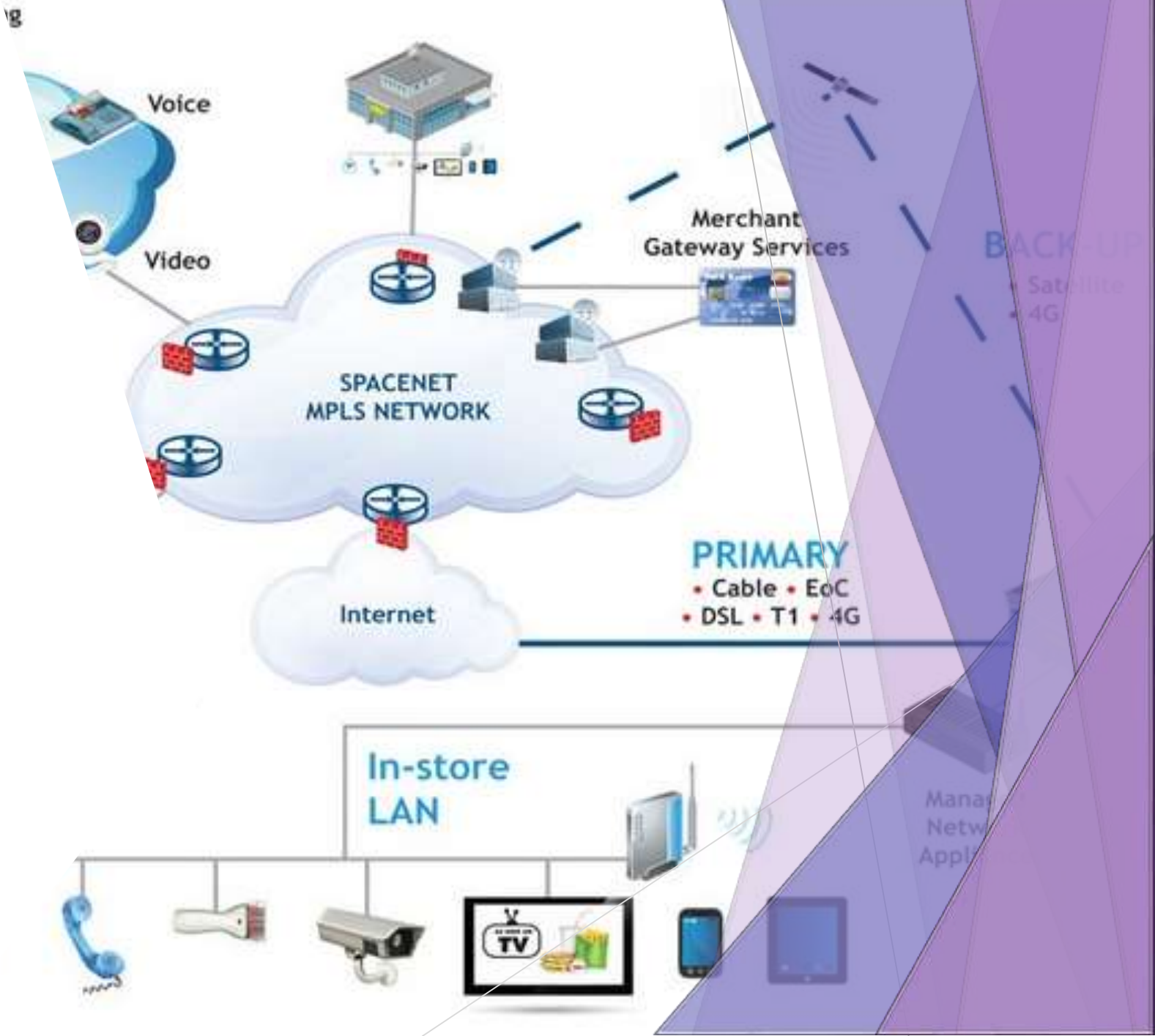
Conectarea telefoanelor Cisco Ip la un sistem de Comunicații Unificate în Cloud

Borze-Ștef Roxana

Cureu Denisa

Pop Cătălin



Cuprins

1.Obiectiv

Implementarea SIP a 3CX și Cisco Ip utilizând GNS3

ECHIPA 1:
Roxana-Florica BORZE-STEF, Denisa Geanina CUREU, Catalin Mircea POP
Adrese statii:
172.27.6.162/24 (Statia 1)
172.27.6.161/24 (Statia 2)
TEMA 8

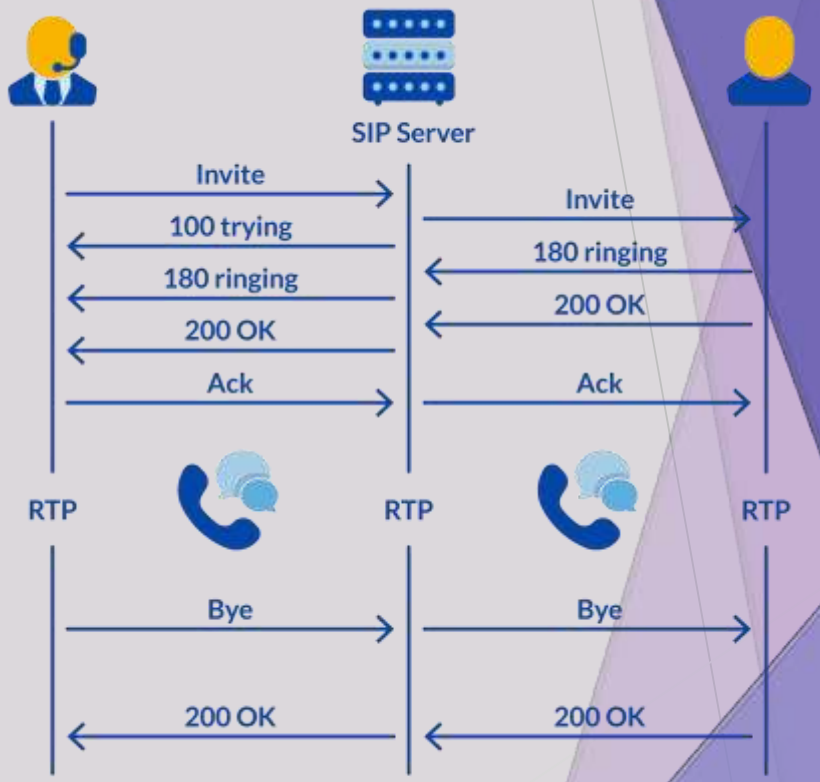
Echipament	Tip	Protocol VoIP	Versiune	Sistem de operare
Telefon X	3CX Phone	SIP	15	Windows 10/11 sau Windroid
UCS	Cisco GNS3 (Gateway/ CUCME)	SIP	3745	Windows 10/11 + IOS
Telefon Y	Cisco IP Communicator	SIP	7	Windows 10/11
Server STUN	stun.nextcloud.com:3478			
Tip cloud	Optional (cloud privat UC Labs)			
Observatii				

2.Protocolul SIP

Protocolul de inițiere a sesiunii(SIP) este un protocol de semnalizare care activează Voice Over Internet Protocol (VoIP) prin definirea mesajelor trimise între punctele terminale și gestionarea elementelor efective ale unui apel. SIP acceptă apeluri vocale, conferințe video, mesagerie instantanee și distribuție media.

Ca principiu, are un model de transmisie bazat pe cereri și răspunsuri prin care se deschid sesiuni în care participanții sunt invitați

- Determină locația terminalului;
- Determină capabilitățile media ale terminalului invitat;
- Determină disponibilitatea terminalului invitat;
- Stabilește o sesiune între terminalul origine și terminalele invitate;
- Tratează transferul și terminarea apelurilor.

