 00 .C....@. D.....
0020 00 14 35 39 33 36 20 52 54 50 2f 41 56 50 20 33 ..5936 R TP/AVP 3
0030 20 30 20 31 30 31 0d 0a 62 3d 41 53 3a 36 34 0d 0 101.. b=AS:64.

Frame (593 bytes) Reassembled IPv4 (2039 bytes)

File: "/home/networkbeans/Down... Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default

(2f) What are the different MIME TYPES and their sampling rate?

MIME types are:

- 1) GSM = 8000
- 2) PCMU - Sample rate = 8000
- 3) telephone-event - Sample rate = 8000

310 Capture [Wireshark 1.6.7]

Filter: sip Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
81	104.843043	10.0.0.2	10.0.0.20	SIP	544	Status: 101 Dialog Establishment
82	106.842403	10.0.0.2	10.0.0.20	SIP	561	Status: 408 Request Timeout
157	409.096764	10.0.0.2	10.0.0.20	SIP	757	Request: SUBSCRIBE sip:alice@10.0.0.20:5060;line=...
158	409.097197	10.0.0.20	10.0.0.2	SIP	543	Status: 500 Retry Later
186	503.071768	192.168.0.2	10.0.0.2	SIP/SDP	211	Request: INVITE sip:alice@ncsu-ims.test, with se...
187	503.077633	10.0.0.2	192.168.0.2	SIP	677	Status: 100 trying -- your call is important to u...
189	503.079801	10.0.0.2	10.0.0.20	SIP/SDP	593	Request: INVITE sip:alice@10.0.0.20:5060;line=d9f...
190	503.081416	10.0.0.20	10.0.0.2	SIP	640	Status: 100 Trying
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session descri...
196	503.225069	10.0.0.2	192.168.0.2	SIP/SDP	90	Status: 183 Session Progress, with session descri...
197	503.610522	192.168.0.2	10.0.0.2	SIP/SDP	1392	Request: PRACK sip:alice@10.0.0.20:5060, with ses...

Media Format: 3
 MIME Type: GSM
 Sample Rate: 8000

- Media Attribute (a): rtpmap:0 PCMU/8000
 Media Attribute Fieldname: rtpmap
 Media Format: 0
 MIME Type: PCMU
 Sample Rate: 8000
- Media Attribute (a): rtpmap:101 telephone-event/8000
 Media Attribute Fieldname: rtpmap
 Media Format: 101
 MIME Type: telephone-event
 Sample Rate: 8000

Media Attribute (a): rtpmap:101 telephone-event/8000

05e0 41 53 3a 36 34 0d 0a 61 3d 72 74 70 6d 61 70 3a AS:64..a =rtpmap:
 05f0 33 20 47 53 4d 2f 38 30 30 30 0d 0a 61 3d 72 74 3 GSM/80 00..a=rt
 0600 70 6d 61 70 3a 30 20 50 43 4d 55 2f 38 30 30 30 pmap:0 P CMU/8000
 0610 0d 0a 61 3d 72 74 70 6d 61 70 3a 31 30 31 20 74 ..a=rtpmap:101 t

Frame (593 bytes) | Reassembled IPv4 (2039 bytes)

Media Attribute (a) (sdp.media a... | Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 | Profile: Default

3. Observe the PRACK message and answer the following

(3a) What is the difference between PRACK and ACK messages ?

PRACK stands for Provisional Acknowledgement. These indicate reception of 1xx responses while the ACK indicates receipt of 2xx responses.

The image shows a Wireshark capture of SIP traffic. The filter is set to 'sip'. The packet list shows several SIP messages, including INVITE, 100 Trying, 101 Dialog Establishment, 183 Session Progress, and a PRACK message (Frame 197). The PRACK message is highlighted in orange. The packet details pane shows the structure of the PRACK message, including the Session Initiation Protocol (SIP) and the User Datagram Protocol (UDP) headers. The packet bytes pane shows the raw data of the PRACK message, including the SIP message body.

