Lab Hours

- We need to allocate 3 hours in this week for hands-on lab hours (Nov 13th 14:10-17:00).
- The instructor will set up the SIP server.
- Every student will bring a labtop or desktop PC and install a SIP UA (softphone). It will be even better if you have a WiFi-phone.
- Packet analyzer will be utilized to capture and analyze the SIP messages.

SIP UAs and SIP Message Analysis

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Exercise 1: SIP UA operations

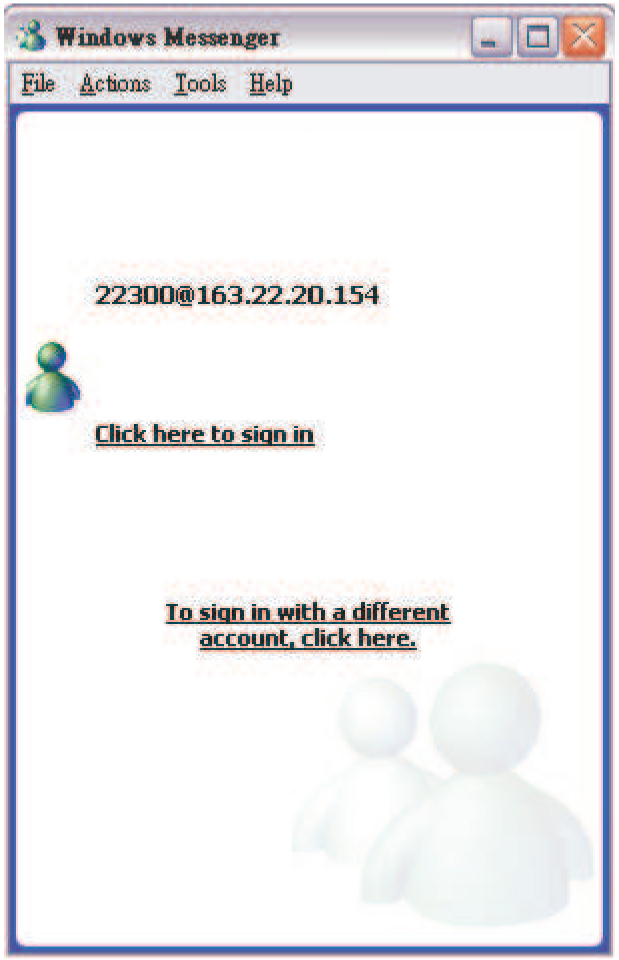
- Download & Install SIP UA
- Download & Install Ethereal
- Packet Analysis Using Ethereal
  - SIP signaling flow
  - RTP traffic
  - SIP headers
  - SDP Contents
  - Call Hold/Retrieve

Windows-based SIP UA

- Microsoft Windows Messenger
- X-Lite

SIP UA – Windows Messenger

- By default, Windows XP installs Windows Messenger Version 4.7
- There are two messengers from Microsoft
  - MSN Messenger 6.2, 7.0
  - Windows Messenger 4.7, 5.1
- Inside Windows Messenger - How it Communicates
  - http://www.microsoft.com/technet/prodtechnol/winxppro/evaluate/insid01.mspx

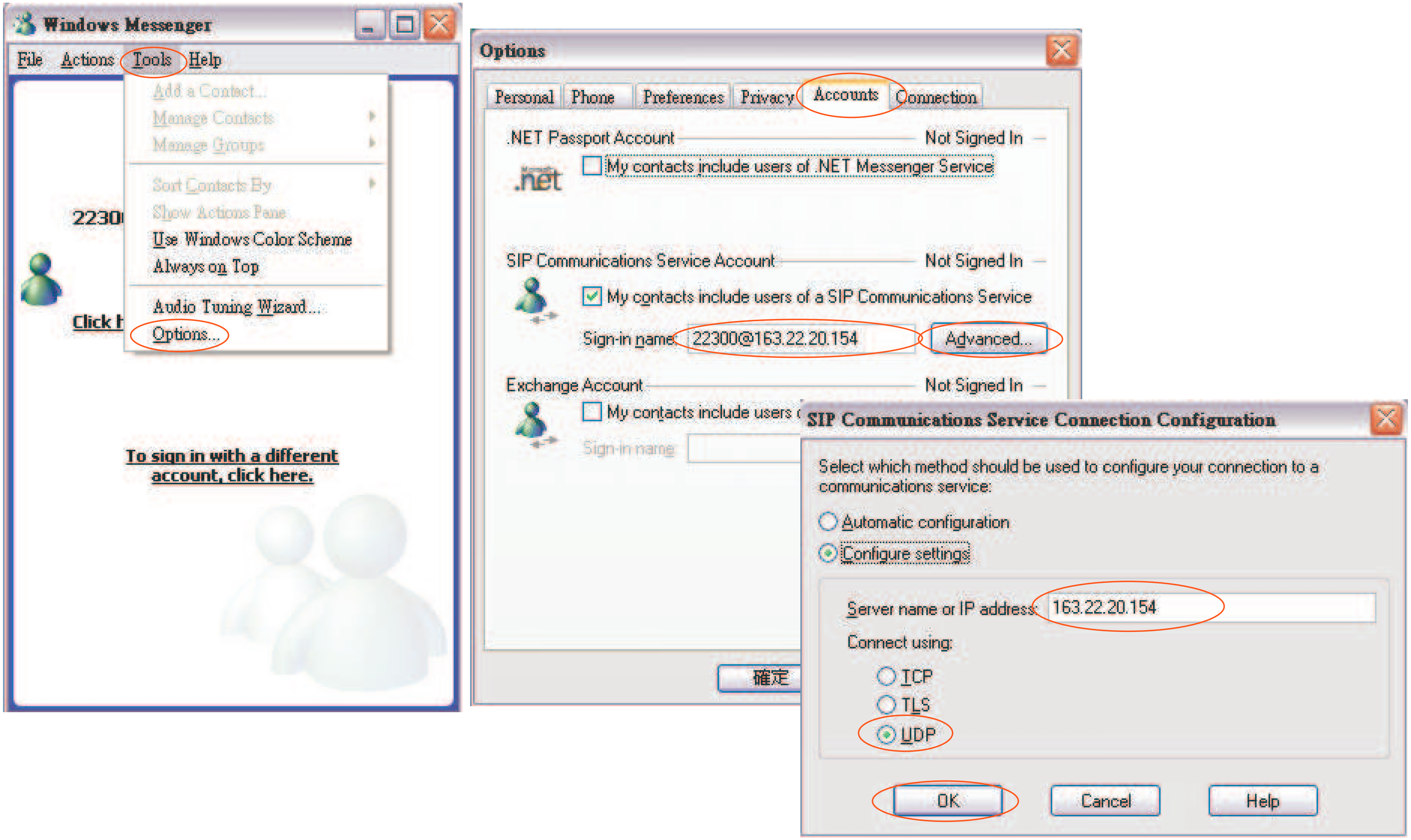


22300@163.22.20.154

Click here to sign in

To sign in with a different account, click here.

Step 1: Configure



.NET Passport Account — Not Signed In

□ My contacts include users of .NET Messenger Service

SIP Communications Service Account — Not Signed In

☑ My contacts include users of a SIP Communications Service

Sign-in name: 22300@163.22.20.154 Advanced...

Exchange Account — Not Signed In

□ My contacts include users o

Sign-in name:

SIP Communications Service Connection Configuration

Select which method should be used to configure your connection to a communications service:

○ Automatic configuration

● Configure settings

Server name or IP address: 163.22.20.154

Connect using:

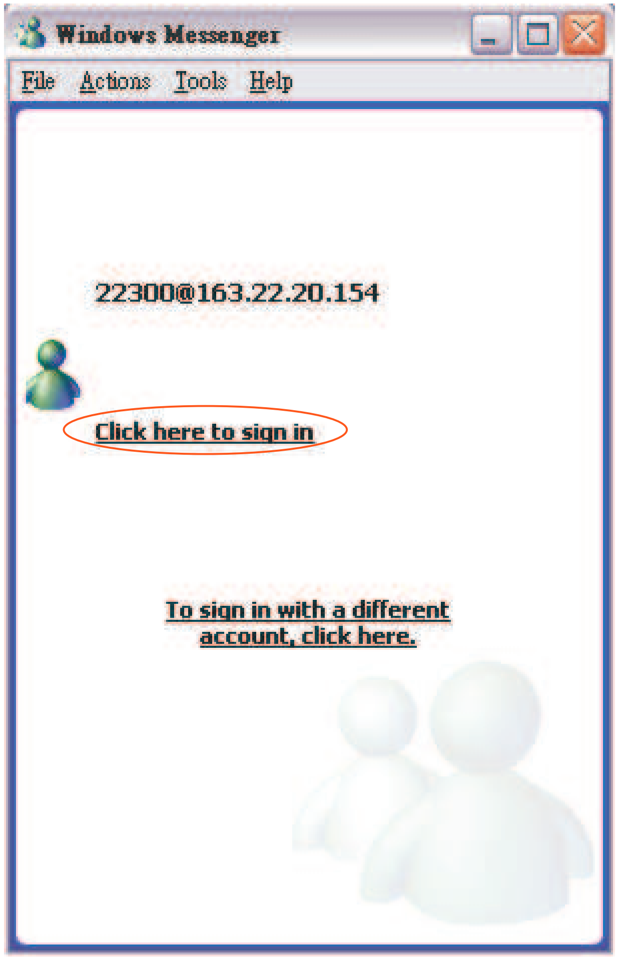
○ TCP

○ TLS

● UDP

OK Cancel Help

Step 2: REGISTER

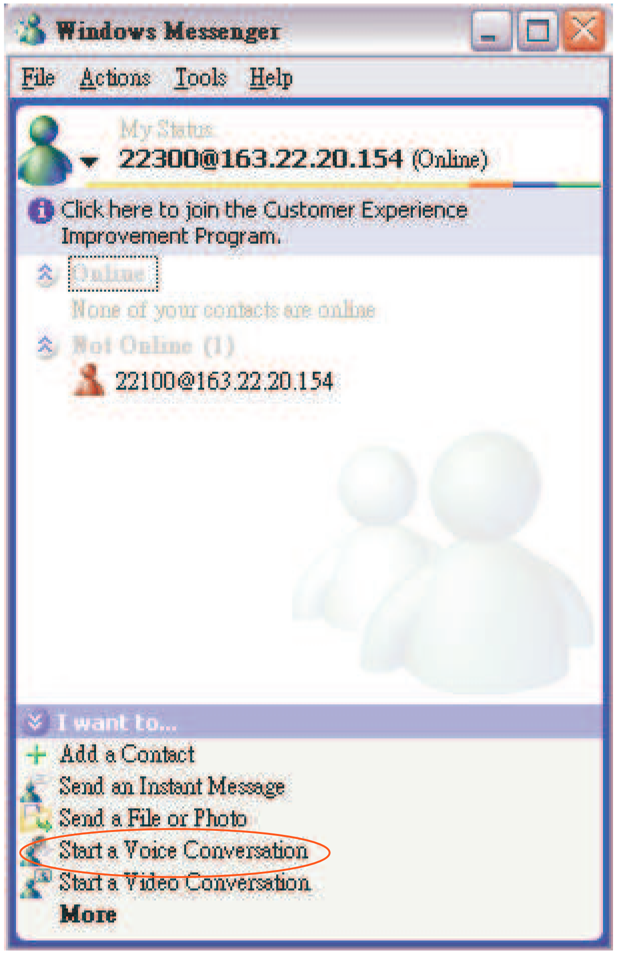


22300@163.22.20.154

Click here to sign in

To sign in with a different account, click here.

Step 3: Make A Call



22300@163.22.20.154 (Online)

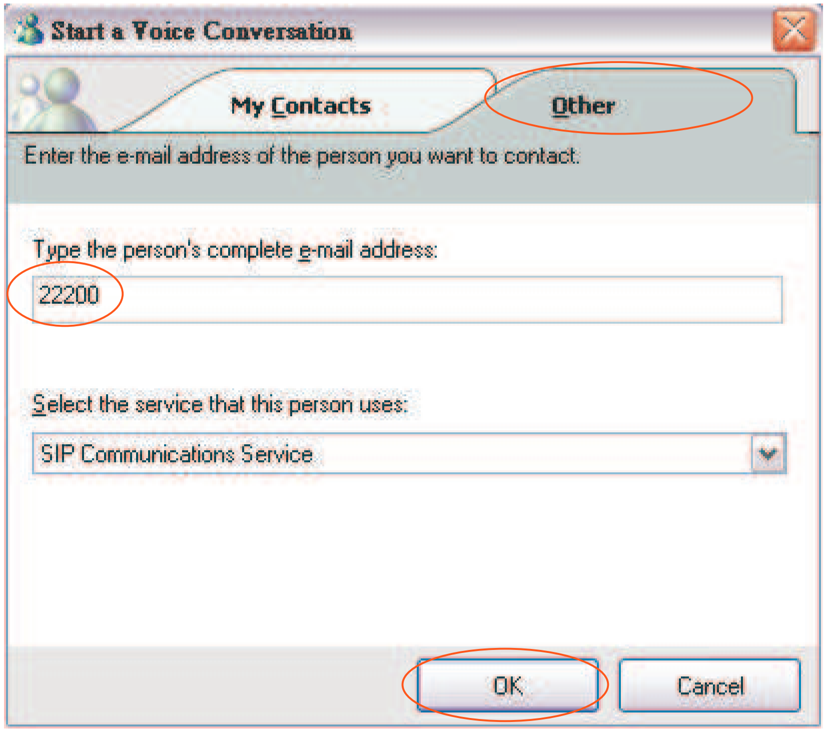
Click here to join the Customer Experience Improvement Program.

Online

None of your contacts are online

Not Online (1)

22100@163.22.20.154

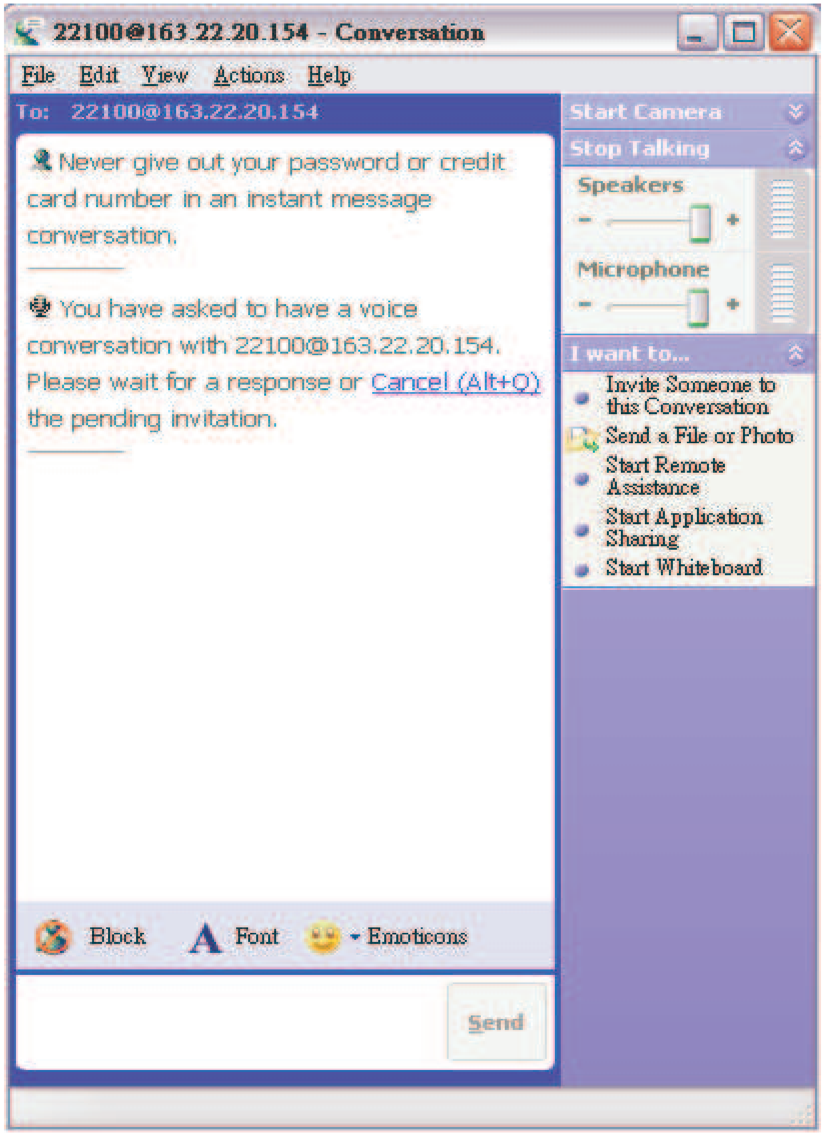


Enter the e-mail address of the person you want to contact.

Type the person's complete e-mail address: 22200

Select the service that this person uses: SIP Communications Service

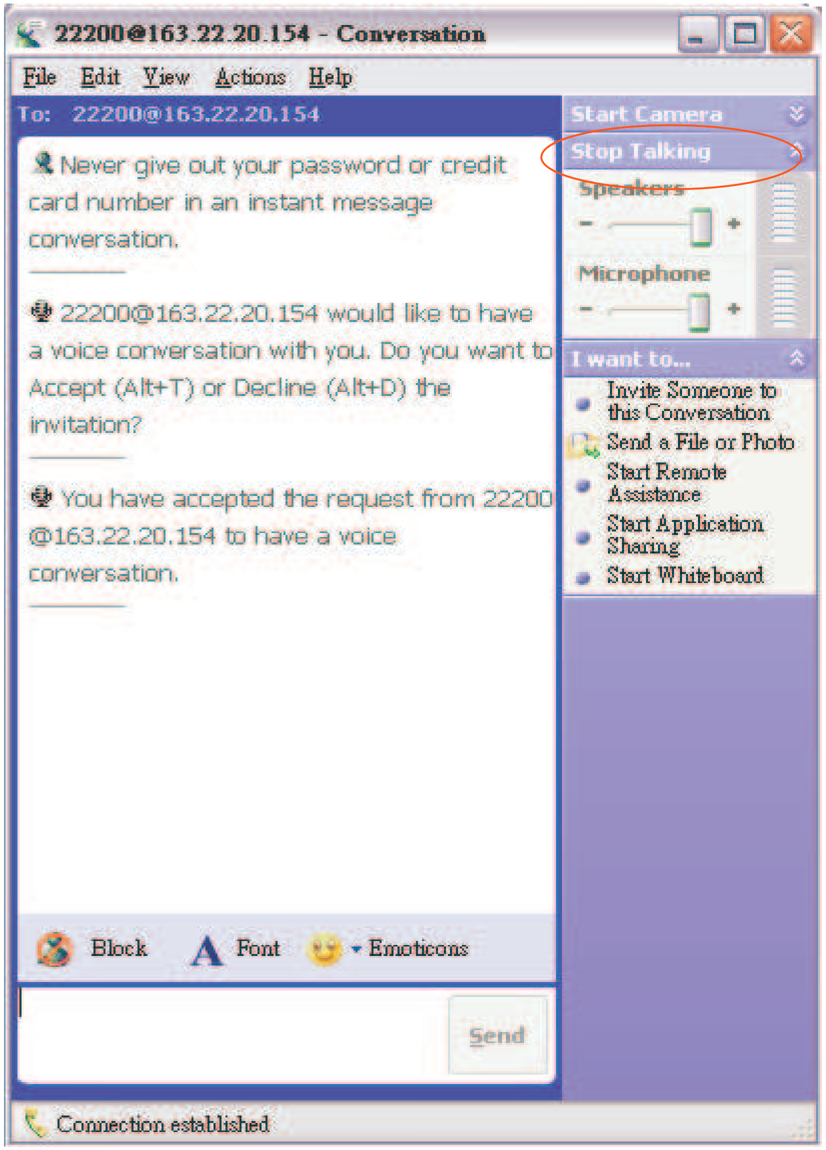
Step 4: Ringing



Never give out your password or credit card number in an instant message conversation.

You have asked to have a voice conversation with 22100@163.22.20.154. Please wait for a response or Cancel (Alt+Q) the pending invitation.

Step 5: Conversation



To: 22200@163.22.20.154

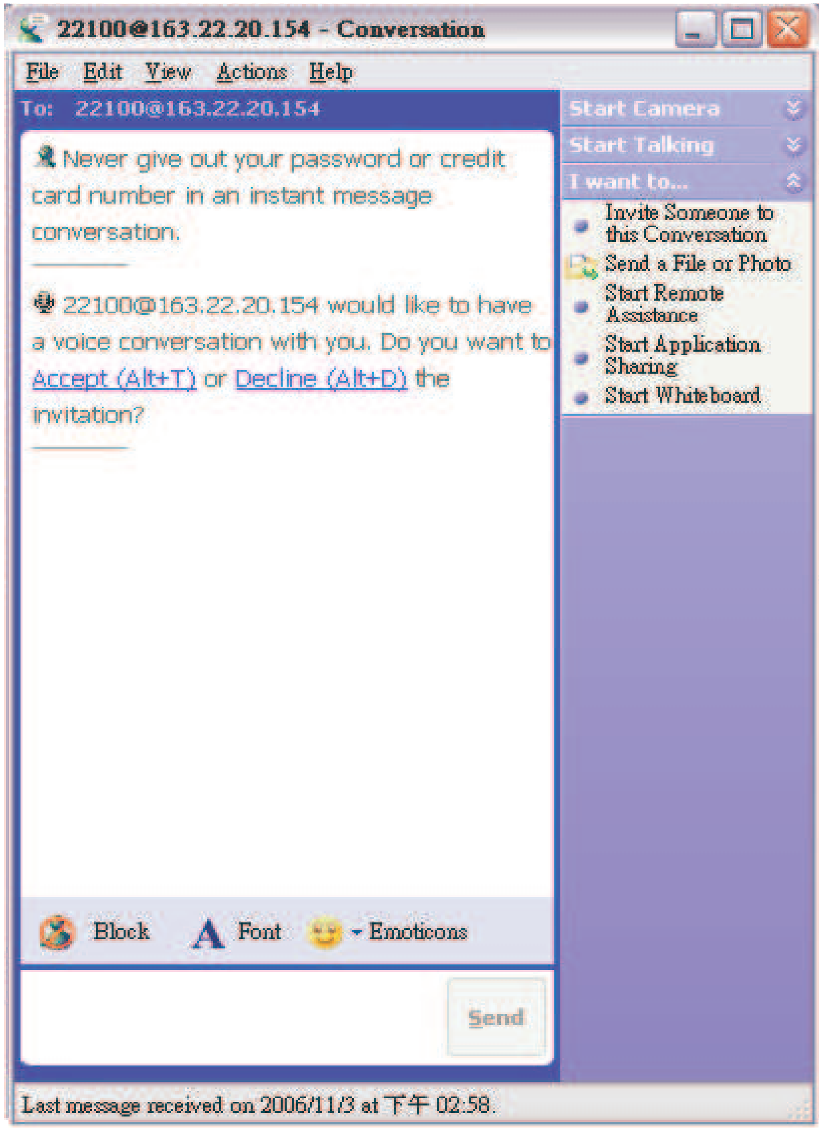
Never give out your password or credit card number in an instant message conversation.

22200@163.22.20.154 would like to have a voice conversation with you. Do you want to Accept (Alt+T) or Decline (Alt+D) the invitation?

You have accepted the request from 22200@163.22.20.154 to have a voice conversation.

Connection established

Step 6: Answer A Call

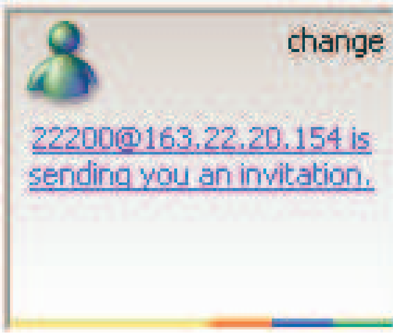


To: 22100@163.22.20.154

Never give out your password or credit card number in an instant message conversation.

22100@163.22.20.154 would like to have a voice conversation with you. Do you want to Accept (Alt+T) or Decline (Alt+D) the invitation?

Last message received on 2006/11/3 at 下午 02:58.



22200@163.22.20.154 is sending you an invitation.