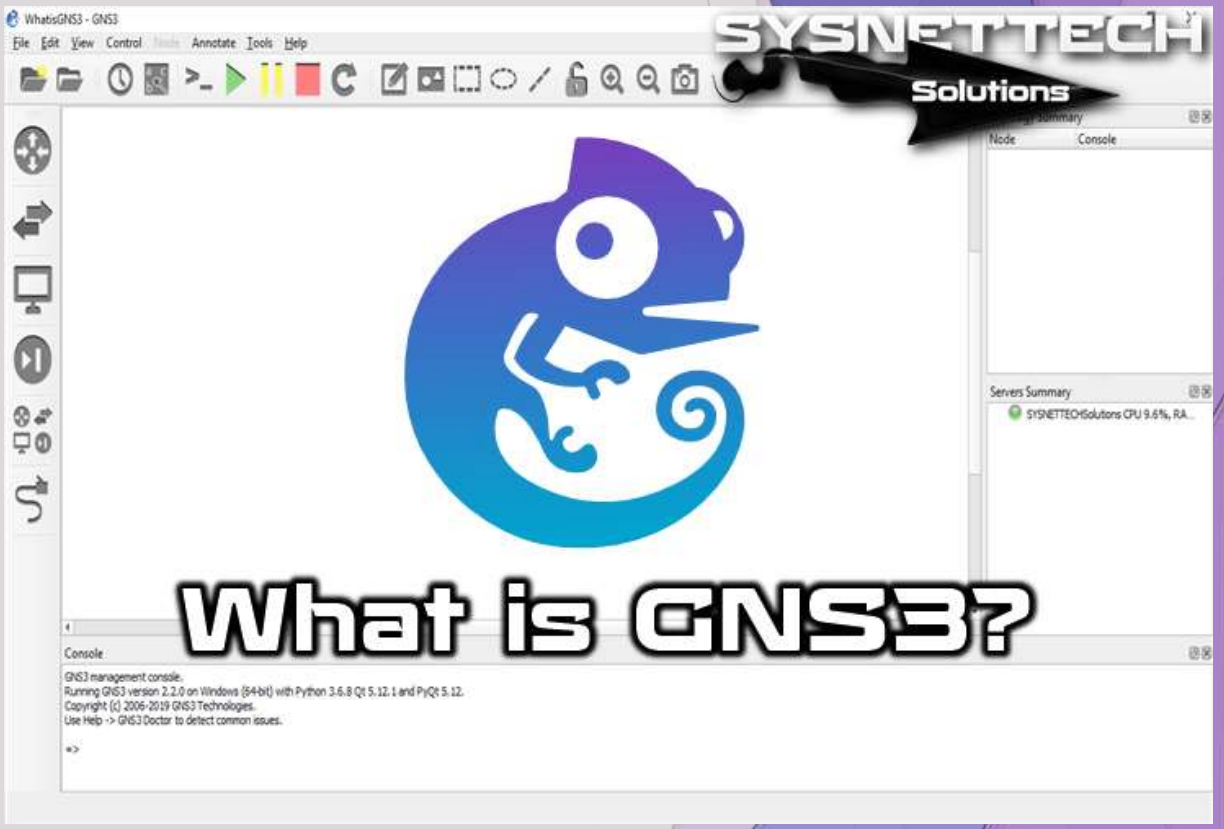


3.Aplicații folosite pentru implementare_GNS3

Graphical Network Simulator-3 este un emulator de software de rețea lansat pentru prima dată în 2008.

Acesta permite combinarea dispozitivelor virtuale și reale, utilizate pentru a simula rețele complexe.

Utilizează software-ul de emulare Dynamips pentru a simula Cisco IOS.



4. Aplicații folosite pentru implementare_ 3CX

3CX

3CX este un sistem de telefonie standard,bazat pe software, bazat pe standardul SIP.

Funcționează cu o gamă largă de opțiuni hardware și oferă, de asemenea, extensii pentru browsere web și aplicații mobile.

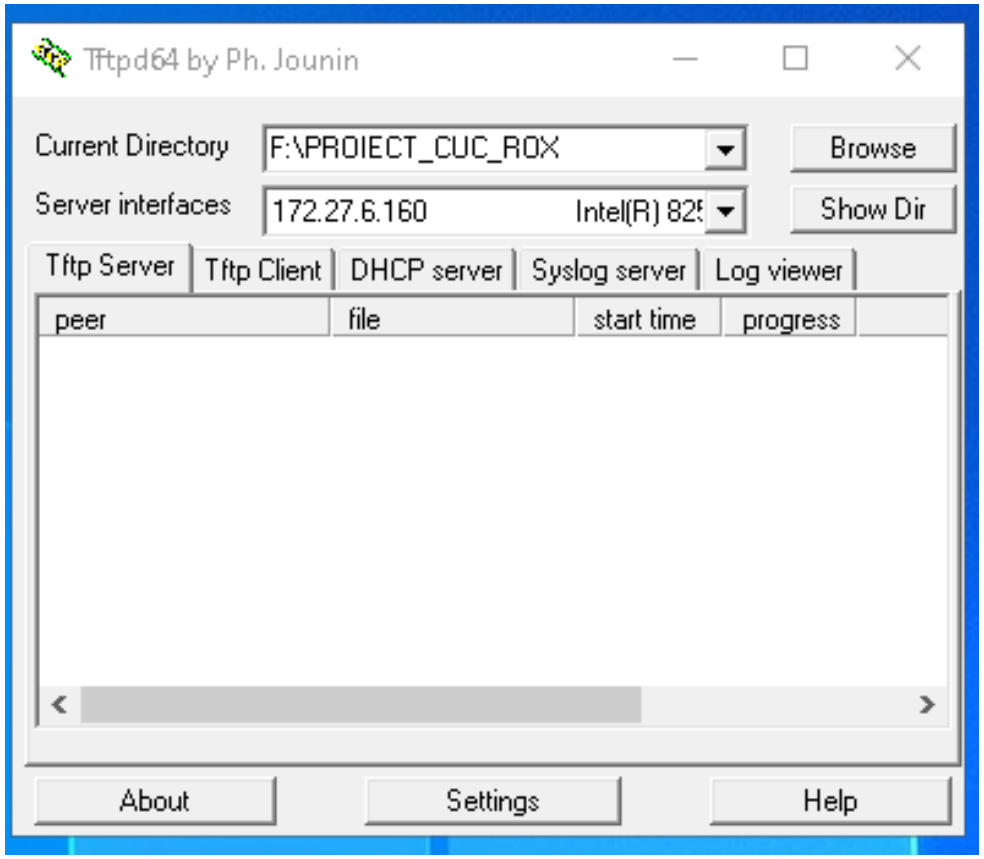
Un avantaj major este că software-ul în sine se poate afla pe un server la distanță, on-premise (pe un server local) sau ambele pentru o funcționare mai bună.

5. Aplicații folosite pentru implementare_Cisco Ip Communicator

Cisco IP Communicator este o aplicație desktop care "transformă" computerul într-un Telefon IP Cisco Unified cu funcții complete, permițând plasarea, primirea și gestionarea apelurilor.

Dacă instalați Cisco IP Communicator pe un laptop sau computer portabil, puteți utiliza Cisco IP Communicator (și întreaga paletă de servicii și setări) din orice locație unde vă puteți conecta la o rețea.

6. Aplicații folosite pentru implementare_TFTP



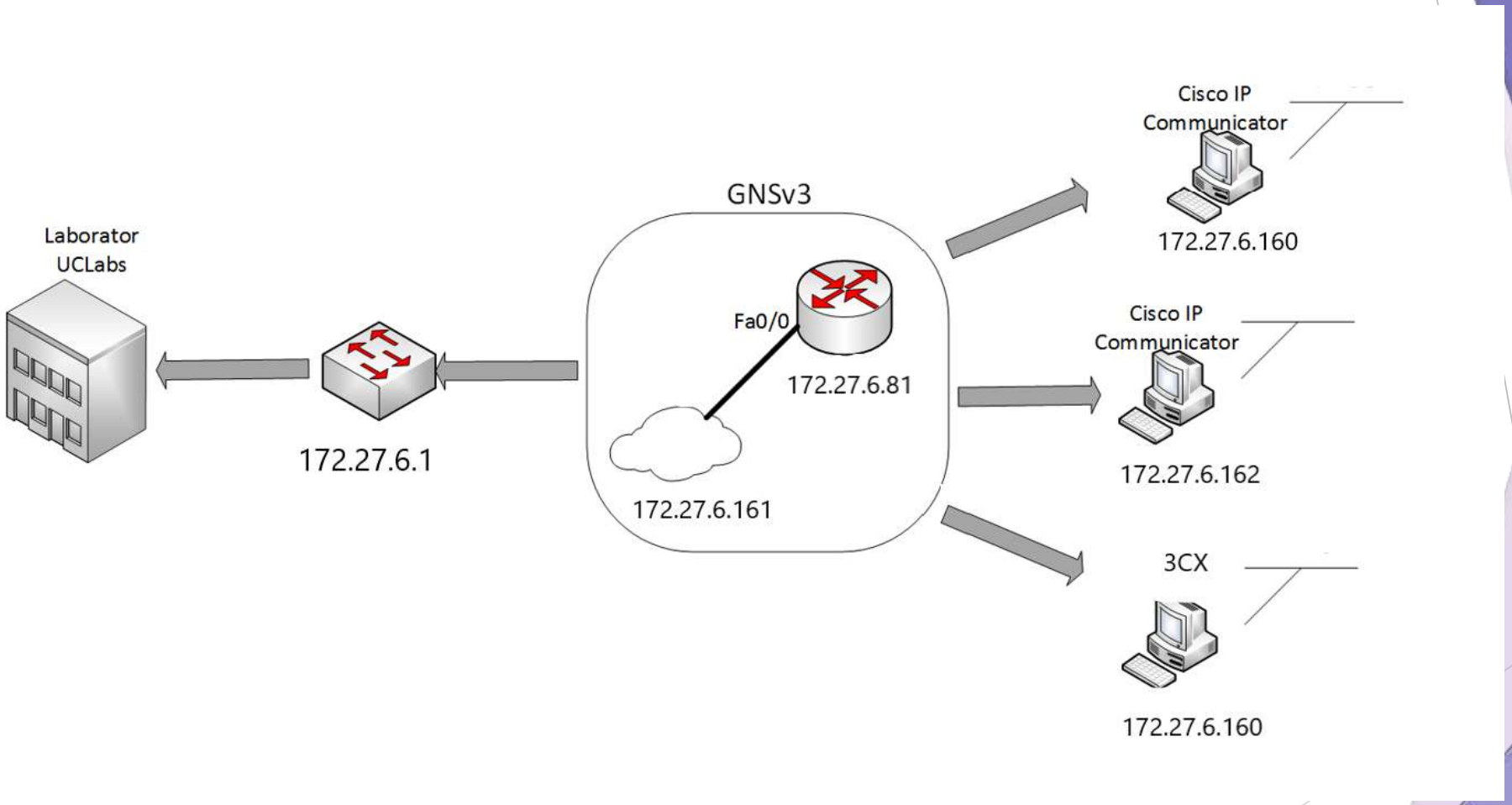
Serverul TFTP este utilizat pentru transferul simplu de fișiere (de obicei, pentru boot-loading-ul dispozitivelor de la distanță).

Trivial File Transfer Protocol (TFTP) este un protocol simplu pentru schimbul de fișiere între două mașini TCP/IP.

