

## **Ex No: 14a    STUDY OF WIRESHARK TOOL FOR PACKET SNIFFING**

### **AIM:**

To study packet sniffing concepts using Wireshark Tool.

### **DESCRIPTION:**

Wireshark, a network analysis tool formerly known as Ethereal, captures packets in real time and display them in human-readable format. Wireshark includes filters, color coding, and other features that let you dig deep into network traffic and inspect individual packets. You can use Wireshark to inspect a suspicious program's network traffic, analyze the traffic flow on your network, or troubleshoot network problems.

### **What we can do with Wireshark:**

- Capture network traffic
- Decode packet protocols using dissectors
- Define filters – capture and display
- Watch smart statistics
- Analyze problems
- Interactively browse that traffic

### **Wireshark used for:**

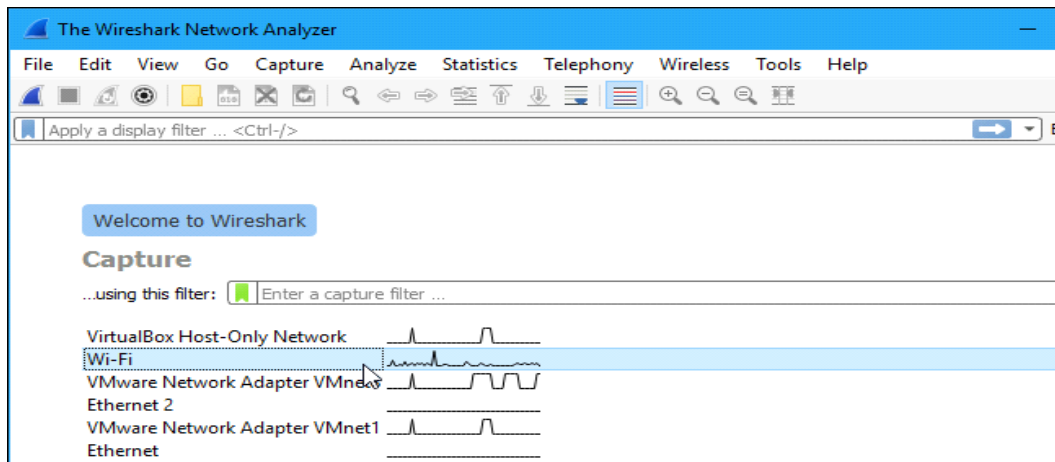
- Network administrators: troubleshoot network problems
- Network security engineers: examine security problems
- Developers: debug protocol implementations
- People: learn **network protocol internals**

### **Getting Wireshark**

Wireshark can be downloaded for Windows or macOS from [its official website](#). For Linux or another UNIX-like system, Wireshark will be found in its package repositories. For Ubuntu, Wireshark will be found in the Ubuntu Software Center.

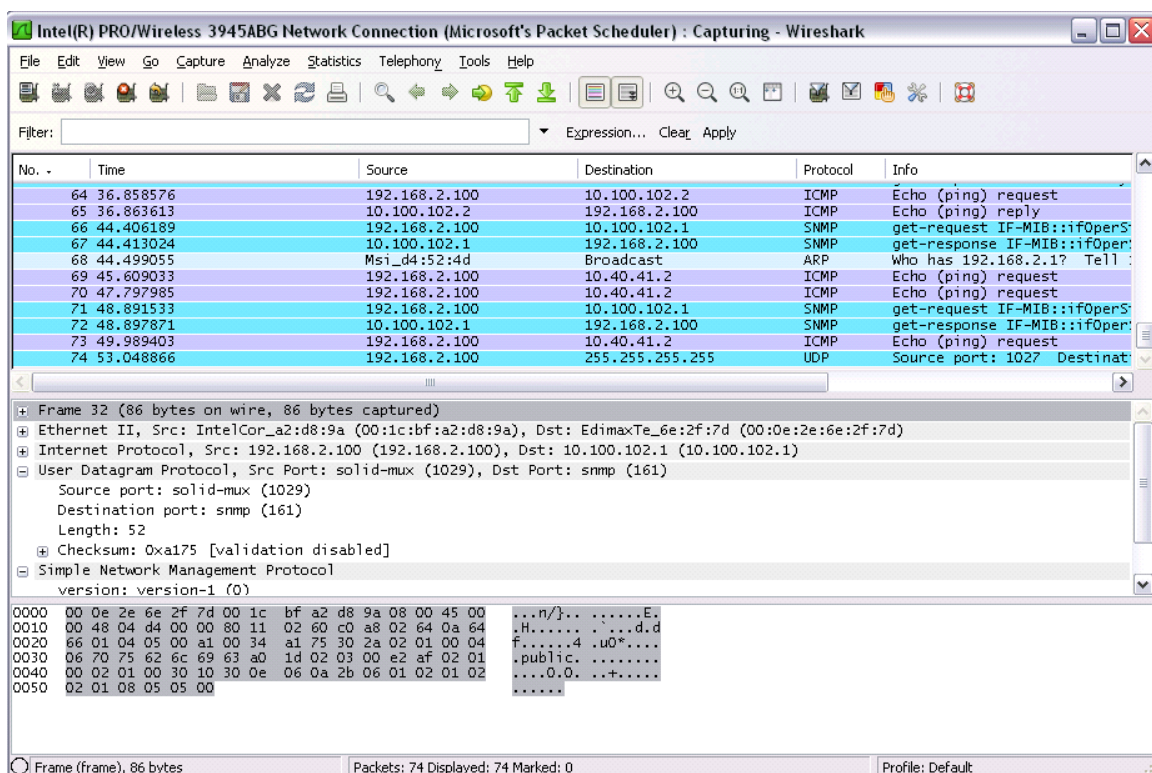
### **Capturing Packets**

After downloading and installing Wireshark, launch it and double-click the name of a network interface under Capture to start capturing packets on that interface



As soon as you click the interface's name, you'll see the packets start to appear in real time. Wireshark captures each packet sent to or from your system.

If you have promiscuous mode enabled—it's enabled by default—you'll also see all the other packets on the network instead of only packets addressed to your network adapter. To check if promiscuous mode is enabled, click **Capture > Options** and verify the "Enable promiscuous mode on all interfaces" checkbox is activated at the bottom of this window.



Click the red "Stop" button near the top left corner of the window when you want to stop capturing traffic.

## The “Packet List” Pane

The packet list pane displays all the packets in the current capture file. The “Packet List” pane Each line in the packet list corresponds to one packet in the capture file. If you select a line in this pane, more details will be displayed in the “Packet Details” and “Packet Bytes” panes.