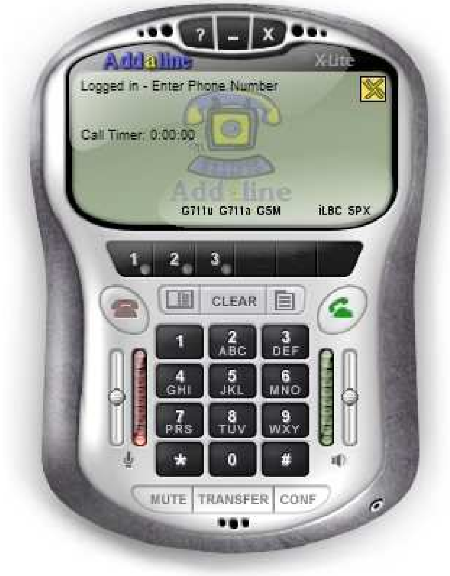
SIP UA - X-Lite

- X-Lite - The Best Free Softphone
- A FREE premium SIP softphone with many PBX-like features.
- Open standards-based design (SIP) allows for maximum network interoperation and integration.
- Download from http://www.xten.com/

Features

- Touch-tones [DTMF]
- 3 Lines, Multiple Proxies
- Line Hold
- Inbound Call 'Ignore'
- Inbound Call 'Go to Voicemail'
- Dial/ Redial/Hangup
- Caller ID [SIP ID]
- Call Timer
- Mute
- Microphone & Speakers Levels
- Microphone & Speakers Meters
- Recent Calls Dialed
- Recent Calls Received
- Speed Dial

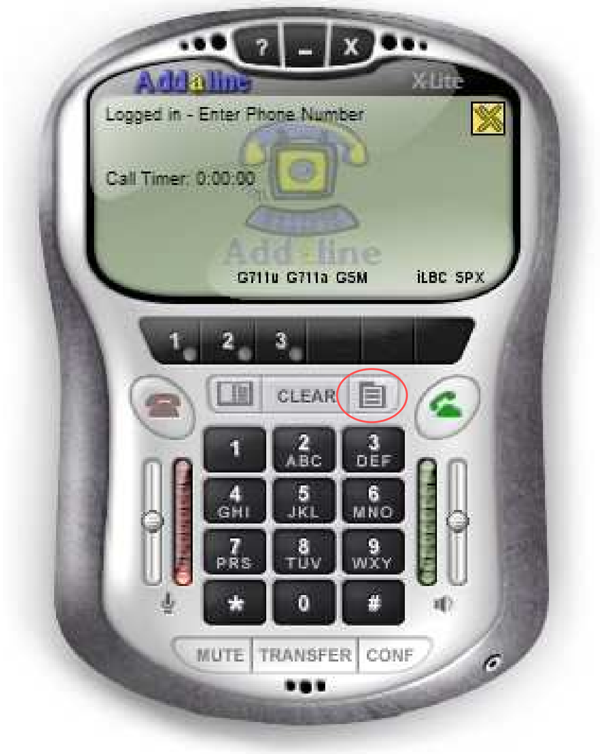
- G.711u+a/iLBC/GSM codecs
- NAT/Firewall support
- Specify NAT IP to be written in SIP messages
- Supports Windows 98SE/NT4/ME/2000/XP

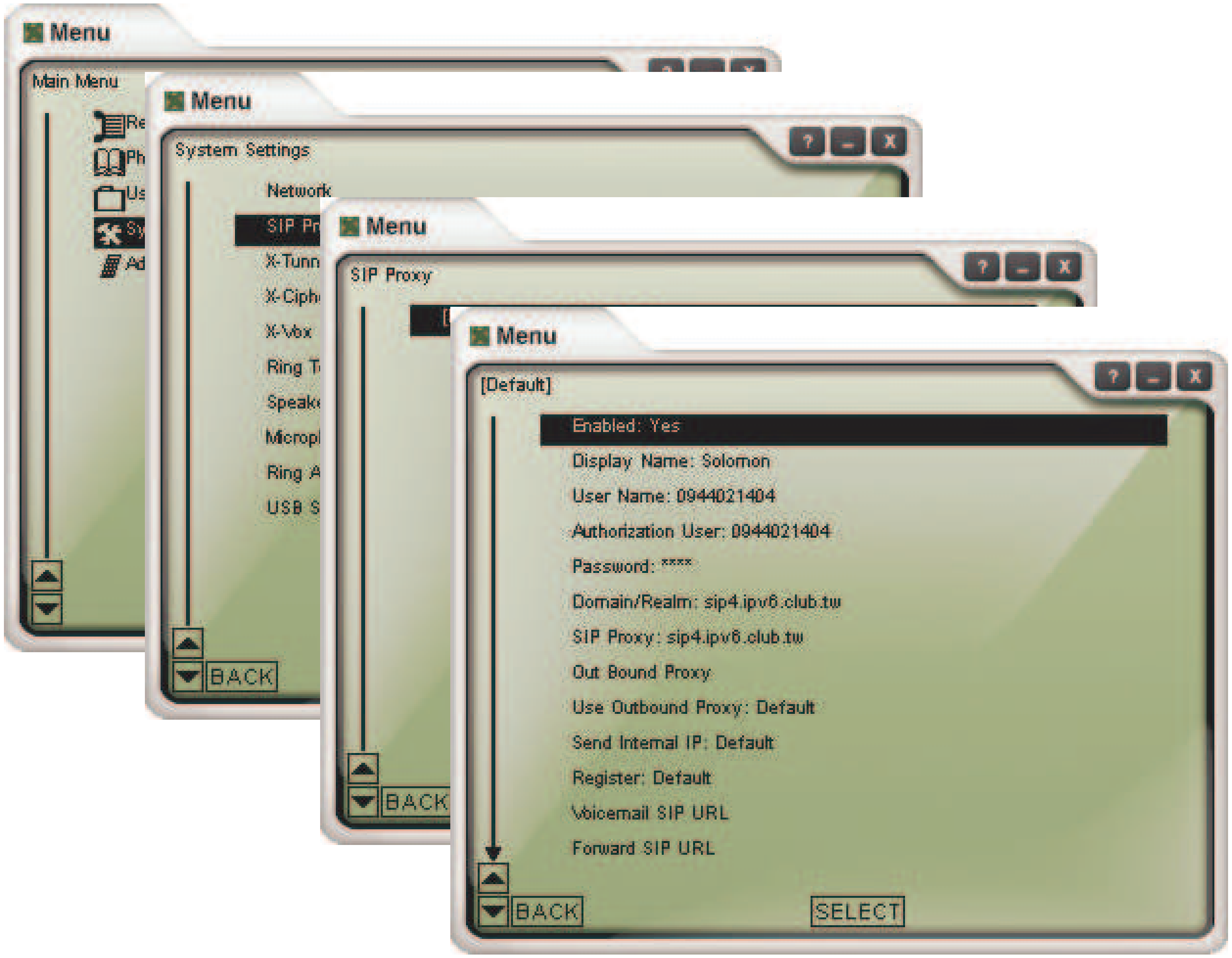


Logged in - Enter Phone Number

Call Timer: 0:00:00

Step 1: Configuration





[Default]

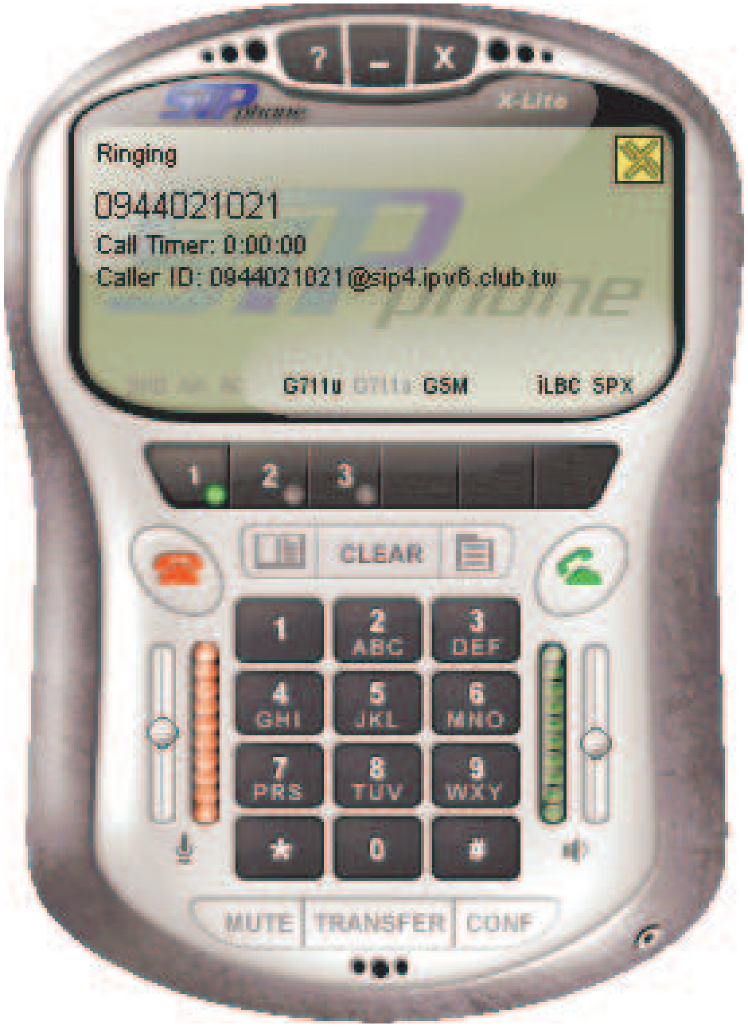
- Enabled: Yes
- Display Name: Solomon
- User Name: 0944021404
- Authorization User: 0944021404
- Password: ****
- Domain/Realm: sip4.ipv6.club.tw
- SIP Proxy: sip4.ipv6.club.tw
- Out Bound Proxy
- Use Outbound Proxy: Default
- Send Internal IP: Default
- Register: Default
- Voicemail SIP URL
- Forward SIP URL

Where to Get X-lite

- http://ms11.voip.edu.tw/~yingshun/tool/X_lite-Xten-Win32-1103m.exe (2.0)
- http://www.counterpath.com/ (3.0)

Step 2: Make/Receive Calls

- Automatically send a REGISTER request to registrar when the program starts up.
- Dial digits, and domain realm will be appended automatically.



Ringing

0944021021

Call Timer: 0:00:00

Caller ID: 0944021021@sip4.ipv6.club.tw

Packets Capturing
&
Analyzing

Ethereal – What Is It?

- Every network manager at some time or other needs a tool that can capture packets off the network and analyze them.
- In the past, such tools were either very expensive, proprietary, or both.
- With the advent of Ethereal, all that has changed.
- *"A rose by any other name would smell as sweet."* - William Shakespeare

Features of Ethereal

- Available for UNIX and Windows.
- Capture and display packets from any interface on a UNIX system.
- Display packets captured under a number of other capture programs:
  - tcpdump
  - Network Associates Sniffer and Sniffer Pro
  - NetXray
  - Microsoft Network Monitor
- Filter packets on many criteria.
- Colorize packet display based on filters
- Allow people to add new protocols to Ethereal.

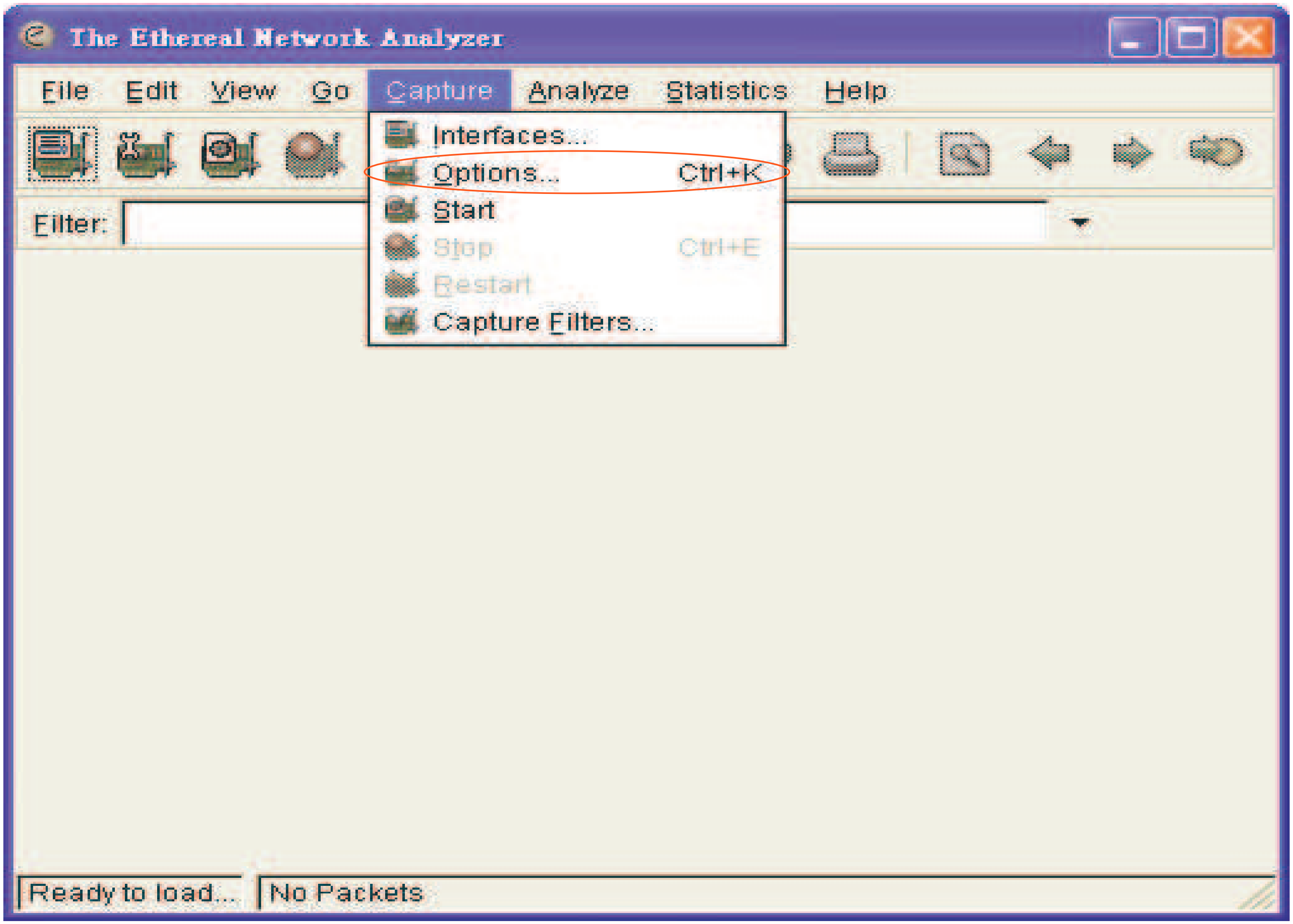
Where to Get Ethereal

- Official site: http://www.ethereal.com/

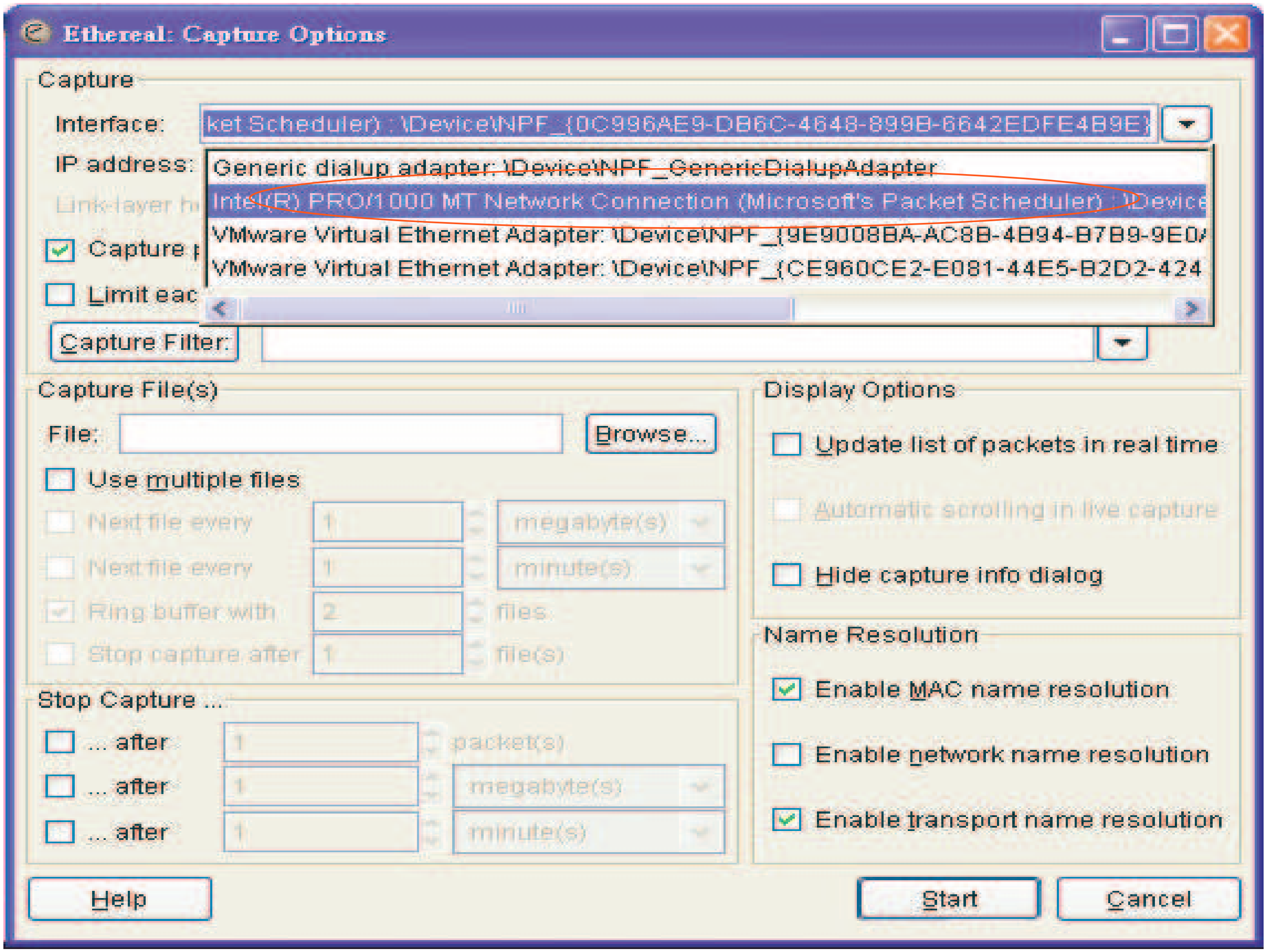
Install Ethereal under Windows

- Install WinPcap 3.1.
  - WinPcap is an architecture for packet capture and network analysis for the Win32 platforms.
  - It includes
    - ☞a kernel-level packet filter,
    - ☞a low-level dynamic link library (packet.dll), and
    - ☞a high-level and system-independent library (wpcap.dll, based on libpcap version 0.6.2)
- Install Ethereal 0.10.14.

Capturing packets with Ethereal



Capturing packets with Ethereal



Ethereal: Capture Options

Capture

Interface: ket Scheduler) : \Device\NPF_{0C996AE9-DB6C-4648-899B-6642EDFE4B9E}

Generic dialup adapter: \Device\NPF_GenericDialupAdapter

Intel(R) PRO/1000 MT Network Connection (Microsoft's Packet Scheduler) : \Device

VMware Virtual Ethernet Adapter: \Device\NPF_{9E9008BA-AC8B-4B94-B7B9-9E0/

VMware Virtual Ethernet Adapter: \Device\NPF_{CE960CE2-E081-44E5-B2D2-424

IP address:

Link-layer h

☑ Capture p

□ Limit eac

Capture Filter:

Capture File(s)

File: Browse...

□ Use multiple files

□ Next file every 1 megabyte(s)

□ Next file every 1 minute(s)

☑ Ring buffer with 2 files

□ Stop capture after 1 file(s)

Stop Capture ...

□ ... after 1 packet(s)

□ ... after 1 megabyte(s)

□ ... after 1 minute(s)

Display Options

□ Update list of packets in real time

□ Automatic scrolling in live capture

□ Hide capture info dialog

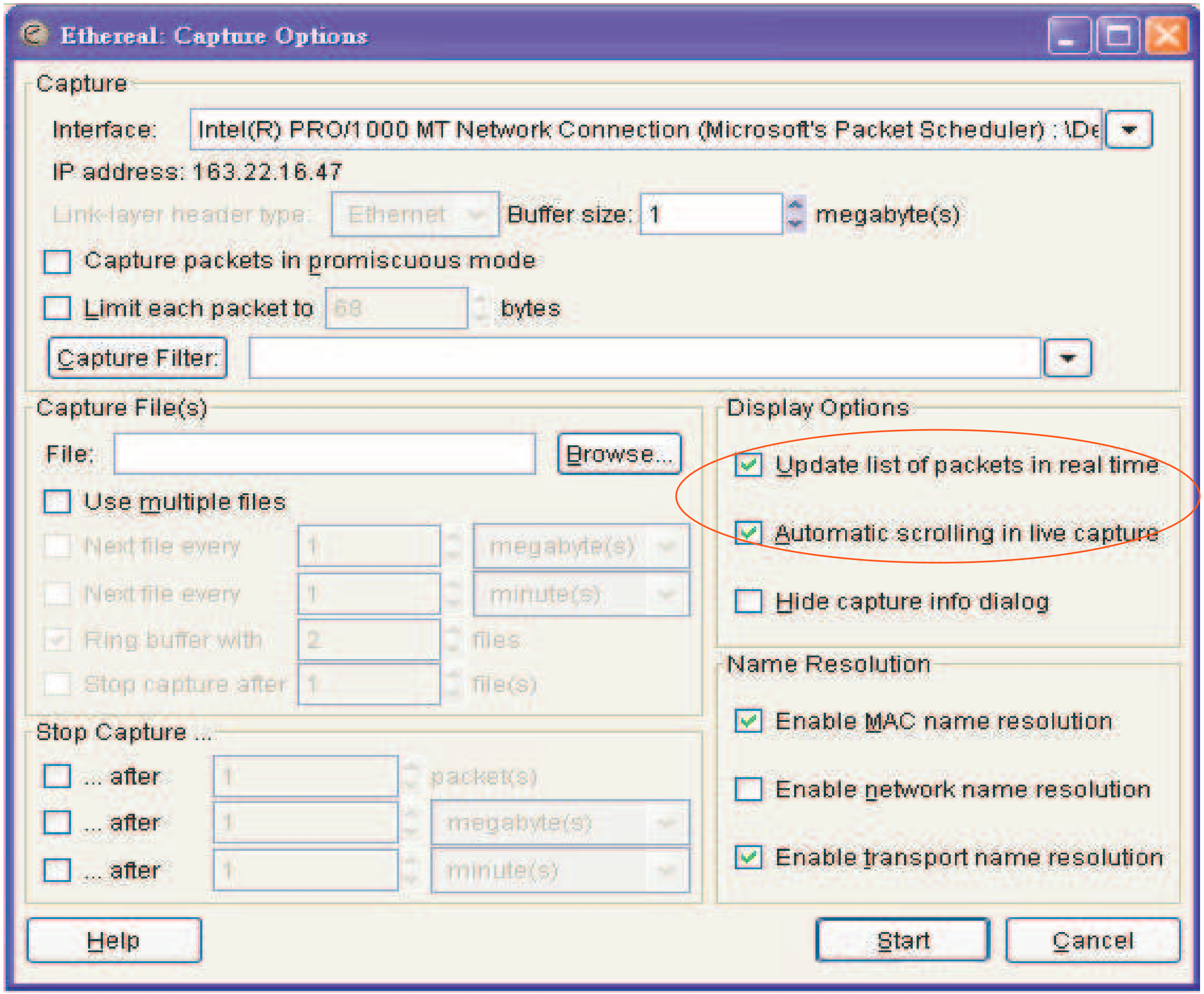
Name Resolution

☑ Enable MAC name resolution

□ Enable network name resolution

☑ Enable transport name resolution

The Capture Preferences dialog box



Ethereal: Capture Options

Capture

Interface: Intel(R) PRO/1000 MT Network Connection (Microsoft's Packet Scheduler) : \De

IP address: 163.22.16.47

Link-layer header type: Ethernet Buffer size: 1 megabyte(s)

□ Capture packets in promiscuous mode

□ Limit each packet to 68 bytes

Capture Filter:

Capture File(s)

File:

□ Use multiple files

□ Next file every 1 megabyte(s)

□ Next file every 1 minute(s)

☑ Ring buffer with 2 files

□ Stop capture after 1 file(s)

Stop Capture ...

