Wireshark For Pentester: A Beginner's Guide

April 13, 2021 By Raj Chandel

Wireshark is an open-source application and it is the world's foremost and widely-used network protocol analyzer that lets you see what's happening on your network at a microscopic level. Just Because it can drill down and read the contents of each packet, it's used to troubleshoot network problems and test software.

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What is Wireshark

Wireshark is an open-source widely used network packet or protocol analyzer. It is an essential tool for security professionals or system administrators. It is used to analyze the structure of different network protocols and has the ability to demonstrate application. Wireshark can be operated in different platforms such as Windows, Unix, Linux and employs the GTK+ widget toolkit or PCAP for packet capturing. IT also has terminal-based free software versions like Tshark. Wireshark shares many characteristics with tcpdump only the difference is that it supports a graphical user interface (GUI) and has information filtering features.

Features

The following are the features that Wireshark provides:

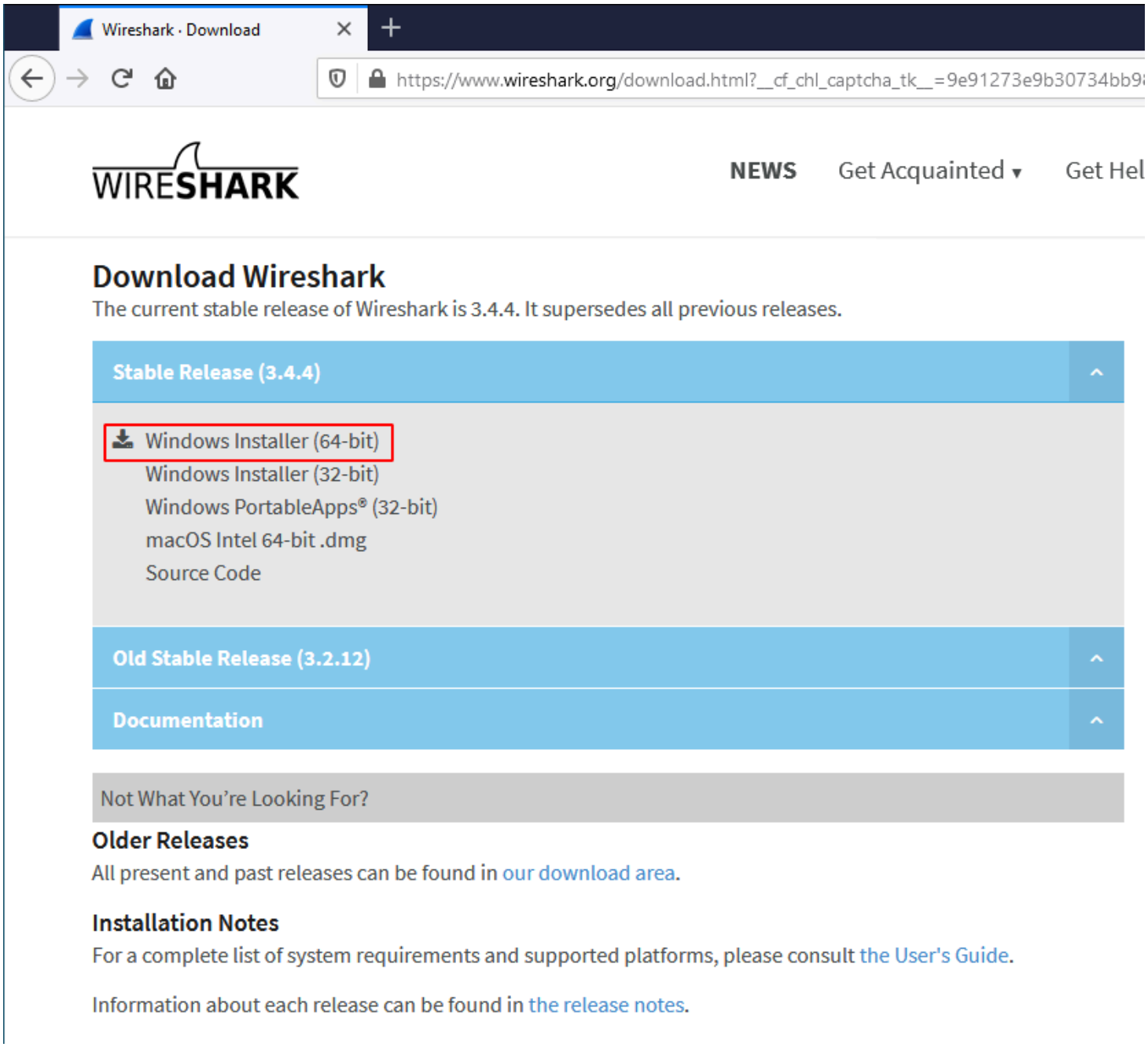
- Can be operated on *UNIX and Windows*.
- *Capture live* packet data from a network interface.
- *Open files* containing packet data captured (PCAP Files) with tcpdump/WinDump, Wireshark, and many other packet capture programs.
- *Import*packets from text files containing hex dumps of packet data.
- Display filters are used to filter and organize the data display.
- Display packets with *very detailed protocol information*.
- New protocols can be scrutinized by creating plug-ins.

- *Captured Traffic can also be trace Voice Over Internet (VOIP) calls over the network*.
- *Export some* or all packets in several capture file formats.
- *Filter packets on* many criteria.
- *Search for* packets on many criteria.
- *Colorize packet* display based on filters.
- Create various *statistics*.
- …and *a lot more!*

Installation of Wireshark

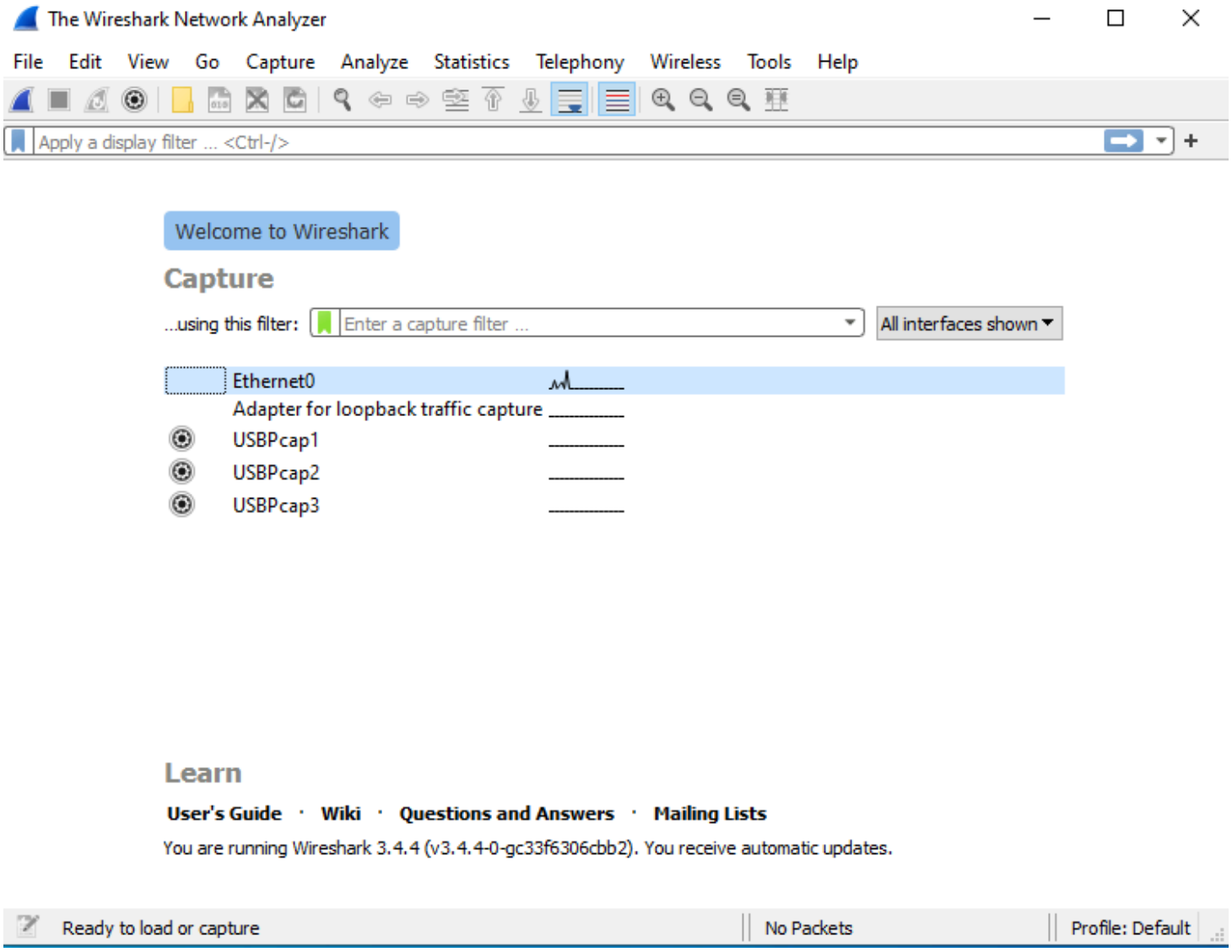
For Windows

Wireshark can be downloaded at no cost from the official website of Wireshark for both Windows and macOS. Here you can select and download the latest stable version of Wireshark



After downloading the Wireshark navigate to the downloads directory and run the Wireshark setup. During the installation process of Wireshark, choose to install Npcap if prompted as these include libraries required for live data capture.