## The “Packet Details” Pane

The packet details pane shows the current packet (selected in the “Packet List” pane) in a more detailed form. This pane shows the protocols and protocol fields of the packet selected in the “Packet List” pane. The protocols and fields of the packet shown in a tree which can be expanded and collapsed.

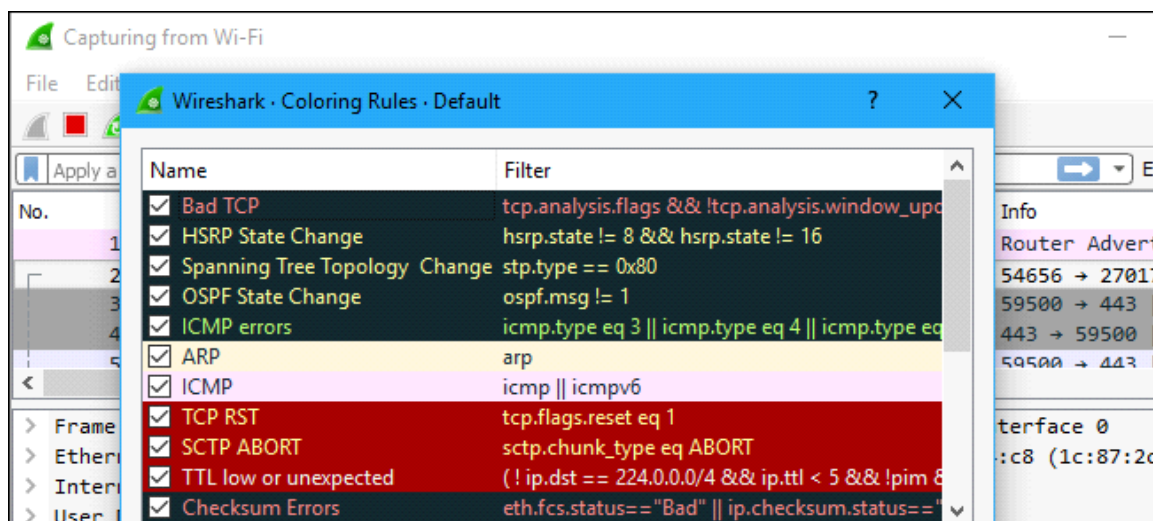
## The “Packet Bytes” Pane

The packet bytes pane shows the data of the current packet (selected in the “Packet List” pane) in a hexdump style.

## Color Coding

You’ll probably see packets highlighted in a variety of different colors. Wireshark uses colors to help you identify the types of traffic at a glance. By default, light purple is TCP traffic, light blue is UDP traffic, and black identifies packets with errors—for example, they could have been delivered out of order.

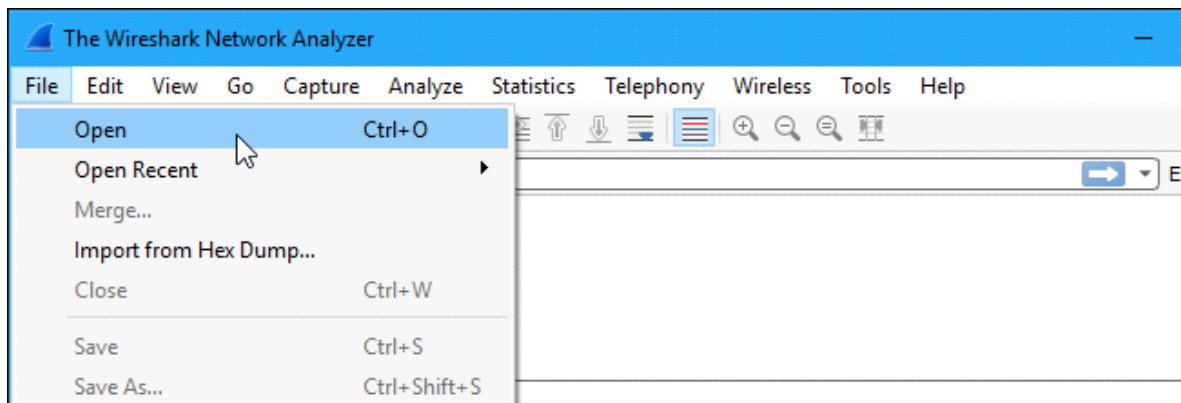
To view exactly what the color codes mean, click View > Coloring Rules. You can also customize and modify the coloring rules from here, if you like.



## Sample Captures

If there's nothing interesting on your own network to inspect, Wireshark's wiki has you covered. The wiki contains a [page of sample capture files](#) that you can load and inspect. Click File > Open in Wireshark and browse for your downloaded file to open one.

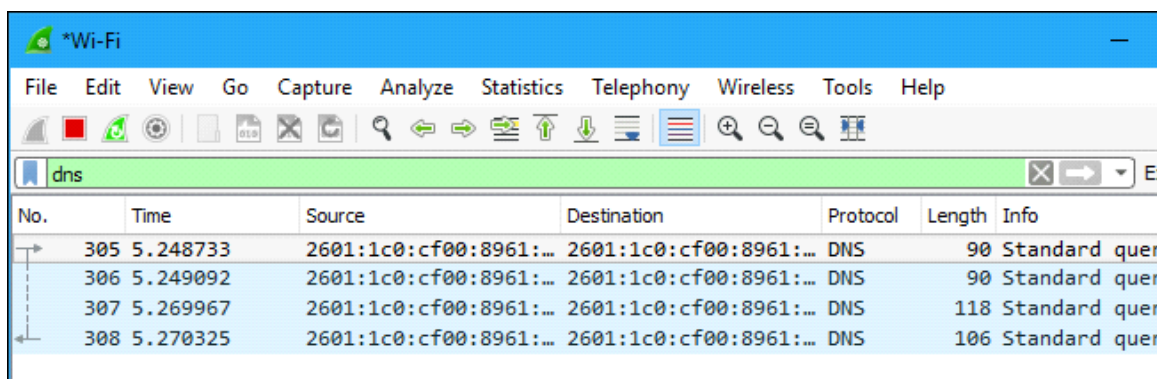
You can also save your own captures in Wireshark and open them later. Click File > Save to save your captured packets.