□ ... after 1 packet(s)

□ ... after 1 megabyte(s)

□ ... after 1 minute(s)

Display Options

☑ Update list of packets in real time

☑ Automatic scrolling in live capture

□ Hide capture info dialog

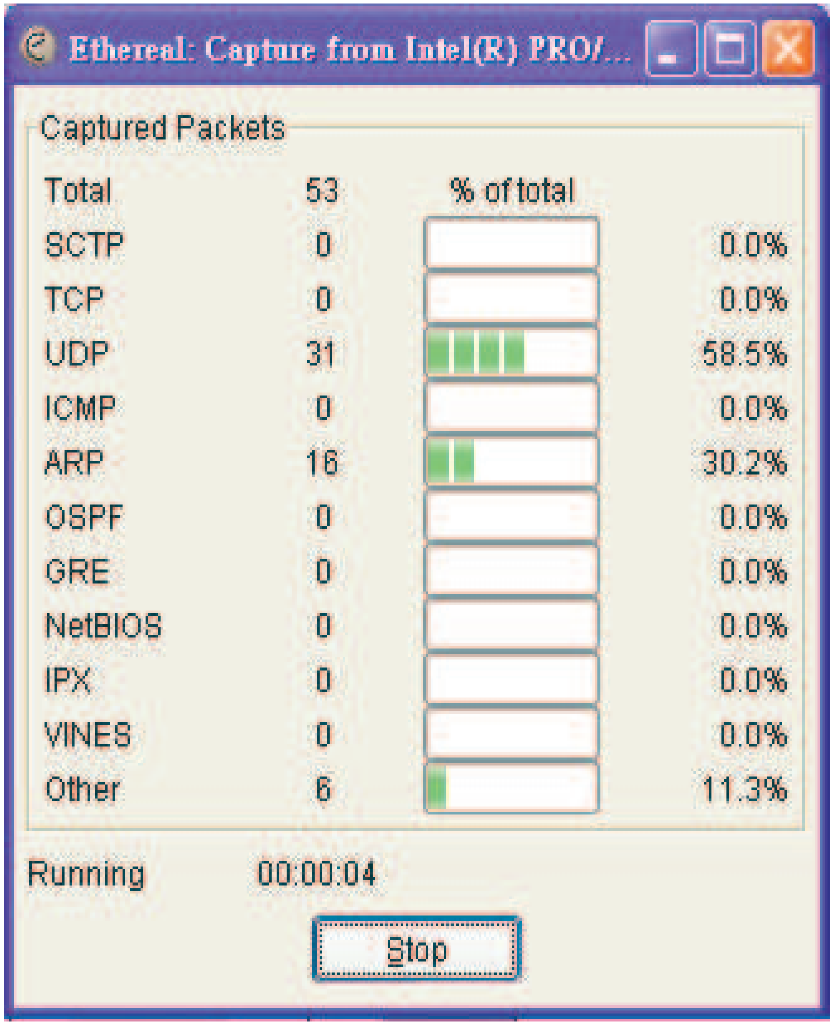
Name Resolution

☑ Enable MAC name resolution

□ Enable network name resolution

☑ Enable transport name resolution

Stop after you have collected enough packets



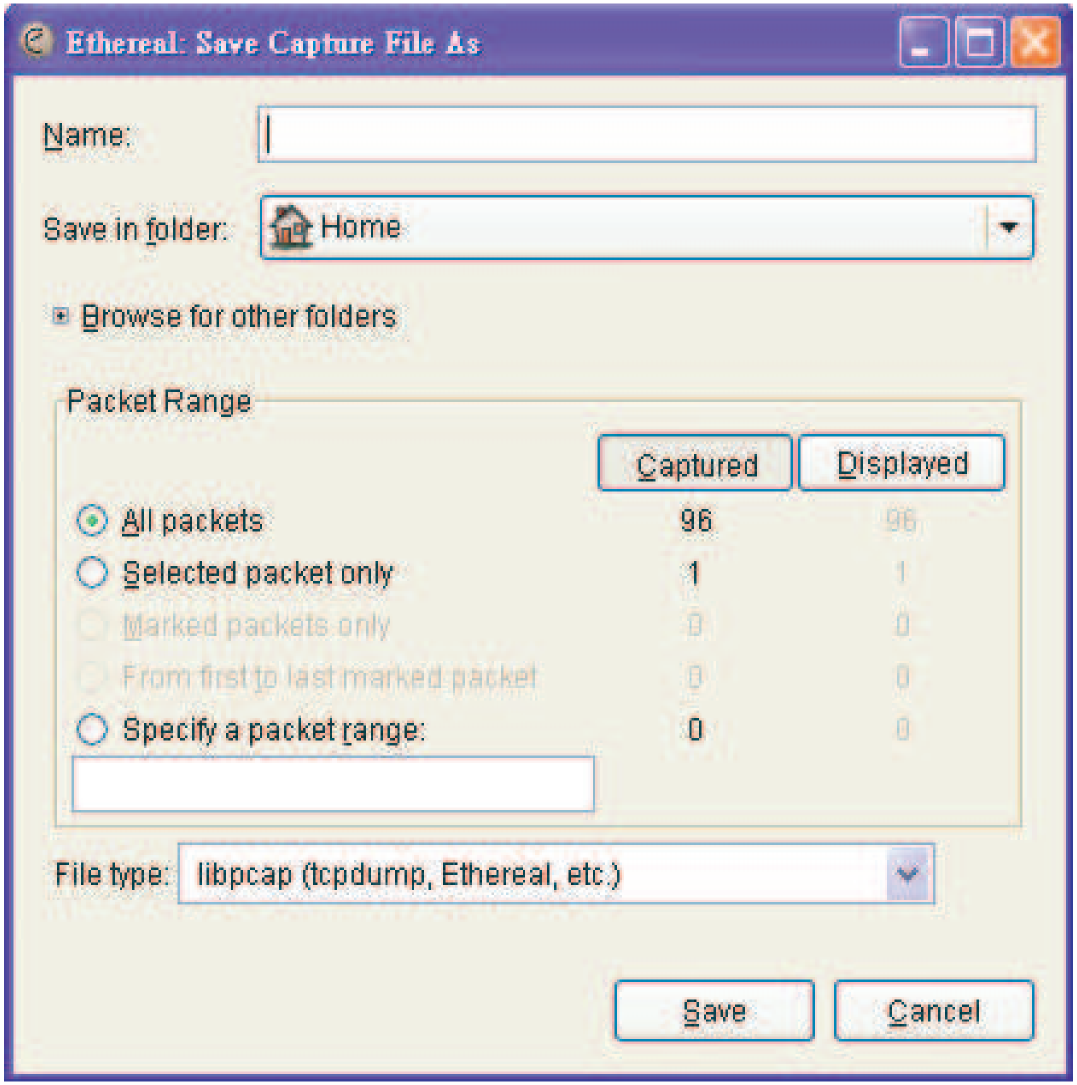
Ethereal: Capture from Intel(R) PRO/...

Captured Packets

Total	53	% of total
SCTP	0	0.0%
TCP	0	0.0%
UDP	31	58.5%
ICMP	0	0.0%
ARP	16	30.2%
OSPF	0	0.0%
GRE	0	0.0%
NetBIOS	0	0.0%
IPX	0	0.0%
VINES	0	0.0%
Other	6	11.3%

Running 00:00:04

File – Save As



Ethereal: Save Capture File As

Name:

Save in folder: Home

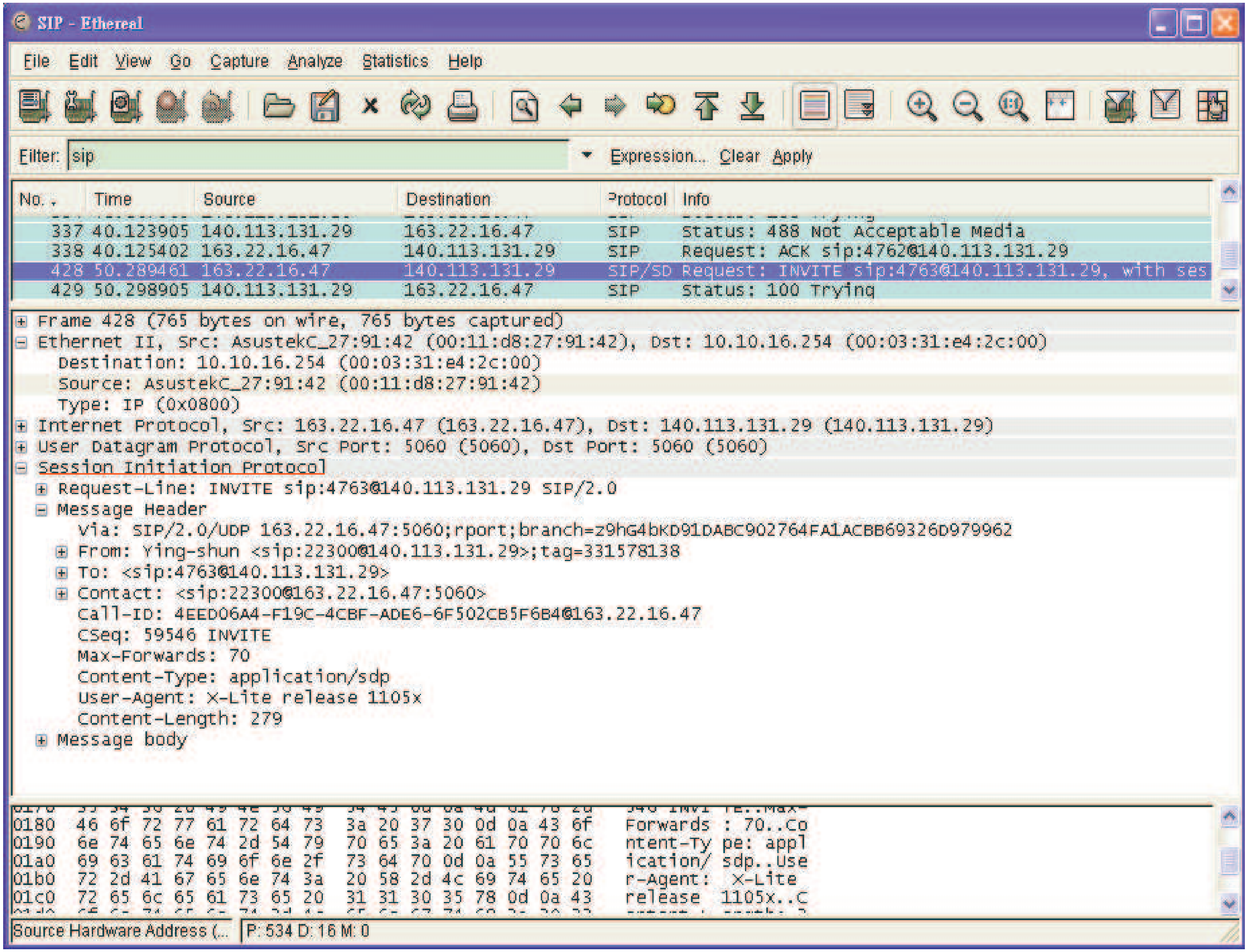
⊞ Browse for other folders

Packet Range

	Captured	Displayed
● All packets	96	96
○ Selected packet only	1	1
○ Marked packets only	0	0
○ From first to last marked packet	0	0
○ Specify a packet range:	0	0

File type: libpcap (tcpdump, Ethereal, etc.)

Show Packet in New Window


SIP - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter: sip
Expression... Clear Apply

```
No. .  Time       Source          Destination     Protocol Info
337 40.123905 140.113.131.29  163.22.16.47    SIP      Status: 488 Not Acceptable Media
338 40.125402 163.22.16.47    140.113.131.29  SIP      Request: ACK sip:4762@140.113.131.29
428 50.289461 163.22.16.47    140.113.131.29  SIP/SD   Request: INVITE sip:4763@140.113.131.29, with ses
429 50.298905 140.113.131.29  163.22.16.47    SIP      Status: 100 Trying
```

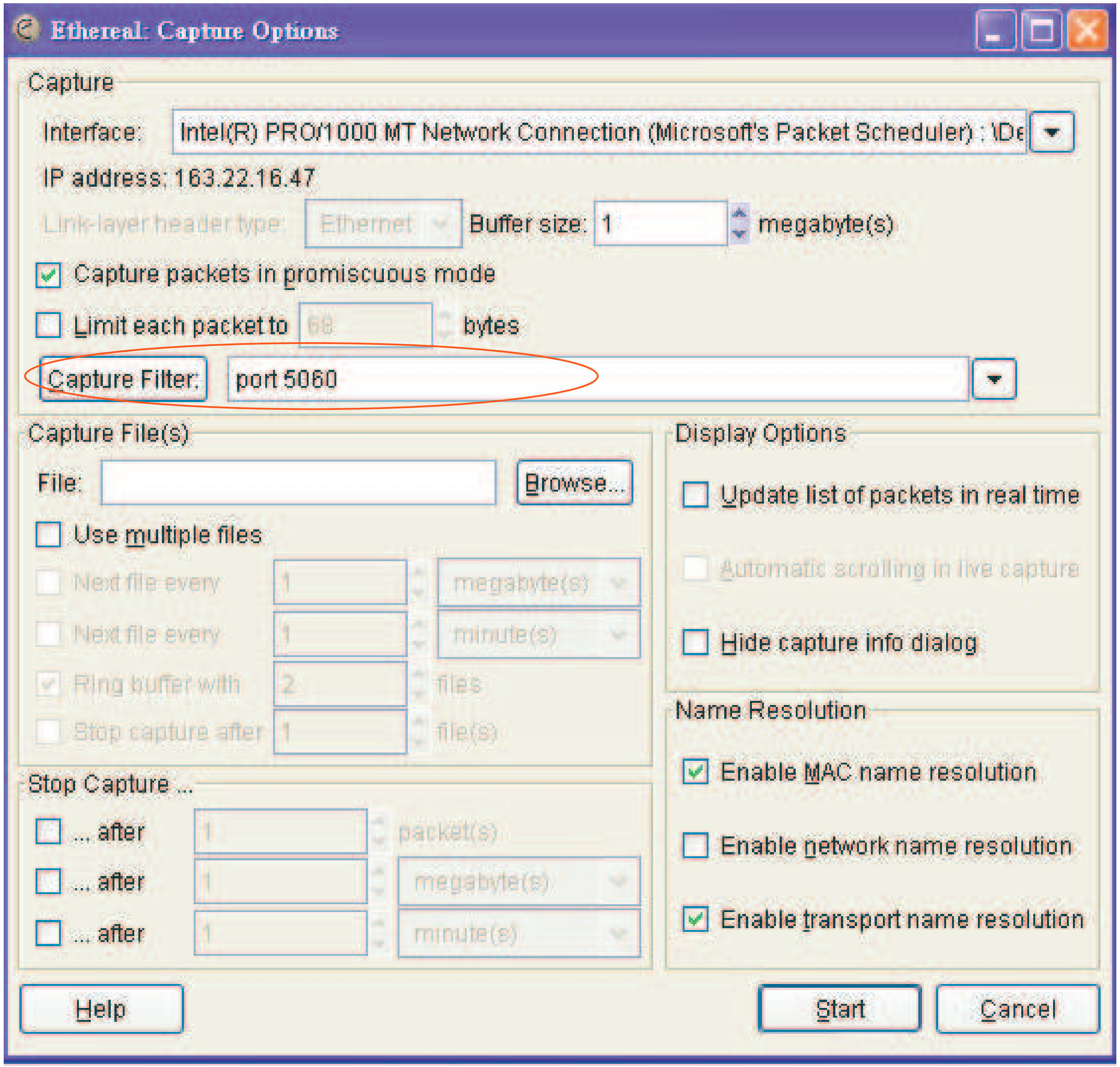
```
⊞ Frame 428 (765 bytes on wire, 765 bytes captured)
⊟ Ethernet II, Src: AsustekC_27:91:42 (00:11:d8:27:91:42), Dst: 10.10.16.254 (00:03:31:e4:2c:00)
    Destination: 10.10.16.254 (00:03:31:e4:2c:00)
    Source: AsustekC_27:91:42 (00:11:d8:27:91:42)
    Type: IP (0x0800)
⊞ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst: 140.113.131.29 (140.113.131.29)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
  ⊞ Request-Line: INVITE sip:4763@140.113.131.29 SIP/2.0
  ⊟ Message Header
      Via: SIP/2.0/UDP 163.22.16.47:5060;rport;branch=z9hG4bKD91DABC902764FA1ACBB69326D979962
    ⊞ From: Ying-shun <sip:22300@140.113.131.29>;tag=331578138
    ⊞ To: <sip:4763@140.113.131.29>
    ⊞ Contact: <sip:22300@163.22.16.47:5060>
      Call-ID: 4EED06A4-F19C-4CBF-ADE6-6F502CB5F6B4@163.22.16.47
      CSeq: 59546 INVITE
      Max-Forwards: 70
      Content-Type: application/sdp
      User-Agent: X-Lite release 1105x
      Content-Length: 279
  ⊞ Message body
```

```
0180  46 6f 72 77 61 72 64 73  3a 20 37 30 0d 0a 43 6f   Forwards : 70..Co
0190  6e 74 65 6e 74 2d 54 79  70 65 3a 20 61 70 70 6c   ntent-Ty pe: appl
01a0  69 63 61 74 69 6f 6e 2f  73 64 70 0d 0a 55 73 65   ication/ sdp..Use
01b0  72 2d 41 67 65 6e 74 3a  20 58 2d 4c 69 74 65 20   r-Agent:  X-Lite
01c0  72 65 6c 65 61 73 65 20  31 31 30 35 78 0d 0a 43   release  1105x..C
```

Source Hardware Address (... | P: 534 D: 16 M: 0

Capture Filters

Filtering While Capturing



Ethereal: Capture Options

Capture

Interface: Intel(R) PRO/1000 MT Network Connection (Microsoft's Packet Scheduler) : \De

IP address: 163.22.16.47

Link-layer header type: Ethernet Buffer size: 1 megabyte(s)

☑ Capture packets in promiscuous mode

□ Limit each packet to 68 bytes

Capture Filter: port 5060

Capture File(s)

File: Browse...

□ Use multiple files

□ Next file every 1 megabyte(s)

□ Next file every 1 minute(s)

☑ Ring buffer with 2 files

□ Stop capture after 1 file(s)

Stop Capture ...

□ ... after 1 packet(s)

□ ... after 1 megabyte(s)

□ ... after 1 minute(s)

Display Options

□ Update list of packets in real time

□ Automatic scrolling in live capture

□ Hide capture info dialog

Name Resolution

☑ Enable MAC name resolution

□ Enable network name resolution

☑ Enable transport name resolution

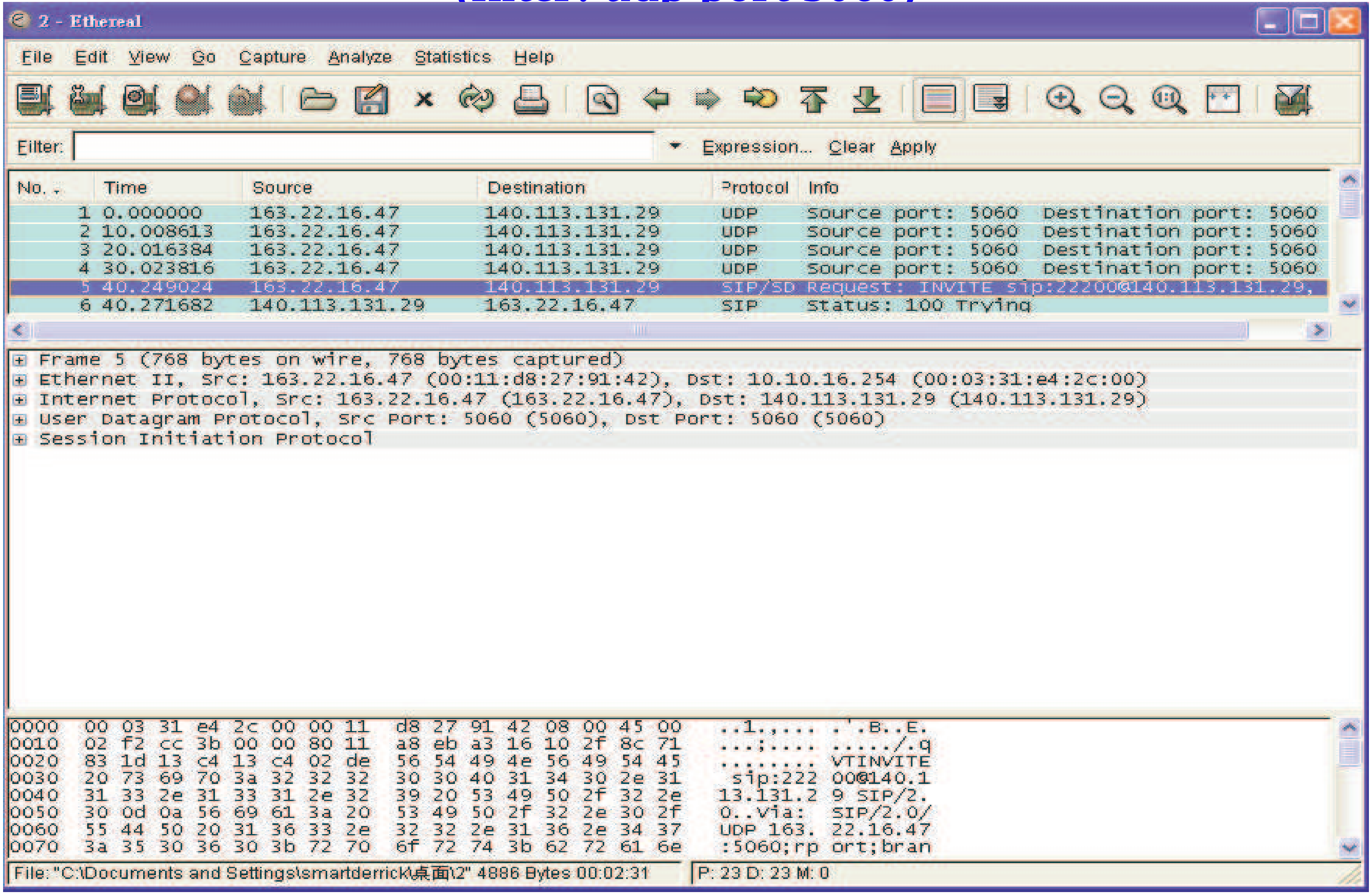
Help Start Cancel

Syntax of the tcpdump capture filter language

- [not] **primitive** [and|or [not] **primitive** ...]
  - tcp port 23 and host 10.0.0.5
  - tcp port 23 and not host 10.0.0.5
- **tcpdump** filter language is explained in the man page.

Capturing SIP signaling

(filter: udp port 5060)



2 - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

```
No. -   Time        Source           Destination      Protocol Info
      1 0.000000    163.22.16.47     140.113.131.29   UDP      Source port: 5060  Destination port: 5060
      2 10.008613   163.22.16.47     140.113.131.29   UDP      Source port: 5060  Destination port: 5060
      3 20.016384   163.22.16.47     140.113.131.29   UDP      Source port: 5060  Destination port: 5060
      4 30.023816   163.22.16.47     140.113.131.29   UDP      Source port: 5060  Destination port: 5060
      5 40.249024   163.22.16.47     140.113.131.29   SIP/SD   Request: INVITE sip:22200@140.113.131.29,
      6 40.271682   140.113.131.29   163.22.16.47     SIP      Status: 100 Trying
```

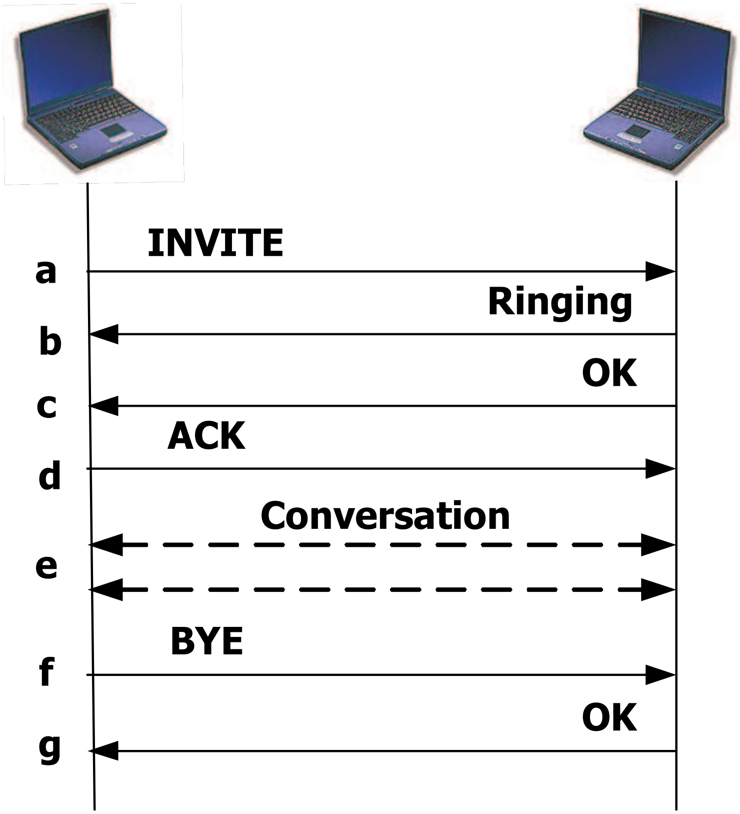
```
⊞ Frame 5 (768 bytes on wire, 768 bytes captured)
⊞ Ethernet II, Src: 163.22.16.47 (00:11:d8:27:91:42), Dst: 10.10.16.254 (00:03:31:e4:2c:00)
⊞ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst: 140.113.131.29 (140.113.131.29)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊞ Session Initiation Protocol
```

```
0000   00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1.,... .'.B..E.
0010   02 f2 cc 3b 00 00 80 11  a8 eb a3 16 10 2f 8c 71   ...;.... ...../.q
0020   83 1d 13 c4 13 c4 02 de  56 54 49 4e 56 49 54 45   ........ VTINVITE
0030   20 73 69 70 3a 32 32 32  30 30 40 31 34 30 2e 31    sip:222 00@140.1
0040   31 33 2e 31 33 31 2e 32  39 20 53 49 50 2f 32 2e   13.131.2 9 SIP/2.
0050   30 0d 0a 56 69 61 3a 20  53 49 50 2f 32 2e 30 2f   0..Via:  SIP/2.0/
0060   55 44 50 20 31 36 33 2e  32 32 2e 31 36 2e 34 37   UDP 163. 22.16.47
0070   3a 35 30 36 30 3b 72 70  6f 72 74 3b 62 72 61 6e   :5060;rp ort;bran
```

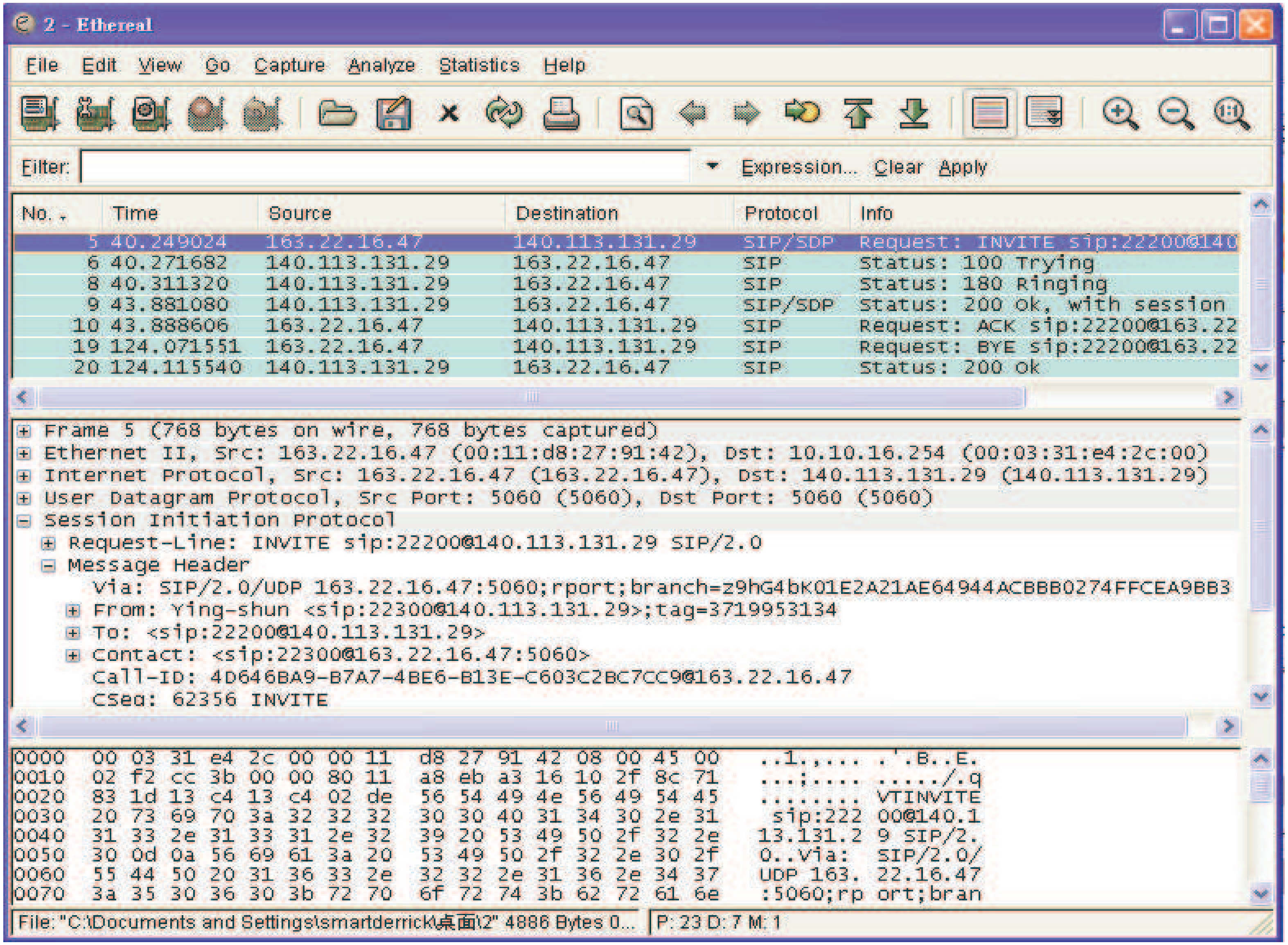
File: "C:\Documents and Settings\smartderrick\桌面\2" 4886 Bytes 00:02:31 | P: 23 D: 23 M: 0

SIP Call Establishment

- It is simple, which contains a number of interim responses.