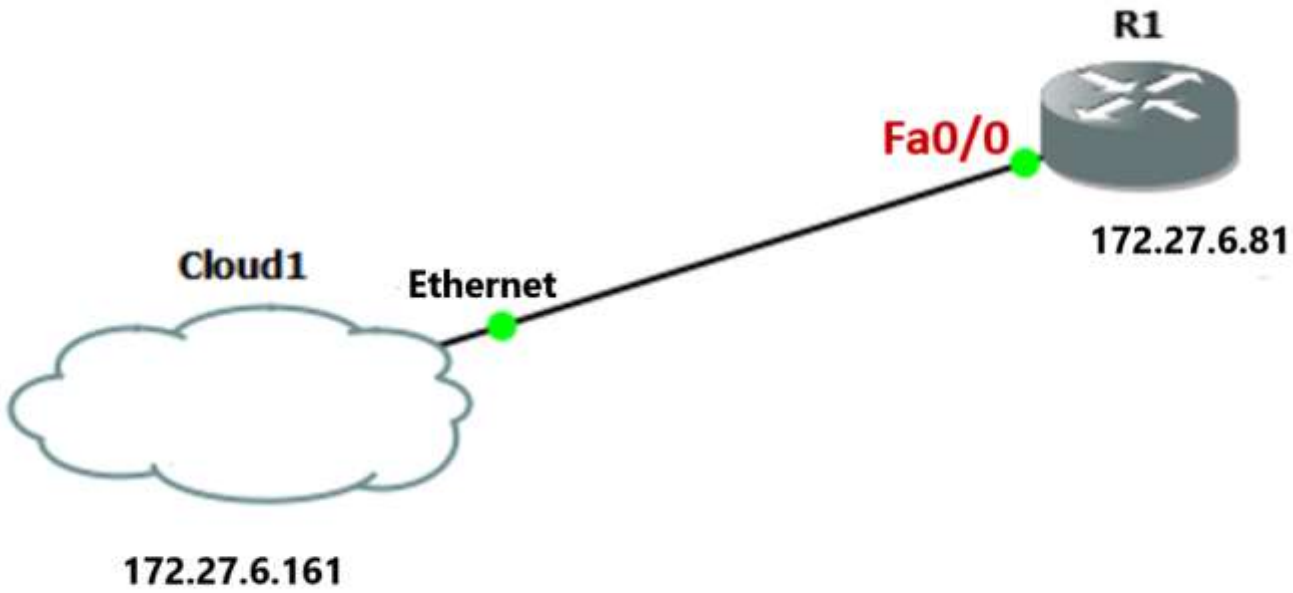
Serverele TFTP permit conexiuni de la un client TFTP pentru trimiterea și primirea fișierelor.

Protocolul TFTP acceptă numai operațiunile de trimitere și primire a fișierelor. Ștergerea, mutarea și redenumirea fișierelor nu sunt acceptate.

7. Scenariul propus



8.Centrala în GNS3



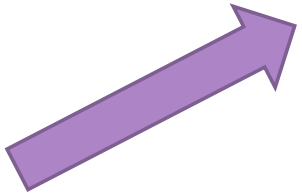
9.Implementare-Configurare router R3745

Configurarea interfeței

#conf t
#interface FastEthernet 0/0
#ip address 172.27.6.81 255.255.255.0
#duplex auto
#speed auto
#no shutdown

Setări SIP R3745

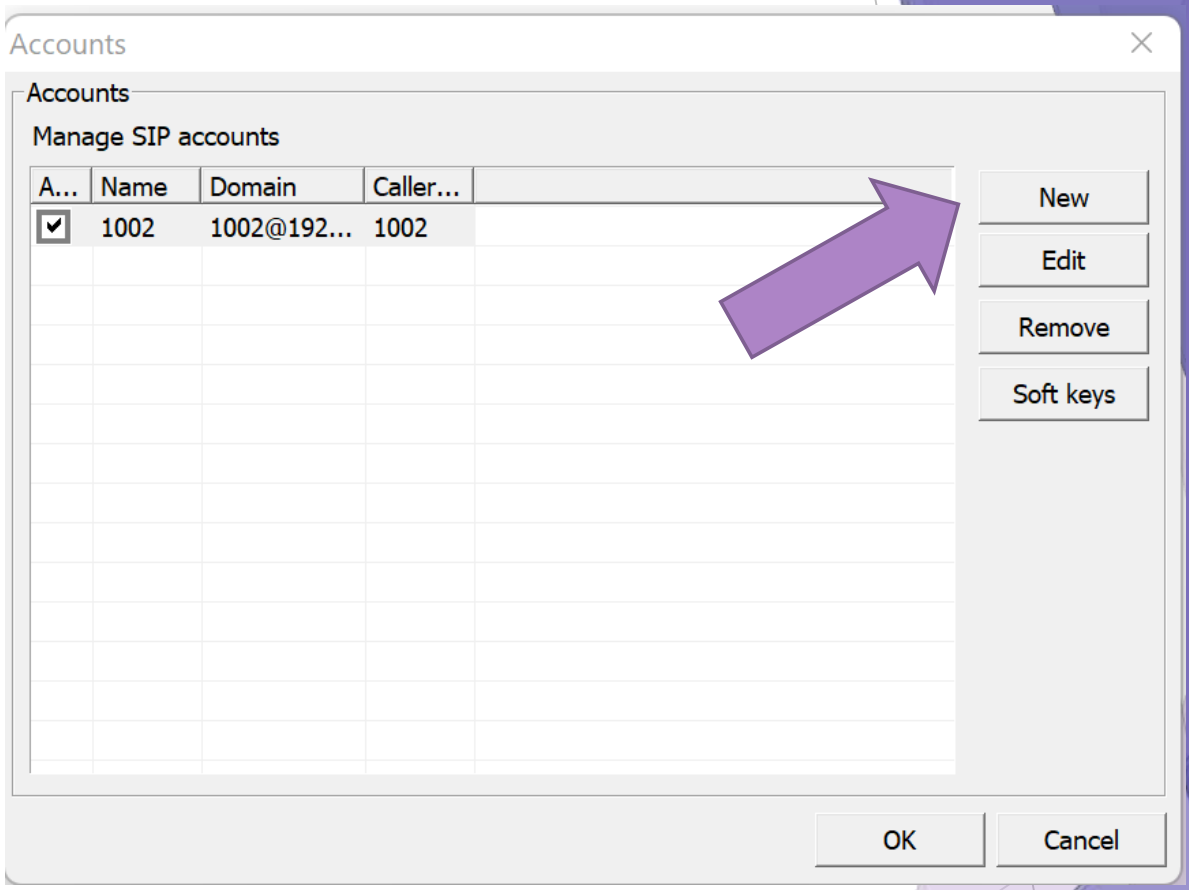
#voice service voip
#allow-connections sip to sip
#sip
#bind all source-interface loopback 0
#registrar Server



#voice register global
#mode cme
#source-address 172.27.6.81 port 5060
#max-dn 100
#max-pool 50

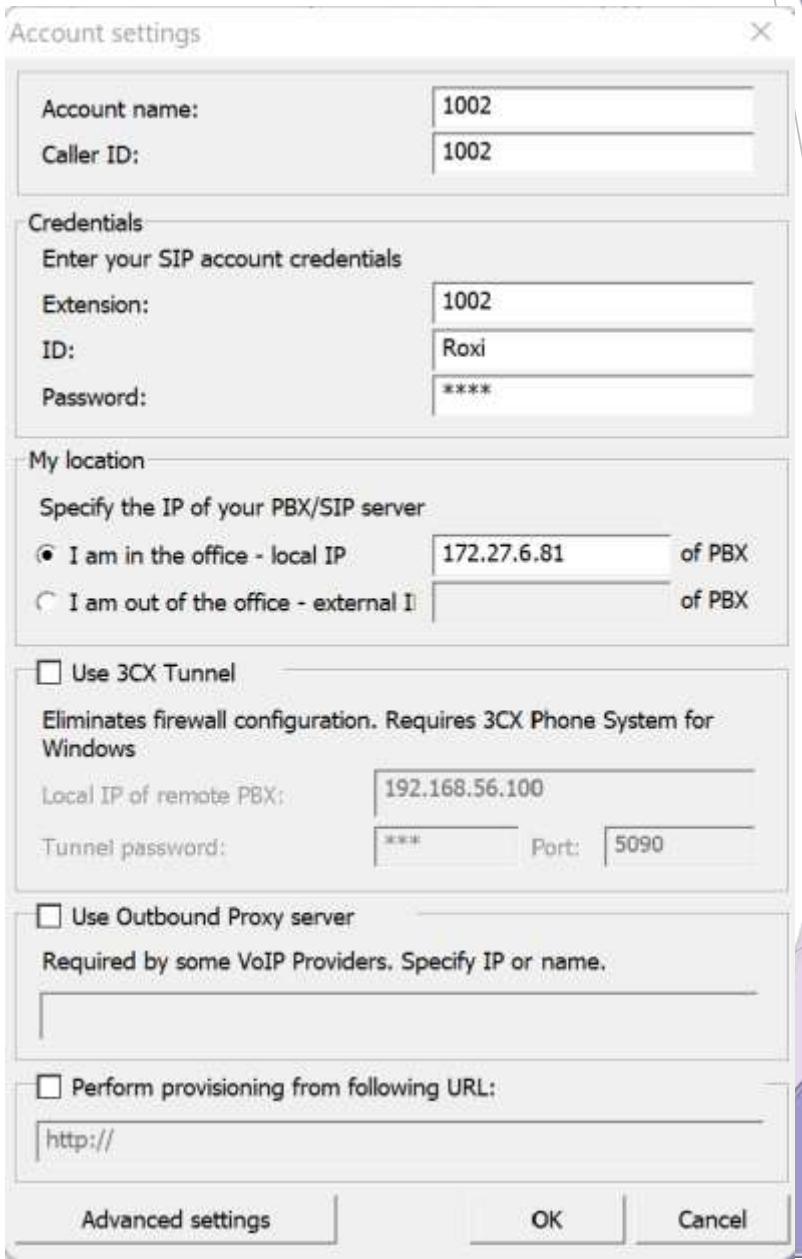
10.Configurarea 3CX

```
#do sh run | sec ephone-dn
#voice register dn 3
#number 1002
#name Roxi
#label Roxi
#exit
#voice register pool 3
#id mac 0000.ffff.0003
#number 1 dn 3
#username Roxi password 1234
#do sh run | sec voice register
```