After the installation of Wireshark, you must be logged in to the device as an administrator to use Wireshark. In Windows 10 simply search Wireshark and ***Run as administrator***. In macOS right-click the Wireshark app icon and select ***Get Info***. In the ***Sharing & Permissions*** settings, give the admin ***Read & Write*** privileges.



For Linux

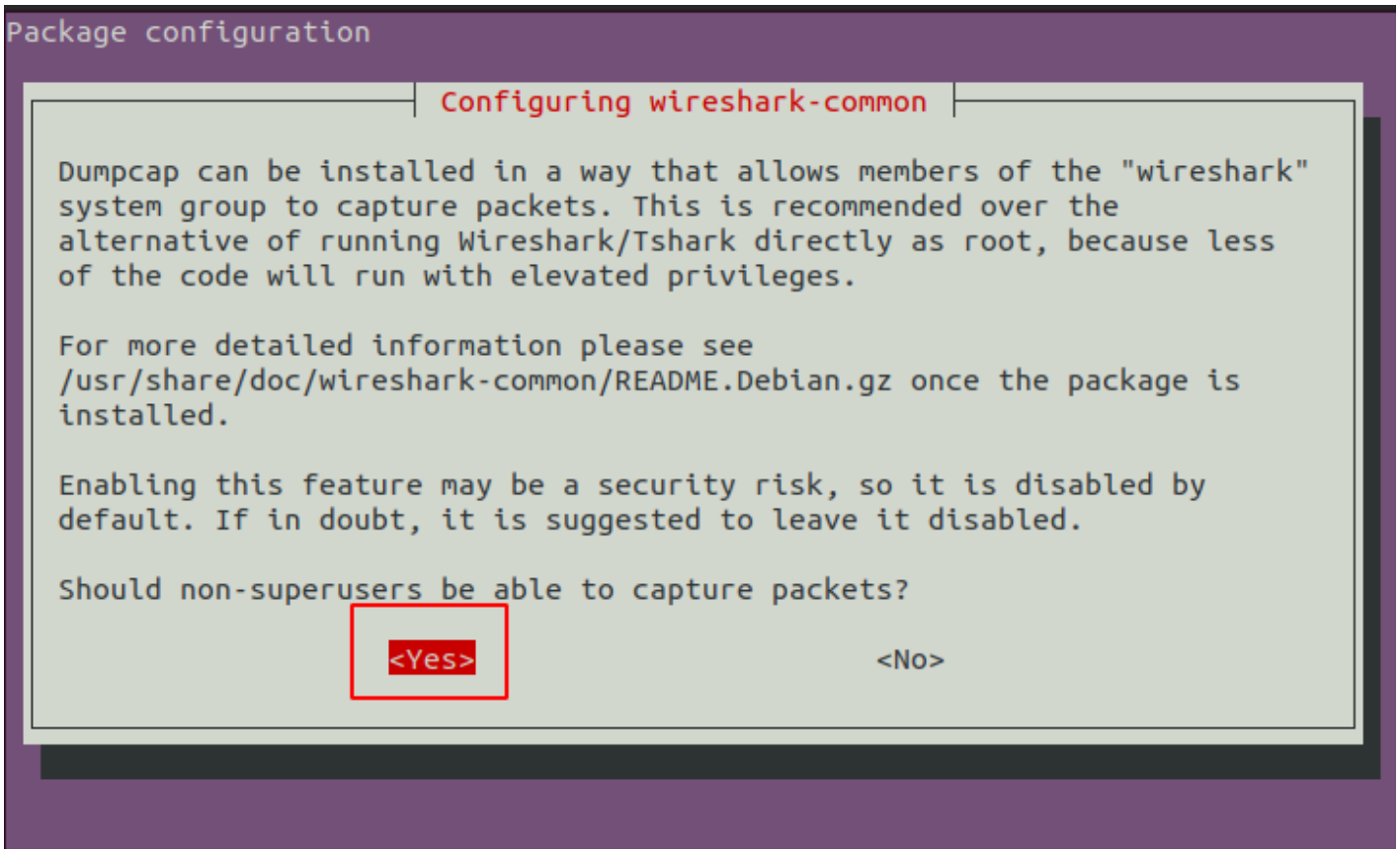
Wireshark is also available for Linux and other UNIX like platforms including Red Hat, and FreeBSD.

To download Wireshark, open a terminal and type the following command to install Wireshark:

```
apt install wireshark
```

```
root@ubuntu: ~
root@ubuntu:~# apt install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libfprint-2-tod1 libllvm10 linux-headers-5.4.0-42
  linux-headers-5.4.0-42-generic linux-image-5.4.0-42-generic
  linux-modules-5.4.0-42-generic linux-modules-extra-5.4.0-42-generic
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libc-ares2 libdouble-conversion3 liblua5.2-0 libpcre2-16-0 libqt5core5a
  libqt5dbus5 libqt5gui5 libqt5multimedia5 libqt5multimedia5-plugins
  libqt5multimediagsttools5 libqt5multimediawidgets5 libqt5network5
  libqt5opengl5 libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2ldbl
  libsnappy1v5 libspandsp2 libssh-gcrypt-4 libwireshark-data libwireshark13
  libwiretap10 libwsutil11 libxcb-xinerama0 libxcb-xinput0
  qt5-gtk-platformtheme qttranslations5-l10n wireshark-common wireshark-qt
Suggested packages:
  qt5-image-formats-plugins qtwayland5 snmp-mibs-downloader geoipupdate
  geoip-database geoip-database-extra libjs-leaflet
  libjs-leaflet.markercluster wireshark-doc
```

Press ‘Y’ when prompted to occupy additional space. During installation, Wireshark configuration will ask “should non-super users be able to capture the packets?”. For security purpose, it is not advisable to allow non-super users to access Wireshark. As of now, continue by pressing ‘yes’. Wireshark installation will continue and successfully install into the system.



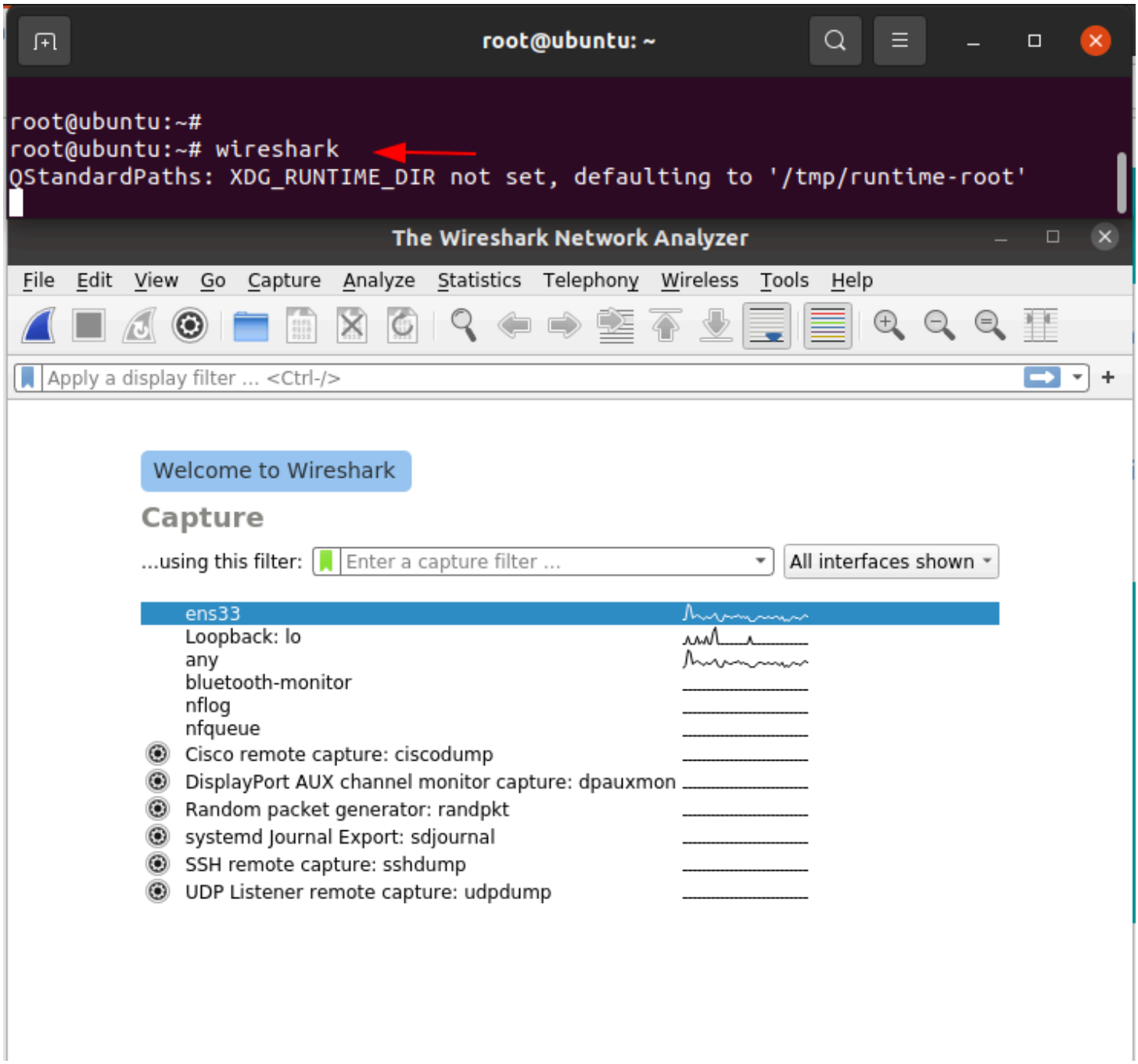
Type the following code to verify the installation package of Wireshark:

```
apt show Wireshark
```