## Filtering Packets

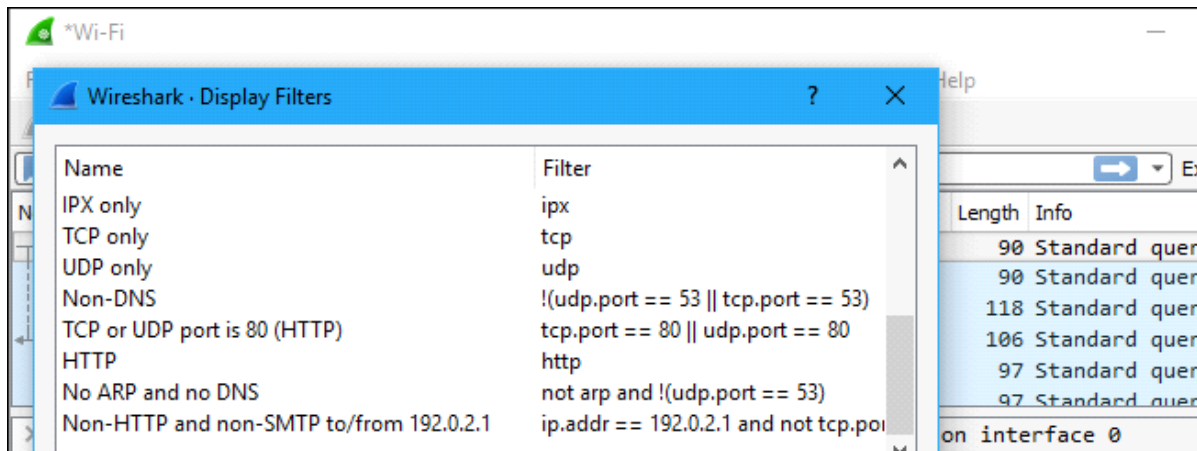
If you're trying to inspect something specific, such as the traffic a program sends when phoning home, it helps to close down all other applications using the network so you can narrow down the traffic. Still, you'll likely have a large amount of packets to sift through. That's where Wireshark's filters come in.

The most basic way to apply a filter is by typing it into the filter box at the top of the window and clicking Apply (or pressing Enter). For example, type "dns" and you'll see only DNS packets. When you start typing, Wireshark will help you autocomplete your filter.



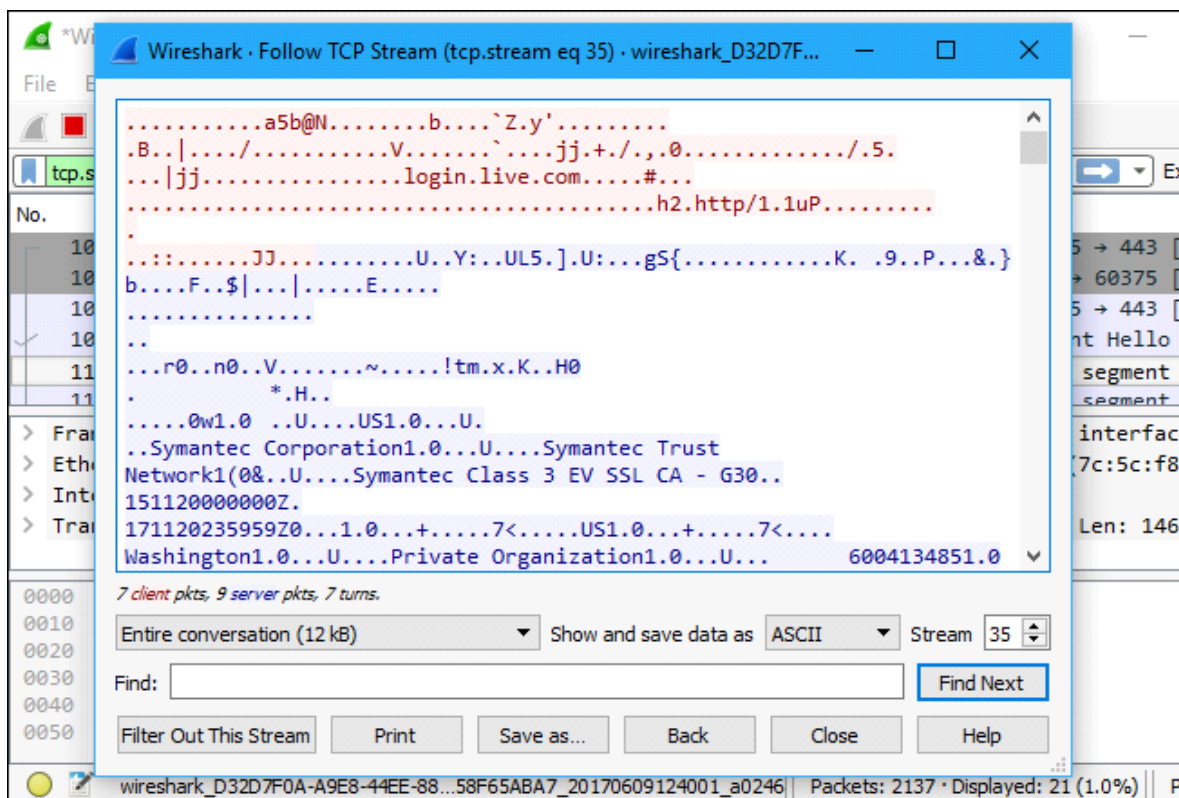
You can also click Analyze > Display Filters to choose a filter from among the default filters included in Wireshark. From here, you can add your own custom filters and save them to easily access them in the future.

For more information on Wireshark's display filtering language, read the [Building display filter expressions](#) page in the official Wireshark documentation.



Another interesting thing you can do is right-click a packet and select Follow > TCP Stream.

You'll see the full TCP conversation between the client and the server. You can also click other protocols in the Follow menu to see the full conversations for other protocols, if applicable.



Close the window and you'll find a filter has been applied automatically. Wireshark is showing you the packets that make up the conversation.

No.	Time	Source	Destination	Protocol	Length	Info
1054	2.798483	192.168.29.250	131.253.61.66	TCP	66	60375 → 443
1078	2.891263	131.253.61.66	192.168.29.250	TCP	58	443 → 60375
1079	2.891359	192.168.29.250	131.253.61.66	TCP	54	60375 → 443
1080	2.891527	192.168.29.250	131.253.61.66	TLSv1.2	288	Client Hello
1103	2.992980	131.253.61.66	192.168.29.250	TCP	1514	[TCP segment
1104	2.992980	131.253.61.66	192.168.29.250	TCP	1514	[TCP segment

> Frame 1078: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface 0  
 > Ethernet II, Src: AsustekC\_35:e4:c8 (1c:87:2c:35:e4:c8), Dst: IntelCor\_38:be:bd (7c:5c:f8  
 > Internet Protocol Version 4, Src: 131.253.61.66, Dst: 192.168.29.250  
 > Transmission Control Protocol, Src Port: 443, Dst Port: 60375, Seq: 0, Ack: 1, Len: 0

## Inspecting Packets

Click a packet to select it and you can dig down to view its details.