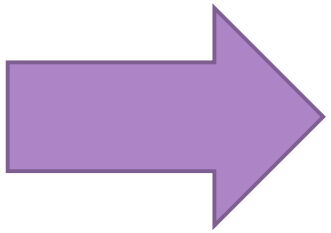
```
Router#
*Mar  1 01:33:51.619: VOICE REGISTER POOL-1 has registered. Name:SEP0000FFFF0001  IP:19
3.226.5.161  DeviceType:Phone
```

10.Configurarea 3CX



11.Configurarea Cisco IP Communicator_COD

```
#telephony-service
#ip source-address 172.27.6.81
port 5060
#max-ephones 50
#max-dn 100
#no auto-reg-ephone
#exit
```

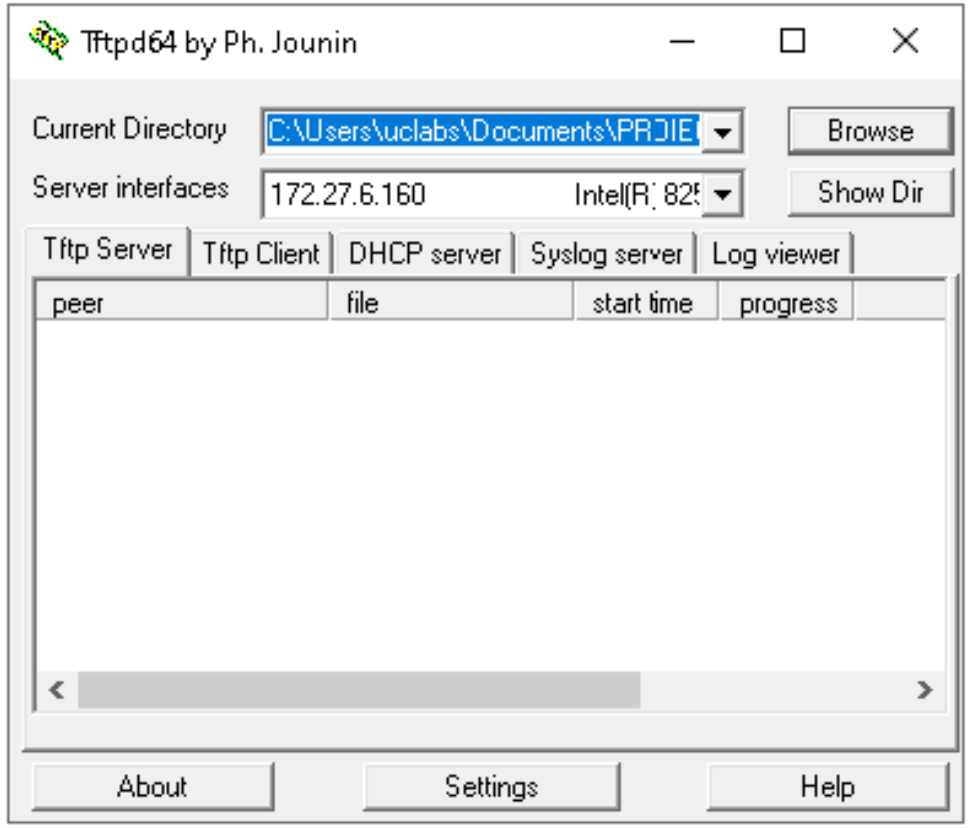


```
#ephone-dn 2
#number 1001
#name RDC
#label RDC
#exit
#do sh run | sec ephone-dn
#ephone 2
#mac-address
bcbc.adad.0002
#button 1:2
#codec g711ulaw
#type cipc
#do sh run | sec ephone
#exit
```

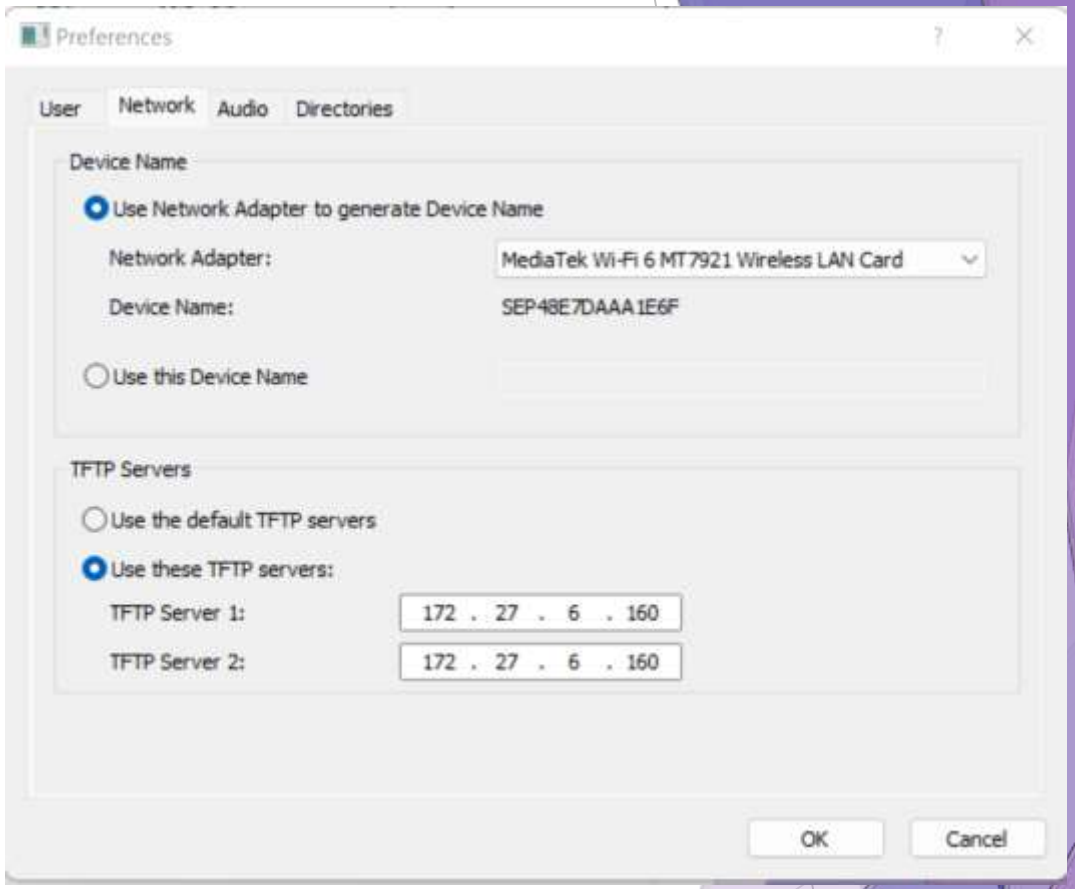
12.Configurarea Cisco IP Communicator_TFPT

XML File

```
<Default>
<callManagerGroup>
<members>
<member  priority="0">
<callManager>
<ports>
<ethernetPhonePort>5060</ethernetPhonePort>
</ports>
<processNodeName>172.27.6.81</processNodeName>
</callManager>
</member>
</members>
</callManagerGroup>
<loadInformation6  model="IP Phone 7910"></loadInformation6>
<loadInformation124  model="Addon 7914"></loadInformation124>
<loadInformation9  model="IP Phone 7935"></loadInformation9>
<loadInformation8  model="IP Phone 7940"></loadInformation8>
<loadInformation7  model="IP Phone 7960"></loadInformation7>
<loadInformation20000  model="IP Phone 7905"></loadInformation20000>
<loadInformation30008  model="IP Phone 7902"></loadInformation30008>
<loadInformation30002  model="IP Phone 7920"></loadInformation30002>
<loadInformation30019  model="IP Phone 7936"></loadInformation30019>
<loadInformation30006  model="IP Phone 7970">term70.default</loadInformation30006>
<loadInformation119  model="IP Phone 7971"></loadInformation119>
<loadInformation30018  model="IP Phone 7961"></loadInformation30018>
<loadInformation30007  model="IP Phone 7912"></loadInformation30007>
</Default>
```



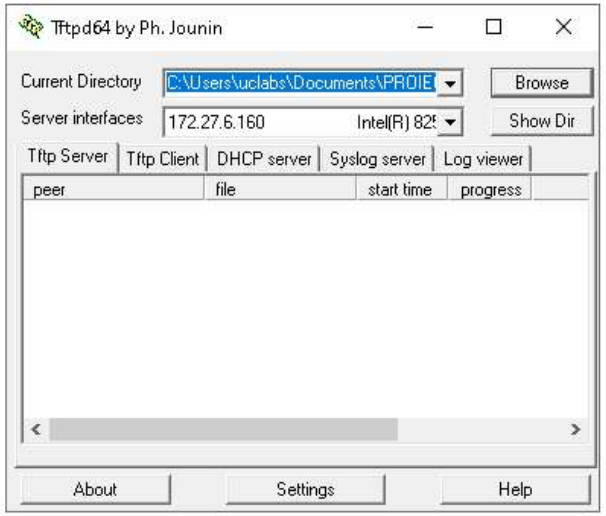
13.Configurarea Cisco IP Communicator_Telefon Cisco




```
*Mar  1 00:11:29.439: %IPPHONE-6-UNREGISTER_NORMAL: ephone-1:SEPCC52AF4C1B60 IP:172.27.
6.160 Socket:1 DeviceType:Phone has unregistered normally.
R1#
*Mar  1 00:11:57.059: %IPPHONE-6-REG_ALARM: 25: Name=SEPCC52AF4C1B60 Load= 7.0.2.0 Last
=Initialized
*Mar  1 00:11:57.059: %IPPHONE-6-REGISTER: ephone-1:SEPCC52AF4C1B60 IP:172.27.6.160 Soc
ket:1 DeviceType:Phone has registered.
R1#
```