No.	Time	Source	Destination	Protocol	Length	Info
186	503.071768	192.168.0.2	10.0.0.2	SIP/SDP	211	Request: INVITE sip:alice@ncsu-ims.test, with ses
187	503.077633	10.0.0.2	192.168.0.2	SIP	677	Status: 100 trying -- your call is important to c
189	503.079801	10.0.0.2	10.0.0.20	SIP/SDP	593	Request: INVITE sip:alice@10.0.0.20:5060;line=d98
190	503.081416	10.0.0.20	10.0.0.2	SIP	640	Status: 100 Trying
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session descri
196	503.225069	10.0.0.2	192.168.0.2	SIP/SDP	90	Status: 183 Session Progress, with session descri
197	503.610522	192.168.0.2	10.0.0.2	SIP/SDP	1392	Request: PRACK sip:alice@10.0.0.20:5060, with ses
198	503.611181	10.0.0.2	10.0.0.20	SIP/SDP	1455	Request: PRACK sip:alice@10.0.0.20:5060, with ses
199	503.618516	10.0.0.20	10.0.0.2	SIP/SDP	1401	Status: 200 OK, with session description
200	503.619155	10.0.0.2	192.168.0.2	SIP/SDP	1248	Status: 200 OK, with session description
201	503.811962	192.168.0.2	10.0.0.2	SIP/SDP	1347	Request: UPDATE sip:alice@10.0.0.20:5060, with se

Frame 197: 1392 bytes on wire (11136 bits), 1392 bytes captured (11136 bits)

- Ethernet II, Src: Vmware a2:b8:49 (00:0c:29:a2:b8:49), Dst: Vmware 28:94:77 (00:0c:29:28:94:77)
- Internet Protocol Version 4, Src: 192.168.0.2 (192.168.0.2), Dst: 10.0.0.2 (10.0.0.2)
- User Datagram Protocol, Src Port: 6060 (6060), Dst Port: 6060 (6060)
 - Source port: 6060 (6060)
 - Destination port: 6060 (6060)
 - Length: 1358
 - Checksum: 0x18d2 [validation disabled]
- Session Initiation Protocol

0000 00 0c 29 28 94 77 00 0c 29 a2 b8 49 08 00 45 10 ..)(.w..)..I..E.
0010 05 62 00 00 40 00 3f 11 6b cf c0 a8 00 02 0a 00 .b..@.?..k.....
0020 00 02 17 ac 17 ac 05 4e 18 d2 50 52 41 43 4b 20N ..PRACK
0030 73 69 70 3a 61 6c 69 63 65 40 31 30 2e 30 2e 30 sip:alic e@10.0.0
0040 2e 32 30 3a 35 30 36 30 20 53 49 50 2f 32 2e 30 .20:5060 SIP/2.0
0050 0d 0a 56 69 61 3a 20 53 49 50 2f 32 2e 30 2f 55 Via: S IP/2 0/U

Frame (frame), 1392 bytes Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default

(3b) What is the value of the Max-Forwards what does it signify?

Max Forwards: 15

The Max-Forwards value signifies the valid number of hops a request can transit before it is rejected.

310Capture [Wireshark 1.6.7]

Filter: sip Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
186	503.071768	192.168.0.2	10.0.0.2	SIP/SDP	211	Request: INVITE sip:alice@ncsu-ims.test, with ses
187	503.077633	10.0.0.2	192.168.0.2	SIP	677	Status: 100 trying -- your call is important to c
189	503.079801	10.0.0.2	10.0.0.20	SIP/SDP	593	Request: INVITE sip:alice@10.0.0.20:5060;line=d9t
190	503.081416	10.0.0.20	10.0.0.2	SIP	640	Status: 100 Trying
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session descri
196	503.225069	10.0.0.2	192.168.0.2	SIP/SDP	90	Status: 183 Session Progress, with session descri
197	503.610522	192.168.0.2	10.0.0.2	SIP/SDP	1392	Request: PRACK sip:alice@10.0.0.20:5060, with ses
198	503.611181	10.0.0.2	10.0.0.20	SIP/SDP	1455	Request: PRACK sip:alice@10.0.0.20:5060, with ses
199	503.618516	10.0.0.20	10.0.0.2	SIP/SDP	1401	Status: 200 OK, with session description
200	503.619155	10.0.0.2	192.168.0.2	SIP/SDP	1248	Status: 200 OK, with session description
201	503.811962	192.168.0.2	10.0.0.2	SIP/SDP	1347	Request: UPDATE sip:alice@10.0.0.20:5060, with se

