



Open Source VoIPv6

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Quick Over View

Open Source

Computer software for which the human-readable source code is made available under a copyright license (or arrangement such as the public domain) that meets the Open Source Definition, this permits users to use, change, and improve the software, and to redistribute it in modified or unmodified form. It is often developed in a public, collaborative manner. Open source software is the most prominent example of open source development and often compared to user generated content.



VoIP

Voice-over-Internet protocol (VoIP) is a protocol optimized for the transmission of voice through the Internet or other packet-switched networks. It is also referred to as *IP telephony*.

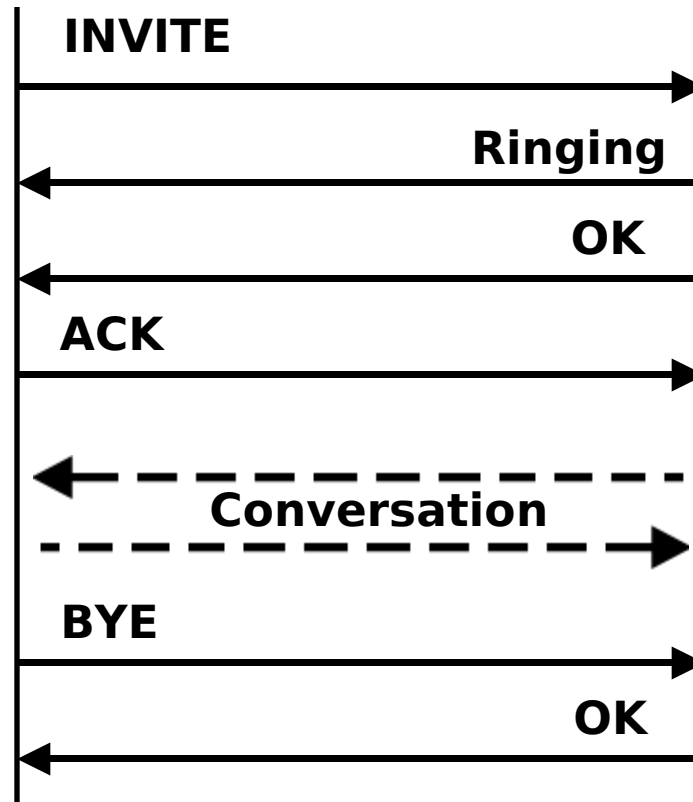
Voice-over-IP systems carry telephony signals as digital audio, typically reduced in data rate using speech data compression techniques, encapsulated in a data-packet stream over IP.

Famous protocols

- Session Initiation Protocol (SIP)
- H.323
- Media Gateway Control Protocol (MGCP)



SIP Call Establishment





Open Source Tools

Asteriskv6

Asterisk is an open source/free software implementation of a telephone private branch exchange (PBX) originally created in 1999 by Mark Spencer of Digium.

Like any PBX, it allows a number of attached telephones to make calls to one another, and to connect to other telephone services including the public switched telephone network (PSTN). Its name comes from the asterisk symbol, *, which in Unix (and Unix-like operating systems such as Linux) and DOS environments is a wildcard character, matching any sequence of characters in a filename.

Asterisk was ported to IPv6 by Viagénie in 2007.