14. Apel

172.27.6.160



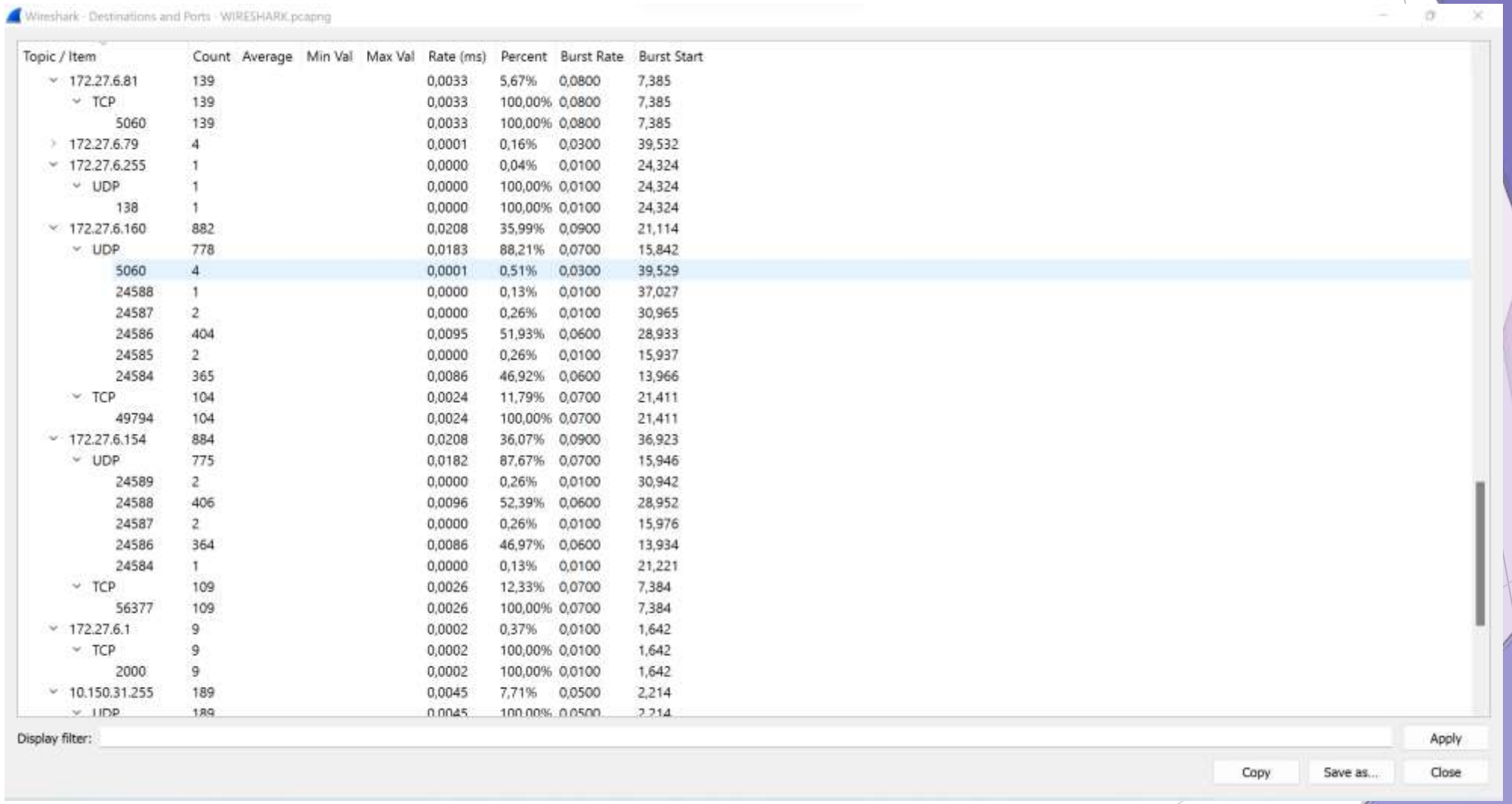
14.Apel

172.27.6.154

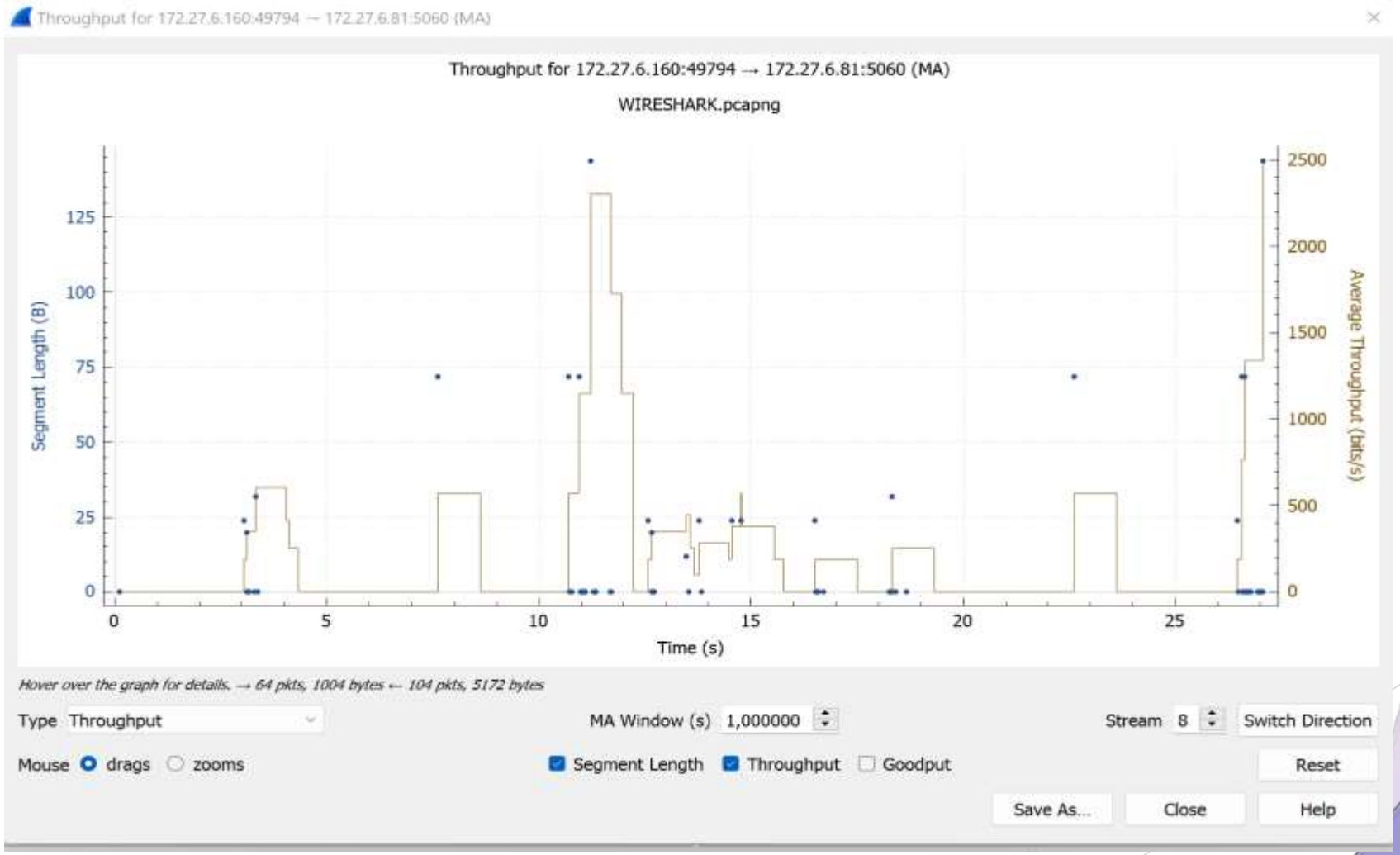
15.Rezultate experimentale_Stream Flow

16.Rezultate experimentale_TCP Stream

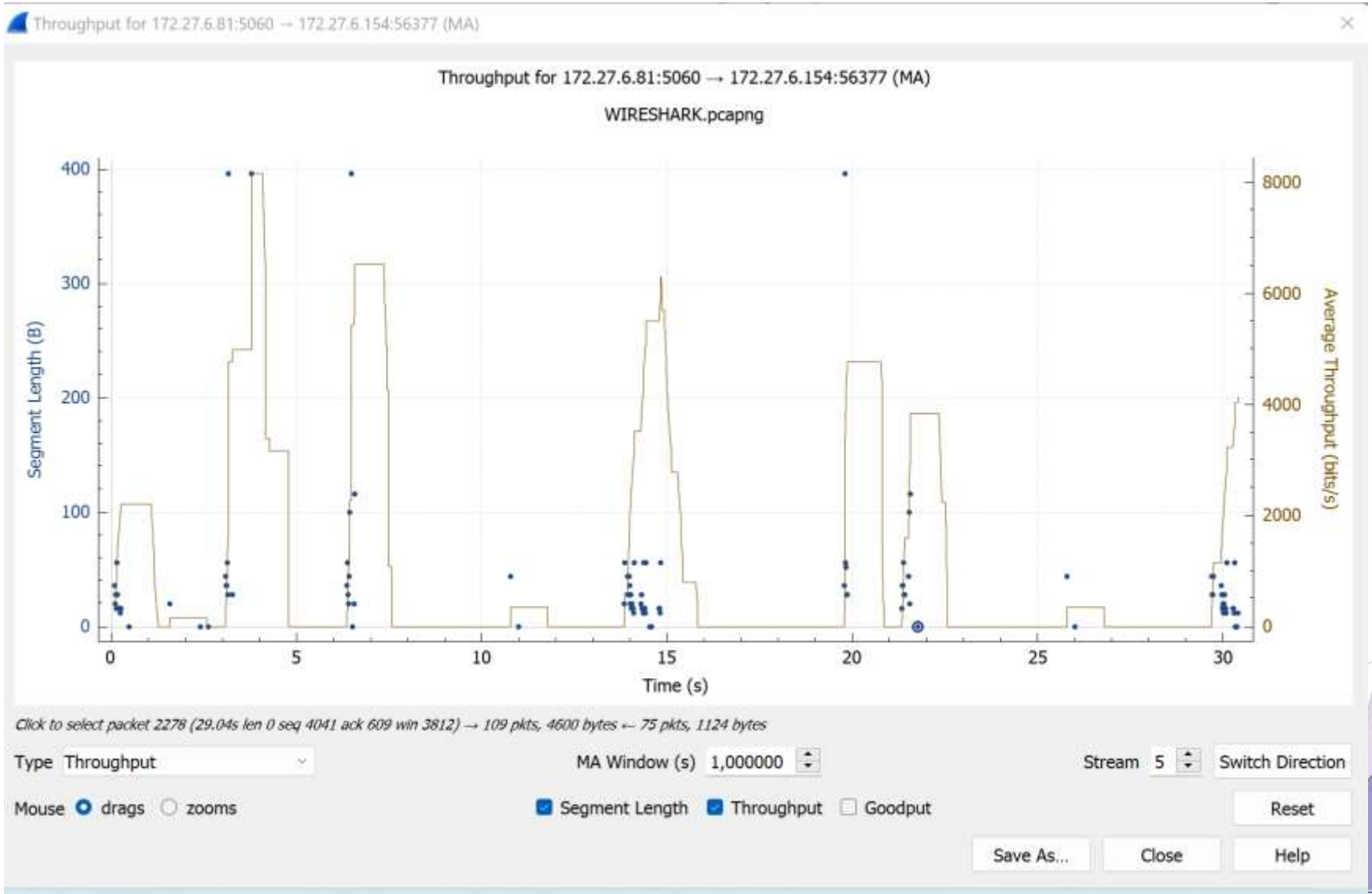
16.Rezultate experimentale_Porturi și destinații



