CISCO PROJECT 9

Session Initiation Protocol

Akash Ranjan Das	1SI18CS008
Rakshita Bantwal	1SI18CS085
Hrithik Rajput	1SI18CS042

Session Initiation Protocol (SIP)

- Session Initiation Protocol (SIP) is one of the most common protocols used in **VoIP** technology.

Voice over Internet Protocol

Voice & Multimedia

What is VoIP Technology ?

Video Conferencing

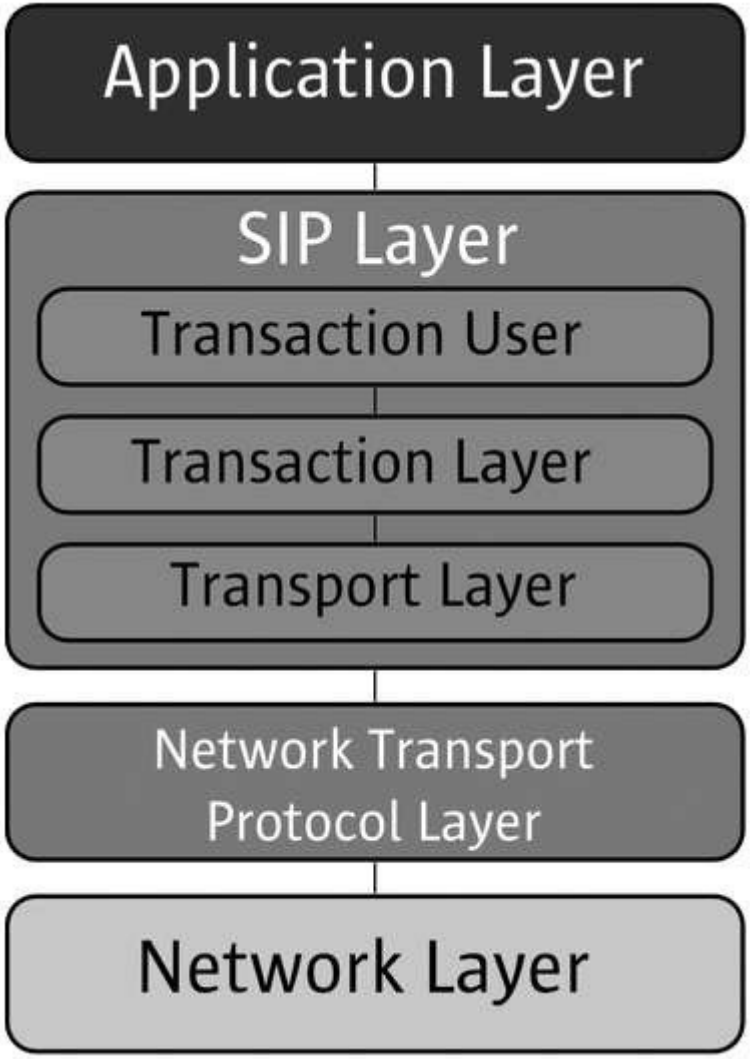
Cheap & Portable

Session Initiation Protocol (SIP)

- Session Initiation Protocol (SIP) is one of the most common protocols used in **VoIP** technology.
- It is an application layer protocol that works in conjunction with other application layer protocols to control multimedia communication sessions over the Internet.
- SIP is a signalling protocol used to create, modify, and terminate a multimedia session over the Internet Protocol.
- A session is nothing but a simple call between two endpoints.
- An endpoint can be a smartphone, a laptop, or any device that can receive and send multimedia content over the Internet.

Where Does SIP Fit?

- Basically SIP is an **application layer** protocol. It is a simple network signalling protocol for creating and terminating sessions with one or more participants.
- The SIP protocol is designed to be independent of the underlying transport protocol, so SIP applications can run on TCP, UDP, or other lower-layer networking protocols.