No.	Time	Source	Destination	Protocol	Length	Info
1054	2.798483	192.168.29.250	131.253.61.66	TCP	66	60375 → 443
1078	2.891263	131.253.61.66	192.168.29.250	TCP	58	443 → 60375
1079	2.891359	192.168.29.250	131.253.61.66	TCP	54	60375 → 443
1080	2.891527	192.168.29.250	131.253.61.66	TLSv1.2	288	Client Hello

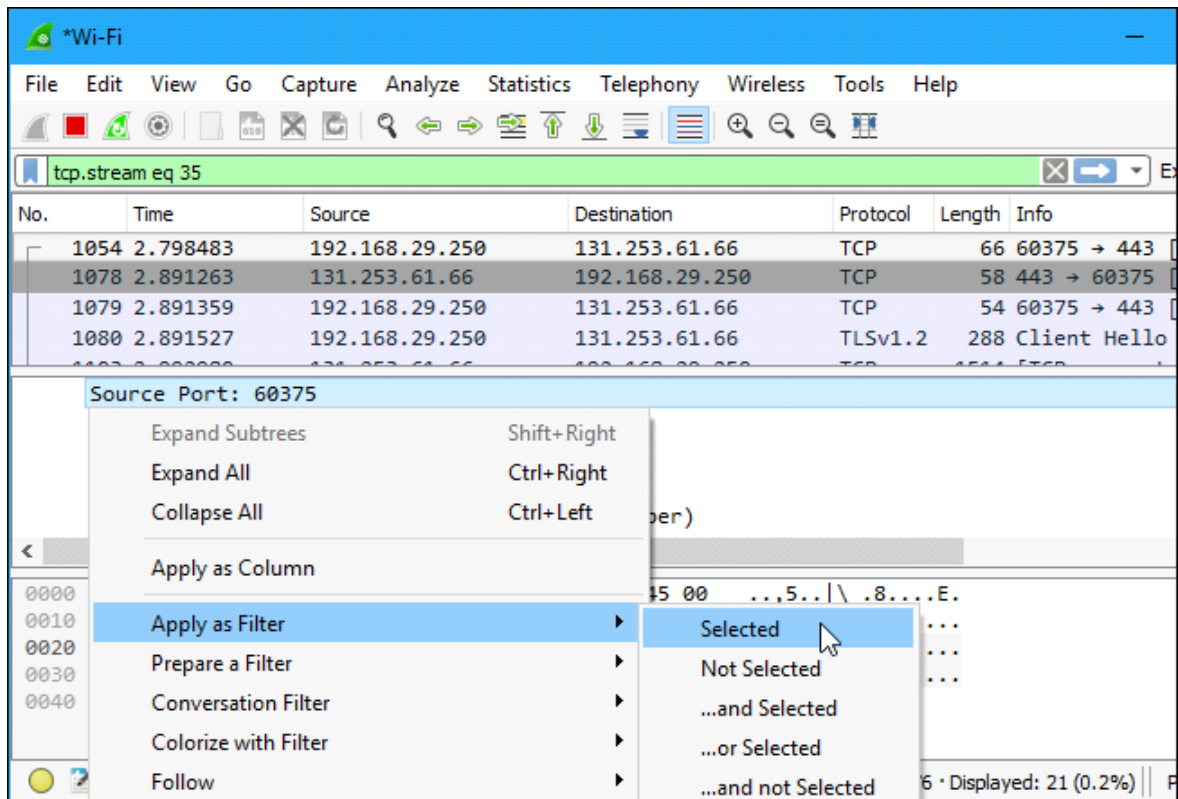
Frame 1054: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0  
 Interface id: 0 (\Device\NPF\_{D32D7F0A-A9E8-44EE-88DC-DFD58F65ABA7})  
 Encapsulation type: Ethernet (1)  
 Arrival Time: Jun 9, 2017 12:40:04.140141000 Pacific Daylight Time  
 [Time shift for this packet: 0.000000000 seconds]  
 Epoch Time: 1497037204.140141000 seconds

Offset	Hex	ASCII
0000	1c 87 2c 35 e4 c8 7c 5c f8 38 be bd 08 00 45 00	..,5.. \ .8....E.
0010	00 34 0b 5d 40 00 80 06 4f 85 c0 a8 1d fa 83 fd	.4.]@... 0.....
0020	3d 42 eb d7 01 bb 22 52 7b 69 00 00 00 00 80 02	=B...."R {i.....
0030	fa f0 48 ef 00 00 02 04 05 b4 01 03 03 08 01 01	..H.....
0040	04 02	..

Encapsulation type (frame.encap\_type) | Packets: 8136 · Displayed: 21 (0.3%)

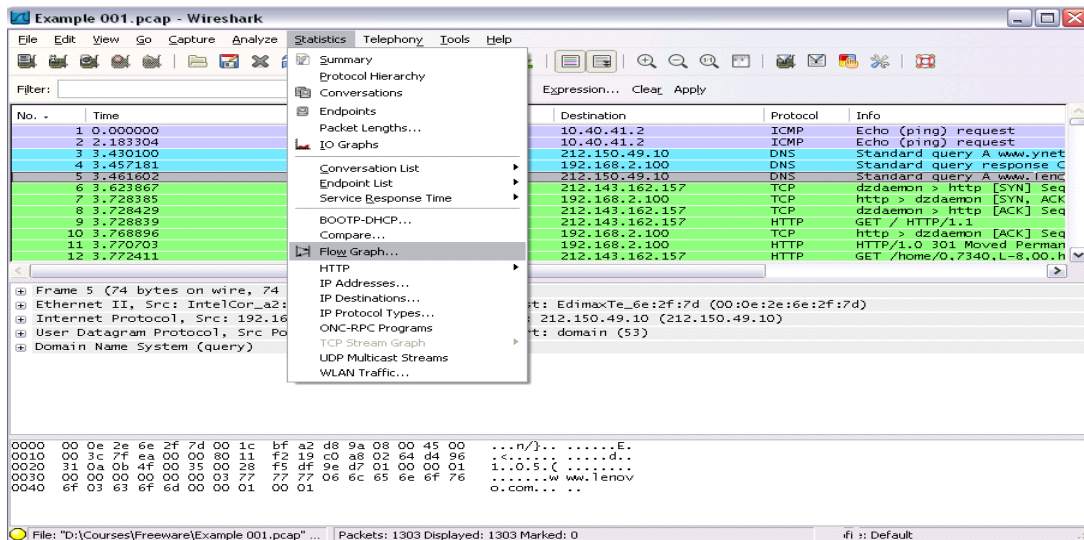
You can also create filters from here — just right-click one of the details and use the Apply as Filter submenu to create a filter based on it.