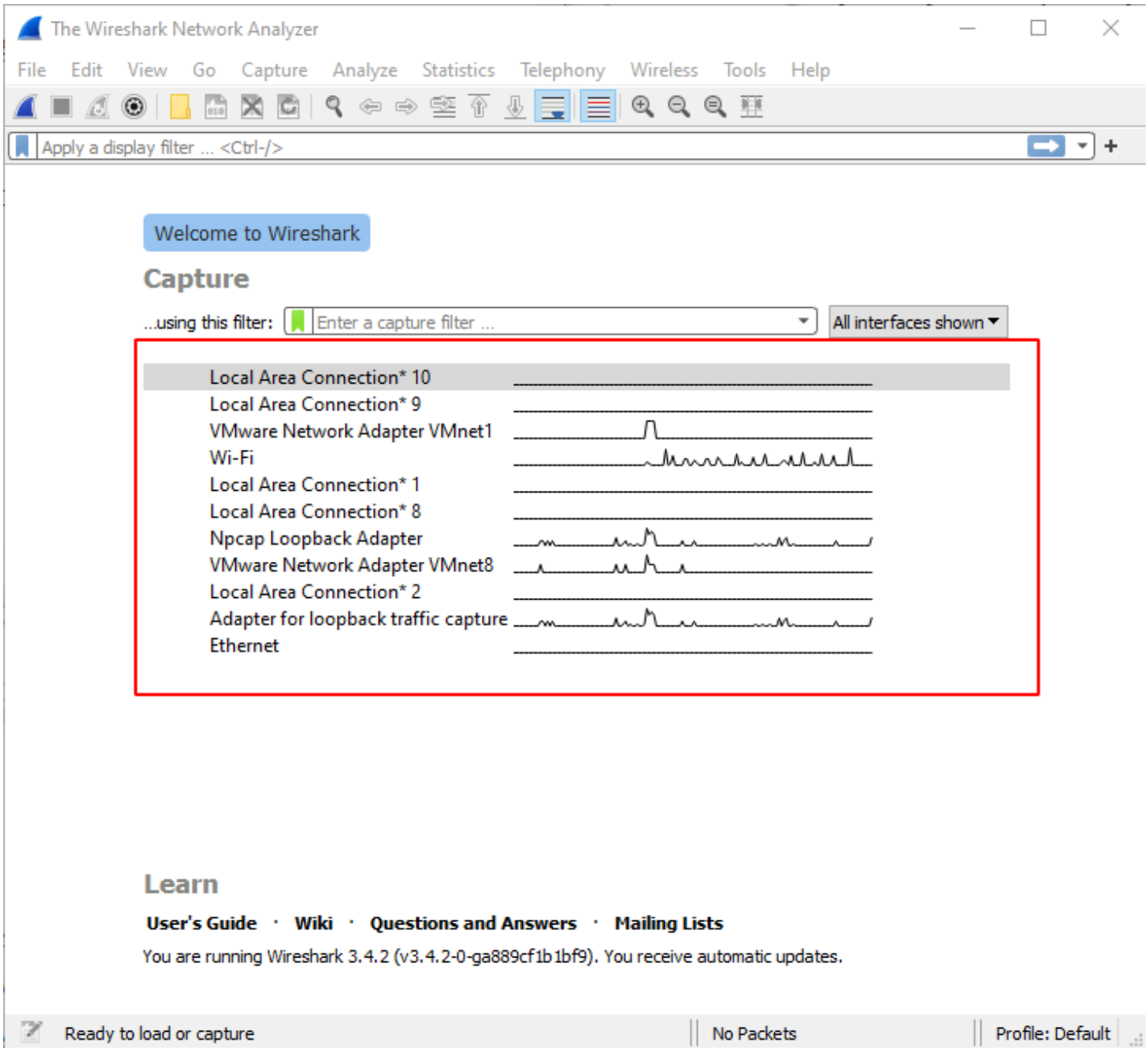
```
root@ubuntu: ~
root@ubuntu:~# apt show wireshark
Package: wireshark
Version: 3.2.3-1
Priority: optional
Section: universe/net
Origin: Ubuntu
Maintainer: Balint Reczey <rbalint@ubuntu.com>
Bugs: https://bugs.launchpad.net/ubuntu/+filebug
Installed-Size: 59.4 kB
Depends: wireshark-qt (= 3.2.3-1)
Conflicts: ethereal (<< 1.0.0-3)
Replaces: ethereal (<< 1.0.0-3)
Homepage: https://www.wireshark.org/
Download-Size: 5,088 B
APT-Manual-Installed: yes
APT-Sources: http://us.archive.ubuntu.com/ubuntu focal/universe amd64 Packages
Description: network traffic analyzer - meta-package
 Wireshark is a network "sniffer" - a tool that captures and analyzes
 packets off the wire. Wireshark can decode too many protocols to list
 here.
 .
 This is a meta-package for Wireshark.

root@ubuntu:~#
```

And to open the Wireshark run the following command and the Wireshark application will be visible as below:

```
Wireshark
```



Whenever you open Wireshark you will be prompted with the following screen.



Here you can see different network interfaces on your device. In the above image we can see there is a lot of traffic being communicated through the Wi-Fi interface. In most cases, you will only be able to see traffic going in and out of your own device, however, some wireless network cards can be set into monitor mode so that you will be able to see traffic from other wireless devices on the network.

Introduction to Wireshark UI Basics

As of this now you have installed Wireshark into your systems and likely excited to get started capturing your first packets. Without wasting of much time let's get started!!!

Now we're going to explore

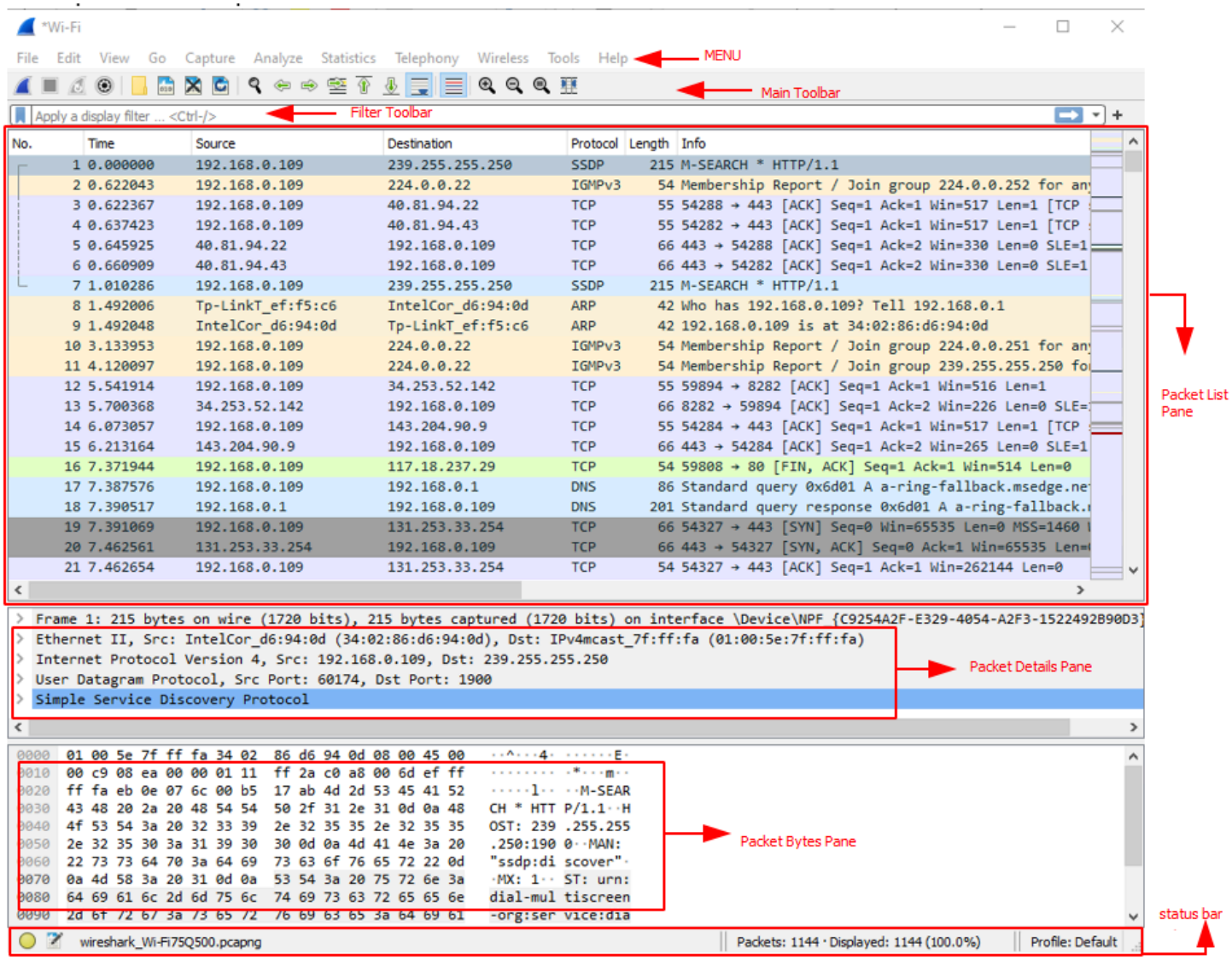
- How Wireshark interface works
- How to view packets in Wireshark

- How to capture packets in Wireshark
- How to perform Trace Analysis in Wireshark
- How to filter packets in Wireshark
- ….and much more things!!