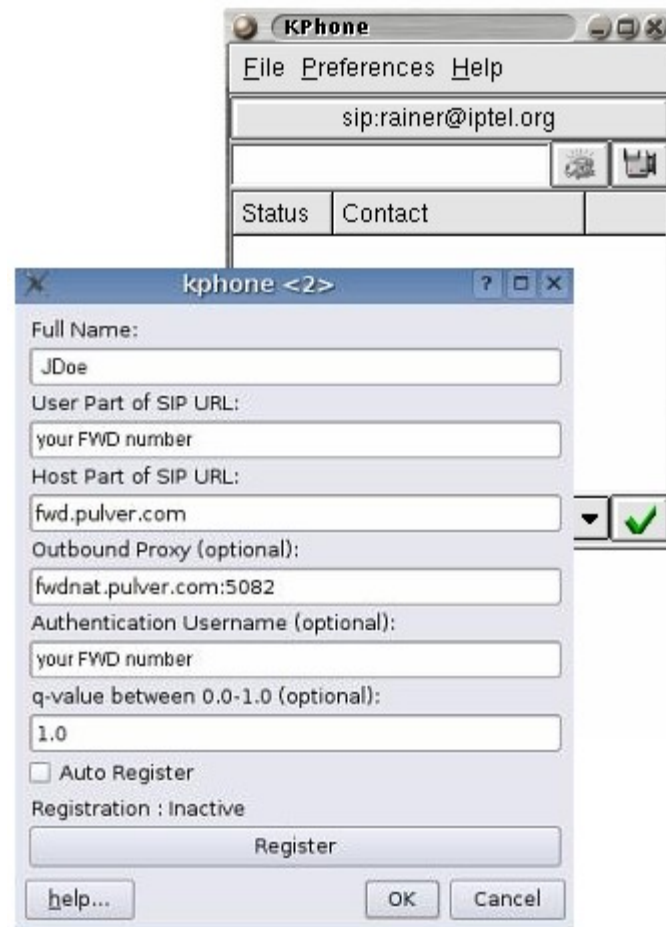
KPhone

KPhone is a voice-over-IP softphone which uses SIP for signalling. The original version is maintained at wirlab.

The kphone-3.11-ipv6 version of KPhone was extended to support IPv6 for audio calls and user registration as a result of a project at the FOKUS institute of the Fraunhofer society.

KPhone is an application for the K Desktop environment (KDE) version 3.114 and the corresponding graphics and widget library QT version 3.1. based on the free operating system "Linux".

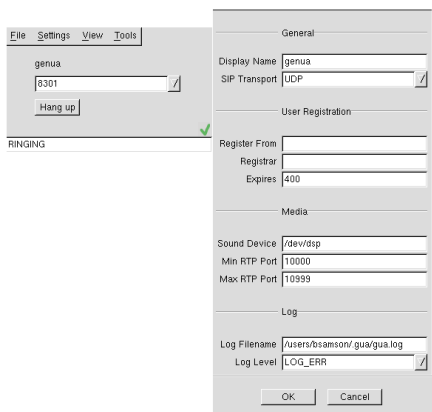
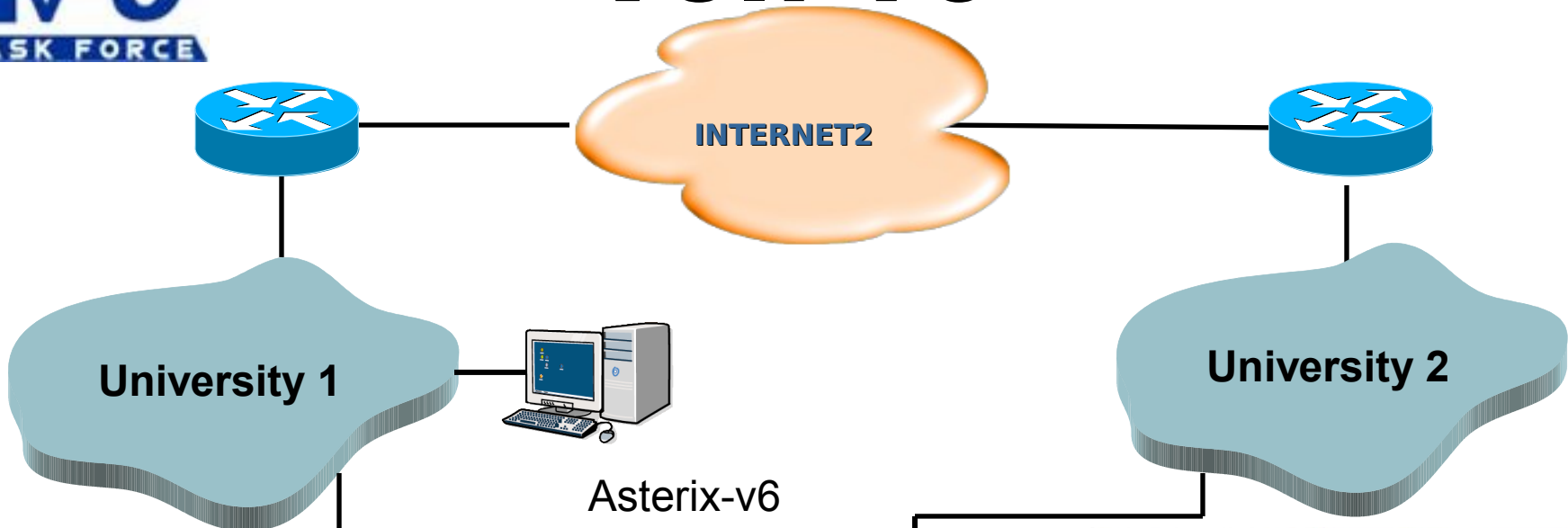
KPhone implements SIP for call signaling and RTP for audio streaming. KPhone is written in the C++ programming language.