Network Elements

USER AGENT

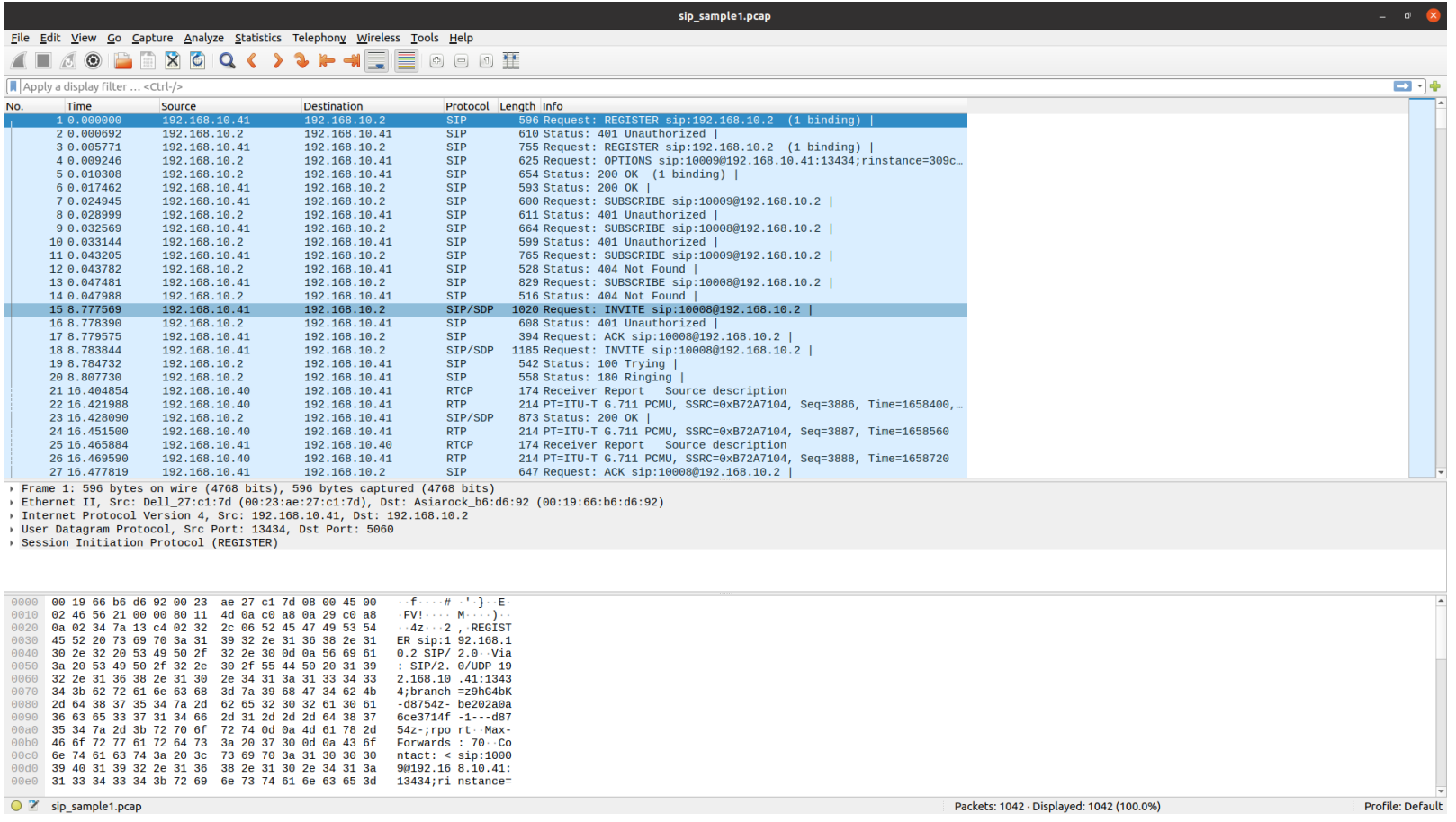
PROXY SERVER

REGISTRAR SERVER

REDIRECT SERVER

LOCATION SERVER

WireShark Capture



Python Analysis

In [18]:
```
#List the SIP info fields wrt time for file 3
sip1[['No.', 'Time', 'Info']]
```

Out[18]:

	No.	Time	Info
1	2	0.007889	Status: 100 Trying |
2	3	0.047524	Status: 180 Ringing |
151	152	4.056633	Request: REGISTER sip:Verso.com (1 binding) |
152	153	4.072335	Status: 200 OK (1 binding) |
516	517	8.524137	Request: ACK sip:francisco@200.57.7.204:5061 |
1723	1724	17.457029	Request: REGISTER sip:bestel.com (1 binding) |
1726	1727	17.473413	Status: 200 OK (1 binding) |
2910	2911	24.309202	Request: REGISTER sip:Verso.com (1 binding) |
2911	2912	24.324792	Status: 200 OK (1 binding) |
2964	2965	24.674680	Status: 100 Trying |
2966	2967	24.692752	Status: 180 Ringing |

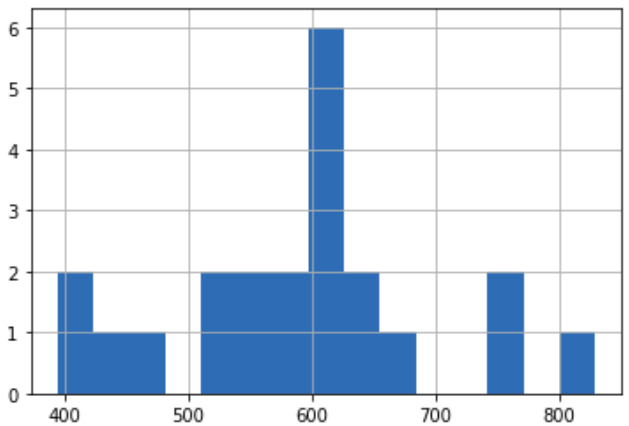
In [109]:
```
#Analysis 1 File 2
infos1 = sip1['Info'].to_list()
times1 = sip1['Time'].to_list()

print('Type Fields\n')
flags1 = []
print('Time\t\t\tType\t\t\t Command\n')
for info1, time1 in zip(infos1, times1):
    flag1 = info1.split(':')
    command1 = flag1[1].split(' ')
    if(command1[1].isdigit()):
        command2 = flag1[1].strip().split(' ', 2)
        command1 = command2[1]
        print(time1, '\t\t' ,flag1[0] ,'\t\t', command1)
    else:
        command1 = flag1[1].strip().split(' ', 1)
        print(time1, '\t\t' ,flag1[0] ,'\t\t', command1[0])
    flags1.append(flag1[0])
```

```
Type Fields

Time                    Type                    Command

0.007889                 Status                 Trying
0.047524                 Status                 Ringing
4.056633                 Request                REGISTER
4.072335                 Status                 OK
8.524137                 Request                ACK
17.457029                Request                REGISTER
17.473413                Status                 OK
24.309202                Request                REGISTER
24.324792                Status                 OK
24.67468                 Status                 Trying
24.692752                Status                 Ringing
```

Visualization using Matplotlib

```
In [23]: #Plot of Packets Length of SIP in File 1
         %matplotlib inline
         df[df['Protocol']=='SIP'].Length.hist(bins=15)
```