Wireshark can be started through windows program manager by searching Wireshark or also can be started through the command line by typing “Wireshark” in the directory of Wireshark.

The Main Window

Let’s quickly take a look at the Wireshark user interface. Usually, you would see this similar scenario after some packets are captured or loaded.



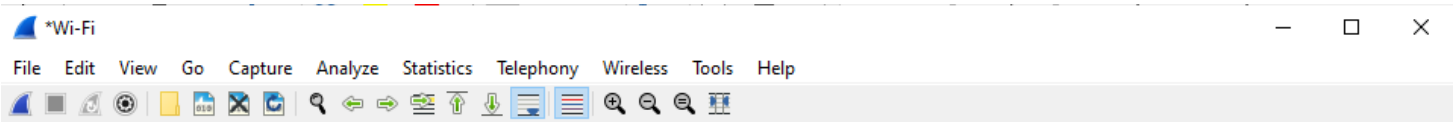
Wireshark main window consists of these parts that are commonly called GUI programs.

1. The menu is used to start actions
2. The main toolbar quick access to frequently used items from the menu
3. Filter Toolbar allows user to set display filters to filter which packet should be displayed

4. The Packet list pane displays a summary of each packet captured.
5. The Packet details pane displays the packet selected in the packet list pane
6. The packet bytes pane displays the data from the packet selected in the packet list pane and highlights the field selected in the packet details pane
7. The status bar shows some detailed information about the current program state and the captured data.

The Menu

Wireshark main menu is located at the top of the main window (window, Linux).



The main menu contains the following Items:

File

This menu contains items to open and merge capture files, save, print, or export capture files in different Formats

Edit

This menu contains items to find a packet, time reference or mark one or more packets, handle configuration profiles, and set your preferences; (cut, copy, and paste are not presently implemented). The Wireshark Edit menu contains the fields as shown in the below image

View

This menu controls the display of the captured data, including colourization of packets, zooming the font, showing a packet in a separate window, expanding and collapsing trees in packet details.

Go

This menu contains items to go to a specific packet.

Capture

This menu allows you to start and stop captures and edit capture filters. Some of the important filters that make our capture more efficient are described below.

Analyze

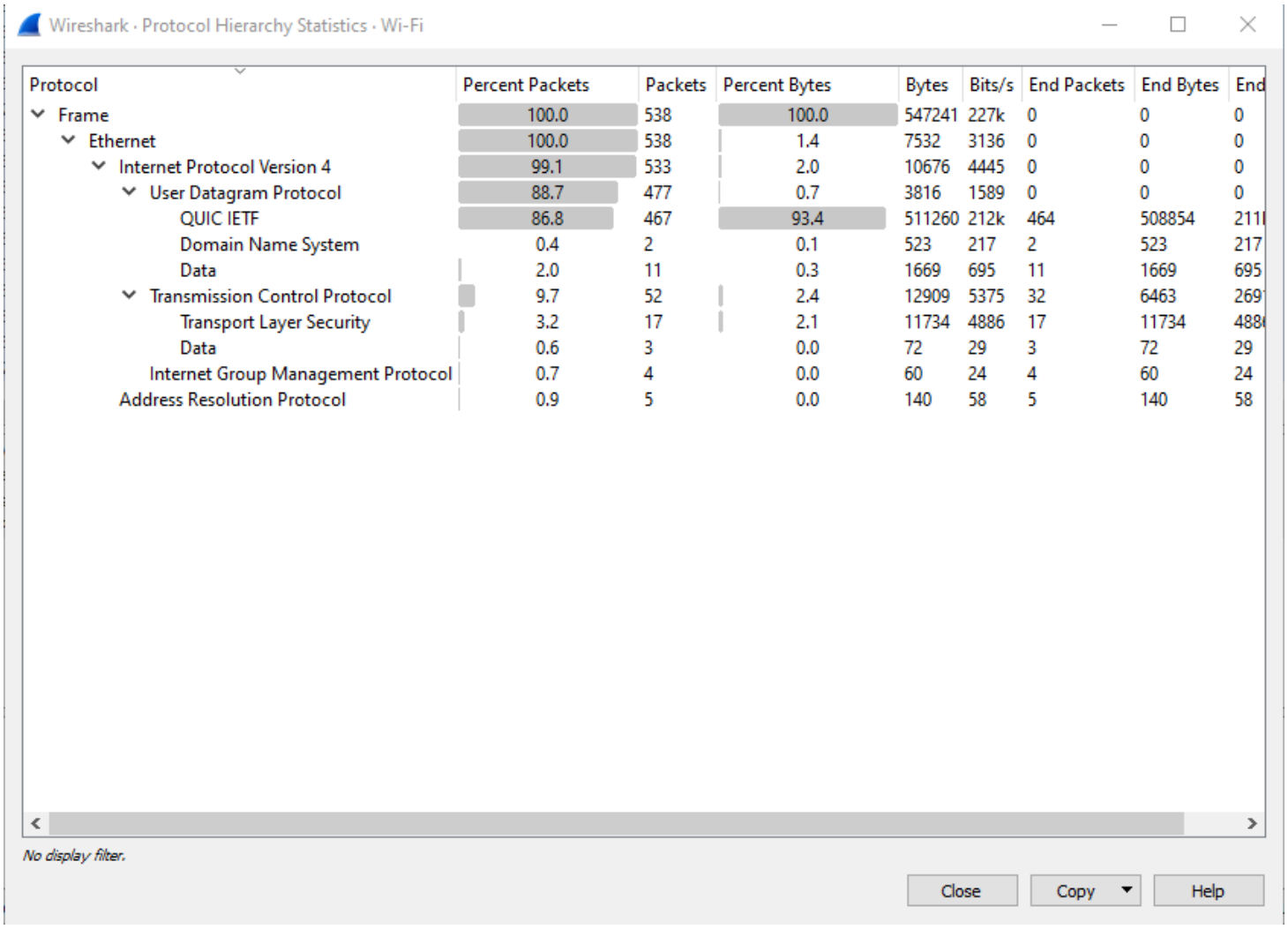
This menu contains items to manipulate display filters, enable or disable the dissection of protocols, configure user-specified decodes and follow a TCP stream.

Statistics

This menu contains items to display various statistic windows, including a summary of the packets that have been captured, a display protocol hierarchy statistics and much more. Some of the important filters that make our Trace analysis more efficient are described below.

Statistics -> Protocol Hierarchy

- Presents descriptive statistics per protocol.
- Useful for determining the types, amounts, and relative proportions of protocols within a trace



Protocol	Percent Packets	Packets	Percent Bytes	Bytes	Bits/s	End Packets	End Bytes	End
Frame	100.0	538	100.0	547241	227k	0	0	0
Ethernet	100.0	538	1.4	7532	3136	0	0	0
Internet Protocol Version 4	99.1	533	2.0	10676	4445	0	0	0
User Datagram Protocol	88.7	477	0.7	3816	1589	0	0	0
QUIC IETF	86.8	467	93.4	511260	212k	464	508854	211
Domain Name System	0.4	2	0.1	523	217	2	523	217
Data	2.0	11	0.3	1669	695	11	1669	695
Transmission Control Protocol	9.7	52	2.4	12909	5375	32	6463	269
Transport Layer Security	3.2	17	2.1	11734	4886	17	11734	488
Data	0.6	3	0.0	72	29	3	72	29
Internet Group Management Protocol	0.7	4	0.0	60	24	4	60	24
Address Resolution Protocol	0.9	5	0.0	140	58	5	140	58

Statistics -> Conversations

- Generates descriptive statistics about each conversation for each protocol in the trace.