Basic Call Flow

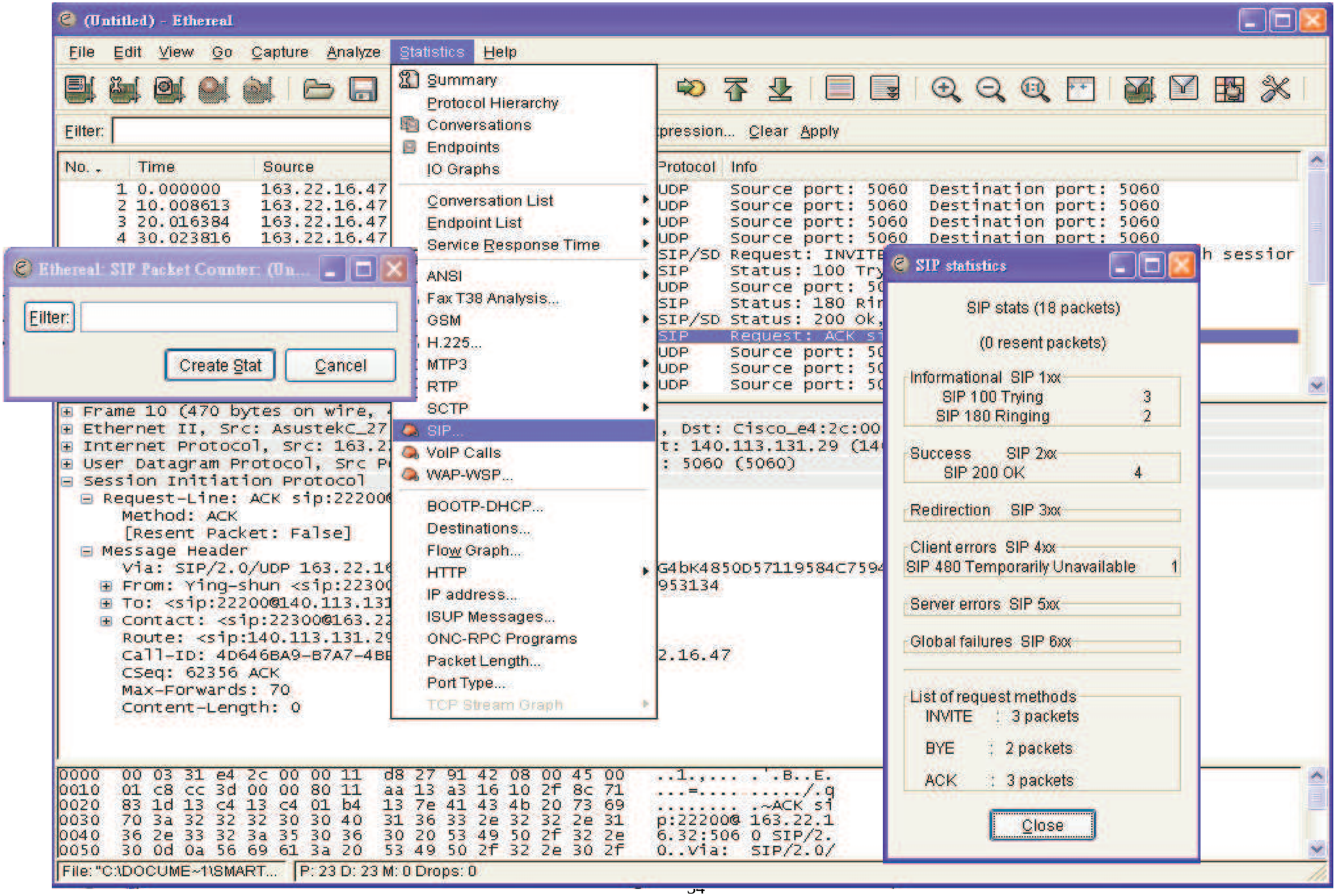

2 - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

```
No. .   Time         Source            Destination       Protocol   Info
      5 40.249024    163.22.16.47      140.113.131.29    SIP/SDP    Request: INVITE sip:22200@140
      6 40.271682    140.113.131.29    163.22.16.47      SIP        Status: 100 Trying
      8 40.311320    140.113.131.29    163.22.16.47      SIP        Status: 180 Ringing
      9 43.881080    140.113.131.29    163.22.16.47      SIP/SDP    Status: 200 OK, with session
     10 43.888606    163.22.16.47      140.113.131.29    SIP        Request: ACK sip:22200@163.22
     19 124.071551   163.22.16.47      140.113.131.29    SIP        Request: BYE sip:22200@163.22
     20 124.115540   140.113.131.29    163.22.16.47      SIP        Status: 200 OK
```

```
⊞ Frame 5 (768 bytes on wire, 768 bytes captured)
⊞ Ethernet II, Src: 163.22.16.47 (00:11:d8:27:91:42), Dst: 10.10.16.254 (00:03:31:e4:2c:00)
⊞ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst: 140.113.131.29 (140.113.131.29)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
  ⊞ Request-Line: INVITE sip:22200@140.113.131.29 SIP/2.0
  ⊟ Message Header
      Via: SIP/2.0/UDP 163.22.16.47:5060;rport;branch=z9hG4bK01E2A21AE64944ACBBB0274FFCEA9BB3
    ⊞ From: Ying-shun <sip:22300@140.113.131.29>;tag=3719953134
    ⊞ To: <sip:22200@140.113.131.29>
    ⊞ Contact: <sip:22300@163.22.16.47:5060>
      Call-ID: 4D646BA9-B7A7-4BE6-B13E-C603C2BC7CC9@163.22.16.47
      CSeq: 62356 INVITE
```

```
0000   00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1.,... .'.B..E.
0010   02 f2 cc 3b 00 00 80 11  a8 eb a3 16 10 2f 8c 71   ...;.... ...../.q
0020   83 1d 13 c4 13 c4 02 de  56 54 49 4e 56 49 54 45   ........ VTINVITE
0030   20 73 69 70 3a 32 32 32  30 30 40 31 34 30 2e 31    sip:222 00@140.1
0040   31 33 2e 31 33 31 2e 32  39 20 53 49 50 2f 32 2e   13.131.2 9 SIP/2.
0050   30 0d 0a 56 69 61 3a 20  53 49 50 2f 32 2e 30 2f   0..Via:  SIP/2.0/
0060   55 44 50 20 31 36 33 2e  32 32 2e 31 36 2e 34 37   UDP 163. 22.16.47
0070   3a 35 30 36 30 3b 72 70  6f 72 74 3b 62 72 61 6e   :5060;rp ort;bran
```

File: "C:\Documents and Settings\smartderrick\桌面\2" 4886 Bytes 0... P: 23 D: 7 M: 1



```
No. .   Time         Source          Protocol  Info
  1 0.000000     163.22.16.47    UDP       Source port: 5060  Destination port: 5060
  2 10.008613    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
  3 20.016384    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
  4 30.023816    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
                                 SIP/SD    Request: INVITE                              h session
                                 SIP       Status: 100 Try
                                 UDP       Source port: 50
                                 SIP       Status: 180 Rin
                                 SIP/SD    Status: 200 Ok,
                                 SIP       Request: ACK si
                                 UDP       Source port: 50
                                 UDP       Source port: 50
                                 UDP       Source port: 50
```

```
⊞ Frame 10 (470 bytes on wire, 4
⊞ Ethernet II, Src: AsustekC_27                , Dst: Cisco_e4:2c:00
⊞ Internet Protocol, Src: 163.2               t: 140.113.131.29 (14
⊞ User Datagram Protocol, Src P               : 5060 (5060)
⊟ Session Initiation Protocol
  ⊟ Request-Line: ACK sip:22200
      Method: ACK
      [Resent Packet: False]
  ⊟ Message Header
      Via: SIP/2.0/UDP 163.22.16               G4bK4850D57119584C7594
    ⊞ From: Ying-shun <sip:22300               953134
    ⊞ To: <sip:22200@140.113.131
    ⊞ Contact: <sip:22300@163.22
      Route: <sip:140.113.131.29
      Call-ID: 4D646BA9-B7A7-4BE               2.16.47
      CSeq: 62356 ACK
      Max-Forwards: 70
      Content-Length: 0
```

```
0000  00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1.,... .'.B..E.
0010  01 c8 cc 3d 00 00 80 11  aa 13 a3 16 10 2f 8c 71   ...=.... ...../.q
0020  83 1d 13 c4 13 c4 01 b4  13 7e 41 43 4b 20 73 69   ........ .~ACK si
0030  70 3a 32 32 32 30 30 40  31 36 33 2e 32 32 2e 31   p:22200@ 163.22.1
0040  36 2e 33 32 3a 35 30 36  30 20 53 49 50 2f 32 2e   6.32:506 0 SIP/2.
0050  30 0d 0a 56 69 61 3a 20  53 49 50 2f 32 2e 30 2f   0..Via:  SIP/2.0/
```

File: "C:\DOCUME~1\SMART...   P: 23 D: 23 M: 0 Drops: 0

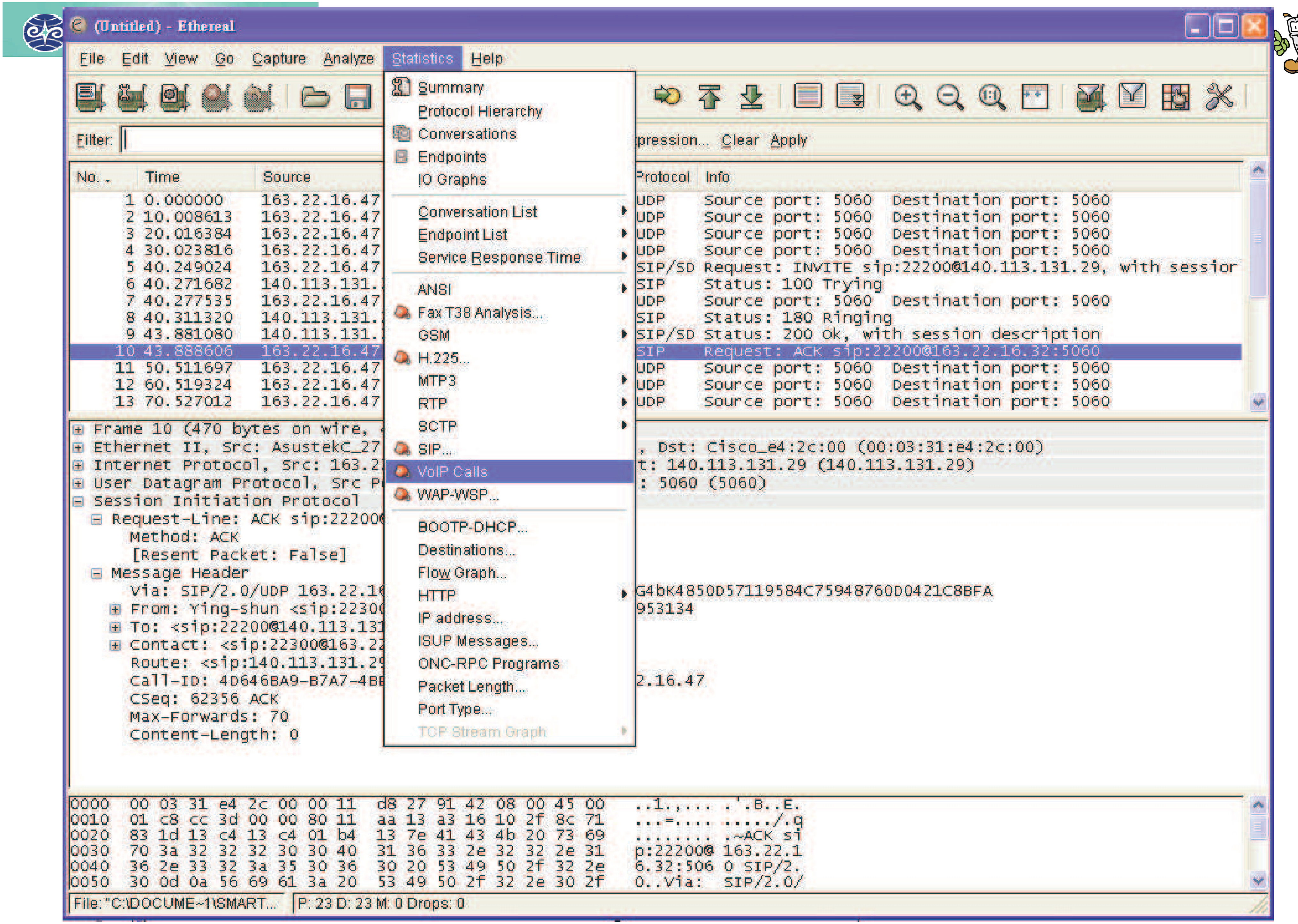
SIP stats (18 packets)

(0 resent packets)

Informational SIP 1xx	
SIP 100 Trying	3
SIP 180 Ringing	2
Success SIP 2xx	
SIP 200 OK	4
Redirection SIP 3xx	
Client errors SIP 4xx	
SIP 480 Temporarily Unavailable	1
Server errors SIP 5xx	
Global failures SIP 6xx	

List of request methods

INVITE	:	3 packets
BYE	:	2 packets
ACK	:	3 packets

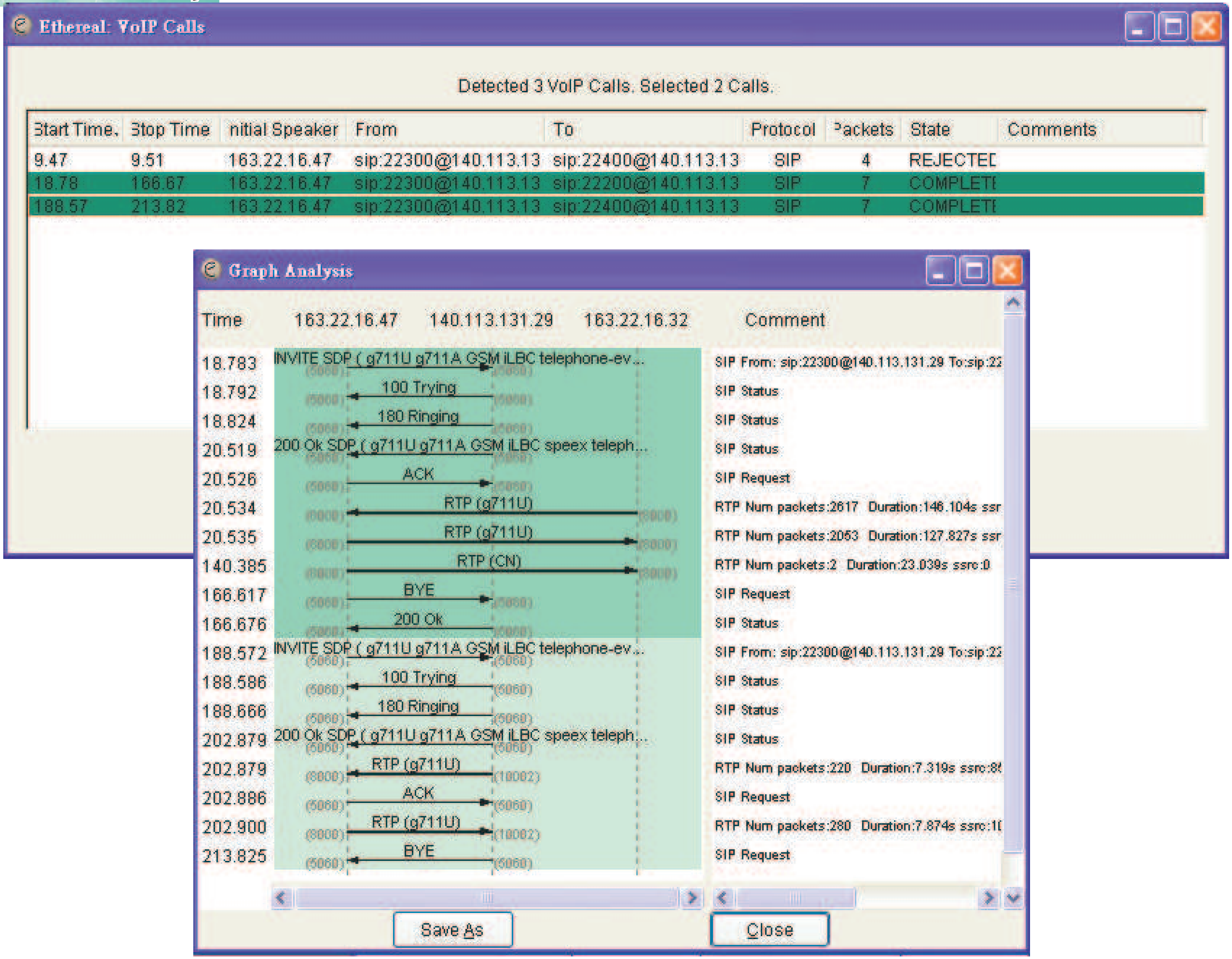


```
No. .  Time         Source          Protocol  Info
    1  0.000000     163.22.16.47    UDP       Source port: 5060  Destination port: 5060
    2  10.008613    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
    3  20.016384    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
    4  30.023816    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
    5  40.249024    163.22.16.47    SIP/SD    Request: INVITE sip:22200@140.113.131.29, with sessior
    6  40.271682    140.113.131.    SIP       Status: 100 Trying
    7  40.277535    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
    8  40.311320    140.113.131.    SIP       Status: 180 Ringing
    9  43.881080    140.113.131.    SIP/SD    Status: 200 Ok, with session description
   10  43.888606    163.22.16.47    SIP       Request: ACK sip:22200@163.22.16.32:5060
   11  50.511697    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
   12  60.519324    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
   13  70.527012    163.22.16.47    UDP       Source port: 5060  Destination port: 5060
```

```
⊞ Frame 10 (470 bytes on wire, 4
⊞ Ethernet II, Src: AsustekC_27                 , Dst: Cisco_e4:2c:00 (00:03:31:e4:2c:00)
⊞ Internet Protocol, Src: 163.2                 t: 140.113.131.29 (140.113.131.29)
⊞ User Datagram Protocol, Src P                 : 5060 (5060)
⊟ Session Initiation Protocol
  ⊟ Request-Line: ACK sip:22200
      Method: ACK
      [Resent Packet: False]
  ⊟ Message Header
      Via: SIP/2.0/UDP 163.22.16                G4bK4850D57119584C75948760D0421C8BFA
    ⊞ From: Ying-shun <sip:2230                 953134
    ⊞ To: <sip:22200@140.113.131
    ⊞ Contact: <sip:22300@163.22
      Route: <sip:140.113.131.29
      Call-ID: 4D646BA9-B7A7-4BE                2.16.47
      CSeq: 62356 ACK
      Max-Forwards: 70
      Content-Length: 0
```

```
0000  00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1.,... .'.B..E.
0010  01 c8 cc 3d 00 00 80 11  aa 13 a3 16 10 2f 8c 71   ...=.... ...../.q
0020  83 1d 13 c4 13 c4 01 b4  13 7e 41 43 4b 20 73 69   ........ .~ACK si
0030  70 3a 32 32 32 30 30 40  31 36 33 2e 32 32 2e 31   p:22200@ 163.22.1
0040  36 2e 33 32 3a 35 30 36  30 20 53 49 50 2f 32 2e   6.32:506 0 SIP/2.
0050  30 0d 0a 56 69 61 3a 20  53 49 50 2f 32 2e 30 2f   0..Via:  SIP/2.0/
```

File: "C:\DOCUME~1\SMART... P: 23 D: 23 M: 0 Drops: 0

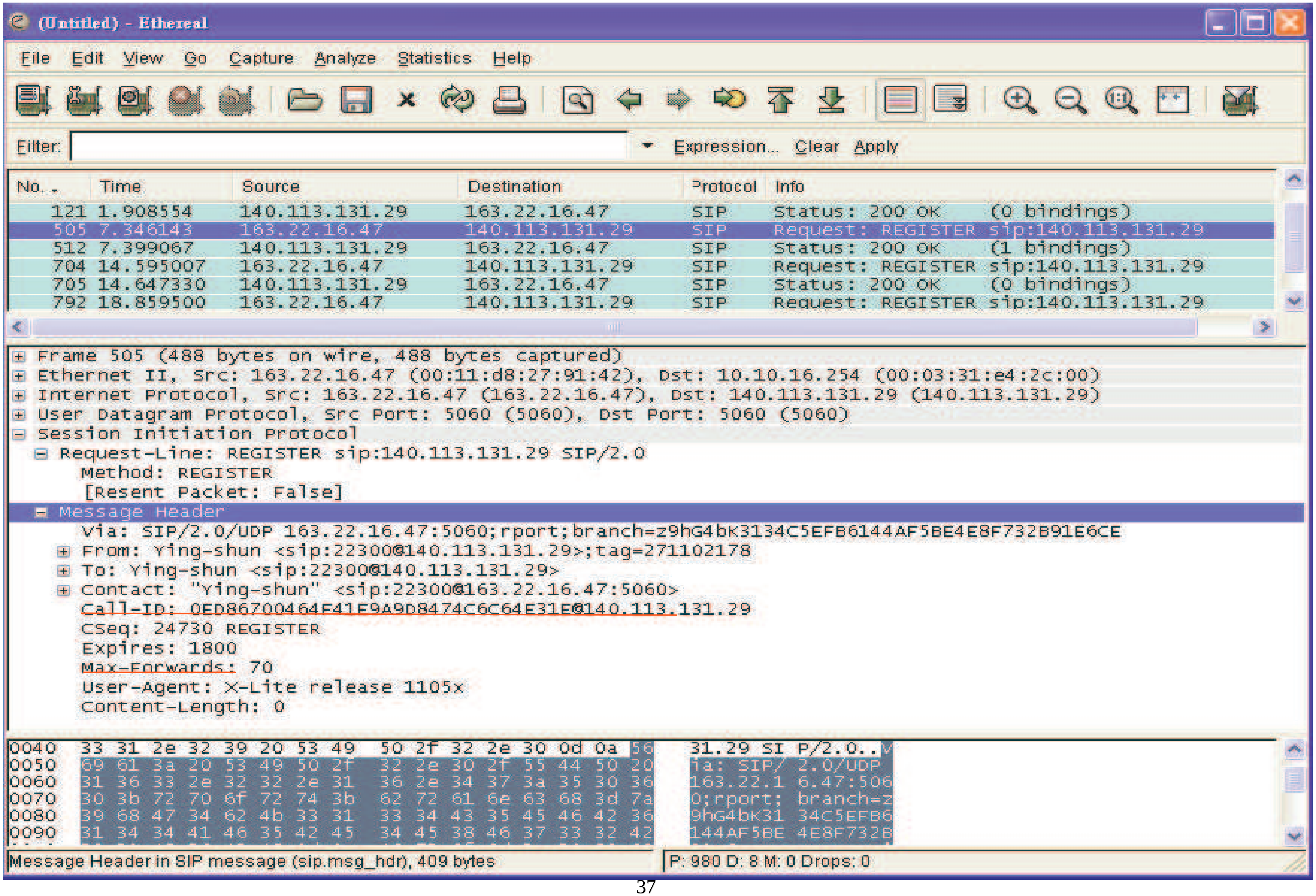


Detected 3 VoIP Calls. Selected 2 Calls.