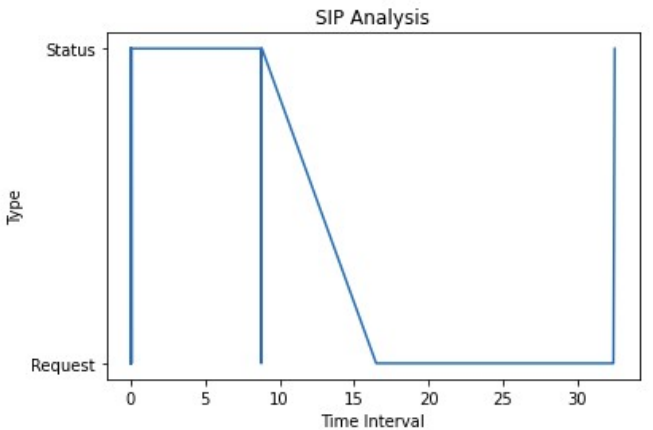
```
Out[23]: <AxesSubplot:>
```



Packets Length vs time

```
In [26]: import matplotlib.pyplot as plt
```

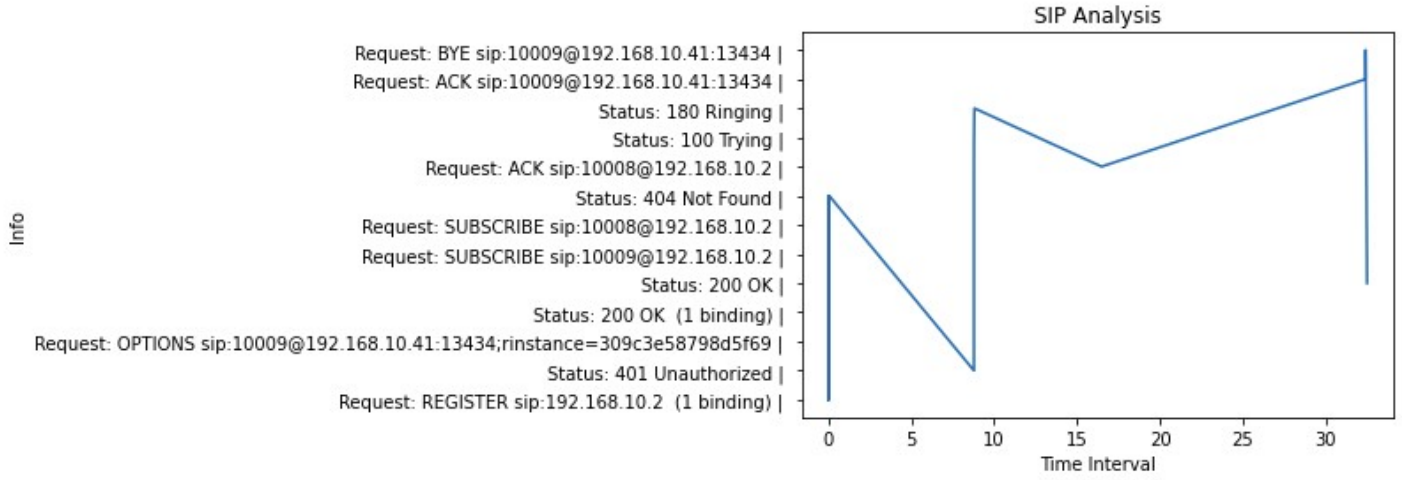
```
In [27]: #Plot Type vs time interval for File1
         plt.plot(time, flags)
         plt.xlabel('Time Interval')
         plt.ylabel('Type')
         plt.title('SIP Analysis')
         plt.show()
```



Type vs Time interval

Visualization using Matplotlib

In [28]:
```
#Plot Information vs time interval for File1
plt.plot(times, infos)
plt.xlabel('Time Interval')
plt.ylabel('Info')
plt.title('SIP Analysis')
plt.show()
```

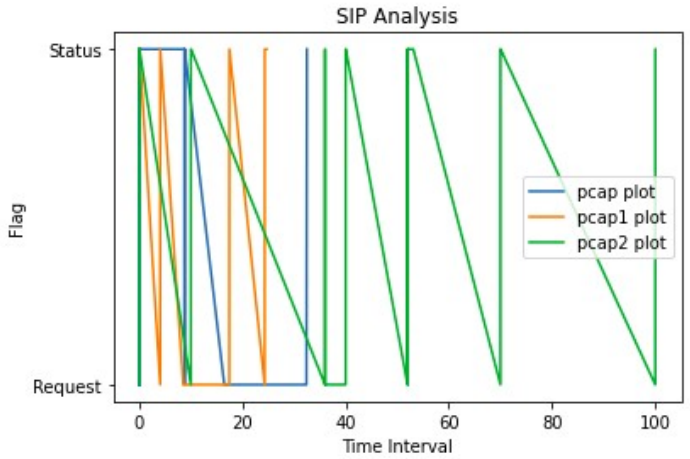


Info vs Time Interval

Visualizing Three PCAP files

In [40]:
```
#Visualizing all the analysis in one plot
plt.plot(times, flags, label='pcap plot')
plt.plot(times1, flags1, label='pcap1 plot')
plt.plot(times2, flags2, label='pcap2 plot')
plt.xlabel('Time Interval')
plt.ylabel('Flag')
plt.title('SIP Analysis')
plt.legend()
```

Out[40]: <matplotlib.legend.Legend at 0x7f7b69ec3908>



THANK YOU