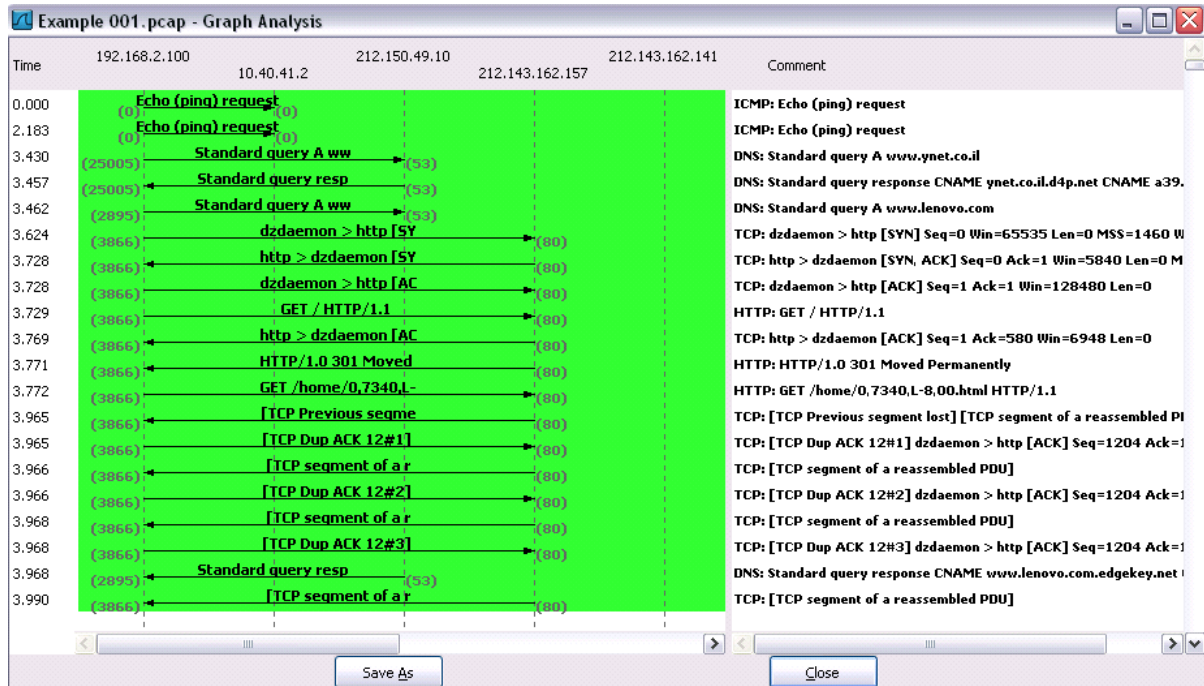




Wireshark is an extremely powerful tool, and this tutorial is just scratching the surface of what you can do with it. Professionals use it to debug network protocol implementations, examine security problems and inspect network protocol internals.

**Flow Graph: Gives a better understanding of what we see.**





## Ex No: 14 b PACKET SNIFFING USING WIRESHARK

### AIM:

To capture, save, filter and analyze network traffic on TCP / UDP / IP / HTTP / ARP /DHCP /ICMP/DNS using Wireshark Tool

### Exercises

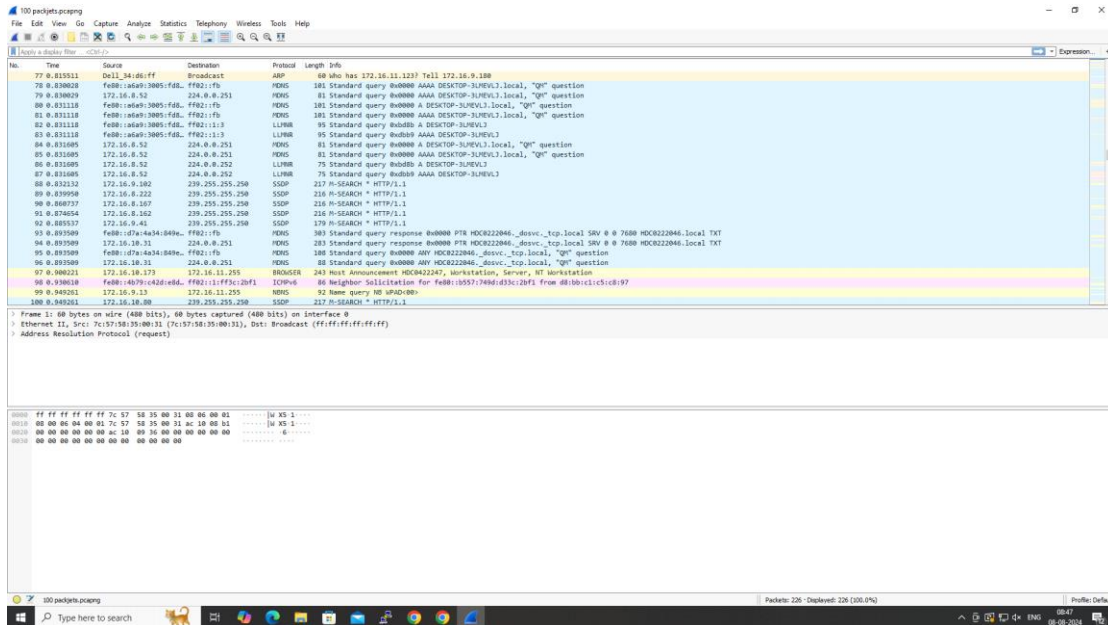
1. Capture 100 packets from the Ethernet: IEEE 802.3 LAN Interface and save it.

### Procedure

- Select Local Area Connection in Wireshark.
- Go to capture ☐ option
- Select stop capture automatically after 100 packets.
- Then click Start capture.
- Save the packets.