Start Time	Stop Time	nitial Speaker	From	To	Protocol	Packets	State	Comments
9.47	9.51	163.22.16.47	sip:22300@140.113.13	sip:22400@140.113.13	SIP	4	REJECTEI	
18.78	166.67	163.22.16.47	sip:22300@140.113.13	sip:22200@140.113.13	SIP	7	COMPLETI	
188.57	213.82	163.22.16.47	sip:22300@140.113.13	sip:22400@140.113.13	SIP	7	COMPLETI	

Time	163.22.16.47	140.113.131.29	163.22.16.32	Comment
18.783	INVITE SDP (g711U g711A GSM iLBC telephone-ev... (5060) → (5060)			SIP From: sip:22300@140.113.131.29 To:sip:22
18.792	(5060) ← 100 Trying (5060)			SIP Status
18.824	(5060) ← 180 Ringing (5060)			SIP Status
20.519	200 Ok SDP (g711U g711A GSM iLBC speex teleph... (5060) ← (5060)			SIP Status
20.526	(5060) ACK → (5060)			SIP Request
20.534	(8000) ← RTP (g711U)		(8000)	RTP Num packets:2617 Duration:146.104s ssr
20.535	(8000) RTP (g711U) →		(8000)	RTP Num packets:2053 Duration:127.827s ssr
140.385	(8000) RTP (CN) →		(8000)	RTP Num packets:2 Duration:23.039s ssrc:0
166.617	(5060) BYE → (5060)			SIP Request
166.676	(5060) ← 200 Ok (5060)			SIP Status
188.572	INVITE SDP (g711U g711A GSM iLBC telephone-ev... (5060) → (5060)			SIP From: sip:22300@140.113.131.29 To:sip:22
188.586	(5060) ← 100 Trying (5060)			SIP Status
188.666	(5060) ← 180 Ringing (5060)			SIP Status
202.879	200 Ok SDP (g711U g711A GSM iLBC speex teleph... (5060) ← (5060)			SIP Status
202.879	(8000) ← RTP (g711U) (10002)			RTP Num packets:220 Duration:7.319s ssrc:8
202.886	(5060) ACK → (5060)			SIP Request
202.900	(8000) RTP (g711U) → (10002)			RTP Num packets:280 Duration:7.874s ssrc:1
213.825	(5060) ← BYE (5060)			SIP Request

REGISTER


(Untitled) - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

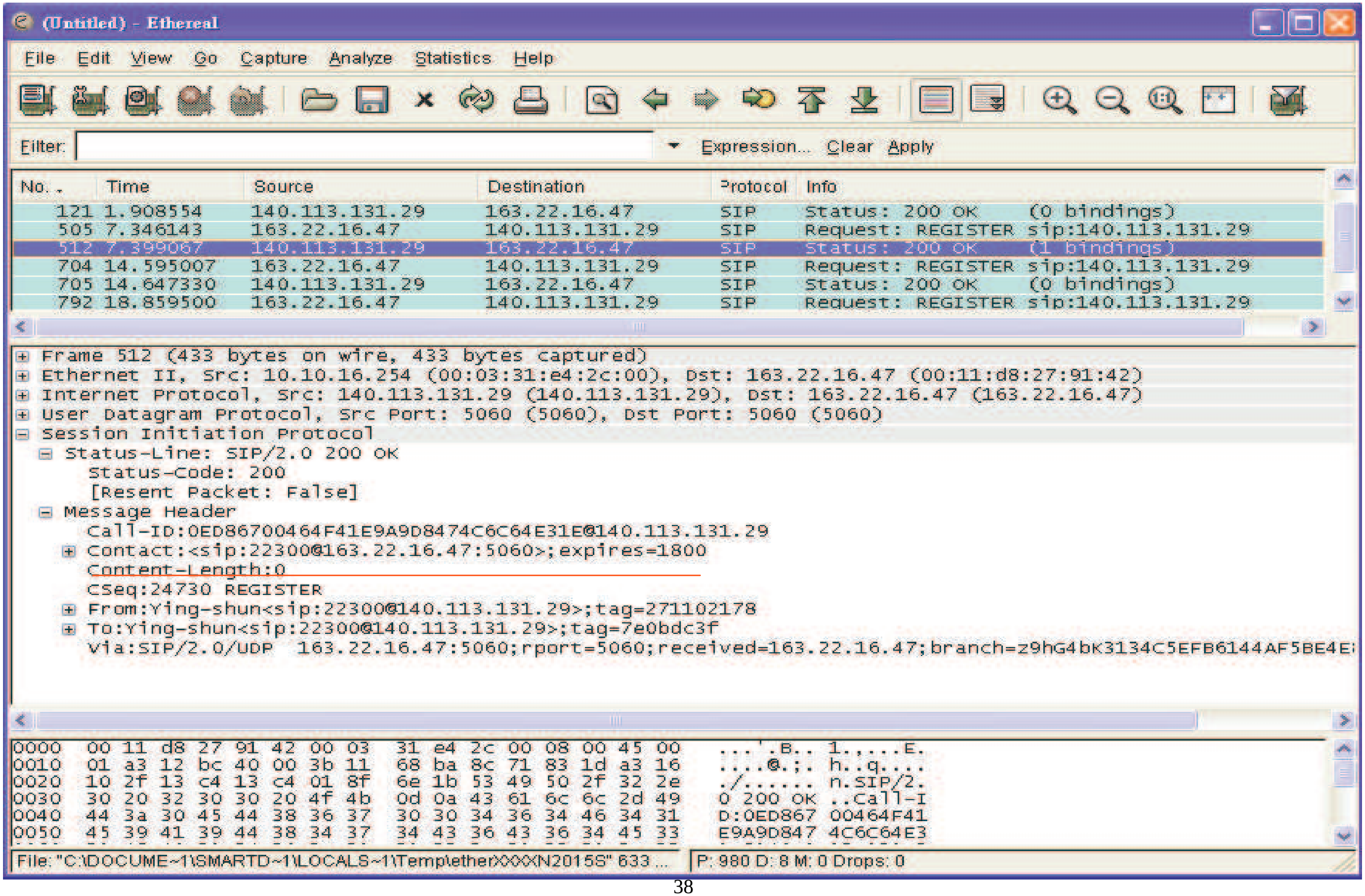
```
No. .    Time        Source           Destination      Protocol  Info
  121 1.908554    140.113.131.29   163.22.16.47      SIP    Status: 200 OK      (0 bindings)
  505 7.346143    163.22.16.47     140.113.131.29    SIP    Request: REGISTER sip:140.113.131.29
  512 7.399067    140.113.131.29   163.22.16.47      SIP    Status: 200 OK      (1 bindings)
  704 14.595007   163.22.16.47     140.113.131.29    SIP    Request: REGISTER sip:140.113.131.29
  705 14.647330   140.113.131.29   163.22.16.47      SIP    Status: 200 OK      (0 bindings)
  792 18.859500   163.22.16.47     140.113.131.29    SIP    Request: REGISTER sip:140.113.131.29
```

```
⊞ Frame 505 (488 bytes on wire, 488 bytes captured)
⊞ Ethernet II, Src: 163.22.16.47 (00:11:d8:27:91:42), Dst: 10.10.16.254 (00:03:31:e4:2c:00)
⊞ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst: 140.113.131.29 (140.113.131.29)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
  ⊟ Request-Line: REGISTER sip:140.113.131.29 SIP/2.0
      Method: REGISTER
      [Resent Packet: False]
  ⊟ Message Header
      Via: SIP/2.0/UDP 163.22.16.47:5060;rport;branch=z9hG4bK3134C5EFB6144AF5BE4E8F732B91E6CE
    ⊞ From: Ying-shun <sip:22300@140.113.131.29>;tag=271102178
    ⊞ To: Ying-shun <sip:22300@140.113.131.29>
    ⊞ Contact: "Ying-shun" <sip:22300@163.22.16.47:5060>
      Call-ID: 0ED86700464F41E9A9D8474C6C64E31E@140.113.131.29
      CSeq: 24730 REGISTER
      Expires: 1800
      Max-Forwards: 70
      User-Agent: X-Lite release 1105x
      Content-Length: 0
```

```
0040  33 31 2e 32 39 20 53 49  50 2f 32 2e 30 0d 0a 56   31.29 SI P/2.0..V
0050  69 61 3a 20 53 49 50 2f  32 2e 30 2f 55 44 50 20   ia: SIP/ 2.0/UDP 
0060  31 36 33 2e 32 32 2e 31  36 2e 34 37 3a 35 30 36   163.22.1 6.47:506
0070  30 3b 72 70 6f 72 74 3b  62 72 61 6e 63 68 3d 7a   0;rport; branch=z
0080  39 68 47 34 62 4b 33 31  33 34 43 35 45 46 42 36   9hG4bK31 34C5EFB6
0090  31 34 34 41 46 35 42 45  34 45 38 46 37 33 32 42   144AF5BE 4E8F732B
```

Message Header in SIP message (sip.msg_hdr), 409 bytes | P: 980 D: 8 M: 0 Drops: 0

200 OK


(Untitled) - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

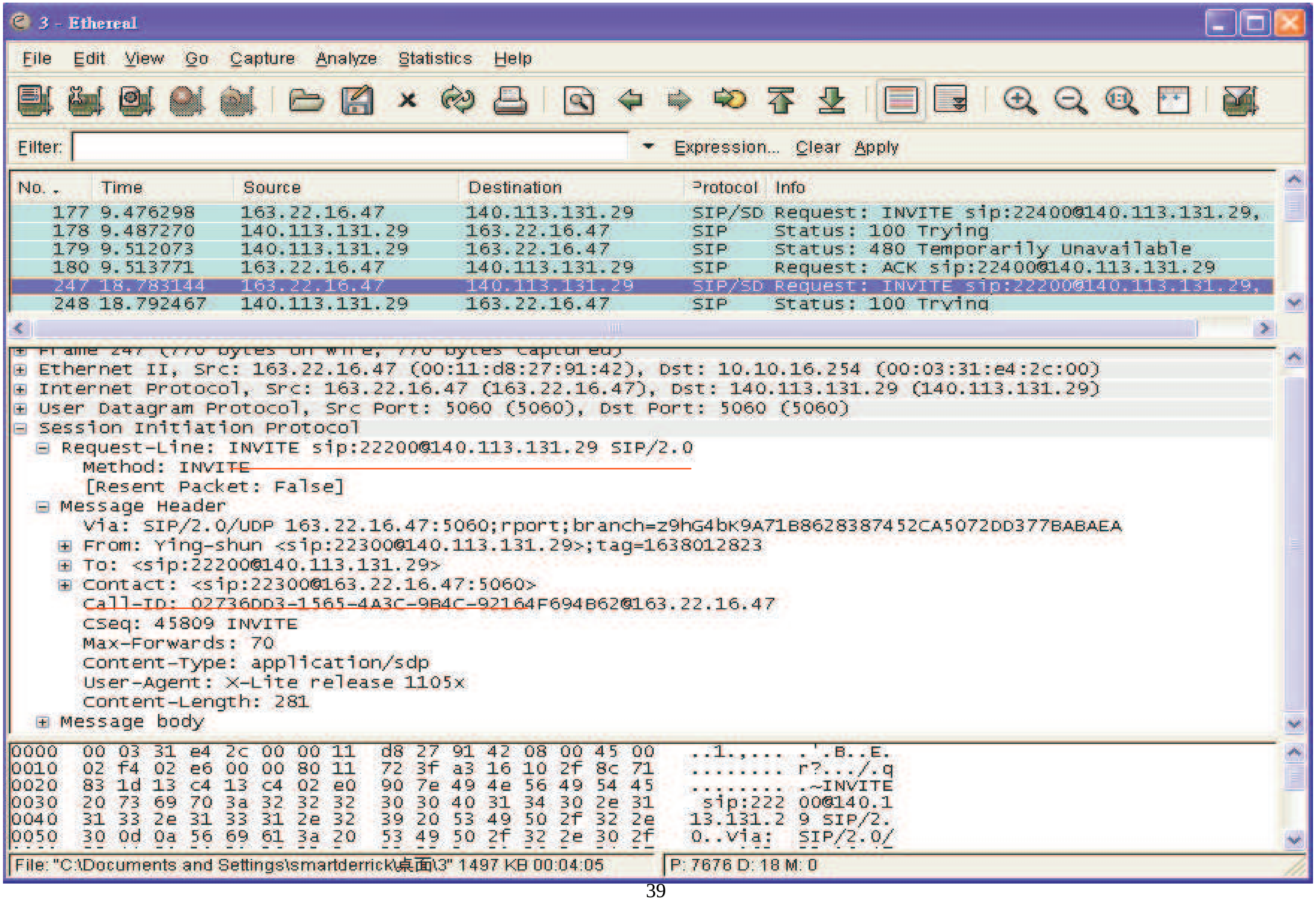
```
No. .  Time         Source            Destination       Protocol  Info
   121 1.908554     140.113.131.29    163.22.16.47      SIP       Status: 200 OK      (0 bindings)
   505 7.346143     163.22.16.47      140.113.131.29    SIP       Request: REGISTER sip:140.113.131.29
   512 7.399067     140.113.131.29    163.22.16.47      SIP       Status: 200 OK      (1 bindings)
   704 14.595007    163.22.16.47      140.113.131.29    SIP       Request: REGISTER sip:140.113.131.29
   705 14.647330    140.113.131.29    163.22.16.47      SIP       Status: 200 OK      (0 bindings)
   792 18.859500    163.22.16.47      140.113.131.29    SIP       Request: REGISTER sip:140.113.131.29
```

```
⊞ Frame 512 (433 bytes on wire, 433 bytes captured)
⊞ Ethernet II, Src: 10.10.16.254 (00:03:31:e4:2c:00), Dst: 163.22.16.47 (00:11:d8:27:91:42)
⊞ Internet Protocol, Src: 140.113.131.29 (140.113.131.29), Dst: 163.22.16.47 (163.22.16.47)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
  ⊟ Status-Line: SIP/2.0 200 OK
      Status-Code: 200
      [Resent Packet: False]
  ⊟ Message Header
      Call-ID:0ED86700464F41E9A9D8474C6C64E31E@140.113.131.29
    ⊞ Contact:<sip:22300@163.22.16.47:5060>;expires=1800
      Content-Length:0
      CSeq:24730 REGISTER
    ⊞ From:Ying-shun<sip:22300@140.113.131.29>;tag=271102178
    ⊞ To:Ying-shun<sip:22300@140.113.131.29>;tag=7e0bdc3f
      Via:SIP/2.0/UDP  163.22.16.47:5060;rport=5060;received=163.22.16.47;branch=z9hG4bK3134C5EFB6144AF5BE4E
```

```
0000  00 11 d8 27 91 42 00 03  31 e4 2c 00 08 00 45 00   ...'.B.. 1.,...E.
0010  01 a3 12 bc 40 00 3b 11  68 ba 8c 71 83 1d a3 16   ....@.;. h..q....
0020  10 2f 13 c4 13 c4 01 8f  6e 1b 53 49 50 2f 32 2e   ./...... n.SIP/2.
0030  30 20 32 30 30 20 4f 4b  0d 0a 43 61 6c 6c 2d 49   0 200 OK ..Call-I
0040  44 3a 30 45 44 38 36 37  30 30 34 36 34 46 34 31   D:0ED867 00464F41
0050  45 39 41 39 44 38 34 37  34 43 36 43 36 34 45 33   E9A9D847 4C6C64E3
```

```
File: "C:\DOCUME~1\SMARTD~1\LOCALS~1\Temp\etherXXXXN2015S" 633 ...   P: 980 D: 8 M: 0 Drops: 0
```

INVITE


3 - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

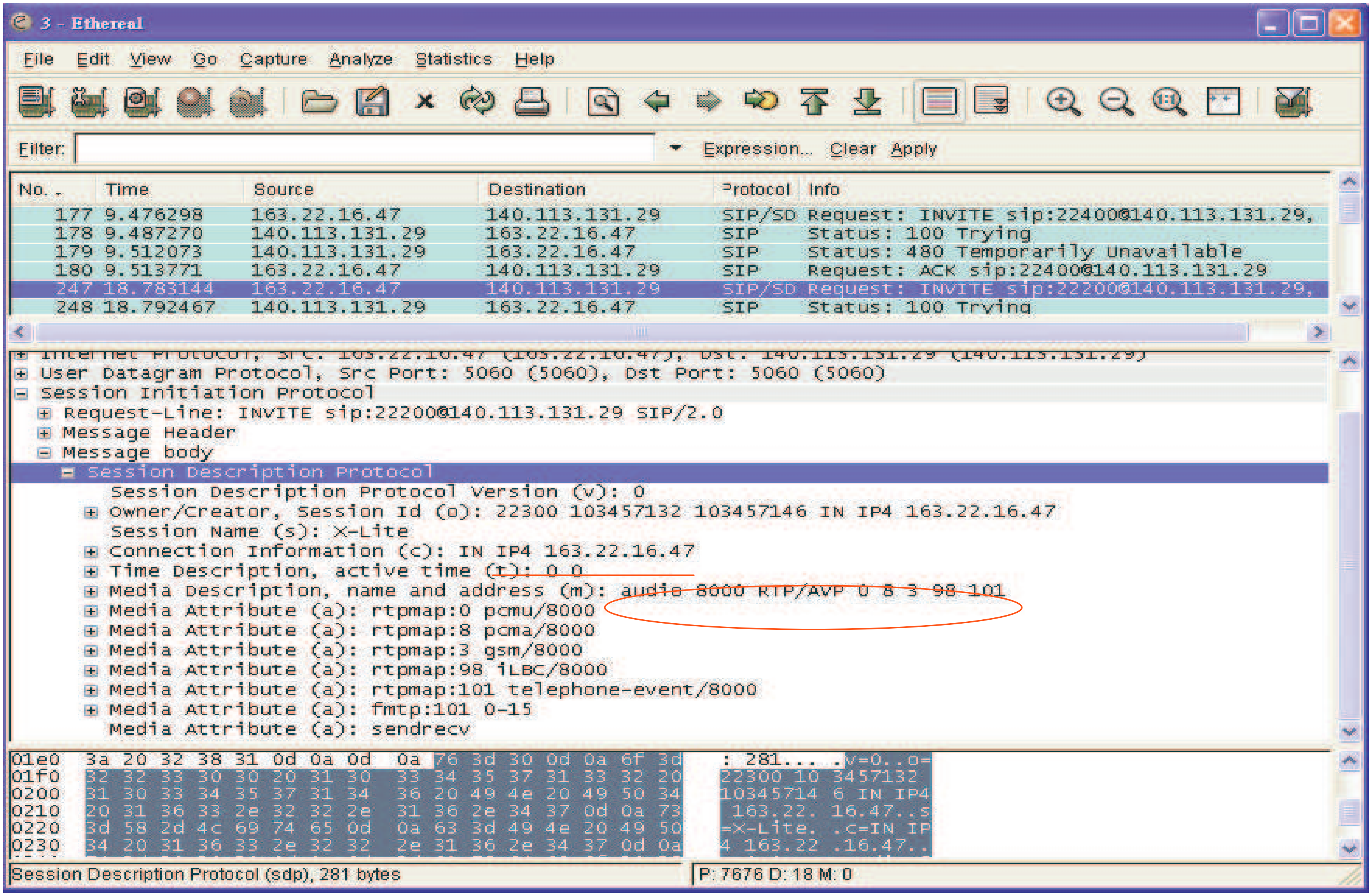
```
No. .  Time        Source           Destination      Protocol Info
   177 9.476298    163.22.16.47     140.113.131.29   SIP/SD   Request: INVITE sip:22400@140.113.131.29,
   178 9.487270    140.113.131.29   163.22.16.47     SIP      Status: 100 Trying
   179 9.512073    140.113.131.29   163.22.16.47     SIP      Status: 480 Temporarily Unavailable
   180 9.513771    163.22.16.47     140.113.131.29   SIP      Request: ACK sip:22400@140.113.131.29
   247 18.783144   163.22.16.47     140.113.131.29   SIP/SD   Request: INVITE sip:22200@140.113.131.29,
   248 18.792467   140.113.131.29   163.22.16.47     SIP      Status: 100 Trying
```

```
⊞ Frame 247 (770 bytes on wire, 770 bytes captured)
⊞ Ethernet II, Src: 163.22.16.47 (00:11:d8:27:91:42), Dst: 10.10.16.254 (00:03:31:e4:2c:00)
⊞ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst: 140.113.131.29 (140.113.131.29)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
  ⊟ Request-Line: INVITE sip:22200@140.113.131.29 SIP/2.0
      Method: INVITE
      [Resent Packet: False]
  ⊟ Message Header
      Via: SIP/2.0/UDP 163.22.16.47:5060;rport;branch=z9hG4bK9A71B86283874 52CA5072DD377BABAEA
    ⊞ From: Ying-shun <sip:22300@140.113.131.29>;tag=1638012823
    ⊞ To: <sip:22200@140.113.131.29>
    ⊞ Contact: <sip:22300@163.22.16.47:5060>
      Call-ID: 02736DD3-1565-4A3C-9B4C-92164F694B62@163.22.16.47
      CSeq: 45809 INVITE
      Max-Forwards: 70
      Content-Type: application/sdp
      User-Agent: X-Lite release 1105x
      Content-Length: 281
  ⊞ Message body
```

```
0000   00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1.,... .'.B..E.
0010   02 f4 02 e6 00 00 80 11  72 3f a3 16 10 2f 8c 71   ........ r?.../.q
0020   83 1d 13 c4 13 c4 02 e0  90 7e 49 4e 56 49 54 45   ........ .~INVITE
0030   20 73 69 70 3a 32 32 32  30 30 40 31 34 30 2e 31    sip:222 00@140.1
0040   31 33 2e 31 33 31 2e 32  39 20 53 49 50 2f 32 2e   13.131.2 9 SIP/2.
0050   30 0d 0a 56 69 61 3a 20  53 49 50 2f 32 2e 30 2f   0..Via:  SIP/2.0/
```

File: "C:\Documents and Settings\smartderrick\桌面\3" 1497 KB 00:04:05 | P: 7676 D: 18 M: 0

SDP in INVITE


3 - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

```
No. .   Time         Source           Destination       Protocol  Info
  177 9.476298    163.22.16.47     140.113.131.29    SIP/SD Request: INVITE sip:22400@140.113.131.29,
  178 9.487270    140.113.131.29   163.22.16.47      SIP    Status: 100 Trying
  179 9.512073    140.113.131.29   163.22.16.47      SIP    Status: 480 Temporarily Unavailable
  180 9.513771    163.22.16.47     140.113.131.29    SIP    Request: ACK sip:22400@140.113.131.29
  247 18.783144   163.22.16.47     140.113.131.29    SIP/SD Request: INVITE sip:22200@140.113.131.29,
  248 18.792467   140.113.131.29   163.22.16.47      SIP    Status: 100 Trying
```