Route: <sip:mt@scscf.ncsu-ims.test:6060;lr>
Route: <sip:mt@pcscf.ncsu-ims.test:4060;lr>
▶ From: "Bob" <sip:bob@open-ims.test>;tag=110779413
▶ To: <sip:alice@ncsu-ims.test>;tag=1933730201
Call-ID: 68805301
▶ CSeq: 21 PRACK
▶ Contact: <sip:bob@192.168.0.20:5060>
Content-Type: application/sdp
Max-Forwards: 15
User-Agent: UCT IMS Client
▶ Rack: 1 20 INVITE
P-Access-Network-Info: IEEE-802.11a
Content-Length: 645

0230 6c 69 63 61 74 69 6f 6e 2f 73 64 70 0d 0a 4d 61 llication /sdp..Ma
0240 78 2d 46 6f 72 77 61 72 64 73 3a 20 31 35 0d 0a x-Forward ds: 15..
0250 55 73 65 72 2d 41 67 65 6e 74 3a 20 55 43 54 20 User-Age nt: UCT
0260 49 4d 53 20 43 6c 69 65 6e 74 0d 0a 52 41 63 6b IMS Clie nt..Rack
0270 3a 20 31 20 32 30 20 49 4e 56 49 54 45 0d 0a 50 : 1 20 I NVITE..P
0280 2d 41 63 63 65 73 73 2d 4e 65 74 77 6f 72 6b 2d -Access- Network-

RFC 3261: Max-Forwards Header (... = Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default

(3c) What are the values for Media Description?

Media type: message

Media Port: 13180

Media type: video

Media Port: 25224

310Capture [Wireshark 1.6.7]

Filter: sip Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
186	503.071768	192.168.0.2	10.0.0.2	SIP/SDP	211	Request: INVITE sip:alice@ncsu-ims.test, with ses
187	503.077633	10.0.0.2	192.168.0.2	SIP	677	Status: 100 trying -- your call is important to t
189	503.079801	10.0.0.2	10.0.0.20	SIP/SDP	593	Request: INVITE sip:alice@10.0.0.20:5060;line=d9
190	503.081416	10.0.0.20	10.0.0.2	SIP	640	Status: 100 Trying
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session descri
196	503.225069	10.0.0.2	192.168.0.2	SIP/SDP	90	Status: 183 Session Progress, with session descri
197	503.610522	192.168.0.2	10.0.0.2	SIP/SDP	1392	Request: PRACK sip:alice@10.0.0.20:5060, with ses
198	503.611181	10.0.0.2	10.0.0.20	SIP/SDP	1455	Request: PRACK sip:alice@10.0.0.20:5060, with ses
199	503.618516	10.0.0.20	10.0.0.2	SIP/SDP	1401	Status: 200 OK, with session description
200	503.619155	10.0.0.2	192.168.0.2	SIP/SDP	1248	Status: 200 OK, with session description
201	503.811962	192.168.0.2	10.0.0.2	SIP/SDP	1347	Request: UPDATE sip:alice@10.0.0.20:5060, with se

Media Format: DynamicRTP-Type-96

- ▶ Bandwidth Information (b): AS:128
- ▶ Media Attribute (a): curr:qos local none
- ▶ Media Attribute (a): curr:qos remote none
- ▶ Media Attribute (a): des:qos mandatory local sendrecv
- ▶ Media Attribute (a): des:qos mandatory remote sendrecv
- ▶ Media Attribute (a): rtpmap:96 H263-1998
- ▶ Media Attribute (a): fmp:96 profile-level-id=0
- ▼ Media Description, name and address (m): message 13180 TCP/MSRP
 - Media Type: message
 - Media Port: 13180
- ▶ Media Attribute (a): accept-types:text/plain
- ▶ Media Attribute (a): path:msrp://192.168.0.20:13180/16d2aef3313b;tcp