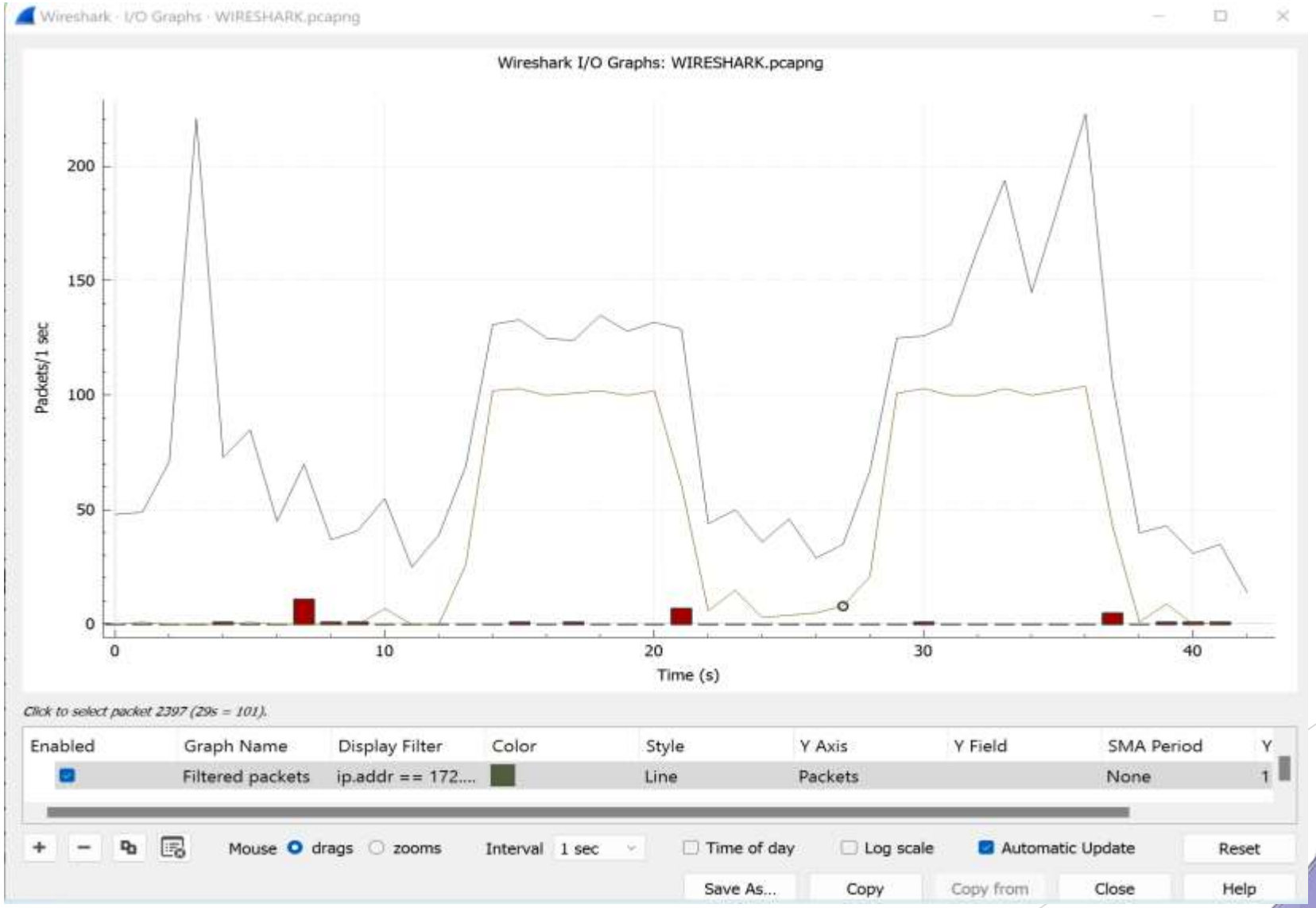
17.Rezultate experimentale_Debitul TCP



18.Rezultate experimentale_Debitul TCP



20.Rezultate experimentale_I/O Graph



25.Rezultate experimentale_Conversații

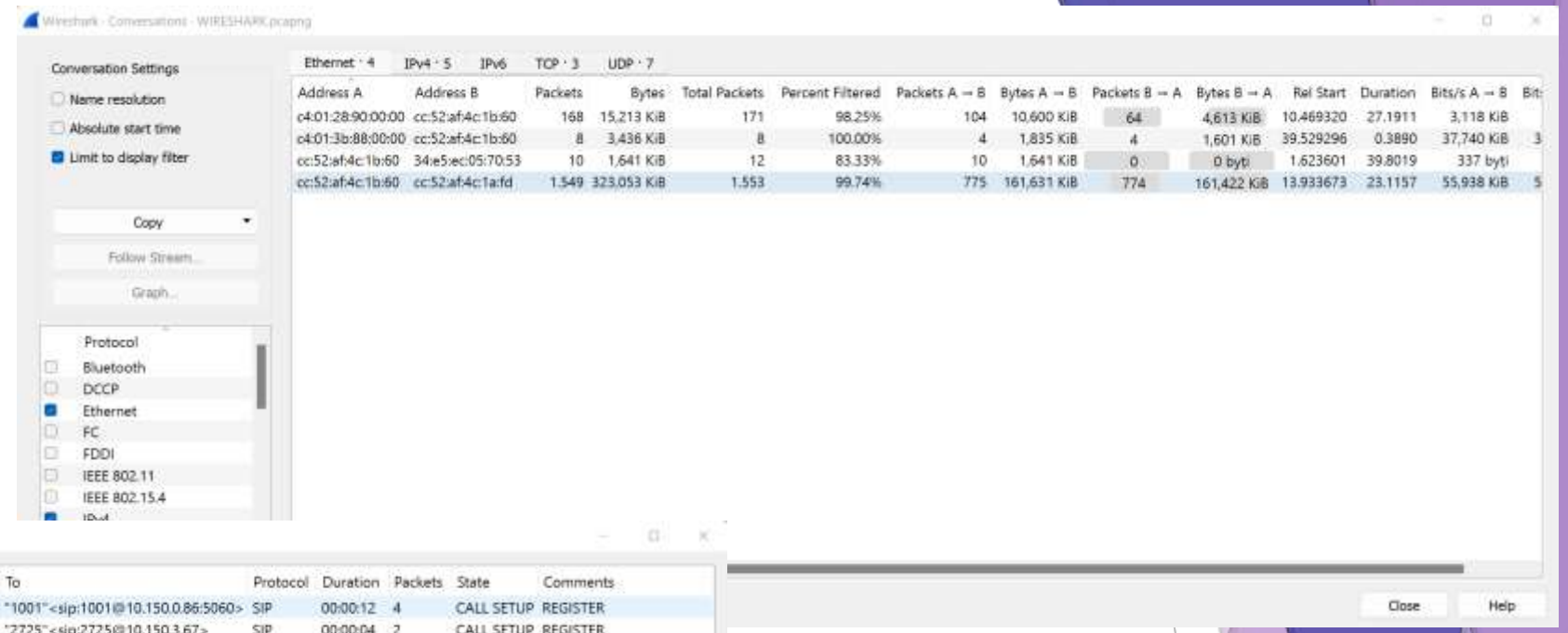
1917 21.500872	172.27.6.160	172.27.6.81	TCP	60 49794 → 5060 [ACK] Seq=293 Ack=1425 Win=63464 Len=0
1919 21.518177	172.27.6.81	172.27.6.160	TCP	70 5060 → 49794 [PSH, ACK] Seq=1425 Ack=149 Win=4024 Len=16 [TCP segment of a reassembled PDU]
1922 21.530474	172.27.6.81	172.27.6.160	TCP	70 5060 → 49794 [PSH, ACK] Seq=1441 Ack=149 Win=4024 Len=16 [TCP segment of a reassembled PDU]
1923 21.530875	172.27.6.160	172.27.6.81	TCP	60 49794 → 5060 [ACK] Seq=293 Ack=1457 Win=63432 Len=0
1924 21.545378	172.27.6.81	172.27.6.160	TCP	66 5060 → 49794 [PSH, ACK] Seq=1457 Ack=149 Win=4024 Len=12 [TCP segment of a reassembled PDU]
1925 21.560544	172.27.6.81	172.27.6.160	TCP	110 5060 → 49794 [PSH, ACK] Seq=1469 Ack=149 Win=4024 Len=56 [TCP segment of a reassembled PDU]
1926 21.560898	172.27.6.160	172.27.6.81	TCP	60 49794 → 5060 [ACK] Seq=293 Ack=1525 Win=63364 Len=0
1938 21.681251	172.27.6.160	172.27.6.81	TCP	198 [TCP Retransmission] 49794 → 5060 [PSH, ACK] Seq=149 Ack=1525 Win=63364 Len=144
1944 21.726323	172.27.6.81	172.27.6.160	TCP	70 5060 → 49794 [PSH, ACK] Seq=1525 Ack=149 Win=4024 Len=16 [TCP segment of a reassembled PDU]
1946 21.741386	172.27.6.81	172.27.6.160	TCP	70 5060 → 49794 [PSH, ACK] Seq=1541 Ack=149 Win=4024 Len=16 [TCP segment of a reassembled PDU]
1947 21.741773	172.27.6.160	172.27.6.81	TCP	60 49794 → 5060 [ACK] Seq=293 Ack=1557 Win=63332 Len=0
1948 21.756249	172.27.6.81	172.27.6.160	TCP	66 5060 → 49794 [PSH, ACK] Seq=1557 Ack=149 Win=4024 Len=12 [TCP segment of a reassembled PDU]
1950 21.771346	172.27.6.81	172.27.6.160	TCP	110 5060 → 49794 [PSH, ACK] Seq=1569 Ack=149 Win=4024 Len=56 [TCP segment of a reassembled PDU]
1951 21.771737	172.27.6.160	172.27.6.81	TCP	60 49794 → 5060 [ACK] Seq=293 Ack=1625 Win=63264 Len=0
1952 21.786303	172.27.6.81	172.27.6.160	TCP	60 5060 → 49794 [ACK] Seq=1625 Ack=221 Win=3952 Len=0
1955 21.801394	172.27.6.81	172.27.6.160	TCP	414 [TCP Spurious Retransmission] 5060 → 49794 [PSH, ACK] Seq=1265 Ack=221 Win=3952 Len=360
1956 21.801394	172.27.6.160	172.27.6.81	TCP	60 [TCP Dup ACK 1951#1] 49794 → 5060 [ACK] Seq=293 Ack=1625 Win=63264 Len=0
1959 21.831271	172.27.6.81	172.27.6.160	TCP	60 5060 → 49794 [ACK] Seq=1625 Ack=293 Win=3880 Len=0
1961 21.846191	172.27.6.81	172.27.6.160	TCP	60 [TCP Dup ACK 1959#1] 5060 → 49794 [ACK] Seq=1625 Ack=293 Win=3880 Len=0
1979 22.123163	172.27.6.81	172.27.6.160	TCP	70 5060 → 49794 [PSH, ACK] Seq=1625 Ack=293 Win=3880 Len=16 [TCP segment of a reassembled PDU]
1980 22.138075	172.27.6.81	172.27.6.160	TCP	70 5060 → 49794 [PSH, ACK] Seq=1641 Ack=293 Win=3880 Len=16 [TCP segment of a reassembled PDU]
1981 22.138517	172.27.6.160	172.27.6.81	TCP	60 49794 → 5060 [ACK] Seq=293 Ack=1657 Win=63232 Len=0
1983 22.153096	172.27.6.81	172.27.6.160	TCP	66 5060 → 49794 [PSH, ACK] Seq=1657 Ack=293 Win=3880 Len=12 [TCP segment of a reassembled PDU]
1985 22.168140	172.27.6.81	172.27.6.160	TCP	110 5060 → 49794 [PSH, ACK] Seq=1669 Ack=293 Win=3880 Len=56 [TCP segment of a reassembled PDU]
1986 22.168564	172.27.6.160	172.27.6.81	TCP	60 49794 → 5060 [ACK] Seq=293 Ack=1725 Win=63164 Len=0
2011 23.032360	172.27.6.160	172.27.6.81	TCP	78 49794 → 5060 [PSH, ACK] Seq=293 Ack=1725 Win=63164 Len=24 [TCP segment of a reassembled PDU]