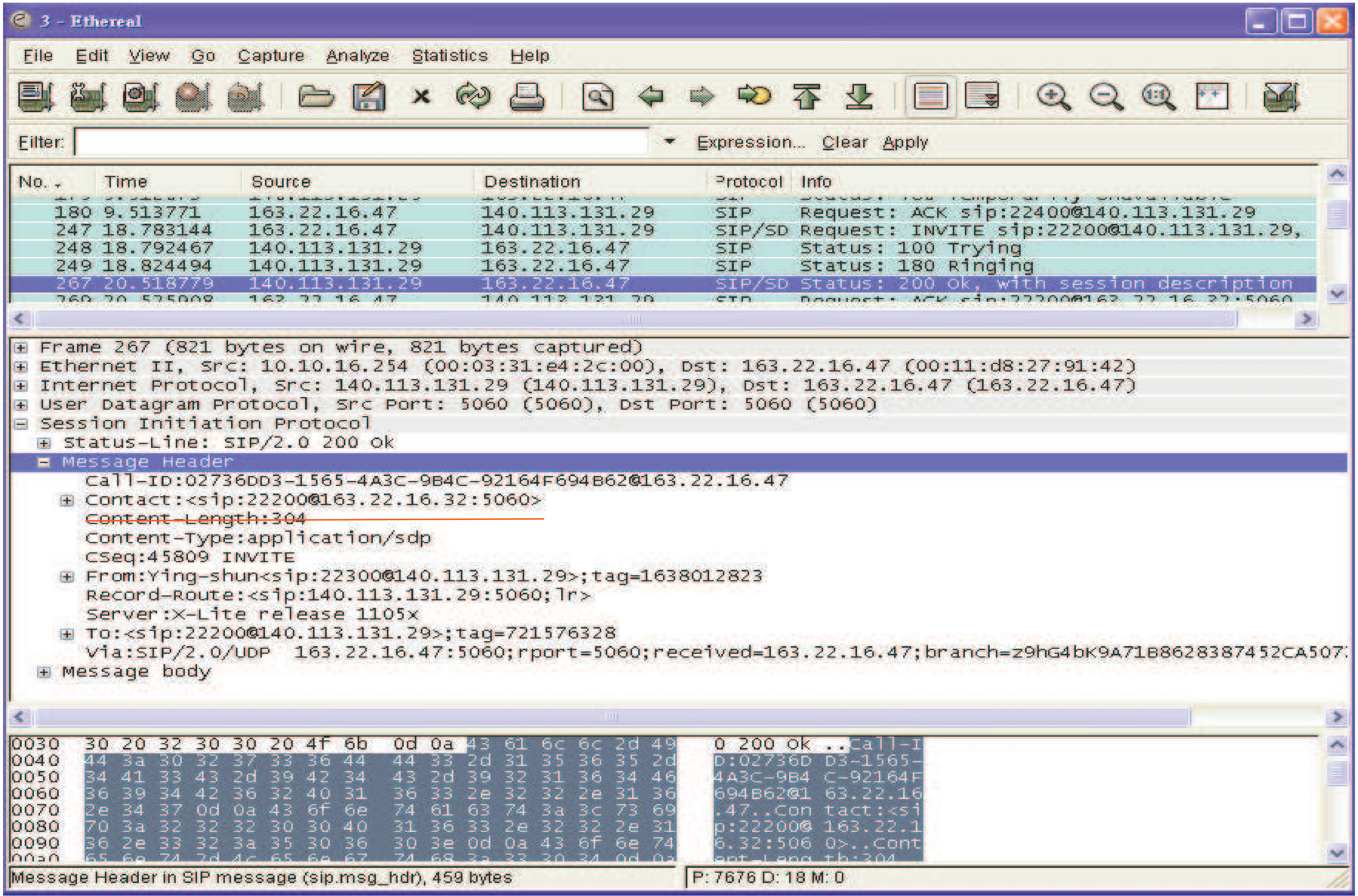
```
⊞ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst: 140.113.131.29 (140.113.131.29)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
   ⊞ Request-Line: INVITE sip:22200@140.113.131.29 SIP/2.0
   ⊞ Message Header
   ⊟ Message body
     ⊟ Session Description Protocol
         Session Description Protocol Version (v): 0
       ⊞ Owner/Creator, Session Id (o): 22300 103457132 103457146 IN IP4 163.22.16.47
         Session Name (s): X-Lite
       ⊞ Connection Information (c): IN IP4 163.22.16.47
       ⊞ Time Description, active time (t): 0 0
       ⊞ Media Description, name and address (m): audio 8000 RTP/AVP 0 8 3 98 101
       ⊞ Media Attribute (a): rtpmap:0 pcmu/8000
       ⊞ Media Attribute (a): rtpmap:8 pcma/8000
       ⊞ Media Attribute (a): rtpmap:3 gsm/8000
       ⊞ Media Attribute (a): rtpmap:98 iLBC/8000
       ⊞ Media Attribute (a): rtpmap:101 telephone-event/8000
       ⊞ Media Attribute (a): fmtp:101 0-15
         Media Attribute (a): sendrecv
```

```
01e0  3a 20 32 38 31 0d 0a 0d  0a 76 3d 30 0d 0a 6f 3d   : 281... .v=0..o=
01f0  32 32 33 30 30 20 31 30  33 34 35 37 31 33 32 20   22300 10 3457132 
0200  31 30 33 34 35 37 31 34  36 20 49 4e 20 49 50 34   10345714 6 IN IP4
0210  20 31 36 33 2e 32 32 2e  31 36 2e 34 37 0d 0a 73    163.22. 16.47..s
0220  3d 58 2d 4c 69 74 65 0d  0a 63 3d 49 4e 20 49 50   =X-Lite. .c=IN IP
0230  34 20 31 36 33 2e 32 32  2e 31 36 2e 34 37 0d 0a   4 163.22 .16.47..
```

Session Description Protocol (sdp), 281 bytes

P: 7676 D: 18 M: 0

200 OK



3 - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

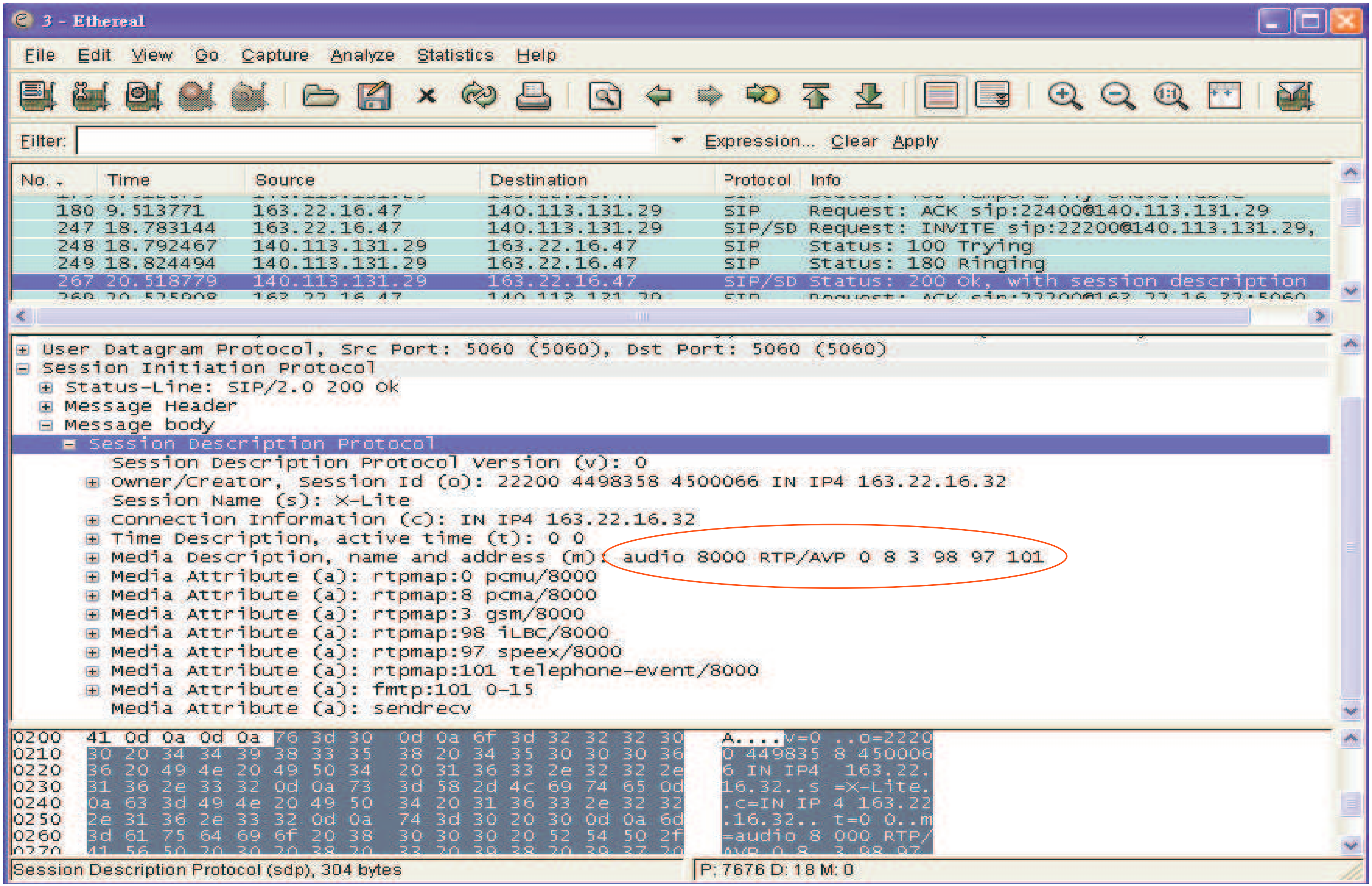
```
No. -  Time        Source           Destination      Protocol Info
180    9.513771    163.22.16.47     140.113.131.29   SIP      Request: ACK sip:22400@140.113.131.29
247    18.783144   163.22.16.47     140.113.131.29   SIP/SD   Request: INVITE sip:22200@140.113.131.29,
248    18.792467   140.113.131.29   163.22.16.47     SIP      Status: 100 Trying
249    18.824494   140.113.131.29   163.22.16.47     SIP      Status: 180 Ringing
267    20.518779   140.113.131.29   163.22.16.47     SIP/SD   Status: 200 OK, with session description
```

```
⊞ Frame 267 (821 bytes on wire, 821 bytes captured)
⊞ Ethernet II, Src: 10.10.16.254 (00:03:31:e4:2c:00), Dst: 163.22.16.47 (00:11:d8:27:91:42)
⊞ Internet Protocol, Src: 140.113.131.29 (140.113.131.29), Dst: 163.22.16.47 (163.22.16.47)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
  ⊞ Status-Line: SIP/2.0 200 OK
  ⊟ Message Header
      Call-ID:02736DD3-1565-4A3C-9B4C-92164F694B62@163.22.16.47
    ⊞ Contact:<sip:22200@163.22.16.32:5060>
      ~~Content-Length:304~~
      Content-Type:application/sdp
      CSeq:45809 INVITE
    ⊞ From:Ying-shun<sip:22300@140.113.131.29>;tag=1638012823
      Record-Route:<sip:140.113.131.29:5060;lr>
      Server:X-Lite release 1105x
    ⊞ To:<sip:22200@140.113.131.29>;tag=721576328
      Via:SIP/2.0/UDP  163.22.16.47:5060;rport=5060;received=163.22.16.47;branch=z9hG4bK9A71B8628387452CA507:
  ⊞ Message body
```

```
0030   30 20 32 30 30 20 4f 6b  0d 0a 43 61 6c 6c 2d 49    0 200 OK ..Call-I
0040   44 3a 30 32 37 33 36 44  44 33 2d 31 35 36 35 2d    D:02736D D3-1565-
0050   34 41 33 43 2d 39 42 34  43 2d 39 32 31 36 34 46    4A3C-9B4 C-92164F
0060   36 39 34 42 36 32 40 31  36 33 2e 32 32 2e 31 36    694B62@1 63.22.16
0070   2e 34 37 0d 0a 43 6f 6e  74 61 63 74 3a 3c 73 69    .47..Con tact:<si
0080   70 3a 32 32 32 30 30 40  31 36 33 2e 32 32 2e 31    p:22200@ 163.22.1
0090   36 2e 33 32 3a 35 30 36  30 3e 0d 0a 43 6f 6e 74    6.32:506 0>..Cont
```

Message Header in SIP message (sip.msg_hdr), 459 bytes | P: 7676 D: 18 M: 0

SDP in 200 OK


3 - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

```
No. -  Time         Source            Destination       Protocol  Info
  180  9.513771     163.22.16.47      140.113.131.29    SIP       Request: ACK sip:22400@140.113.131.29
  247  18.783144    163.22.16.47      140.113.131.29    SIP/SD    Request: INVITE sip:22200@140.113.131.29,
  248  18.792467    140.113.131.29    163.22.16.47      SIP       Status: 100 Trying
  249  18.824494    140.113.131.29    163.22.16.47      SIP       Status: 180 Ringing
  267  20.518779    140.113.131.29    163.22.16.47      SIP/SD    Status: 200 OK, with session description
  268  20.525908    163.22.16.47      140.113.131.29    SIP       Request: ACK sip:22200@163.22.16.32:5060
```

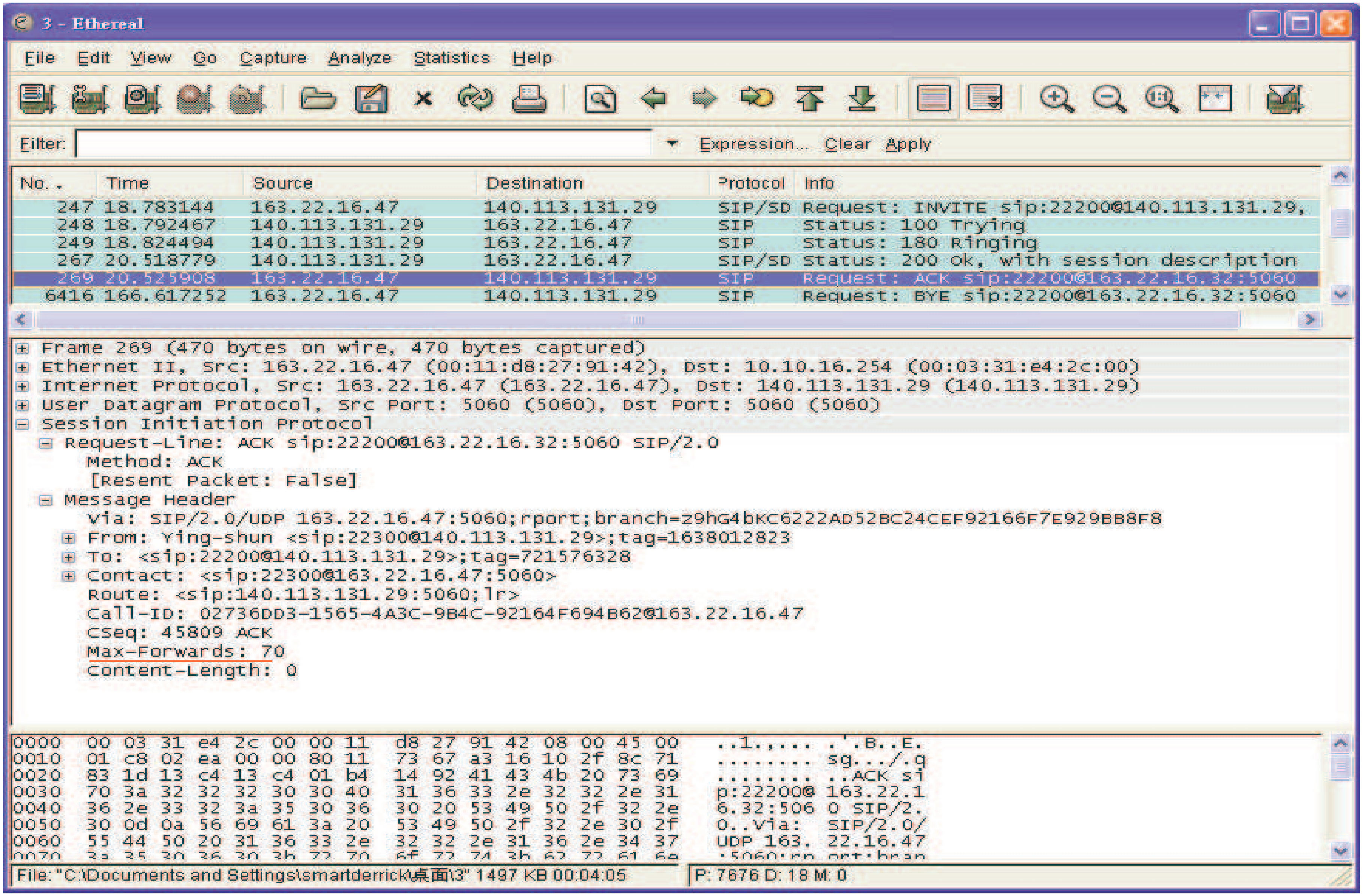
```
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
  ⊞ Status-Line: SIP/2.0 200 OK
  ⊞ Message Header
  ⊟ Message body
    ⊟ Session Description Protocol
        Session Description Protocol Version (v): 0
      ⊞ Owner/Creator, Session Id (o): 22200 4498358 4500066 IN IP4 163.22.16.32
        Session Name (s): X-Lite
      ⊞ Connection Information (c): IN IP4 163.22.16.32
      ⊞ Time Description, active time (t): 0 0
      ⊞ Media Description, name and address (m): audio 8000 RTP/AVP 0 8 3 98 97 101
      ⊞ Media Attribute (a): rtpmap:0 pcmu/8000
      ⊞ Media Attribute (a): rtpmap:8 pcma/8000
      ⊞ Media Attribute (a): rtpmap:3 gsm/8000
      ⊞ Media Attribute (a): rtpmap:98 iLBC/8000
      ⊞ Media Attribute (a): rtpmap:97 speex/8000
      ⊞ Media Attribute (a): rtpmap:101 telephone-event/8000
      ⊞ Media Attribute (a): fmtp:101 0-15
        Media Attribute (a): sendrecv
```

```
0200  41 0d 0a 0d 0a 76 3d 30  0d 0a 6f 3d 32 32 32 30   A....v=0 ..o=2220
0210  30 20 34 34 39 38 33 35  38 20 34 35 30 30 30 36   0 449835 8 450006
0220  36 20 49 4e 20 49 50 34  20 31 36 33 2e 32 32 2e   6 IN IP4  163.22.
0230  31 36 2e 33 32 0d 0a 73  3d 58 2d 4c 69 74 65 0d   16.32..s =X-Lite.
0240  0a 63 3d 49 4e 20 49 50  34 20 31 36 33 2e 32 32   .c=IN IP 4 163.22
0250  2e 31 36 2e 33 32 0d 0a  74 3d 30 20 30 0d 0a 6d   .16.32.. t=0 0..m
0260  3d 61 75 64 69 6f 20 38  30 30 30 20 52 54 50 2f   =audio 8 000 RTP/
0270  41 56 50 20 30 20 38 20  33 20 39 38 20 39 37 20   AVP 0 8  3 98 97
```

Session Description Protocol (sdp), 304 bytes

P: 7676 D: 18 M: 0

ACK


3 - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

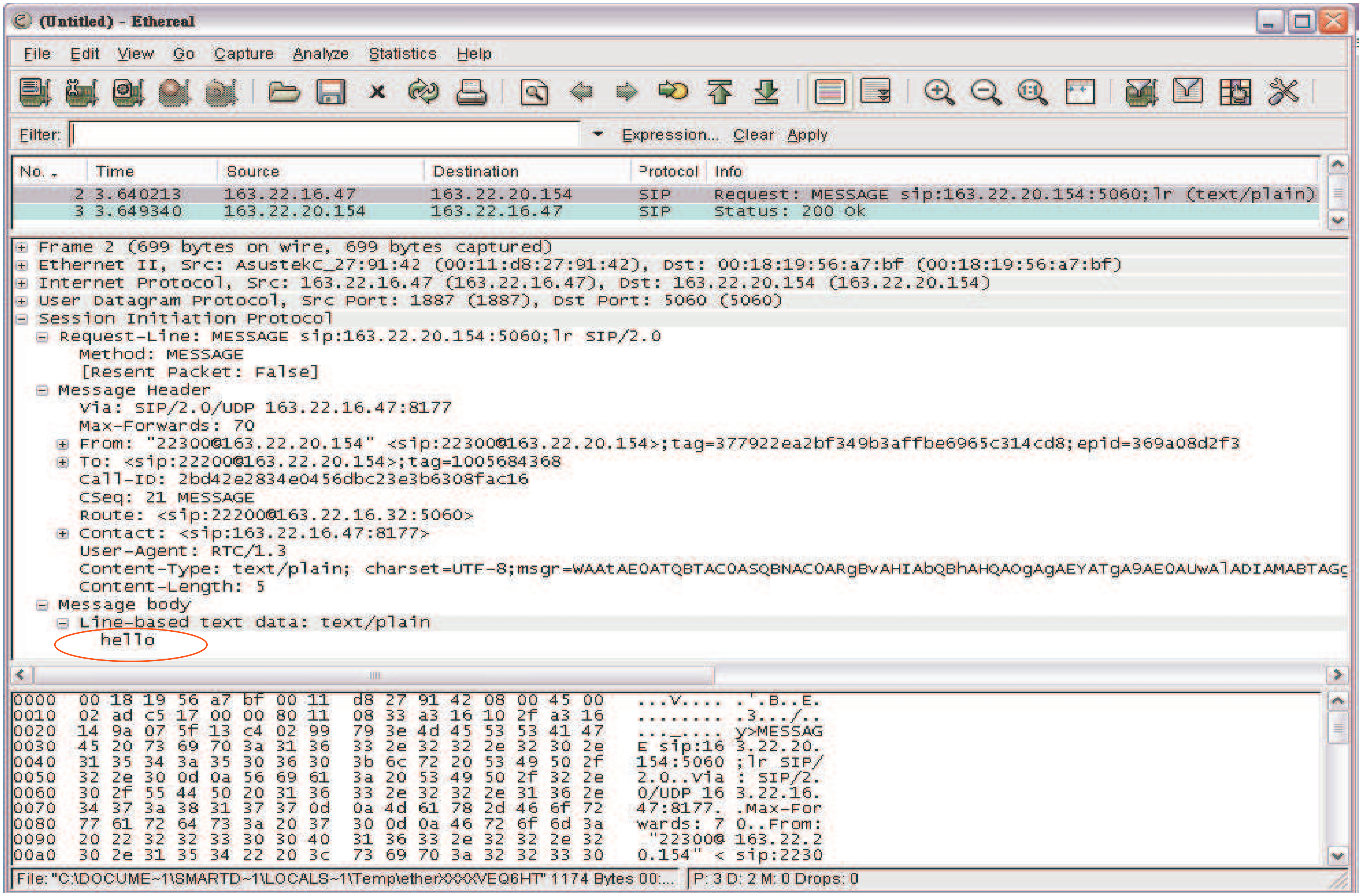
```
No. .  Time        Source          Destination     Protocol Info
   247 18.783144   163.22.16.47    140.113.131.29  SIP/SD   Request: INVITE sip:22200@140.113.131.29,
   248 18.792467   140.113.131.29  163.22.16.47    SIP      Status: 100 Trying
   249 18.824494   140.113.131.29  163.22.16.47    SIP      Status: 180 Ringing
   267 20.518779   140.113.131.29  163.22.16.47    SIP/SD   Status: 200 OK, with session description
   269 20.525908   163.22.16.47    140.113.131.29  SIP      Request: ACK sip:22200@163.22.16.32:5060
  6416 166.617252  163.22.16.47    140.113.131.29  SIP      Request: BYE sip:22200@163.22.16.32:5060
```

```
⊞ Frame 269 (470 bytes on wire, 470 bytes captured)
⊞ Ethernet II, Src: 163.22.16.47 (00:11:d8:27:91:42), Dst: 10.10.16.254 (00:03:31:e4:2c:00)
⊞ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst: 140.113.131.29 (140.113.131.29)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
  ⊟ Request-Line: ACK sip:22200@163.22.16.32:5060 SIP/2.0
      Method: ACK
      [Resent Packet: False]
  ⊟ Message Header
      Via: SIP/2.0/UDP 163.22.16.47:5060;rport;branch=z9hG4bKC6222AD52BC24CEF92166F7E929BB8F8
    ⊞ From: Ying-shun <sip:22300@140.113.131.29>;tag=1638012823
    ⊞ To: <sip:22200@140.113.131.29>;tag=721576328
    ⊞ Contact: <sip:22300@163.22.16.47:5060>
      Route: <sip:140.113.131.29:5060;lr>
      Call-ID: 02736DD3-1565-4A3C-9B4C-92164F694B62@163.22.16.47
      CSeq: 45809 ACK
      Max-Forwards: 70
      Content-Length: 0
```

```
0000   00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1.,... .'.B..E.
0010   01 c8 02 ea 00 00 80 11  73 67 a3 16 10 2f 8c 71   ........ sg.../.q
0020   83 1d 13 c4 13 c4 01 b4  14 92 41 43 4b 20 73 69   ........ ..ACK si
0030   70 3a 32 32 32 30 30 40  31 36 33 2e 32 32 2e 31   p:22200@ 163.22.1
0040   36 2e 33 32 3a 35 30 36  30 20 53 49 50 2f 32 2e   6.32:506 0 SIP/2.
0050   30 0d 0a 56 69 61 3a 20  53 49 50 2f 32 2e 30 2f   0..Via:  SIP/2.0/
0060   55 44 50 20 31 36 33 2e  32 32 2e 31 36 2e 34 37   UDP 163. 22.16.47
0070   3a 35 30 36 30 3b 72 70  6f 72 74 3b 62 72 61 6e   :5060;rp ort;bran
```

File: "C:\Documents and Settings\smartderrick\桌面\3" 1497 KB 00:04:05 P: 7676 D: 18 M: 0