0000 00 0c 29 28 94 77 00 0c 29 a2 b8 49 08 00 45 10 ..)(.w..)..I..E.
0010 05 62 00 00 40 00 3f 11 6b cf c0 a8 00 02 0a 00 .b..@.?. k.....
0020 00 02 17 ac 17 ac 05 4e 18 d2 50 52 41 43 4b 20N ..PRACK
0030 73 69 70 3a 61 6c 69 63 65 40 31 30 2e 30 2e 30 sip:alic e@10.0.0
0040 2e 32 30 3a 35 30 36 30 20 53 49 50 2f 32 2e 30 .20:5060 SIP/2.0
0050 0d 0a 56 69 61 3a 20 53 49 50 2f 32 2e 30 2f 55 Via: S IP/2 0/11

File: "/home/networkbeans/Down... Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default

310Capture [Wireshark 1.6.7] 11:22 AM networkbeans

Filter: sip Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
186	503.071768	192.168.0.2	10.0.0.2	SIP/SDP	211	Request: INVITE sip:alice@ncsu-ims.test, with ses
187	503.077633	10.0.0.2	192.168.0.2	SIP	677	Status: 100 trying -- your call is important to c
189	503.079801	10.0.0.2	10.0.0.20	SIP/SDP	593	Request: INVITE sip:alice@10.0.0.20:5060;line=d9b
190	503.081416	10.0.0.20	10.0.0.2	SIP	640	Status: 100 Trying
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session descri
196	503.225069	10.0.0.2	192.168.0.2	SIP/SDP	90	Status: 183 Session Progress, with session descri
197	503.610522	192.168.0.2	10.0.0.2	SIP/SDP	1392	Request: PRACK sip:alice@10.0.0.20:5060, with ses
198	503.611181	10.0.0.2	10.0.0.20	SIP/SDP	1455	Request: PRACK sip:alice@10.0.0.20:5060, with ses
199	503.618516	10.0.0.20	10.0.0.2	SIP/SDP	1401	Status: 200 OK, with session description
200	503.619155	10.0.0.2	192.168.0.2	SIP/SDP	1248	Status: 200 OK, with session description
201	503.811962	192.168.0.2	10.0.0.2	SIP/SDP	1347	Request: UPDATE sip:alice@10.0.0.20:5060, with se

Media Description, name and address (m): video 25224 RTP/AVP 96

- Media Type: video
- Media Port: 25224
- Media Protocol: RTP/AVP
- Media Format: DynamicRTP-Type-96
- ▶ Bandwidth Information (b): AS:128
- ▶ Media Attribute (a): curr:qos local none
- ▶ Media Attribute (a): curr:qos remote none
- ▶ Media Attribute (a): des:qos mandatory local sendrecv
- ▶ Media Attribute (a): des:qos mandatory remote sendrecv
- ▶ Media Attribute (a): rtpmap:96 H263-1998
- ▶ Media Attribute (a): fmp:96 profile-level-id=0

Media Description, name and address (m): message 13180 TCP/MSRP

```

0000  00 0c 29 28 94 77 00 0c 29 a2 b8 49 08 00 45 10  ..)(.w.. )..I..E.
0010  05 62 00 00 40 00 3f 11 6b cf c0 a8 00 02 0a 00  .b..@.?. k.....
0020  00 02 17 ac 17 ac 05 4e 18 d2 50 52 41 43 4b 20  .....N ..PRACK
0030  73 69 70 3a 61 6c 69 63 65 40 31 30 2e 30 2e 30  sip:alic e@10.0.0
0040  2e 32 30 3a 35 30 36 30 20 53 49 50 2f 32 2e 30  .20:5060 SIP/2.0
0050  0d 0a 56 69 61 3a 20 53 49 50 2f 32 2e 30 2f 55  Via: S IP/2.0/II

```

File: "/home/networkbeans/Down... Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default

4. Identify session progress message and identify the User-Agent ?

User-Agent ID: UCT IMS Client with Contact info as alice@10.0.0.20:5060

310Capture [Wireshark 1.6.7]