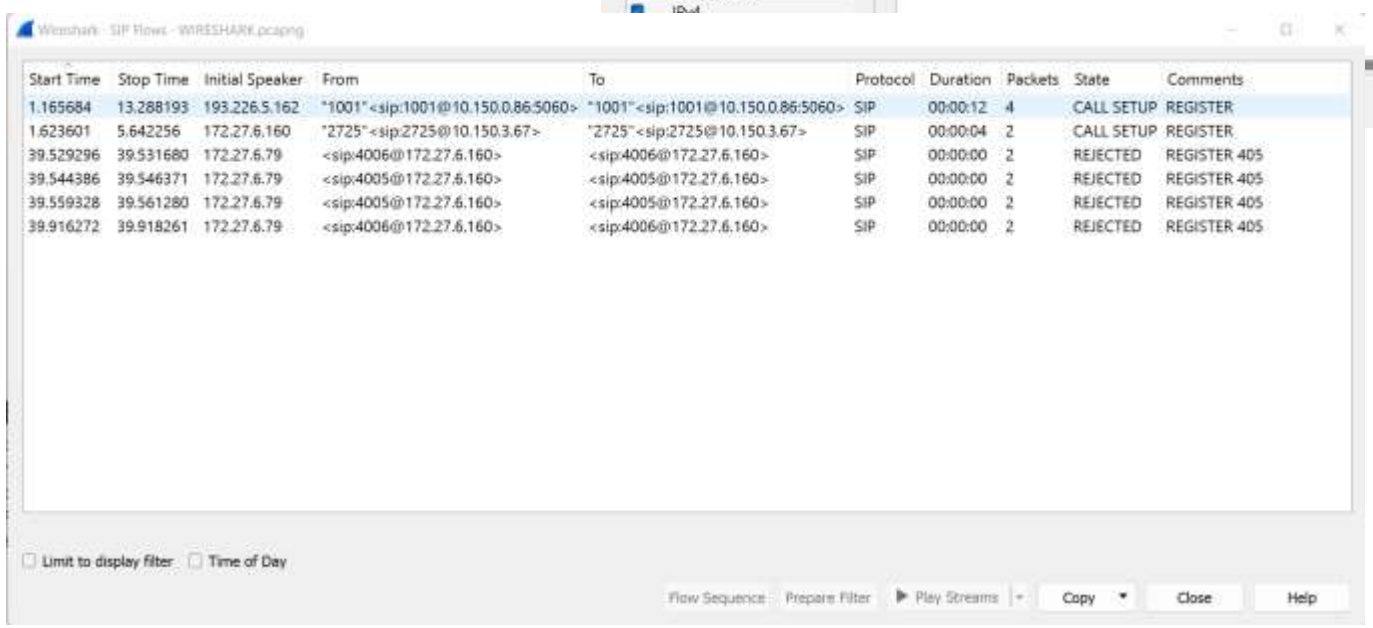
26.Rezultate experimentale_Conversații

eth.addr eq c4:01:28:90:00:00 and eth.addr eq cc:52:af:4c:1b:60

No.	Time	Source	Destination	Protocol	Length	Info
769	10.469320	172.27.6.81	172.27.6.160	TCP	90	5060 → 49794 [PSH, ACK] Seq=1 Ack=1 Win=2696 Len=36
771	10.484366	172.27.6.81	172.27.6.160	TCP	450	5060 → 49794 [PSH, ACK] Seq=37 Ack=1 Win=2696 Len=396
773	10.500337	172.27.6.81	172.27.6.160	TCP	110	5060 → 49794 [PSH, ACK] Seq=433 Ack=1 Win=2696 Len=56
777	10.515352	172.27.6.81	172.27.6.160	TCP	106	5060 → 49794 [PSH, ACK] Seq=489 Ack=1 Win=2696 Len=52 [TCP segment of a reassembled PDU]
779	10.530214	172.27.6.81	172.27.6.160	TCP	82	5060 → 49794 [PSH, ACK] Seq=541 Ack=1 Win=2696 Len=28
781	10.545340	172.27.6.81	172.27.6.160	TCP	82	5060 → 49794 [PSH, ACK] Seq=569 Ack=1 Win=2696 Len=28
783	10.575274	c4:01:28:90:00:00	Universa_4c:1b:60	ARP	60	172.27.6.81 is at c4:01:28:90:00:00
784	10.575720	172.27.6.160	172.27.6.81	TCP	60	49794 → 5060 [ACK] Seq=1 Ack=597 Win=62792 Len=0
875	13.508534	172.27.6.160	172.27.6.81	TCP	78	49794 → 5060 [PSH, ACK] Seq=1 Ack=597 Win=62792 Len=24
877	13.557442	172.27.6.81	172.27.6.160	TCP	70	5060 → 49794 [PSH, ACK] Seq=597 Ack=25 Win=2672 Len=16 [TCP segment of a reassembled PDU]
878	13.572505	172.27.6.81	172.27.6.160	TCP	90	5060 → 49794 [PSH, ACK] Seq=613 Ack=25 Win=2672 Len=36
879	13.574610	172.27.6.160	172.27.6.81	TCP	60	49794 → 5060 [ACK] Seq=25 Ack=649 Win=64240 Len=0
880	13.576209	172.27.6.160	172.27.6.81	TCP	74	49794 → 5060 [PSH, ACK] Seq=25 Ack=649 Win=64240 Len=20 [TCP segment of a reassembled PDU]
881	13.587462	172.27.6.81	172.27.6.160	TCP	90	5060 → 49794 [PSH, ACK] Seq=649 Ack=25 Win=2672 Len=36

946	14.127866	172.27.6.160	172.27.6.154	UDP	214	24584 → 24586 Len=172
947	14.139004	172.27.6.154	172.27.6.160	UDP	214	24586 → 24584 Len=172
948	14.145175	172.27.6.160	172.27.6.154	UDP	214	24584 → 24586 Len=172
949	14.160760	172.27.6.154	172.27.6.160	UDP	214	24586 → 24584 Len=172
950	14.169169	172.27.6.160	172.27.6.154	UDP	214	24584 → 24586 Len=172
951	14.178880	172.27.6.154	172.27.6.160	UDP	214	24586 → 24584 Len=172
952	14.188372	172.27.6.160	172.27.6.154	UDP	214	24584 → 24586 Len=172
953	14.196926	172.27.6.154	172.27.6.160	UDP	214	24586 → 24584 Len=172