Wireshark · Conversations · Wi-Fi

Ethernet · 6 | IPv4 · 49 | IPv6 | TCP · 18 | UDP · 49

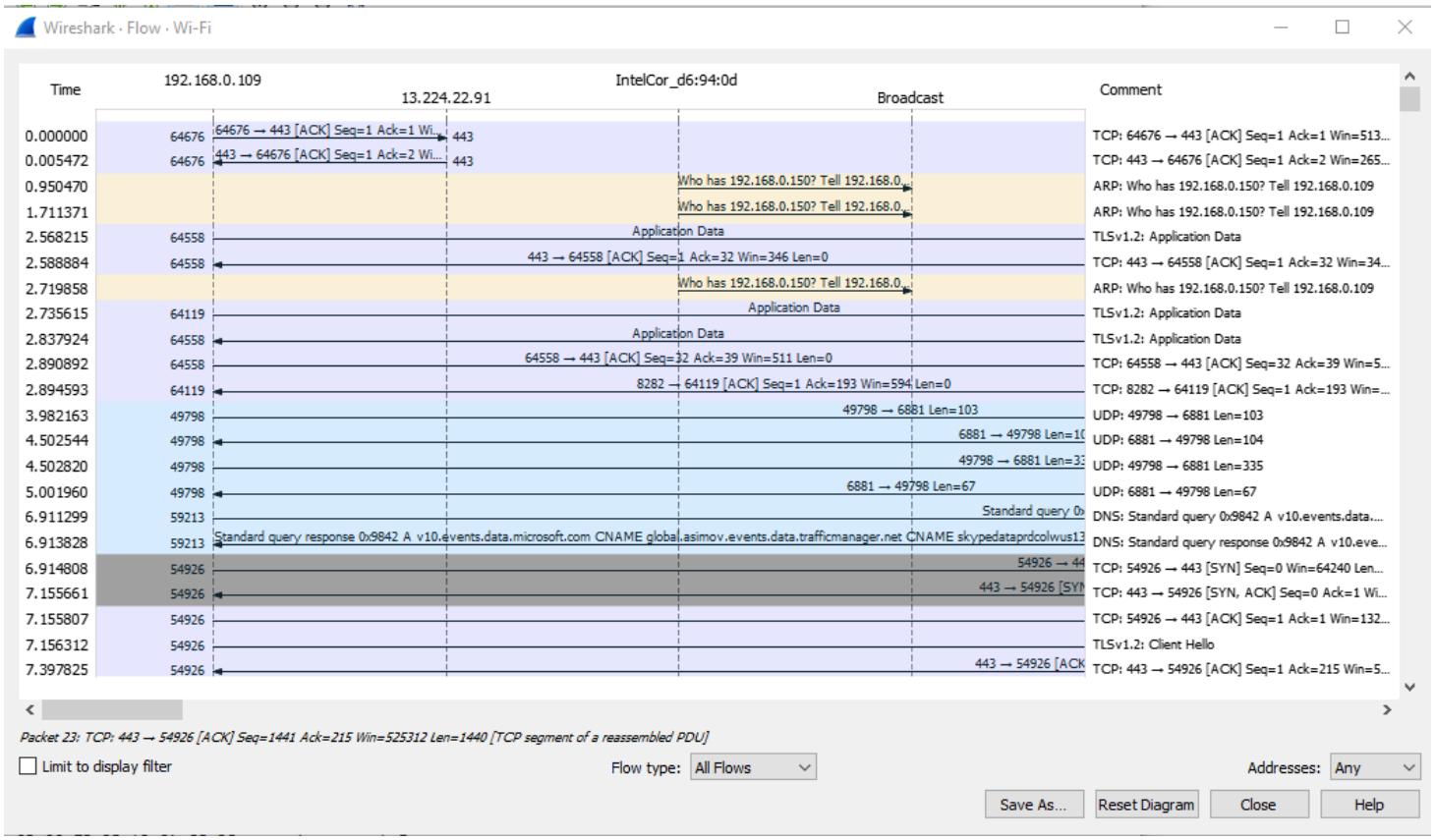
Address A	Port A	Address B	Port B	Packets	Bytes	Packets A → B	Bytes A → B	Packets B → A	Bytes B → A	Rel Start	Duration	Bits/s A → B	Bits/s B → A
5.189.160.21	59176	192.168.0.109	49798	2	500	1	139	1	361	35.707985	0.0006	—	—
105.112.101.150	137	192.168.0.109	137	3	276	0	0	3	276	65.620324	3.0218	0	730
176.17.110.118	137	192.168.0.109	137	3	276	0	0	3	276	83.700050	3.0228	0	730
188.143.94.195	59904	192.168.0.109	49798	2	476	1	145	1	331	59.696701	0.0005	—	—
192.168.0.101	5353	224.0.0.251	5353	5	680	5	680	0	0	64.941035	22.0139	247	0
192.168.0.109	49798	54.70.28.180	6881	2	254	1	145	1	109	3.982163	1.0198	1137	855
192.168.0.109	49798	118.238.105.185	6881	2	523	1	377	1	146	4.502544	0.0003	—	—
192.168.0.109	59213	192.168.0.1	53	2	607	1	89	1	518	6.911299	0.0025	—	—
192.168.0.109	49798	159.196.228.199	3251	2	500	1	361	1	139	10.067895	0.0007	—	—
192.168.0.109	49798	45.14.225.8	6339	1	145	1	145	0	0	10.965520	0.0000	—	—
192.168.0.109	49798	185.157.221.247	25401	2	233	1	112	1	121	14.520769	0.0004	—	—
192.168.0.109	59215	163.53.87.205	443	1,747	2128k	221	20k	1,526	2107k	16.560878	30.5271	5471	552k
192.168.0.109	49798	131.147.215.124	22840	2	476	1	145	1	331	17.976309	0.1503	7718	17k
192.168.0.109	59218	239.255.255.250	1900	4	860	4	860	0	0	21.159028	3.0222	2276	0
192.168.0.109	49798	85.175.24.75	36090	2	505	1	359	1	146	24.322242	0.0005	—	—
192.168.0.109	49798	41.190.31.14	26305	1	145	1	145	0	0	24.983319	0.0000	—	—
192.168.0.109	59220	142.250.192.238	443	11	6933	4	2934	7	3999	26.473376	0.1109	211k	288k
192.168.0.109	49798	54.214.105.212	6881	2	254	1	145	1	109	31.972508	1.0482	1106	831
192.168.0.109	49798	93.104.54.130	49001	4	1392	2	1001	2	391	38.122057	19.0303	420	164
192.168.0.109	49798	223.225.170.221	32023	1	145	1	145	0	0	38.961315	0.0000	—	—
192.168.0.109	49798	188.242.253.229	41337	2	476	1	145	1	331	45.981992	0.1964	5906	13k
192.168.0.109	49798	197.252.202.95	21046	2	505	1	359	1	146	45.996464	0.0006	—	—
192.168.0.109	51987	192.168.0.1	53	2	235	1	87	1	148	47.987934	0.0713	9766	16k
192.168.0.109	137	197.252.202.95	137	3	276	3	276	0	0	48.059949	3.0185	731	0
192.168.0.109	49798	88.109.57.199	6895	2	505	1	359	1	146	48.716617	0.0006	—	—
192.168.0.109	49798	194.87.220.20	9850	2	476	1	145	1	331	52.979140	0.2039	5688	12k
192.168.0.109	49798	88.127.230.103	23712	2	505	1	359	1	146	55.449494	0.0006	—	—
192.168.0.109	49798	77.133.61.87	44900	2	476	1	331	1	145	56.046705	0.0005	—	—
192.168.0.109	63221	192.168.0.1	53	3	373	2	170	1	203	57.475076	0.4599	2957	3531
192.168.0.109	62884	192.168.0.1	53	2	518	1	77	1	441	57.599999	0.0047	—	—
192.168.0.109	49798	91.144.176.221	40331	2	476	1	145	1	331	59.983077	0.2035	5700	13k
192.168.0.109	52095	192.168.0.1	53	3	443	2	174	1	269	61.521663	0.5958	2336	3611
192.168.0.109	49798	105.112.101.150	23853	4	1010	2	718	2	292	63.530956	25.9380	221	90
192.168.0.109	58471	192.168.0.1	53	2	237	1	88	1	149	65.545202	0.0745	9450	16k

Name resolution | Limit to display filter | Absolute start time | Conversation Types

Copy | Follow Stream... | Graph... | Close | Help

Statistics -> Flow Graph

- Generates a sequence graph for the selected traffic.
- Useful for understanding seq. and ack. calculations.



Telephony

This menu contains items to display various telephony related statistic windows, including a media analysis, flow diagrams, display protocol hierarchy statistics and much more.

Wireless

This menu contains items to display Bluetooth and IEEE 802.11 wireless statistics.

Tools

This menu contains various tools available in Wireshark, such as creating Firewall ACL Rules.

Help

This menu contains items to help the user, e.g. access to some basic help, manual pages of the various command-line tools, online access to some of the webpages, and the usual dialogue.

The Main Toolbar

The main toolbar provides quick access to frequently used items from the menu. This toolbar can customize by the user.