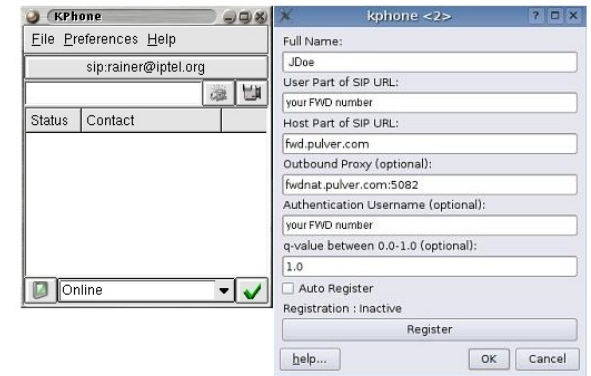
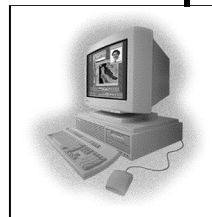
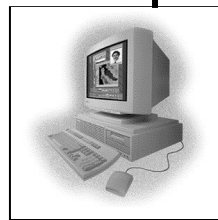


Egyptian University Deployment

VoIPv6



SipSet Client



Kphone Client



The National Research & Education Network

EUN

ENSTINET

- Cairo University
- Alexandria University
- Ain Shams University
- Assiut University
- Tanta University
- Mansoura University
- Zagazig University
- Helwan University
- Minia University
- Menofia University
- Suez Canal University
- South Vally University
- Al-Azhar University
- Banha University
- Fayom University
- Bany swief University
- National institute of Astronomy and Geophysics
- National Authority of Remote Sensing & Space Sciences
- National Research Center & Electronic Research
- National Institute of Measures and Standardizations
- National Telecommunications Institute
- Mobark City for Scientific Research and Applied Technology
- Egyptian Petroleum Research Institute
- Tudoar Belhares Research Institute
- Eye Diosis Research Institute
- Metal deployment Research Institute
- Ministry of Communication and Information Technology

2001:4300:4300::/48

2001:4300:2001::/48





Performance Analysis

Packet Analysis Using Ethereal

The screenshot displays a Linux desktop environment with the following components:

- Terminal Window:** Shows SIP logs including:
 - SipClient: Sending UDP Response
 - SipClient: Sending to '[2001:660:5503:276a:20d:56ff:fe9b:b5be]' port...
 - hostname(): resolving Hostname 2001:660:5503:276a:20d:56ff:fe9b:b5be
 - hostname(): ok -> 2001:660:5503:276a:20d:56ff:fe9b:b5be
 - 5:20.811
 -
 - via: SIP/2.0/UDP [2001:660:5503:276a:20d:56ff:fe9b:b5be];branch=z9hJov6L
 - From: "asterisk" <sip:asterisk@[2001:660:5503:276a:20d:56ff:fe9b:b5be]>
 - 13694c
 - CSeq: 102 INVITE
 - Call-ID: 751b66f902253a6a50d8330a16d5f9d5@2001:660:5503:276a:20d:56ff:fe9b:b5be
 - To: <sip:root@[2001:4348:8000:208:216:d4ff:fe23:4911];transport=udp
 - 0
 - Content-Length: 0
 - User-Agent: KPhone/3.11
 - KCallWidget: Switching calls...
- KPhone Window:** Shows call status:
 - Status: Invitation received
 - Audio: Unattached
 - Buttons: Accept, Reject, Hold, Transfer, Hide
 - Running timer: 00:01:18
 - Stop button
- Incoming Call Dialog:** Displays:
 - Remote: sip:asterisk@[2001:660:5503:276a:20d:56ff:fe9b:b5be]
 - Call ID: 751b66f902253a6a50d8330a16d5f9d5@2001:660:5503:276a:20d:56ff:fe9b:b5be