MESSAGE


(Untitled) - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

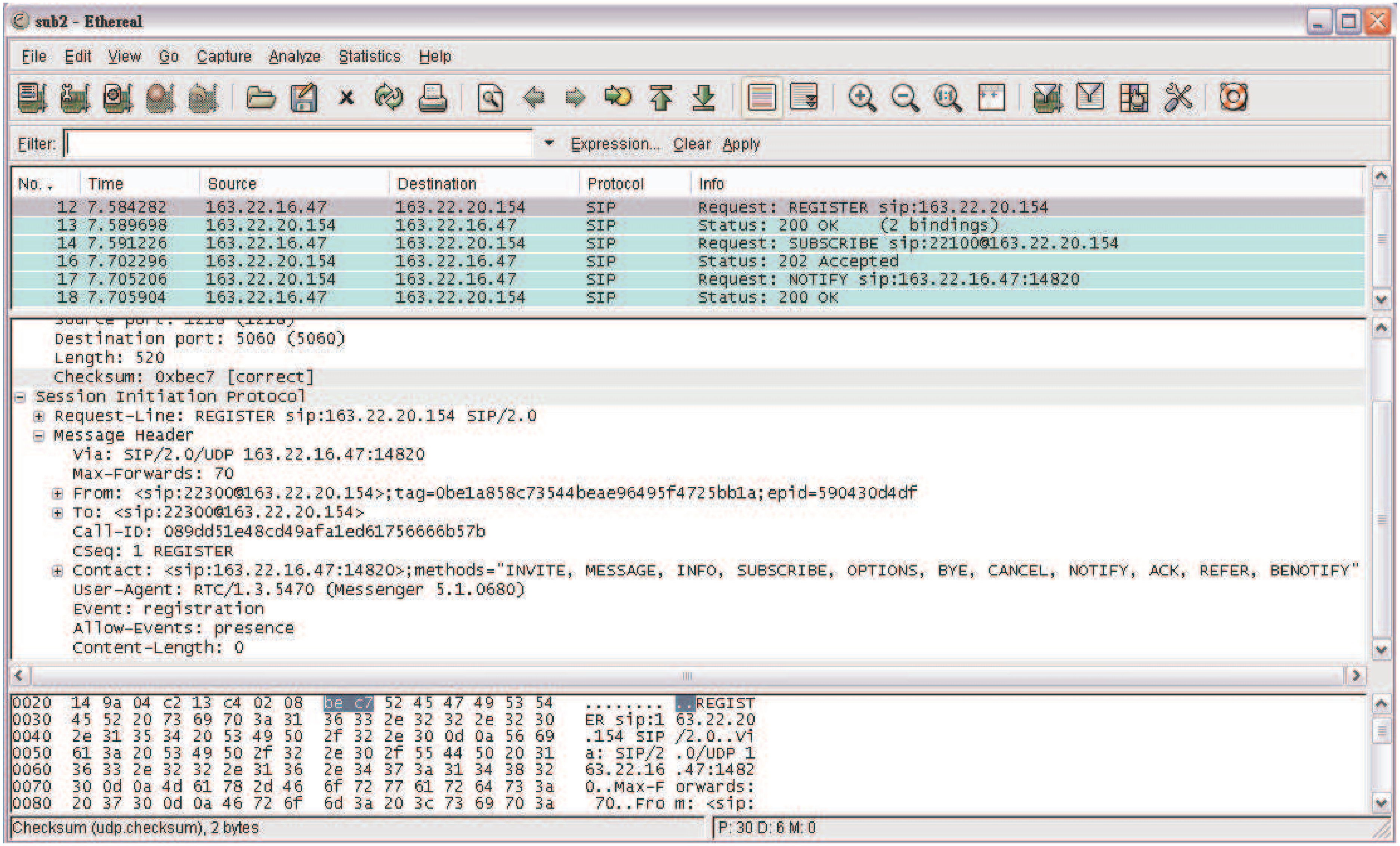
```
No. .  Time        Source          Destination     Protocol  Info
    2 3.640213    163.22.16.47    163.22.20.154   SIP       Request: MESSAGE sip:163.22.20.154:5060;lr (text/plain)
    3 3.649340    163.22.20.154   163.22.16.47    SIP       Status: 200 Ok
```

```
⊞ Frame 2 (699 bytes on wire, 699 bytes captured)
⊞ Ethernet II, Src: AsustekC_27:91:42 (00:11:d8:27:91:42), Dst: 00:18:19:56:a7:bf (00:18:19:56:a7:bf)
⊞ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst: 163.22.20.154 (163.22.20.154)
⊞ User Datagram Protocol, Src Port: 1887 (1887), Dst Port: 5060 (5060)
⊟ Session Initiation Protocol
  ⊟ Request-Line: MESSAGE sip:163.22.20.154:5060;lr SIP/2.0
      Method: MESSAGE
      [Resent Packet: False]
  ⊟ Message Header
      Via: SIP/2.0/UDP 163.22.16.47:8177
      Max-Forwards: 70
    ⊞ From: "22300@163.22.20.154" <sip:22300@163.22.20.154>;tag=377922ea2bf349b3affbe6965c314cd8;epid=369a08d2f3
    ⊞ To: <sip:22200@163.22.20.154>;tag=1005684368
      Call-ID: 2bd42e2834e0456dbc23e3b6308fac16
      CSeq: 21 MESSAGE
      Route: <sip:22200@163.22.16.32:5060>
    ⊞ Contact: <sip:163.22.16.47:8177>
      User-Agent: RTC/1.3
      Content-Type: text/plain; charset=UTF-8;msgr=WAAtAE0ATQBTAC0ASQBNAC0ARgBvAHIAbQBhAHQAOgAgAEYATgA9AE0AUwA1ADIAMABTAGc
      Content-Length: 5
  ⊟ Message body
    ⊟ Line-based text data: text/plain
        hello
```

```
0000  00 18 19 56 a7 bf 00 11  d8 27 91 42 08 00 45 00   ...V.... .'.B..E.
0010  02 ad c5 17 00 00 80 11  08 33 a3 16 10 2f a3 16   ........ .3.../..
0020  14 9a 07 5f 13 c4 02 99  79 3e 4d 45 53 53 41 47   ..._.... y>MESSAG
0030  45 20 73 69 70 3a 31 36  33 2e 32 32 2e 32 30 2e   E sip:16 3.22.20.
0040  31 35 34 3a 35 30 36 30  3b 6c 72 20 53 49 50 2f   154:5060 ;lr SIP/
0050  32 2e 30 0d 0a 56 69 61  3a 20 53 49 50 2f 32 2e   2.0..Via : SIP/2.
0060  30 2f 55 44 50 20 31 36  33 2e 32 32 2e 31 36 2e   0/UDP 16 3.22.16.
0070  34 37 3a 38 31 37 37 0d  0a 4d 61 78 2d 46 6f 72   47:8177. .Max-For
0080  77 61 72 64 73 3a 20 37  30 0d 0a 46 72 6f 6d 3a   wards: 7 0..From:
0090  20 22 32 32 33 30 30 40  31 36 33 2e 32 32 2e 32    "22300@ 163.22.2
00a0  30 2e 31 35 34 22 20 3c  73 69 70 3a 32 32 33 30   0.154" < sip:2230
```

File: "C:\DOCUME~1\SMARTD~1\LOCALS~1\Temp\etherXXXXVEQ6HT" 1174 Bytes 00:... P: 3 D: 2 M: 0 Drops: 0

SUBSCRIBE/NOTIFY


sub2 - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

```
No. .  Time       Source          Destination     Protocol  Info
    12 7.584282   163.22.16.47    163.22.20.154   SIP       Request: REGISTER sip:163.22.20.154
    13 7.589698   163.22.20.154   163.22.16.47    SIP       Status: 200 OK      (2 bindings)
    14 7.591226   163.22.16.47    163.22.20.154   SIP       Request: SUBSCRIBE sip:22100@163.22.20.154
    16 7.702296   163.22.20.154   163.22.16.47    SIP       Status: 202 Accepted
    17 7.705206   163.22.20.154   163.22.16.47    SIP       Request: NOTIFY sip:163.22.16.47:14820
    18 7.705904   163.22.16.47    163.22.20.154   SIP       Status: 200 OK
```

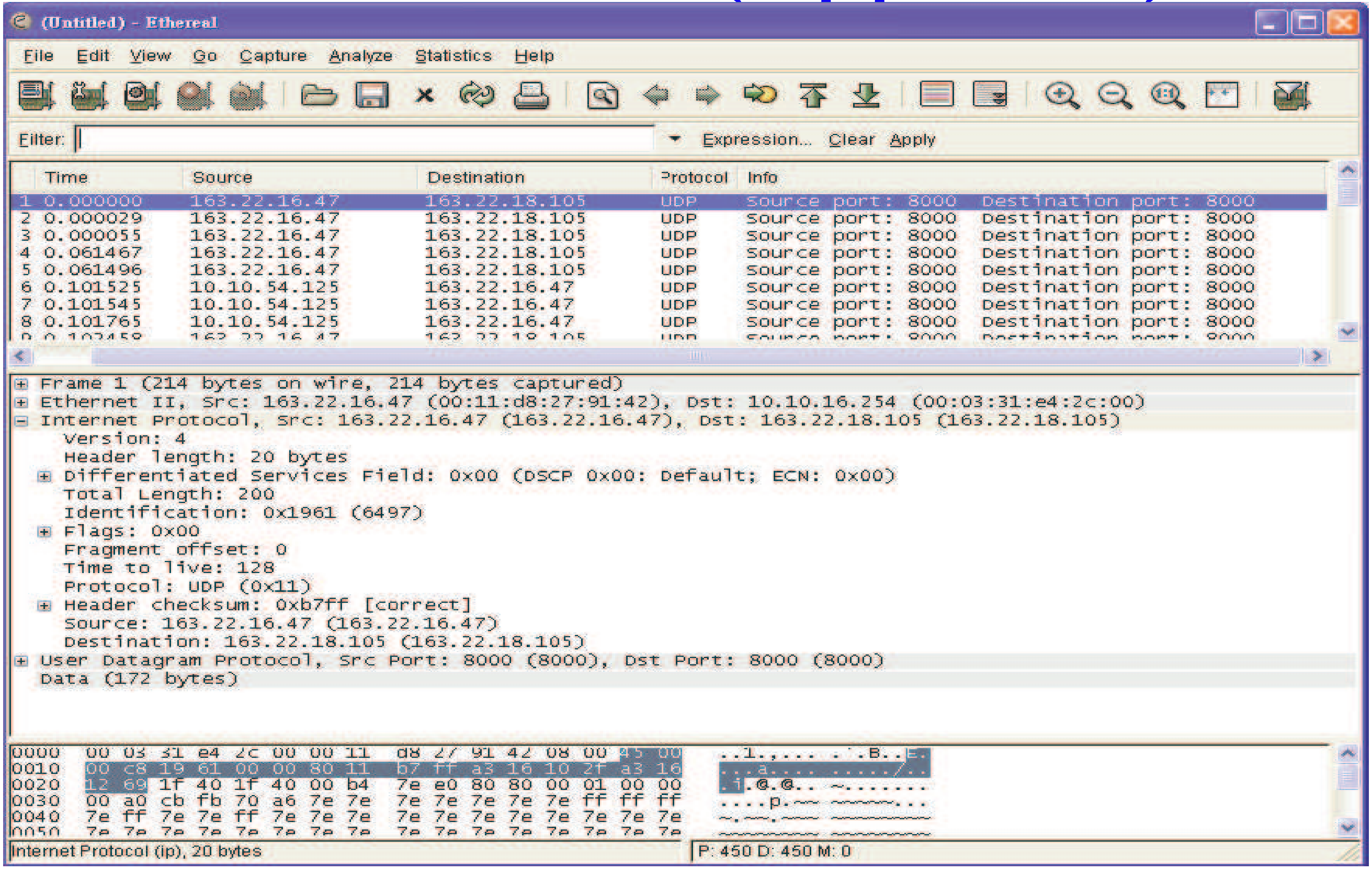
```
    Source port: 1218 (1218)
    Destination port: 5060 (5060)
    Length: 520
    Checksum: 0xbec7 [correct]
⊟ Session Initiation Protocol
  ⊞ Request-Line: REGISTER sip:163.22.20.154 SIP/2.0
  ⊟ Message Header
      Via: SIP/2.0/UDP 163.22.16.47:14820
      Max-Forwards: 70
    ⊞ From: <sip:22300@163.22.20.154>;tag=0be1a858c73544beae96495f4725bb1a;epid=590430d4df
    ⊞ To: <sip:22300@163.22.20.154>
      Call-ID: 089dd51e48cd49afa1ed61756666b57b
      CSeq: 1 REGISTER
    ⊞ Contact: <sip:163.22.16.47:14820>;methods="INVITE, MESSAGE, INFO, SUBSCRIBE, OPTIONS, BYE, CANCEL, NOTIFY, ACK, REFER, BENOTIFY"
      User-Agent: RTC/1.3.5470 (Messenger 5.1.0680)
      Event: registration
      Allow-Events: presence
      Content-Length: 0
```

```
0020  14 9a 04 c2 13 c4 02 08  be c7 52 45 47 49 53 54   ........ ..REGIST
0030  45 52 20 73 69 70 3a 31  36 33 2e 32 32 2e 32 30   ER sip:1 63.22.20
0040  2e 31 35 34 20 53 49 50  2f 32 2e 30 0d 0a 56 69   .154 SIP /2.0..Vi
0050  61 3a 20 53 49 50 2f 32  2e 30 2f 55 44 50 20 31   a: SIP/2 .0/UDP 1
0060  36 33 2e 32 32 2e 31 36  2e 34 37 3a 31 34 38 32   63.22.16 .47:1482
0070  30 0d 0a 4d 61 78 2d 46  6f 72 77 61 72 64 73 3a   0..Max-F orwards:
0080  20 37 30 0d 0a 46 72 6f  6d 3a 20 3c 73 69 70 3a    70..Fro m: <sip:
```

Checksum (udp.checksum), 2 bytes   P: 30 D: 6 M: 0

Capturing the packets of Media Data

RTP Traffic (udp port 8000)


(Untitled) - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply

```
  Time        Source          Destination     Protocol  Info
1 0.000000    163.22.16.47    163.22.18.105   UDP       Source port: 8000  Destination port: 8000
2 0.000029    163.22.16.47    163.22.18.105   UDP       Source port: 8000  Destination port: 8000
3 0.000055    163.22.16.47    163.22.18.105   UDP       Source port: 8000  Destination port: 8000
4 0.061467    163.22.16.47    163.22.18.105   UDP       Source port: 8000  Destination port: 8000
5 0.061496    163.22.16.47    163.22.18.105   UDP       Source port: 8000  Destination port: 8000
6 0.101525    10.10.54.125    163.22.16.47    UDP       Source port: 8000  Destination port: 8000
7 0.101545    10.10.54.125    163.22.16.47    UDP       Source port: 8000  Destination port: 8000
8 0.101765    10.10.54.125    163.22.16.47    UDP       Source port: 8000  Destination port: 8000
9 0.102458    163.22.16.47    163.22.18.105   UDP       Source port: 8000  Destination port: 8000
```

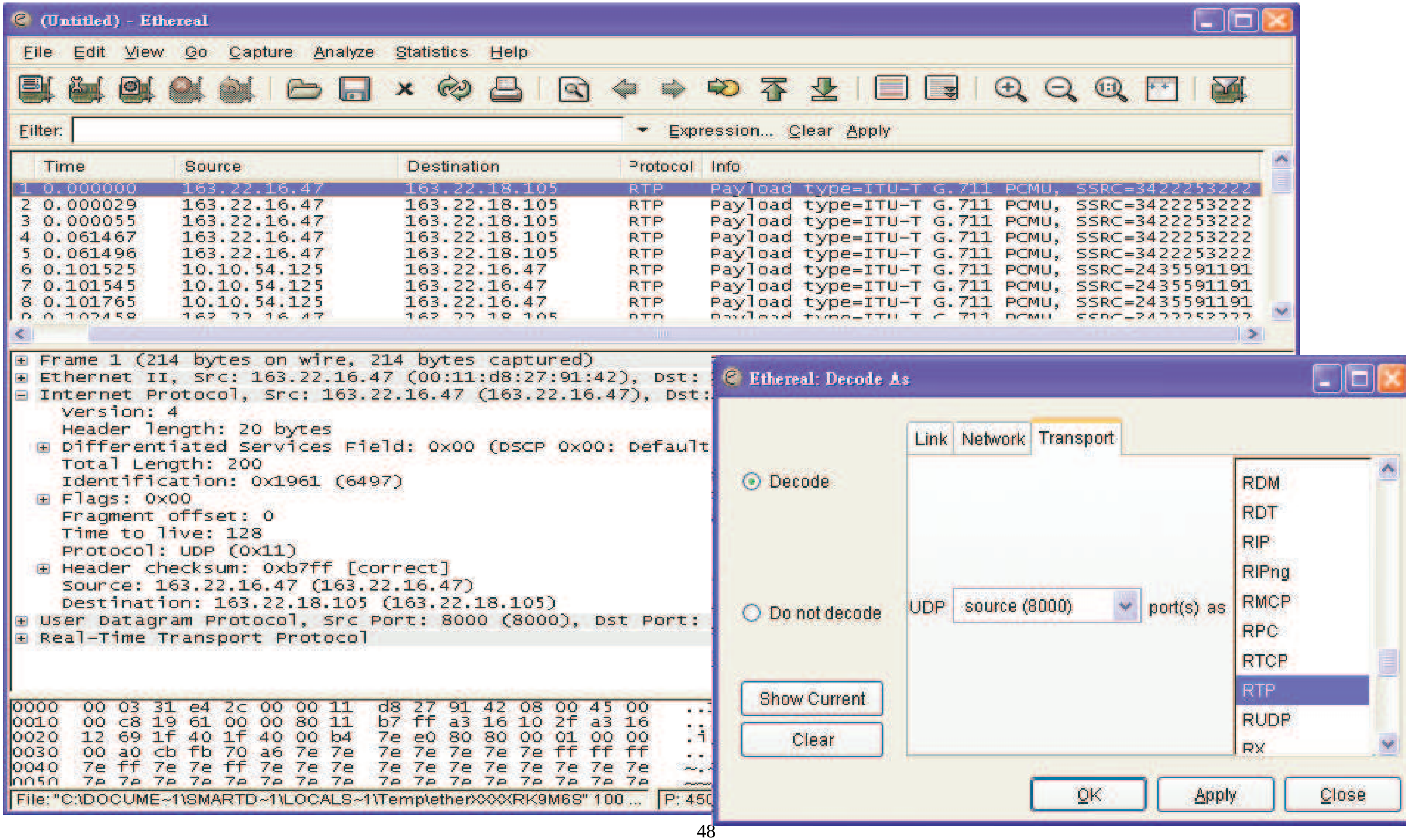
```
⊞ Frame 1 (214 bytes on wire, 214 bytes captured)
⊞ Ethernet II, Src: 163.22.16.47 (00:11:d8:27:91:42), Dst: 10.10.16.254 (00:03:31:e4:2c:00)
⊟ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst: 163.22.18.105 (163.22.18.105)
    Version: 4
    Header length: 20 bytes
  ⊞ Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
    Total Length: 200
    Identification: 0x1961 (6497)
  ⊞ Flags: 0x00
    Fragment offset: 0
    Time to live: 128
    Protocol: UDP (0x11)
  ⊞ Header checksum: 0xb7ff [correct]
    Source: 163.22.16.47 (163.22.16.47)
    Destination: 163.22.18.105 (163.22.18.105)
⊞ User Datagram Protocol, Src Port: 8000 (8000), Dst Port: 8000 (8000)
  Data (172 bytes)
```

```
0000  00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1.,... .'.B..E.
0010  00 c8 19 61 00 00 80 11  b7 ff a3 16 10 2f a3 16   ...a.... ...../..
0020  12 69 1f 40 1f 40 00 b4  7e e0 80 80 00 01 00 00   .i.@.@.. ~.......
0030  00 a0 cb fb 70 a6 7e 7e  7e 7e 7e 7e 7e ff ff ff   ....p.~~ ~~~~~...
0040  7e ff 7e 7e ff 7e 7e 7e  7e 7e 7e 7e 7e 7e 7e 7e   ~.~~.~~~ ~~~~~~~~
0050  7e 7e 7e 7e 7e 7e 7e 7e  7e 7e 7e 7e 7e 7e 7e 7e   ~~~~~~~~ ~~~~~~~~
```

Internet Protocol (ip), 20 bytes   P: 450 D: 450 M: 0

- What’s wrong?

Tools – Decode As RTP



```
   Time       Source          Destination     Protocol  Info
1  0.000000   163.22.16.47    163.22.18.105   RTP       Payload type=ITU-T G.711 PCMU, SSRC=3422253222
2  0.000029   163.22.16.47    163.22.18.105   RTP       Payload type=ITU-T G.711 PCMU, SSRC=3422253222
3  0.000055   163.22.16.47    163.22.18.105   RTP       Payload type=ITU-T G.711 PCMU, SSRC=3422253222
4  0.061467   163.22.16.47    163.22.18.105   RTP       Payload type=ITU-T G.711 PCMU, SSRC=3422253222
5  0.061496   163.22.16.47    163.22.18.105   RTP       Payload type=ITU-T G.711 PCMU, SSRC=3422253222
6  0.101525   10.10.54.125    163.22.16.47    RTP       Payload type=ITU-T G.711 PCMU, SSRC=2435591191
7  0.101545   10.10.54.125    163.22.16.47    RTP       Payload type=ITU-T G.711 PCMU, SSRC=2435591191
8  0.101765   10.10.54.125    163.22.16.47    RTP       Payload type=ITU-T G.711 PCMU, SSRC=2435591191
9  0.102458   163.22.16.47    163.22.18.105   RTP       Payload type=ITU-T G.711 PCMU, SSRC=3422253222
```

```
⊞ Frame 1 (214 bytes on wire, 214 bytes captured)
⊞ Ethernet II, Src: 163.22.16.47 (00:11:d8:27:91:42), Dst:
⊟ Internet Protocol, Src: 163.22.16.47 (163.22.16.47), Dst:
    Version: 4
    Header length: 20 bytes
  ⊞ Differentiated Services Field: 0x00 (DSCP 0x00: Default
    Total Length: 200
    Identification: 0x1961 (6497)
  ⊞ Flags: 0x00
    Fragment offset: 0
    Time to live: 128
    Protocol: UDP (0x11)
  ⊞ Header checksum: 0xb7ff [correct]
    Source: 163.22.16.47 (163.22.16.47)
    Destination: 163.22.18.105 (163.22.18.105)
⊞ User Datagram Protocol, Src Port: 8000 (8000), Dst Port:
⊞ Real-Time Transport Protocol
```

```
0000  00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1
0010  00 c8 19 61 00 00 80 11  b7 ff a3 16 10 2f a3 16   ..
0020  12 69 1f 40 1f 40 00 b4  7e e0 80 80 00 01 00 00   .i
0030  00 a0 cb fb 70 a6 7e 7e  7e 7e 7e 7e 7e ff ff ff   ..
0040  7e ff 7e 7e ff 7e 7e 7e  7e 7e 7e 7e 7e 7e 7e 7e   ~.
0050  7e 7e 7e 7e 7e 7e 7e 7e  7e 7e 7e 7e 7e 7e 7e 7e   ~~
```

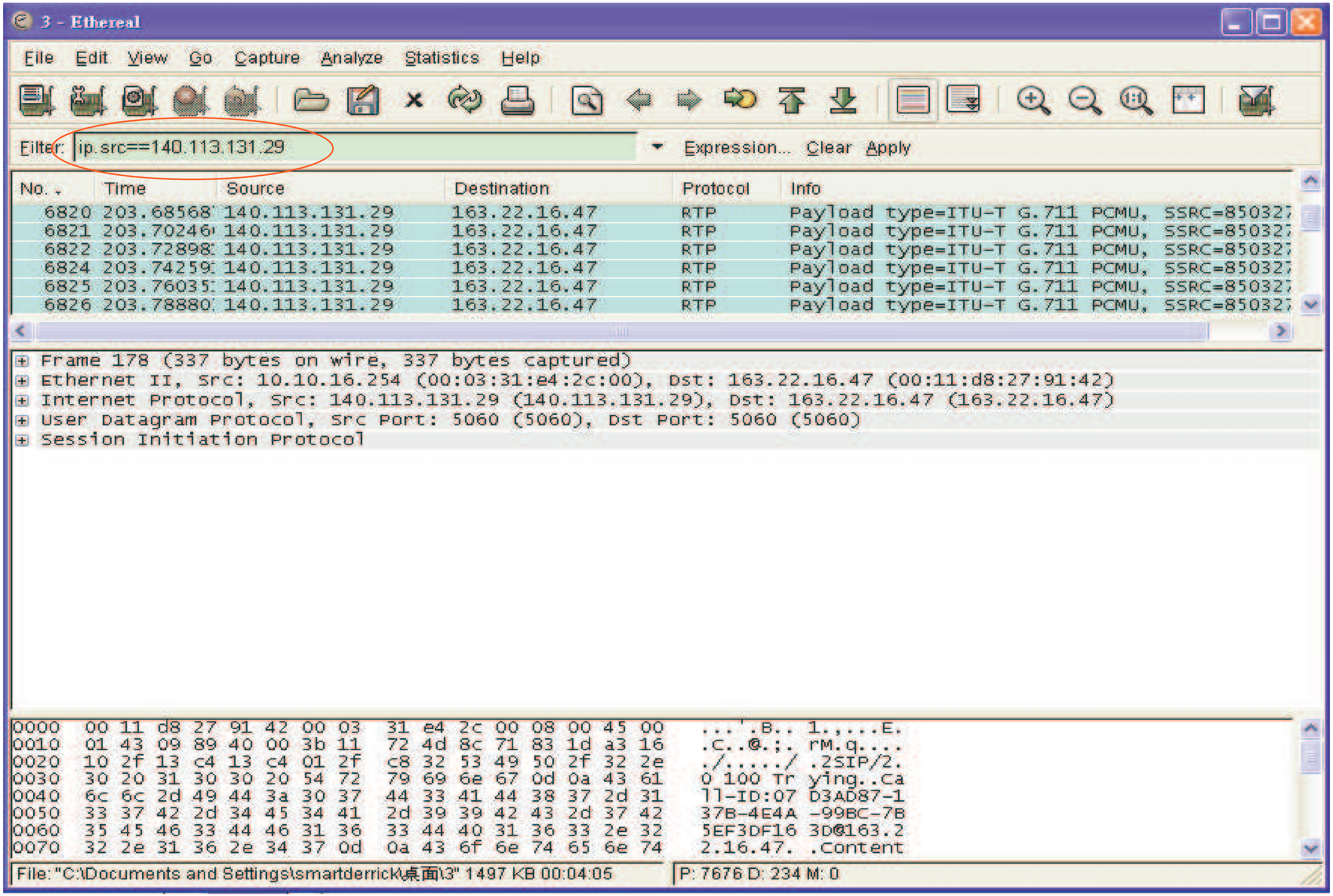
File: "C:\DOCUME~1\SMARTD~1\LOCALS~1\Temp\etherXXXXRK9M6S" 100 ... P: 450

● Decode
○ Do not decode

UDP source (8000) port(s) as RTP

RDM
RDT
RIP
RIPng
RMCP
RPC
RTCP
RTP
RUDP
RX

Display Filter


3 - Ethereal
File Edit View Go Capture Analyze Statistics Help
Expression... Clear Apply