Actions of this filter toolbar are described below

Toolbar Icon	Toolbar Item	Description
	Start	**Starts capturing packets with the same options as the last capture or the default options if none were set**
	Stop	**Stops the currently running capture**
	Restart	**Restarts the current capture session**
	Options	**Opens the "Capture Options" dialog box**
	Open	**Opens the file open dialog box, which allows you to load a capture file for viewing**
	Save As	**Save the current capture file to whatever file you would like**
	Close	**Closes the current capture. If you have not saved the capture, you will be asked to save it first**
	Reload	**Reloads the current capture file**
	Find packet	**Find a packet based on different criteria**
	Go back	**Jump back in the packet history. Hold down the Alt key (Option key on macOS) to go forward in the selection history**

Toolbar Icon	Toolbar Item	Description
	Go Forward	**Jump forward in the packet history. Hold down the Alt key (Option on macOS) to go forward in the selection history.**
	Go To Packet	**Go to a specific packet**
	Go To First Packet	**Jump to the last packet of the capture file**
	Go To Last Packet	**Jump to the last packet of the capture file**
	Auto Scroll in Live capture	**Auto scroll packet list while doing a live capture (or not)**
	Colorize	**Colorize the packet list (or not)**
	Zoom In	**Zoom out of the packet data (increase the font size)**
	Zoom Out	**Zoom out of the packet data (decrease the font size)**
	Normal Size	**Set zoom level back to 100%**
	Resize Columns	**Resize columns, so the content fits into them.**

Reference: – https://www.wireshark.org/docs/wsug_html_chunked/ChUseMainToolbarSection.html

The Filter Toolbar

The filter toolbar lets you quickly edit and apply display filters.

Actions of this filter toolbar are described below

Toolbar Icon	Name	Description
	Bookmarks	Manage or select save filters.
Apply a display filter ..	Filter input	**The area is provided to enter or edit a display string. A syntax check of your filter string while you are typing such as the background will turn red if you enter an incomplete or invalid string and will become green when you enter a valid string.**
	Clear	Reset the current display filter and clear the edit area.
	Apply	Apply the current value in the edit area as the new display filter.
	Recent	Select from a list of recently applied filters.
	Add Button	Add a new filter button.

The packet list pane

The packet list pane displays all the packets in the order they were recorded.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.0.109	239.255.255.250	SSDP	215	M-SEARCH * HTTP/1.1
2	0.622043	192.168.0.109	224.0.0.22	IGMPv3	54	Membership Report / Join group 224.0.0.252 for any
3	0.622367	192.168.0.109	40.81.94.22	TCP	55	54288 → 443 [ACK] Seq=1 Ack=1 Win=517 Len=1 [TCP
4	0.637423	192.168.0.109	40.81.94.43	TCP	55	54282 → 443 [ACK] Seq=1 Ack=1 Win=517 Len=1 [TCP
5	0.645925	40.81.94.22	192.168.0.109	TCP	66	443 → 54288 [ACK] Seq=1 Ack=2 Win=330 Len=0 SLE=1
6	0.660909	40.81.94.43	192.168.0.109	TCP	66	443 → 54282 [ACK] Seq=1 Ack=2 Win=330 Len=0 SLE=1
7	1.010286	192.168.0.109	239.255.255.250	SSDP	215	M-SEARCH * HTTP/1.1
8	1.492006	Tp-LinkT_ef:f5:c6	IntelCor_d6:94:0d	ARP	42	Who has 192.168.0.109? Tell 192.168.0.1
9	1.492048	IntelCor_d6:94:0d	Tp-LinkT_ef:f5:c6	ARP	42	192.168.0.109 is at 34:02:86:d6:94:0d
10	3.133953	192.168.0.109	224.0.0.22	IGMPv3	54	Membership Report / Join group 224.0.0.251 for any
11	4.120097	192.168.0.109	224.0.0.22	IGMPv3	54	Membership Report / Join group 239.255.255.250 fo
12	5.541914	192.168.0.109	34.253.52.142	TCP	55	59894 → 8282 [ACK] Seq=1 Ack=1 Win=516 Len=1
13	5.700368	34.253.52.142	192.168.0.109	TCP	66	8282 → 59894 [ACK] Seq=1 Ack=2 Win=226 Len=0 SLE=
14	6.073057	192.168.0.109	143.204.90.9	TCP	55	54284 → 443 [ACK] Seq=1 Ack=1 Win=517 Len=1 [TCP
15	6.213164	143.204.90.9	192.168.0.109	TCP	66	443 → 54284 [ACK] Seq=1 Ack=2 Win=265 Len=0 SLE=1
16	7.371944	192.168.0.109	117.18.237.29	TCP	54	59808 → 80 [FIN, ACK] Seq=1 Ack=1 Win=514 Len=0
17	7.387576	192.168.0.109	192.168.0.1	DNS	86	Standard query 0x6d01 A a-ring-fallback.msedge.ne
18	7.390517	192.168.0.1	192.168.0.109	DNS	201	Standard query response 0x6d01 A a-ring-fallback.
19	7.391069	192.168.0.109	131.253.33.254	TCP	66	54327 → 443 [SYN] Seq=0 Win=65535 Len=0 MSS=1460
20	7.462561	131.253.33.254	192.168.0.109	TCP	66	443 → 54327 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=
21	7.462654	192.168.0.109	131.253.33.254	TCP	54	54327 → 443 [ACK] Seq=1 Ack=1 Win=262144 Len=0

Each line in the packet list corresponds to one packet in the capture file select the lines to get more details. More details will be displayed In the Packet details pane and packet byte panes.

There are lots of column available such as

- No: -The number of the packet in the capture file. This number won't change, even if a display filter is used.
- Time: -The timestamp of when the packet was captured is displayed in this column. The presentation format of this timestamp can be changed.
- Source: -The address where this packet is coming from.
- Destination: -The address where this packet is going.

- Protocol: -The highest-level protocol that Wireshark can detect.
- Length: -The length in bytes of each packet.
- Info: -Additional information about the packet content.

The packet details pane

The packet details pane shows the selected or current packet in a detailed form.

```
> Frame 5: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface \Device\NPF_{C9254A2F-E329-4054-A2F3-1522492B90D3}, id 0
> Ethernet II, Src: Tp-LinkT_ef:f5:c6 (1c:3b:f3:ef:f5:c6), Dst: IntelCor_d6:94:0d (34:02:86:d6:94:0d)
> Internet Protocol Version 4, Src: 142.250.193.227, Dst: 192.168.0.109
v Transmission Control Protocol, Src Port: 443, Dst Port: 57048, Seq: 1, Ack: 2, Len: 0
    Source Port: 443
    Destination Port: 57048
    [Stream index: 1]
    [TCP Segment Len: 0]
    Sequence Number: 1    (relative sequence number)
    Sequence Number (raw): 3028339892
    [Next Sequence Number: 1    (relative sequence number)]
    Acknowledgment Number: 2    (relative ack number)
    Acknowledgment number (raw): 4155320799
    1000 .... = Header Length: 32 bytes (8)
  > Flags: 0x010 (ACK)
    Window: 261
    [Calculated window size: 261]
    [Window size scaling factor: -1 (unknown)]
    Checksum: 0xa055 [unverified]
    [Checksum Status: Unverified]
    Urgent Pointer: 0
  > Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), SACK
  > [SEQ/ACK analysis]
  > [Timestamps]
```

The above pane shows the protocols and protocol fields of the packet selected in the “packet list” pane. The protocols are shown in a tree which can be expanded and collapsed.’’

The Packet Bytes pane

The packet bytes pane shows the data of the selected or current packet in hex dump style.

```
0000  34 02 86 d6 94 0d 1c 3b  f3 ef f5 c6 08 00 45 00   4·····; ·····E·
0010  00 34 b7 cf 00 00 3c 06  b5 01 8e fa c1 e3 c0 a8   ·4····<· ·····
0020  00 6d 01 bb de d8 b4 80  cc b4 f7 ad 29 df 80 10   ·m····· ····)···
0030  01 05 a0 55 00 00 01 01  05 0a f7 ad 29 de f7 ad   ···U···· ····)···
0040  29 df                                              )·
```

The packet bytes pane shows a canonical hex dump of the packet data. Each line contains the data offset, sixteen hexadecimal bytes and sixteen ASCII bytes. Non-printable bytes are replaced with period **“.”**

The status bar

The status bar displays informational messages such as

```
wireshark_Wi-Fi2ICD10.pcapng   Packets: 345 · Displayed: 345 (100.0%) · Dropped: 0 (0.0%)   Profile: Default
```

The colourized bullet

The left side shows the highest expert information in the currently loaded capture file. Hovering the mouse on the colourized bullet will show you a description of the expert information level.

The edit icon

This allows you to add a comment to the capture file using the capture file properties dialogue.

The middle

It shows the current number of packets in the capture file. The following values are displayed:

Packets

The number of packets is being captured.

Displayed

The number of packets is being displayed.

Marked

The number of marked packets. Only displayed if you mark any packets in the capture.