Packet Analysis Using Ethereal

Applications Actions  Mon Jun 2, 7:41 PM 

ipv6_filtered2 - Ethereal

File Edit View Go Capture Analyze Statistics Help

Filter: + Expression... Clear Apply

| g | Time | Source | Destination | Protocol | Info |
|---|------|----------------|--------------------|----------|---|
| 1 | 0.00 | 2001:4348:800C | 2001:660:5503:276a | SIP | Request: REGISTER sip:voipv6 |
| 2 | 0.36 | 2001:660:5503: | 2001:4348:8000:208 | SIP | Status: 401 Unauthorized (0 bindings) |
| 3 | 5.36 | fe80::21d:e5ff | 2001:4348:8000:208 | ICMPv6 | Neighbor solicitation |
| 4 | 5.36 | 2001:4348:800C | fe80::21d:e5ff:fe5 | ICMPv6 | Neighbor advertisement |
| 5 | 5.83 | 2001:4348:800C | 2001:660:5503:276a | SIP | Request: REGISTER sip:voipv6 |
| 6 | 6.18 | 2001:660:5503: | 2001:4348:8000:208 | SIP | Status: 200 OK (1 bindings) |
| 7 | 44.9 | 2001:660:5503: | 2001:4348:8000:208 | SIP/SD | Request: INVITE sip:root@[2001:4348:8000:208:216: |
| 8 | 44.9 | 2001:4348:800C | 2001:660:5503:276a | SIP | Status: 100 Trying |
| 9 | 44.9 | 2001:4348:800C | 2001:660:5503:276a | SIP | Status: 180 Ringing |
| 0 | 49.9 | fe80::21d:e5ff | 2001:4348:8000:208 | ICMPv6 | Neighbor solicitation |
| 1 | 49.9 | 2001:4348:800C | fe80::21d:e5ff:fe5 | ICMPv6 | Neighbor advertisement |
| 2 | 57.2 | 2001:4348:800C | 2001:660:5503:276a | SIP/SD | Status: 200 OK, with session description |
| 3 | 57.3 | 2001:4348:800C | 2001:660:5503:276a | RTCP | Unknown packet type |
| 4 | 57.3 | 2001:4348:800C | 2001:660:5503:276a | RTCP | Unknown packet type |

Frame 3 (88 bytes on wire, 88 bytes captured)
Linux cooked capture

```

0000  00 00 00 01 00 06 00 1d e5 5e d5 8f 00 00 86 dd  .....^.....
0010  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  -

```

Packet Analysis Using Ethereal

SIP statistics with

SIP stats (11 packets)
 (0 resent packets)

Informational SIP 1xx
 SIP 100 Trying 1
 SIP 180 Ringing 1

Success SIP 2xx
 SIP 200 OK 3

Redirection SIP 3xx

Client errors SIP 4xx
 SIP 401 Unauthorized 1

Server errors SIP 5xx

Global failures SIP 6xx

List of request methods
 INVITE : 1 packets
 BYE : 1 packets
 ACK : 1 packets
 REGISTER : 2 packets

Packet List:

| No. | Time | Source | Destination | Protocol | Info |
|-------|------|--------|-------------|----------|--|
| 5503 | 276a | SIP | | SIP | Request: REGISTER sip:voipv6 |
| :8000 | :208 | SIP | | SIP | Status: 401 Unauthorized (0 bindings) |
| :8000 | :208 | ICMPv6 | | ICMPv6 | Neighbor solicitation |
| :e5ff | :fe5 | ICMPv6 | | ICMPv6 | Neighbor advertisement |
| 5503 | 276a | SIP | | SIP | Request: REGISTER sip:voipv6 |
| :8000 | :208 | SIP | | SIP | Status: 200 OK (1 bindings) |
| :8000 | :208 | SIP/SD | | SIP/SD | Request: INVITE sip:root@[2001:4348:8000:208:2:... |
| 5503 | 276a | SIP | | SIP | Status: 100 Trying |
| 5503 | 276a | SIP | | SIP | Status: 180 Ringing |
| :8000 | :208 | ICMPv6 | | ICMPv6 | Neighbor solicitation |
| :e5ff | :fe5 | ICMPv6 | | ICMPv6 | Neighbor advertisement |
| 5503 | 276a | SIP/SD | | SIP/SD | Status: 200 OK, with session description |
| 5503 | 276a | RTCP | | RTCP | Unknown packet type |