Filter: ip.src==140.113.131.29

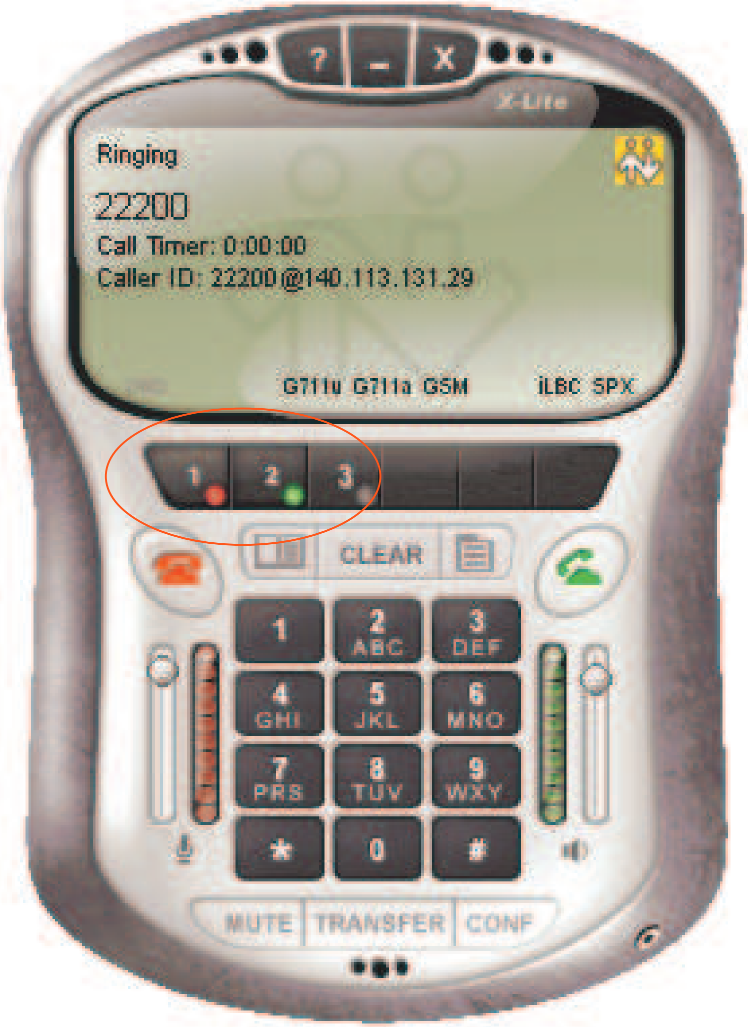
```
No. .  Time       Source          Destination   Protocol  Info
 6820 203.68568  140.113.131.29  163.22.16.47  RTP       Payload type=ITU-T G.711 PCMU, SSRC=850327
 6821 203.70246  140.113.131.29  163.22.16.47  RTP       Payload type=ITU-T G.711 PCMU, SSRC=850327
 6822 203.72898  140.113.131.29  163.22.16.47  RTP       Payload type=ITU-T G.711 PCMU, SSRC=850327
 6824 203.74259  140.113.131.29  163.22.16.47  RTP       Payload type=ITU-T G.711 PCMU, SSRC=850327
 6825 203.76035  140.113.131.29  163.22.16.47  RTP       Payload type=ITU-T G.711 PCMU, SSRC=850327
 6826 203.78880  140.113.131.29  163.22.16.47  RTP       Payload type=ITU-T G.711 PCMU, SSRC=850327
```

```
⊞ Frame 178 (337 bytes on wire, 337 bytes captured)
⊞ Ethernet II, Src: 10.10.16.254 (00:03:31:e4:2c:00), Dst: 163.22.16.47 (00:11:d8:27:91:42)
⊞ Internet Protocol, Src: 140.113.131.29 (140.113.131.29), Dst: 163.22.16.47 (163.22.16.47)
⊞ User Datagram Protocol, Src Port: 5060 (5060), Dst Port: 5060 (5060)
⊞ Session Initiation Protocol
```

```
0000  00 11 d8 27 91 42 00 03  31 e4 2c 00 08 00 45 00   ...'.B.. 1.,...E.
0010  01 43 09 89 40 00 3b 11  72 4d 8c 71 83 1d a3 16   .C..@.;. rM.q....
0020  10 2f 13 c4 13 c4 01 2f  c8 32 53 49 50 2f 32 2e   ./...../ .2SIP/2.
0030  30 20 31 30 30 20 54 72  79 69 6e 67 0d 0a 43 61   0 100 Tr ying..Ca
0040  6c 6c 2d 49 44 3a 30 37  44 33 41 44 38 37 2d 31   ll-ID:07 D3AD87-1
0050  33 37 42 2d 34 45 34 41  2d 39 39 42 43 2d 37 42   37B-4E4A -99BC-7B
0060  35 45 46 33 44 46 31 36  33 44 40 31 36 33 2e 32   5EF3DF16 3D@163.2
0070  32 2e 31 36 2e 34 37 0d  0a 43 6f 6e 74 65 6e 74   2.16.47. .Content
```

File: "C:\Documents and Settings\smartderrick\桌面\3" 1497 KB 00:04:05   P: 7676 D: 234 M: 0

Hold/Unhold of X-Lite



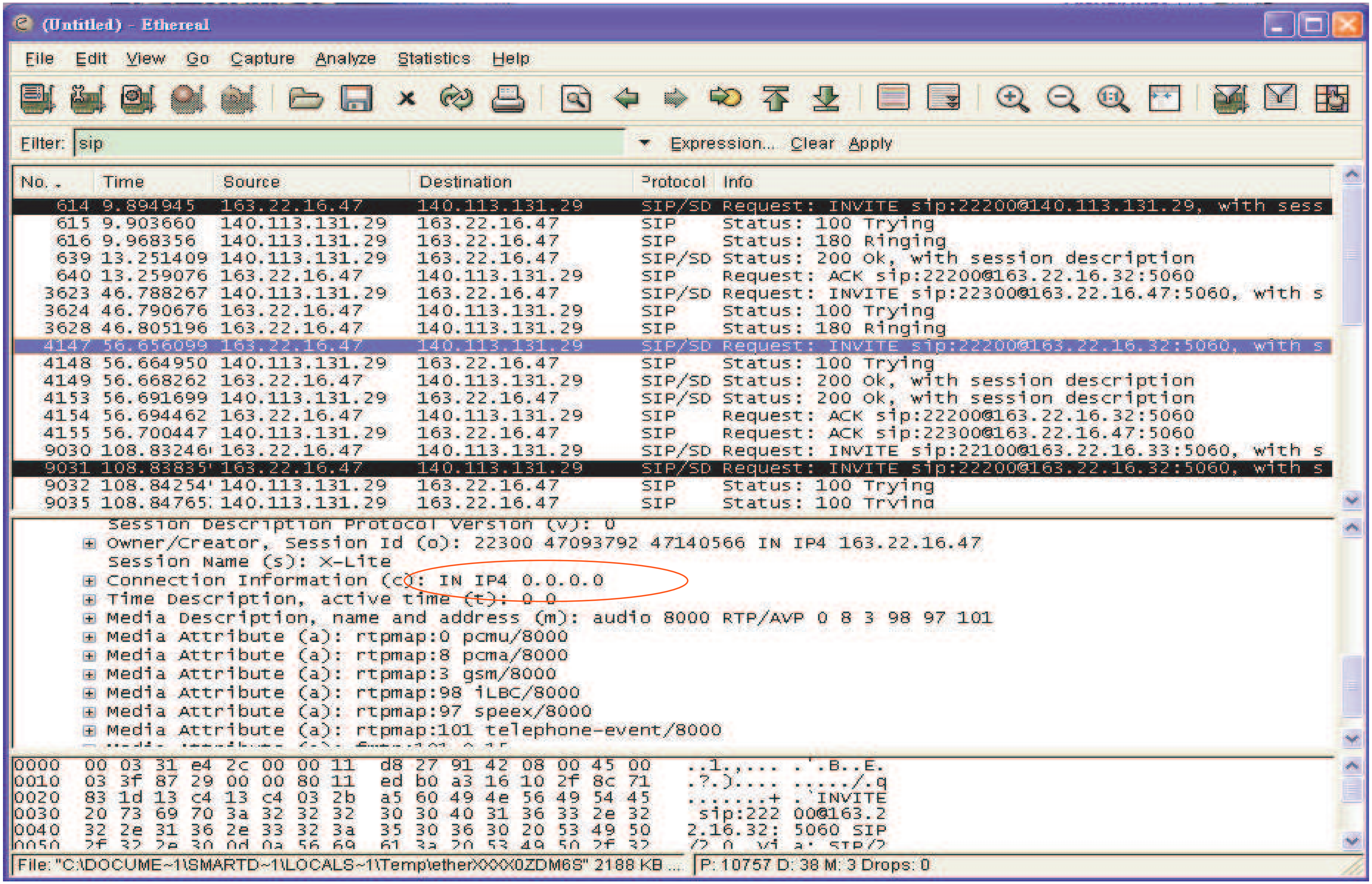
Ringing

22200

Call Timer: 0:00:00

Caller ID: 22200@140.113.131.29

Hold


(Untitled) - Ethereal
File Edit View Go Capture Analyze Statistics Help
Filter: sip
Expression... Clear Apply

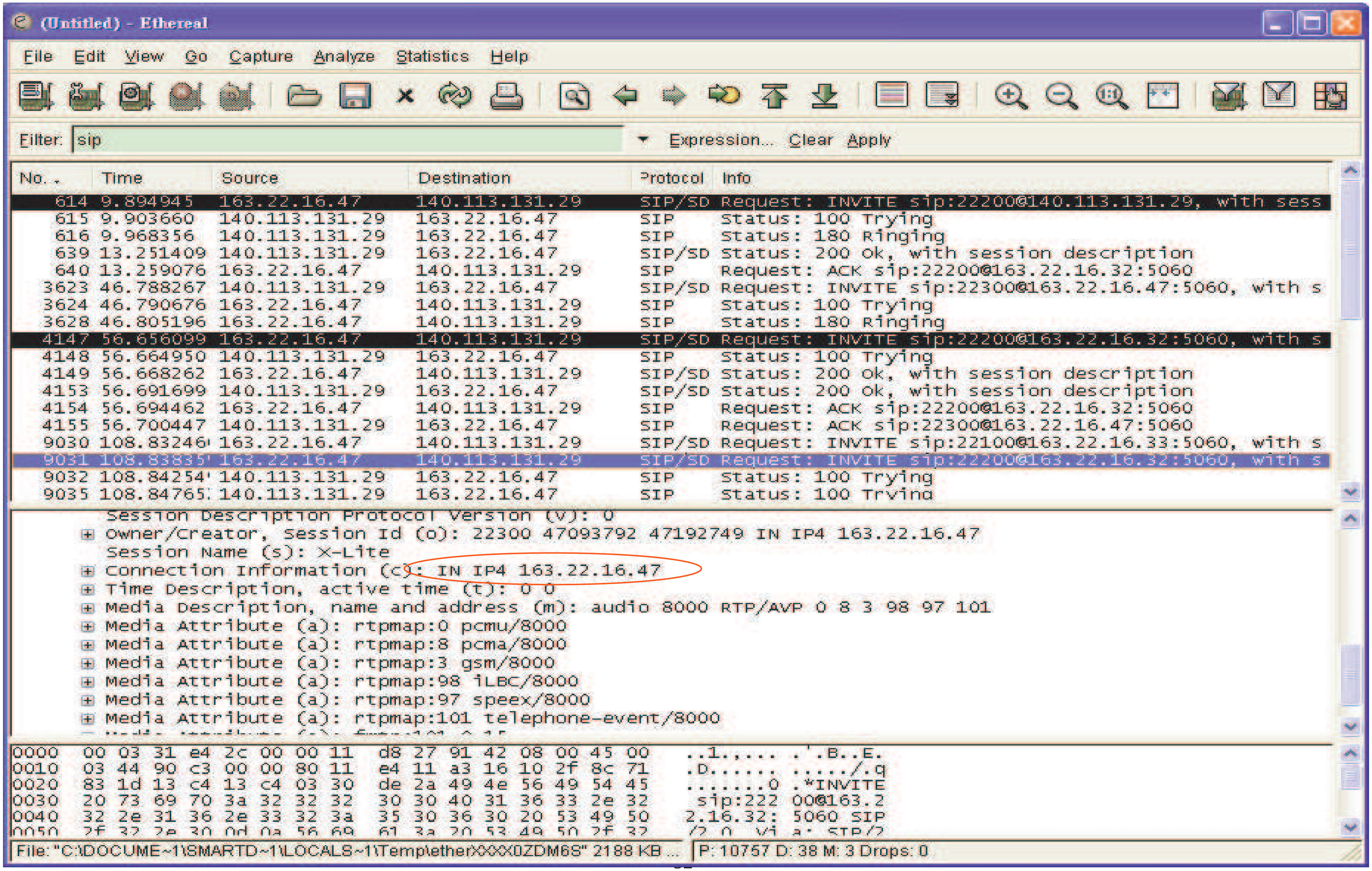
```
No. .  Time        Source            Destination      Protocol Info
  614  9.894945    163.22.16.47      140.113.131.29   SIP/SD   Request: INVITE sip:22200@140.113.131.29, with sess
  615  9.903660    140.113.131.29    163.22.16.47     SIP      Status: 100 Trying
  616  9.968356    140.113.131.29    163.22.16.47     SIP      Status: 180 Ringing
  639  13.251409   140.113.131.29    163.22.16.47     SIP/SD   Status: 200 Ok, with session description
  640  13.259076   163.22.16.47      140.113.131.29   SIP      Request: ACK sip:22200@163.22.16.32:5060
 3623  46.788267   140.113.131.29    163.22.16.47     SIP/SD   Request: INVITE sip:22300@163.22.16.47:5060, with s
 3624  46.790676   163.22.16.47      140.113.131.29   SIP      Status: 100 Trying
 3628  46.805196   163.22.16.47      140.113.131.29   SIP      Status: 180 Ringing
 4147  56.656099   163.22.16.47      140.113.131.29   SIP/SD   Request: INVITE sip:22200@163.22.16.32:5060, with s
 4148  56.664950   140.113.131.29    163.22.16.47     SIP      Status: 100 Trying
 4149  56.668262   163.22.16.47      140.113.131.29   SIP/SD   Status: 200 Ok, with session description
 4153  56.691699   140.113.131.29    163.22.16.47     SIP/SD   Status: 200 Ok, with session description
 4154  56.694462   163.22.16.47      140.113.131.29   SIP      Request: ACK sip:22200@163.22.16.32:5060
 4155  56.700447   140.113.131.29    163.22.16.47     SIP      Request: ACK sip:22300@163.22.16.47:5060
 9030  108.83246   163.22.16.47      140.113.131.29   SIP/SD   Request: INVITE sip:22100@163.22.16.33:5060, with s
 9031  108.83835   163.22.16.47      140.113.131.29   SIP/SD   Request: INVITE sip:22200@163.22.16.32:5060, with s
 9032  108.84254   140.113.131.29    163.22.16.47     SIP      Status: 100 Trying
 9035  108.84765   140.113.131.29    163.22.16.47     SIP      Status: 100 Trying
```

```
      Session Description Protocol Version (v): 0
    ⊞ Owner/Creator, Session Id (o): 22300 47093792 47140566 IN IP4 163.22.16.47
      Session Name (s): X-Lite
    ⊞ Connection Information (c): IN IP4 0.0.0.0
    ⊞ Time Description, active time (t): 0 0
    ⊞ Media Description, name and address (m): audio 8000 RTP/AVP 0 8 3 98 97 101
    ⊞ Media Attribute (a): rtpmap:0 pcmu/8000
    ⊞ Media Attribute (a): rtpmap:8 pcma/8000
    ⊞ Media Attribute (a): rtpmap:3 gsm/8000
    ⊞ Media Attribute (a): rtpmap:98 iLBC/8000
    ⊞ Media Attribute (a): rtpmap:97 speex/8000
    ⊞ Media Attribute (a): rtpmap:101 telephone-event/8000
```

```
0000  00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1.,... .'.B..E.
0010  03 3f 87 29 00 00 80 11  ed b0 a3 16 10 2f 8c 71   .?.).... ...../.q
0020  83 1d 13 c4 13 c4 03 2b  a5 60 49 4e 56 49 54 45   .......+ .`INVITE
0030  20 73 69 70 3a 32 32 32  30 30 40 31 36 33 2e 32    sip:222 00@163.2
0040  32 2e 31 36 2e 33 32 3a  35 30 36 30 20 53 49 50   2.16.32: 5060 SIP
0050  2f 32 2e 30 0d 0a 56 69  61 3a 20 53 49 50 2f 32   /2.0..Vi a: SIP/2
```

File: "C:\DOCUME~1\SMARTD~1\LOCALS~1\Temp\etherXXXX0ZDM6S" 2188 KB ... | P: 10757 D: 38 M: 3 Drops: 0

Retrieve


(Untitled) - Ethereal
File Edit View Go Capture Analyze Statistics Help
Expression... Clear Apply

Filter: sip

```
No. .  Time        Source          Destination      Protocol Info
  614 9.894945   163.22.16.47    140.113.131.29   SIP/SD Request: INVITE sip:22200@140.113.131.29, with sess
  615 9.903660   140.113.131.29  163.22.16.47     SIP    Status: 100 Trying
  616 9.968356   140.113.131.29  163.22.16.47     SIP    Status: 180 Ringing
  639 13.251409  140.113.131.29  163.22.16.47     SIP/SD Status: 200 Ok, with session description
  640 13.259076  163.22.16.47    140.113.131.29   SIP    Request: ACK sip:22200@163.22.16.32:5060
 3623 46.788267  140.113.131.29  163.22.16.47     SIP/SD Request: INVITE sip:22300@163.22.16.47:5060, with s
 3624 46.790676  163.22.16.47    140.113.131.29   SIP    Status: 100 Trying
 3628 46.805196  163.22.16.47    140.113.131.29   SIP    Status: 180 Ringing
 4147 56.656099  163.22.16.47    140.113.131.29   SIP/SD Request: INVITE sip:22200@163.22.16.32:5060, with s
 4148 56.664950  140.113.131.29  163.22.16.47     SIP    Status: 100 Trying
 4149 56.668262  163.22.16.47    140.113.131.29   SIP/SD Status: 200 Ok, with session description
 4153 56.691699  140.113.131.29  163.22.16.47     SIP/SD Status: 200 Ok, with session description
 4154 56.694462  163.22.16.47    140.113.131.29   SIP    Request: ACK sip:22200@163.22.16.32:5060
 4155 56.700447  140.113.131.29  163.22.16.47     SIP    Request: ACK sip:22300@163.22.16.47:5060
 9030 108.83246  163.22.16.47    140.113.131.29   SIP/SD Request: INVITE sip:22100@163.22.16.33:5060, with s
 9031 108.83835  163.22.16.47    140.113.131.29   SIP/SD Request: INVITE sip:22200@163.22.16.32:5060, with s
 9032 108.84254  140.113.131.29  163.22.16.47     SIP    Status: 100 Trying
 9035 108.84765  140.113.131.29  163.22.16.47     SIP    Status: 100 Trying
```

```
     Session Description Protocol Version (v): 0
   ⊞ Owner/Creator, Session Id (o): 22300 47093792 47192749 IN IP4 163.22.16.47
     Session Name (s): X-Lite
   ⊞ Connection Information (c): IN IP4 163.22.16.47
   ⊞ Time Description, active time (t): 0 0
   ⊞ Media Description, name and address (m): audio 8000 RTP/AVP 0 8 3 98 97 101
   ⊞ Media Attribute (a): rtpmap:0 pcmu/8000
   ⊞ Media Attribute (a): rtpmap:8 pcma/8000
   ⊞ Media Attribute (a): rtpmap:3 gsm/8000
   ⊞ Media Attribute (a): rtpmap:98 iLBC/8000
   ⊞ Media Attribute (a): rtpmap:97 speex/8000
   ⊞ Media Attribute (a): rtpmap:101 telephone-event/8000
```

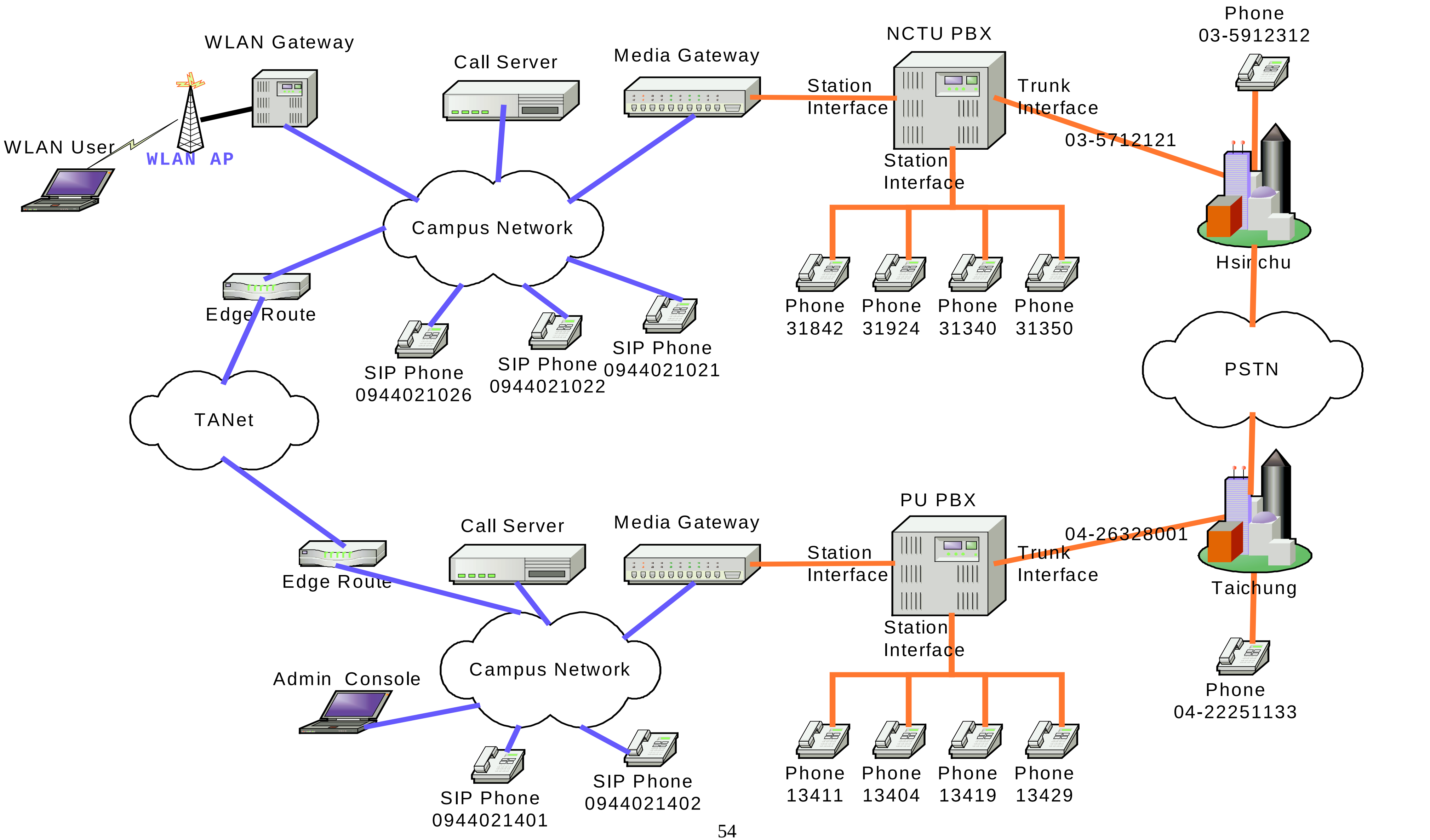
```
0000  00 03 31 e4 2c 00 00 11  d8 27 91 42 08 00 45 00   ..1.,... .'.B..E.
0010  03 44 90 c3 00 00 80 11  e4 11 a3 16 10 2f 8c 71   .D...... ...../.q
0020  83 1d 13 c4 13 c4 03 30  de 2a 49 4e 56 49 54 45   .......0 .*INVITE
0030  20 73 69 70 3a 32 32 32  30 30 40 31 36 33 2e 32    sip:222 00@163.2
0040  32 2e 31 36 2e 33 32 3a  35 30 36 30 20 53 49 50   2.16.32: 5060 SIP
0050  2f 32 2e 30 0d 0a 56 69  61 3a 20 53 49 50 2f 32   /2.0..Vi a: SIP/2
```

File: "C:\DOCUME~1\SMARTD~1\LOCALS~1\Temp\etherXXXX0ZDM6S" 2188 KB ... P: 10757 D: 38 M: 3 Drops: 0

Summary

- We demonstrate the functions of Windows Messenger and X-Lite, which are two SIP User Agents with friendly user interface.
- We demonstrate the functions of Ethereal, which is a powerful tool for packets capturing & analyzing:
  - Capture Filters
  - Colorized Packets
- Practice using this tool to capture SIP signaling in the following call flows
  - REGISTER – 200 OK
  - INVITE – 200 OK - ACK
  - BYE – 200 OK
  - Hold/Retrieve

NTP VoIP Platform


WLAN Gateway
WLAN User
WLAN AP
Call Server
Media Gateway
NCTU PBX
Station
Interface
Trunk
Interface
Station
Interface
Phone
03-5912312
03-5712121
Hsinchu
Campus Network
Edge Route
SIP Phone
0944021026
SIP Phone
0944021022
SIP Phone
0944021021
Phone
31842
Phone
31924
Phone
31340
Phone
31350
TANet
PSTN
PU PBX
Call Server
Media Gateway
Station
Interface
Trunk
Interface
04-26328001
Taichung
Station
Interface
Edge Route
Campus Network
Admin Console
SIP Phone
0944021401
SIP Phone
0944021402
Phone
13411
Phone
13404
Phone
13419
Phone
13429
Phone
04-22251133