Dropped

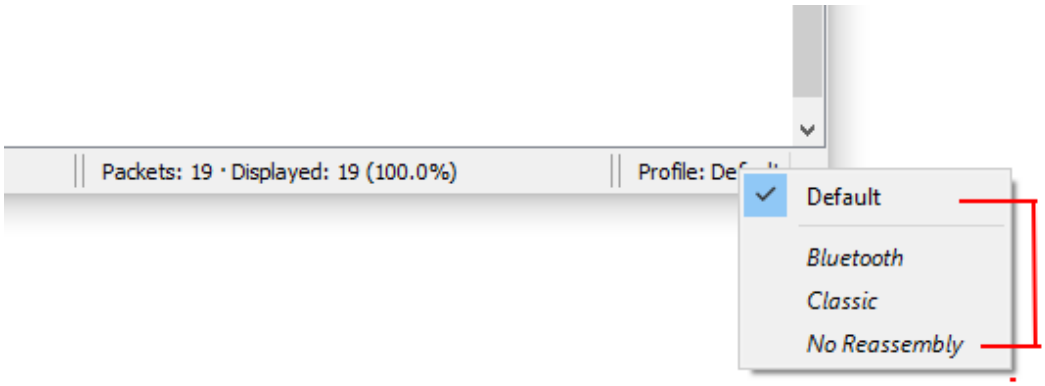
It shows the number of dropped packets. only displayed If Wireshark was unable to capture all packets.

Ignored

It shows the number of ignored packets and it will only be displayed if you ignore any of the packets.

The right side

it shows the selected configuration profile. Clicking on this part of the status bar will bring up a menu with all available configuration profiles, and selecting from this list will change the configuration profile.



Packet Capturing

The following methods can be used to start capturing packets

You can double-click on the interface in the welcome screen of Wireshark

If you already know the name of the capture interface then you can start Wireshark from the command line by running the following command:

```
wireshark -I eth0 -k
```

This will start Wireshark capturing on interface eth0

Once you have captured some packets you can view the packets that are displayed in the packet list pane by simply clicking on a packet on a packet list pane, which will bring up the selected packet in the tree view and byte view panes. As soon you capture some traffic then you need to apply some filter to make it easily understandable.

Wireshark has two filtering languages

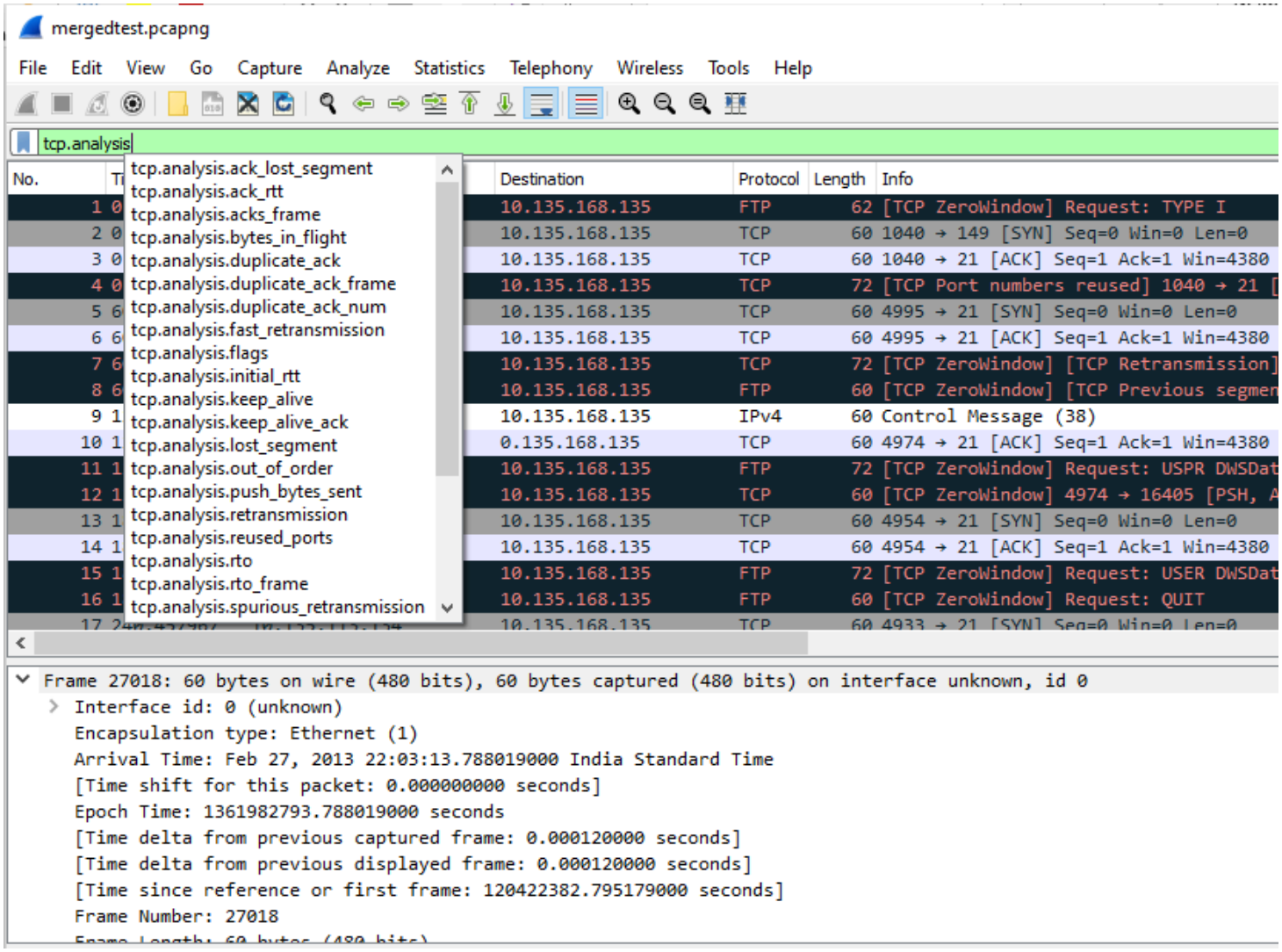
- Capture filters
- Display filters

Capture filters are used for filtering when capturing packets and display filters are used for filtering which packets are displayed. Wireshark provides a display filter language that enables you to precise control which packets are displayed

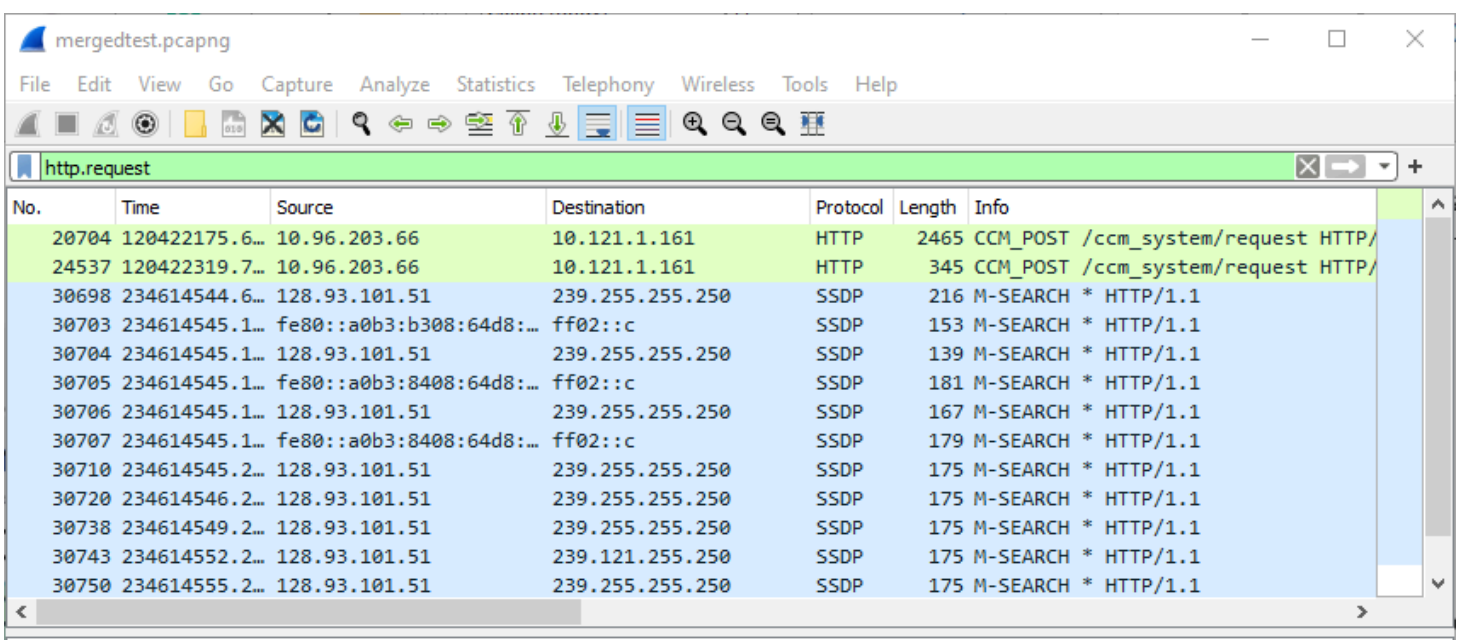
Display filter fields

Wireshark's display filters a bar located right above the column display section. To only display packets containing a particular protocol, type the protocol into Wireshark's display filter toolbar Wireshark offers a list of suggestion based on the text that you typed.