### Output



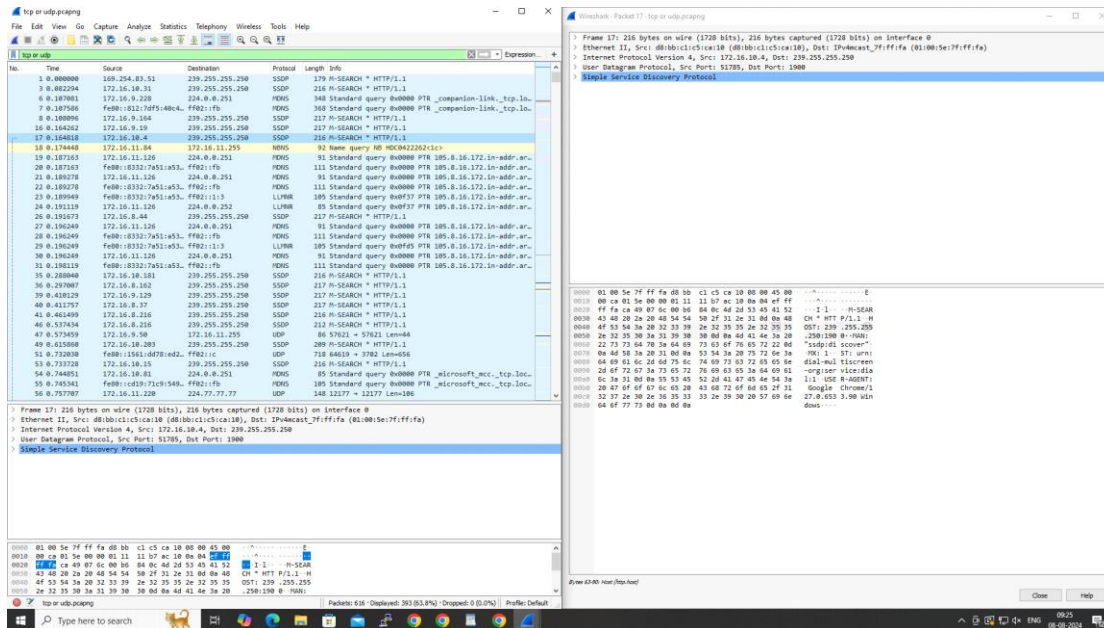


## 2.Create a Filter to display only TCP/UDP packets, inspect the packets and provide the flow graph.

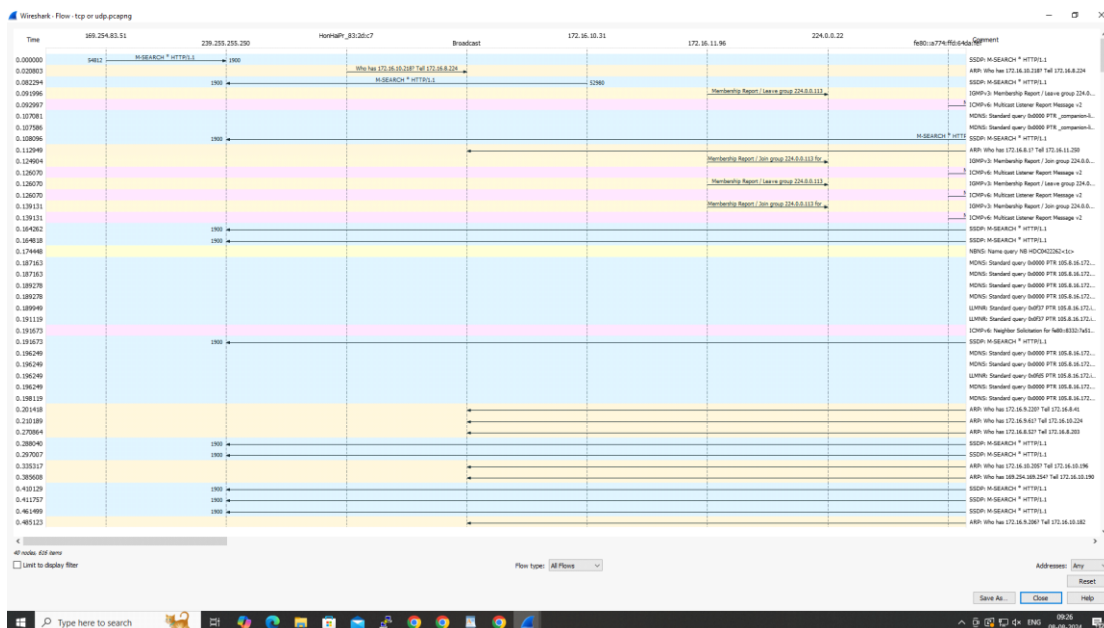
### Procedure

- Select Local Area Connection in Wireshark.
- Go to capture  option
- Select stop capture automatically after 100 packets.
- Then click Start capture.
- Search TCP packets in search bar.
- To see flow graph click StatisticsFlow graph.
- Save the packets.

### Output:




## Flow Graph output:



## 3.Create a Filter to display only ARP packets and inspect the packets.

### Procedure

- Select Local Area Connection in Wireshark.
- Go to capture  option
- Select stop capture automatically after 100 packets.
- Then click Start capture.

- Search ARP packets in search bar.
- Save the packets.

## Output

The screenshot shows the Wireshark network protocol analyzer interface. The main pane displays a list of captured packets, with ARP packets highlighted. The selected packet (No. 97) is shown in the packet details pane on the right, indicating it is an Ethernet II, Src: 88:ae:dd:14:72:42, Dst: Broadcast (ff:ff:ff:ff:ff:ff) Address Resolution Protocol (request) packet. The packet bytes pane at the bottom shows the raw data in hexadecimal and ASCII.