954	14.205868	172.27.6.160	172.27.6.154	UDP	214	24584 → 24586 Len=172
958	14.219449	172.27.6.154	172.27.6.160	UDP	214	24586 → 24584 Len=172
959	14.229207	172.27.6.160	172.27.6.154	UDP	214	24584 → 24586 Len=172
960	14.236649	172.27.6.154	172.27.6.160	UDP	214	24586 → 24584 Len=172
961	14.247889	172.27.6.160	172.27.6.154	UDP	214	24584 → 24586 Len=172





27.Rezultate experimentale_Conversații

28.Rezultate experimentale

Wireshark · Conversations · WIRESHARK.pcapng

Conversation Settings

- Name resolution
- Absolute start time
- Limit to display filter

Copy

Follow Stream...

Graph...

Protocol

- Bluetooth
- DCCP
- Ethernet
- FC
- FDDI
- IEEE 802.11
- IEEE 802.15.4
- IPv4
- IPv6

Filter list for specific type

Ethernet · 4 | IPv4 · 5 | IPv6 | TCP · 3 | UDP · 7

Address A	Address B	Packets	Bytes	Total Packets	Percent Filtered	Packets A → B	Bytes A → B	Packets B → A	Bytes B → A	Rel Start	Duration	Bits/s A → B	Bits/s B → A
172.27.6.79	172.27.6.160	8	3,436 KiB	8	100.00%	4	1,835 KiB	4	1,601 KiB	39.529296	0.3890	37,740 KiB	32,919 KiB
172.27.6.81	172.27.6.160	168	15,213 KiB	168	100.00%	104	10,600 KiB	64	4,613 KiB	10.469320	27.1911	3,118 KiB	1,356 KiB
172.27.6.160	10.150.3.67	5	1,318 KiB	5	100.00%	5	1,318 KiB	0	0 byți	1.623601	39.8019	271 byți	0 byți
172.27.6.160	172.27.6.1	5	330 byți	5	100.00%	5	330 byți	0	0 byți	14.976627	15.0289	175 byți	0 byți
172.27.6.160	172.27.6.154	1.549	323,053 KiB	1.549	100.00%	775	161,631 KiB	774	161,422 KiB	13.933673	23.1157	55,938 KiB	55,865 KiB

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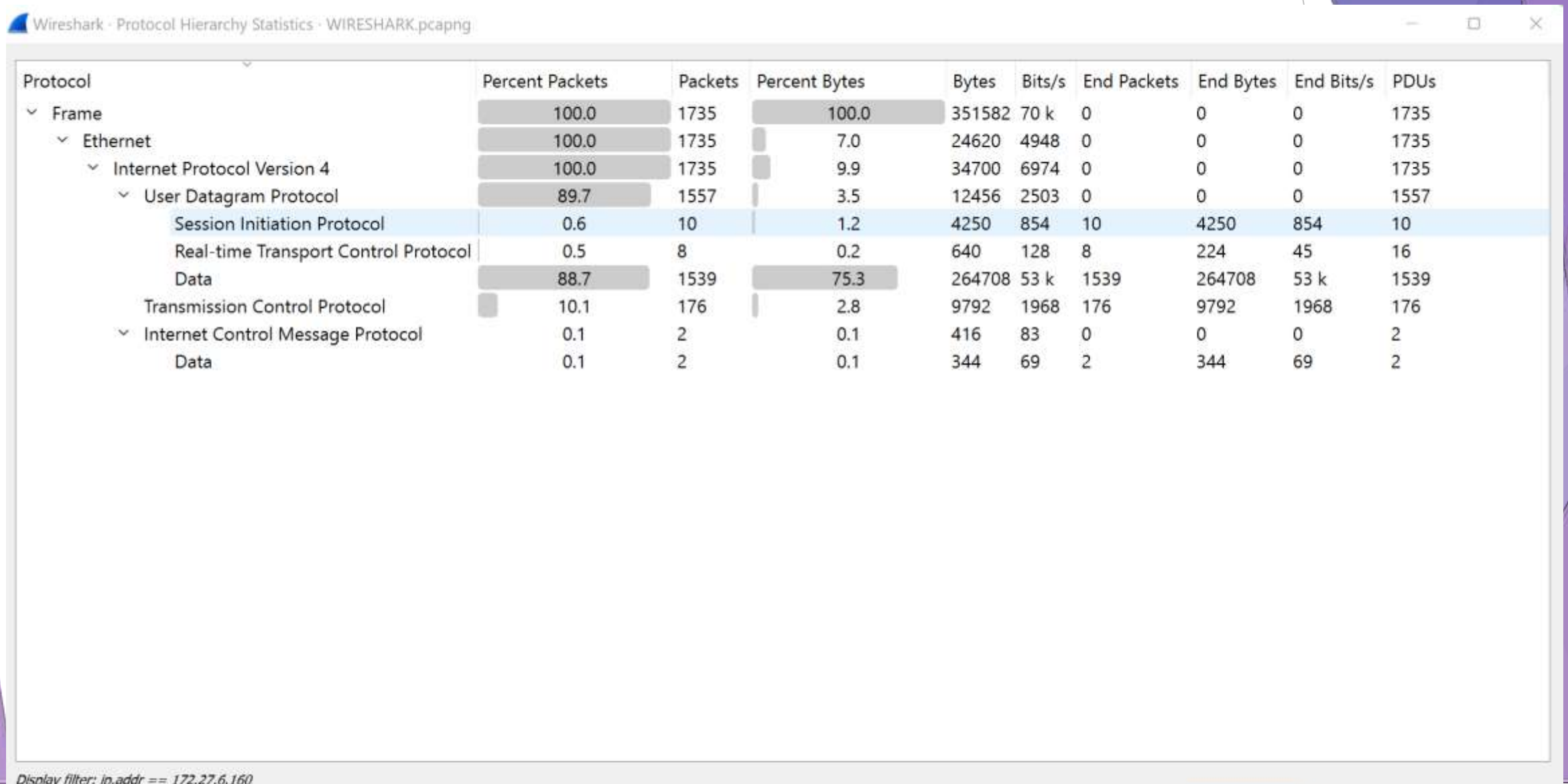
29. Protocol Hierarchy Statistics



Protocol	Percent Packets	Packets	Percent Bytes	Bytes	Bits/s	End Packets	End Bytes	End Bits/s	PDUs
Frame	100.0	1735	100.0	351582	70 k	0	0	0	1735
Ethernet	100.0	1735	7.0	24620	4948	0	0	0	1735
Internet Protocol Version 4	100.0	1735	9.9	34700	6974	0	0	0	1735
User Datagram Protocol	89.7	1557	3.5	12456	2503	0	0	0	1557
Session Initiation Protocol	0.6	10	1.2	4250	854	10	4250	854	10
Real-time Transport Control Protocol	0.5	8	0.2	640	128	8	224	45	16
Data	88.7	1539	75.3	264708	53 k	1539	264708	53 k	1539
Transmission Control Protocol	10.1	176	2.8	9792	1968	176	9792	1968	176
Internet Control Message Protocol	0.1	2	0.1	416	83	0	0	0	2
Data	0.1	2	0.1	344	69	2	344	69	2

Întrebări?