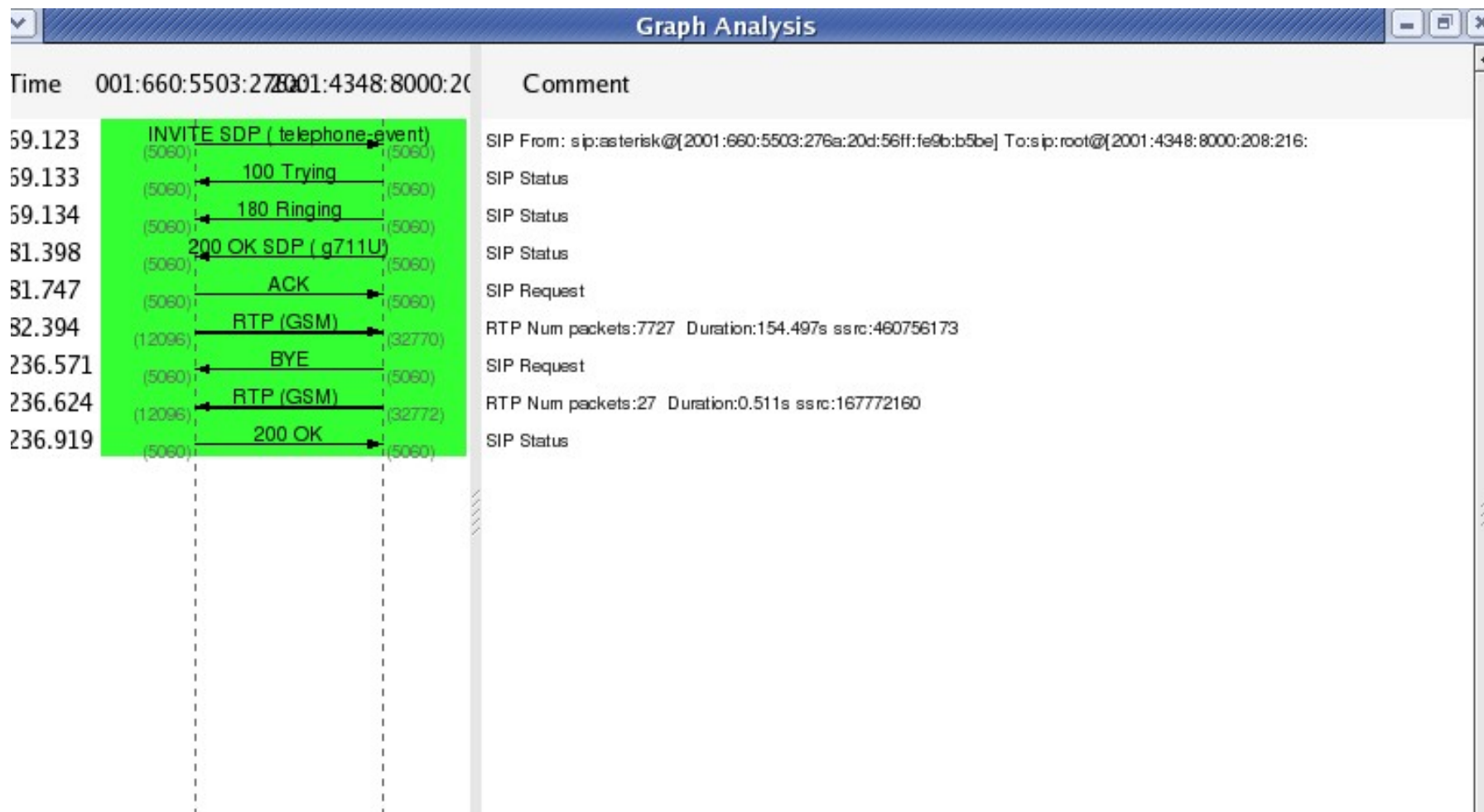
re, 520 bytes captured)