No.	Time	Source	Destination	Protocol	Length	Info
17	0.159891	Dell_34:e7:41	Broadcast	ARP	60	Who has 172.16.11.196? Tell 172.16.9.41
18	0.171775	Hangzhou_8a:a8:4f	Broadcast	ARP	60	Who has 172.16.9.215? Tell 172.16.11.254
19	0.131856	Dell_34:e7:41	Broadcast	ARP	60	Who has 172.16.11.131? Tell 172.16.9.41
36	0.349465	7c:57:58:38:e6:9e	Broadcast	ARP	60	Who has 172.16.9.215? Tell 172.16.8.195
45	0.397889	8a:e8:af:a8:e7:4f	Broadcast	ARP	60	Who has 172.16.51.221? Tell 172.16.8.44
54	0.425328	88:ae:dd:15:e7:f4	Broadcast	ARP	60	Who has 172.16.9.51? Tell 172.16.18.194
57	0.642389	NormalPr_22:c0:81	Broadcast	ARP	60	Who has 172.16.9.196? Tell 172.16.11.128
60	0.605713	db:ad:8b:a3:f4:1c	Broadcast	ARP	60	Who has 172.16.11.132? Tell 172.16.11.131
62	0.711863	88:ae:dd:15:eb:ed	Broadcast	ARP	60	Who has 169.254.169.254? Tell 169.254.283.182
63	0.719811	88:ae:dd:15:ed:53	Broadcast	ARP	60	Who has 172.16.9.215? Tell 172.16.18.283
65	0.724582	Dell_34:e7:41	Broadcast	ARP	60	Who has 172.16.11.196? Tell 172.16.9.41
66	0.749363	db:8b:c1:c5:cd:ef	Broadcast	ARP	60	Who has 172.16.18.221? Tell 172.16.18.3
94	0.923819	7c:57:58:39:06:3d	Broadcast	ARP	60	Who has 172.16.9.75? Tell 172.16.8.172
97	0.926469	88:ae:dd:14:72:42	Broadcast	ARP	60	Who has 172.16.11.196? Tell 172.16.18.288
99	0.948484	db:8b:c1:c5:c8:89	Broadcast	ARP	60	Who has 172.16.9.215? Tell 172.16.18.283
100	0.948484	db:8b:c1:c5:c8:89	Broadcast	ARP	60	Who has 172.16.9.48? Tell 172.16.18.183
162	0.961587	8a:e8:af:a8:e7:4f	Broadcast	ARP	60	Who has 172.16.8.17? Tell 172.16.11.258
119	1.104617	Hangzhou_8a:a8:4f	Broadcast	ARP	60	Who has 172.16.9.215? Tell 172.16.11.254
122	1.221455	Pegatron_eb:05:fe	Broadcast	ARP	60	Who has 169.254.169.254? Tell 172.16.18.218
123	1.224694	Dell_34:e7:41	Broadcast	ARP	60	Who has 172.16.11.132? Tell 172.16.9.41
125	1.258882	88:ae:dd:15:ec:77	Broadcast	ARP	60	Who has 172.16.9.75? Tell 172.16.18.196
127	1.265378	fc:34:97:94:c8:8c	Broadcast	ARP	60	Who has 172.16.18.155? Tell 172.16.11.228
134	1.327227	02p-Myr_9c:04:17	Broadcast	ARP	60	Who has 172.16.9.155? Tell 172.16.11.222
135	1.397512	7c:57:58:38:e6:9e	Broadcast	ARP	60	Who has 172.16.9.215? Tell 172.16.8.195
142	1.405331	8a:e8:af:a8:e7:4f	Broadcast	ARP	60	Who has 172.16.51.221? Tell 172.16.8.44
147	1.458652	db:8b:c1:c5:cd:ef	Broadcast	ARP	60	Who has 172.16.11.227? Tell 172.16.18.17
152	1.507604	db:ad:8b:a3:f4:1c	Broadcast	ARP	60	Who has 172.16.11.132? Tell 172.16.11.131
172	1.576751	db:8b:c1:c5:cd:ef	Broadcast	ARP	60	Who has 172.16.18.221? Tell 172.16.18.3
174	1.585738	88:ae:dd:15:eb:ed	Broadcast	ARP	60	Who has 169.254.169.254? Tell 169.254.283.182
178	1.725807	Dell_34:e7:41	Broadcast	ARP	60	Who has 172.16.11.196? Tell 172.16.9.41
179	1.725807	db:8b:c1:c5:cd:ef	Broadcast	ARP	60	Who has 172.16.9.286? Tell 172.16.18.81
190	1.842511	Pegatron_eb:05:fe	Broadcast	ARP	60	Who has 169.254.169.254? Tell 172.16.18.218
195	1.893784	88:ae:dd:15:ec:77	Broadcast	ARP	60	Who has 172.16.9.75? Tell 172.16.18.196

## 4.Create a Filter to display only DNS packets and provide the flow graph.

### Procedure

- Select Local Area Connection in Wireshark.
- Go to capture option
- Select stop capture automatically after 100 packets.
- Then click Start capture.
- Search DNS packets in search bar.
- To see flow graph click StatisticsFlow graph.
- Save the packets.

## Output



## Output:

The image shows a Wireshark packet capture of an HTTP GET request. The packet list on the left shows packet 2337, which is an HTTP GET request to 172.16.8.121. The packet details pane on the right shows the structure of the request, including the GET method, the URL path, and the User-Agent header. The packet bytes pane at the bottom shows the raw data of the request.

Frame 2337: 731 bytes on wire (5848 bits), 731 bytes captured (5848 bits) on interface 0  
Ethernet II, Src: Sophos-CF8e45 (7c:5a:1c:cf:8e:45), Dst: 7c:57:58:3b:e8:75 (7c:57:58:3b:e8:75)  
Internet Protocol Version 4, Src: 34.184.35.123, Dst: 172.16.8.121  
Transmission Control Protocol, Src Port: 80, Dst Port: 63751, Seq: 1, Ack: 356, Len: 677  
Hypertext Transfer Protocol


## Flow Graph output:

The image shows the Wireshark Flow Editor, which displays a flow graph of the captured traffic. The flow graph shows the sequence of packets and the state of the connections. The flow graph is divided into sections, each representing a different type of traffic. The flow graph shows the sequence of packets and the state of the connections. The flow graph is divided into sections, each representing a different type of traffic. The flow graph shows the sequence of packets and the state of the connections.