Filter: sip Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
191	503.081496	10.0.0.20	10.0.0.2	SIP	915	Status: 101 Dialog Establishment
192	503.082636	10.0.0.2	192.168.0.2	SIP	723	Status: 101 Dialog Establishment
194	503.223838	10.0.0.20	10.0.0.2	SIP/SDP	282	Status: 183 Session Progress, with session description
196	503.225060	10.0.0.2	192.168.0.2	SIP/SDP	90	Status: 183 Session Progress, with session description

▶ From: "Bob" <sip:bob@open-ims.test>;tag=110779413
▶ To: <sip:alice@ncsu-ims.test>;tag=1933730201
Call-ID: 68805301
▶ CSeq: 20 INVITE
▶ Contact: <sip:alice@10.0.0.20:5060>
Content-Type: application/sdp
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
User-Agent: UCT IMS Client
Require: 100rel
RSeq: 1
P-Access-Network-Info: IEEE-802.11a
Content-Length: 690

▼ Message Body

▼ Session Description Protocol

Session Description Protocol Version (v): 0

▼ Owner/Creator, Session Id (o): - 0 0 IN IP4 10.0.0.20

Owner Username: -
Session ID: 0
Session Version: 0
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.0.0.20

0000 00 0c 29 28 94 77 00 0c 29 86 a9 72 08 00 45 00 ..)(.w..)..r..E.
0010 01 0c e2 ca 00 b9 40 11 82 48 0a 00 00 14 0a 00@. .H.....
0020 00 02 3a 71 6f 73 20 6d 61 6e 64 61 74 6f 72 79 ...:qos m andatory
0030 20 72 65 6d 6f 74 65 20 73 65 6e 64 72 65 63 76 remote sendrecv

Frame (282 bytes) Reassembled IPv4 (1728 bytes)

Frame (frame), 282 bytes Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default

5. Identify a Notify message and provide details of Registration information ?

Registration information is in the screenshot below.

The screenshot shows a Wireshark capture of a SIP message. The filter is set to 'sip'. The packet list shows a SIP/XML message (No. 28, Time 59.221792, Source 10.0.0.2, Destination 10.0.0.20, Length 1072) with the info 'Request: NOTIFY sip:alice@10.0.0.20:5060'. The packet details pane shows the 'extensible Markup Language' section expanded, displaying the XML payload. The XML is a SIP NOTIFY message with a registration information body.

No.	Time	Source	Destination	Protocol	Length	Info
28	59.221792	10.0.0.2	10.0.0.20	SIP/XML	1072	Request: NOTIFY sip:alice@10.0.0.20:5060

```
<?xml
<reginfo
  xmlns="urn:ietf:params:xml:ns:reginfo"
  version="0"
  state="full">
  <registration
    aor="sip:alice@ncsu-ims.test"
    id="0xb59da070"
    state="active">
    <contact
      id="0xb59e5b5c"
      state="active"
      event="registered"
      expires="600000">
      <uri>
        sip:alice@10.0.0.20:5060;line=d9b68b5fb16599e
      </uri>
      <unknown-param
        name="+sip.instance">
          [ ERROR: Unrecognized text ]
        </contact>
      </registration>
    </reginfo>
```

0260 2b 78 6d 6c 0d 0a 0d 0a 3c 3f 78 6d 6c 20 76 65 +xml.... <?xml ve
0270 72 73 69 6f 6e 3d 22 31 2e 30 22 3f 3e 0a 3c 72 rsion="1.0"?>.<r
0280 65 67 69 6e 66 6f 20 78 6d 6c 6e 73 3d 22 75 72 eginfo x mlns="ur
0290 6e 3a 69 65 74 66 3a 70 61 72 61 6d 73 3a 78 6d n:ietf:p arams:xm
02a0 6c 3a 6e 73 3a 72 65 67 69 6e 66 6f 22 20 76 65 l:ns:reg info" ve
02b0 72 73 69 6f 6e 3d 22 30 22 20 73 74 61 74 65 3d rsion="0 " state=

Extensible Markup Language (xml...) Packets: 407 Displayed: 163 Marked: 0 Load time: 0:00.021 Profile: Default