6

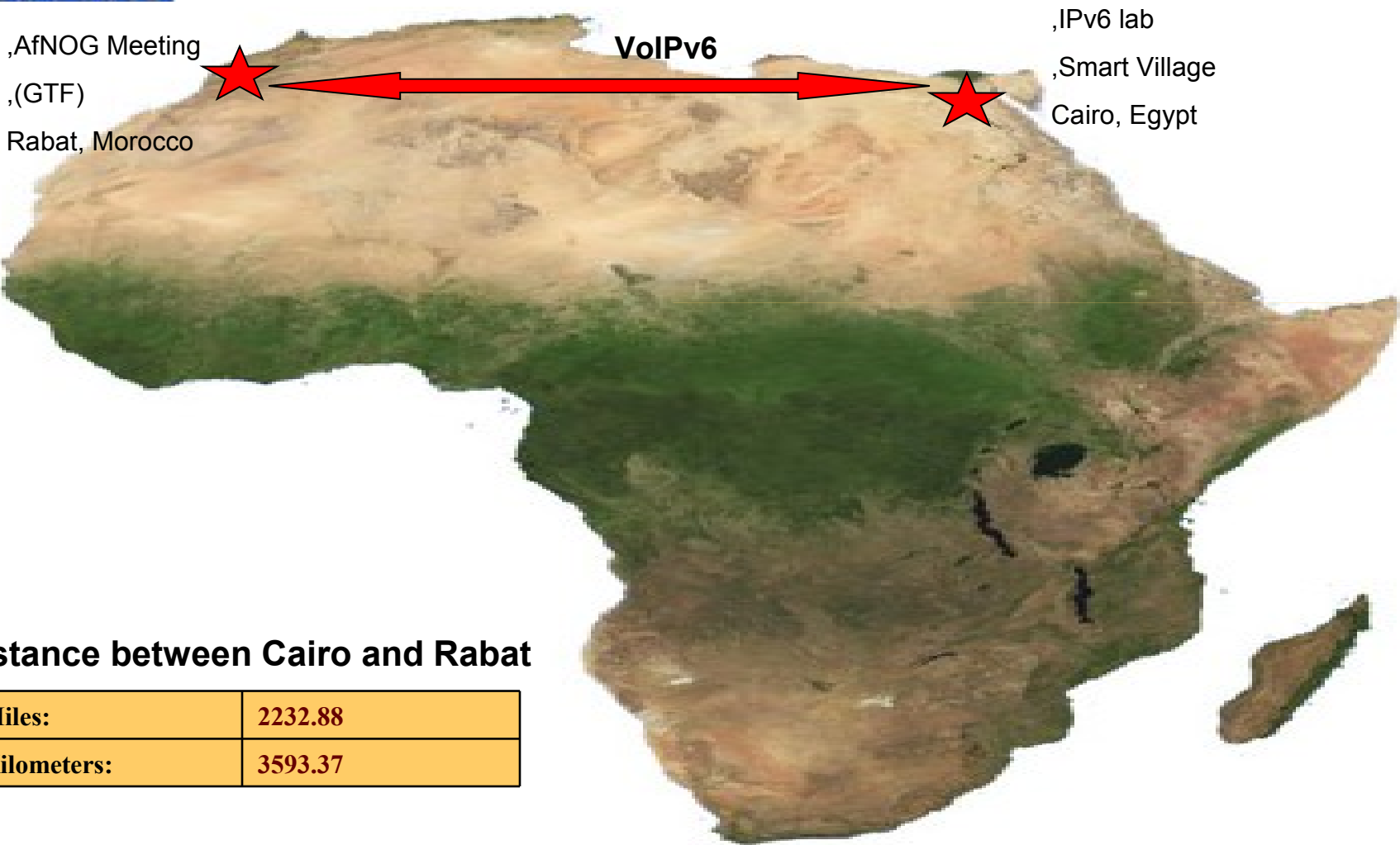
```

L6 d4 23 49 11 00 00 86 dd ..... #I.....
40 20 01 43 48 80 02 08 .....@ .CH....
L1 20 01 06 60 55 03 27 6a .....#I. ..`U.'j
be 13 c4 13 c4 01 d0 ca 95 ..V.....
  
```

Packet Analysis Using Ethereal



Cross border



Distance between Cairo and Rabat

| | |
|-------------|---------|
| Miles: | 2232.88 |
| Kilometers: | 3593.37 |



Thank you