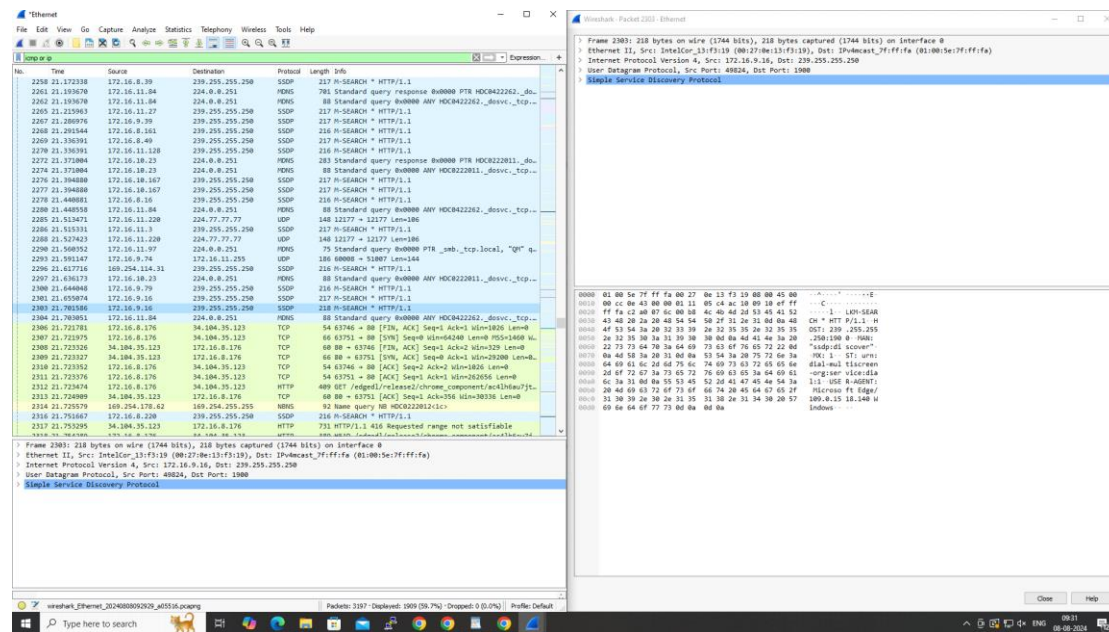


## 6.Create a Filter to display only IP/ICMP packets and inspect the packets.

### Procedure

- Select Local Area Connection in Wireshark.
- Go to capture  option
- Select stop capture automatically after 100 packets.
- Then click Start capture.
- Search ICMP/IP packets in search bar.
- Save the packets

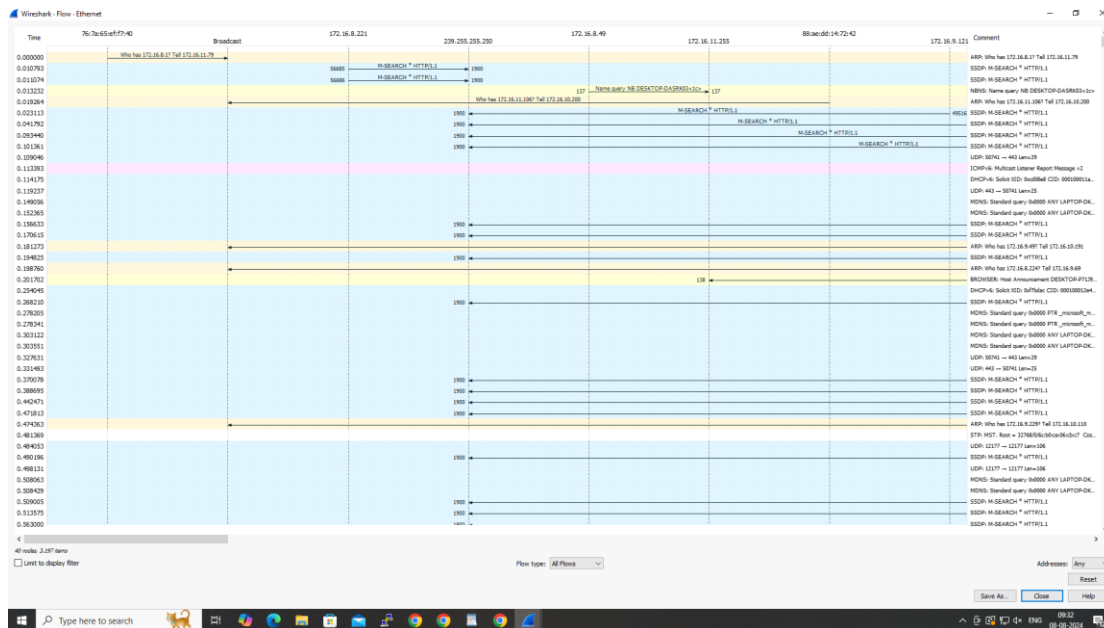
### Output:



The image displays the Wireshark network protocol analyzer interface. The main pane shows a list of captured packets, with packet 21 selected. The packet list pane shows details for the selected packet, including Ethernet II, Internet Protocol Version 4, and User Datagram Protocol. The packet details pane shows the raw packet data in hexadecimal and ASCII. The packet bytes pane shows the raw packet data in hexadecimal and ASCII. The packet list pane shows details for the selected packet, including Ethernet II, Internet Protocol Version 4, and User Datagram Protocol. The packet details pane shows the raw packet data in hexadecimal and ASCII. The packet bytes pane shows the raw packet data in hexadecimal and ASCII.


### Flow Graph output:





## 7.Create a Filter to display only DHCP packets and inspect the packets.

### Procedure

- Select Local Area Connection in Wireshark.
- Go to capture  option
- Select stop capture automatically after 100 packets.
- Then click Start capture.
- Search DHCP packets in search bar.
- Save the packets

### Output:

**Ethernet**

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

**Filter:** **ethernet**

No.	Time	Source	Destination	Protocol	Length	Info
172	2.447186	172.16.8.1	255.255.255.255	DHCP	342	DHCP ACK - Transaction ID 0x4dd99c0e
173	2.447187	0.0.0.0	255.255.255.255	DHCP	378	DHCP Request - Transaction ID 0x4dd99c0e
238	3.191724	0.0.0.0	255.255.255.255	DHCP	364	DHCP Request - Transaction ID 0x7b021321
356	4.239345	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x1efff81c
403	5.240345	0.0.0.0	255.255.255.255	DHCP	378	DHCP Request - Transaction ID 0x1efff81c

Frame 173: 378 bytes on wire (3068 bits), 378 bytes captured (3068 bits) on Interface 0

Ethernet II, Src: 28:c1:9b:de:3f:e1 (28:c1:9b:de:3f:e1), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255

User Datagram Protocol, Src Port: 68, Dst Port: 67

Dynamic Host Configuration Protocol (Request)

0000 ff ff ff ff ff ff 20 c1 9b de 3f e1 00 00 45 00 .....E  
0010 01 64 be c0 00 00 11 7e c3 00 00 00 ff ff .....d...  
0020 ff ff 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
00a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
00b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
00c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
00d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
00e0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
00f0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0100 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0110 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0120 20 c1 9b de 3f e1 12 04 ac 10 00 00 36 04 ac 10 .....  
0130 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
0140 48 47 4e 11 12 00 00 00 44 43 40 54 4f 58 2d .....  
0150 53 46 44 40 48 47 4e 20 00 42 32 46 52 20 24 .....  
0160 30 37 00 01 03 06 0f 1f 21 20 2c 2e 2f 7f 79 .....  
0170 fc ff .....

No. 173: Time 2.447187, Source 0.0.0.0, Destination 255.255.255.255, Protocol DHCP, Length 378, Info: DHCP Request - Transaction ID 0x4dd99c0e

Close Help

winshark\_ethernet\_302408052029\_405516.pcapng

Packets: 3197 - Displayed: 3 (0.2%) - Dropset: 0 (0.0%) - Profile: Default

Type here to search

09:12 08-08-2014