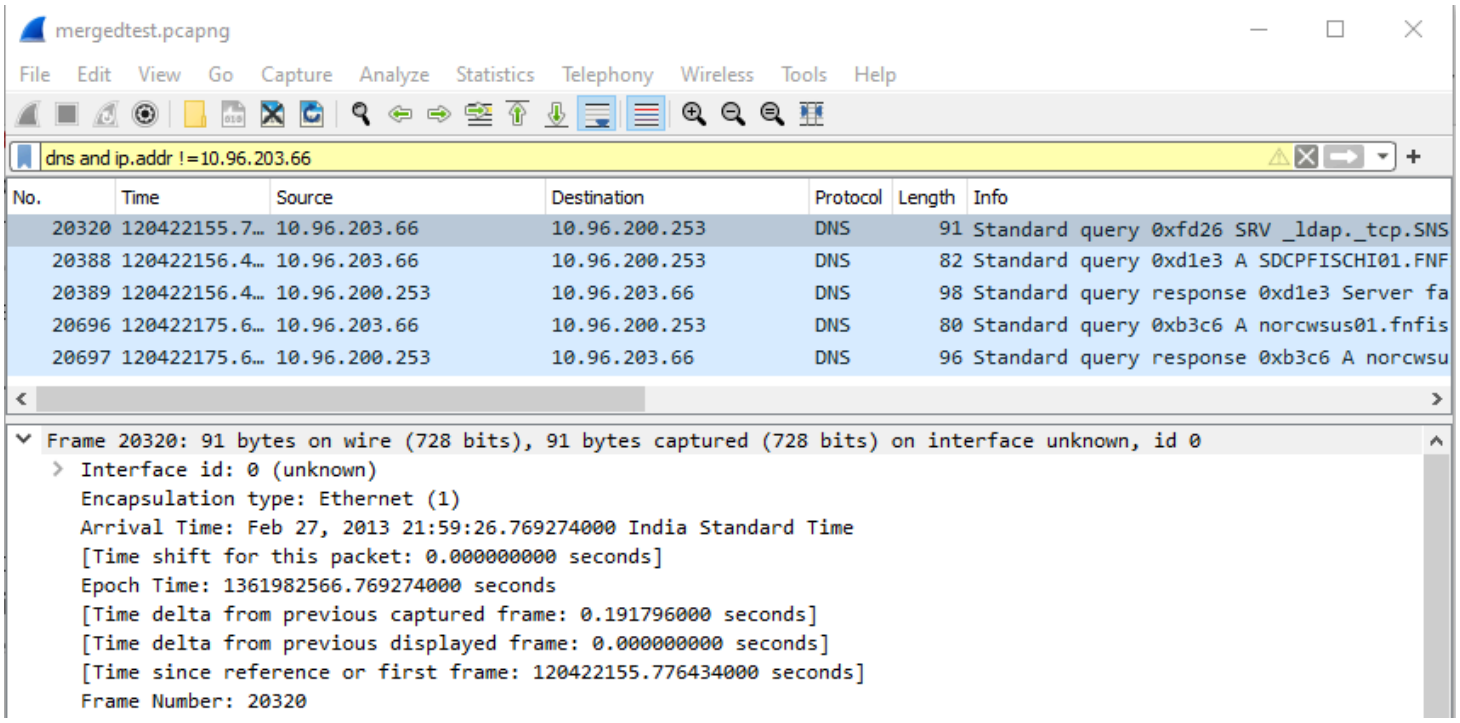
For example, to only display TCP packets, type tcp into Wireshark's display filter toolbar.



Similarly, to only display packets containing a particular field, type the field into Wireshark's display filter toolbar. For example, to only display HTTP requests, type ***http.request*** into Wireshark's display filter toolbar and it will accept the expression and works as intended



A similar example of Wireshark display filter accepting an expression but it does not work as intended such as type DNS and **ip.addr !=10.96.203.66**



As you saw above the expression works but not intended.

As we have noticed these packet captures have different colours. So, what are these colours intended for…?

Don't get confused with a different type of colour packets. These colours are intended for

- Gray – TCP packets
- Black with red letters – TCP Packets with errors
- Green – HTTP Packets
- Light Blue – UDP Packets
- Pale Blue – ARP Packets
- Lavender – ICMP Packets
- Black with green letters – ICMP Packets with errors

Note: – Colourings can be changed under View -> Colouring Rules

Building Display Filter expressions.

we can build display filters that compare values using a different type of comparison operator.

For example to only display packets to or from the IP address 10.96.200.253 use **ip.addr==10.96.200.253** . Wireshark display filter uses Boolean expressions, so we can specify values and chain them together. A complete list of available comparison operators is shown below.

Description	operator	Example
Equal or (eq)	==	Ip.src==192.168.0.134
Not equal or (ne)	!=	Ip.src!=192.168.0.134
Greater than or (gt)	>	frame.len > 20
Less than or (lt)	<	frame.len < 150
Greater than or equal to or (ge)	>=	frame.len >= 0x50
Less than or equal to or (le)	<=	frame.len <= 0x30
Bitwise_and	&	tcp.flags & 0x03
Logical AND or and	&&	Ip.src==192.168.0.134 and tcp.flags.fin
Logical or	||	Ip.src==192.168.0.134 or ip.src==192.168.1.1

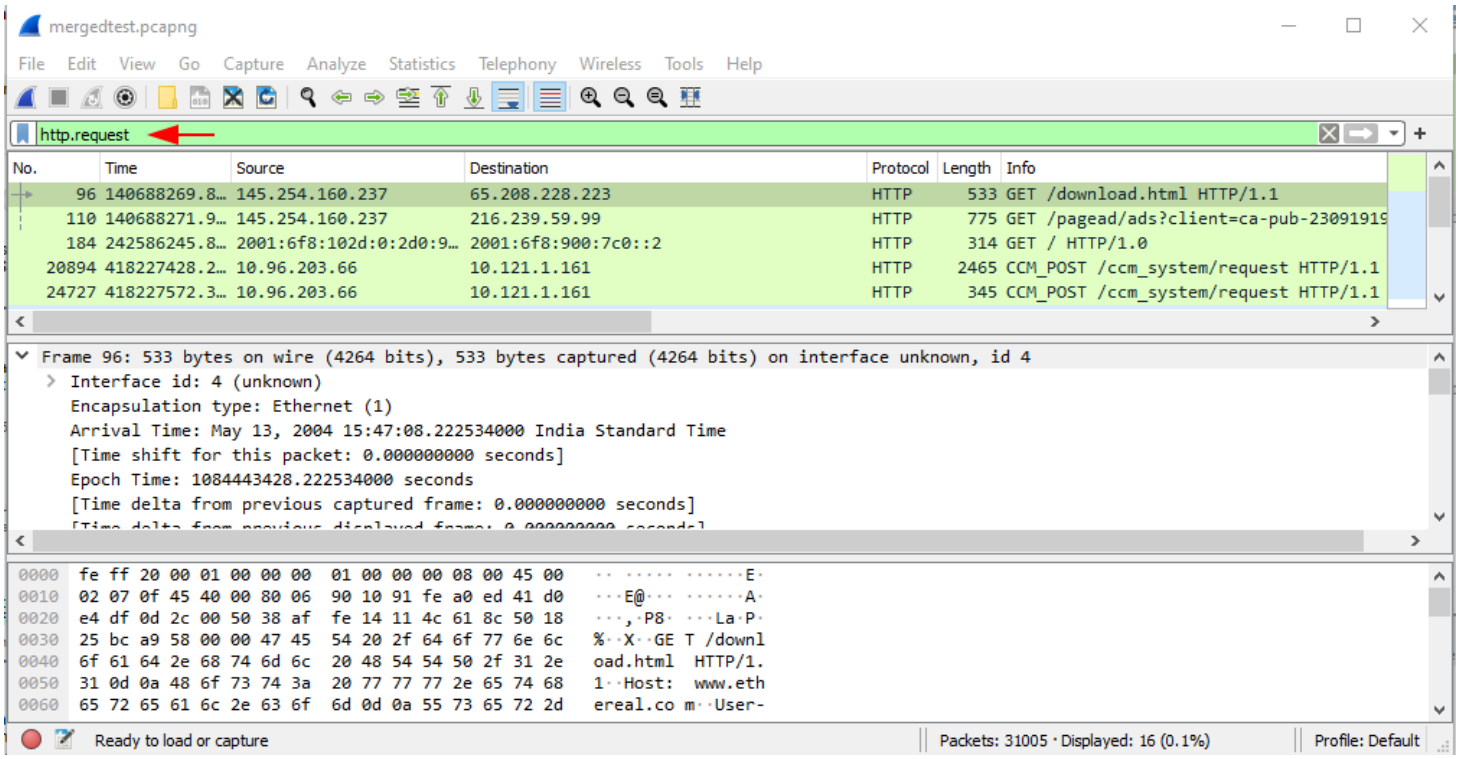
Some Useful Filters

Here are some filter expressions that can be used as a way to quickly review web traffic.

Let's understand this with some sort of methods like how we are going to filter some infectious traffic.

Open the packet capture and apply the following filter: "http.request". This filter will show all HTTP post requests. Also, you can find the total no. of packets at the bottom of the Wireshark screen that are 16 of these packets.

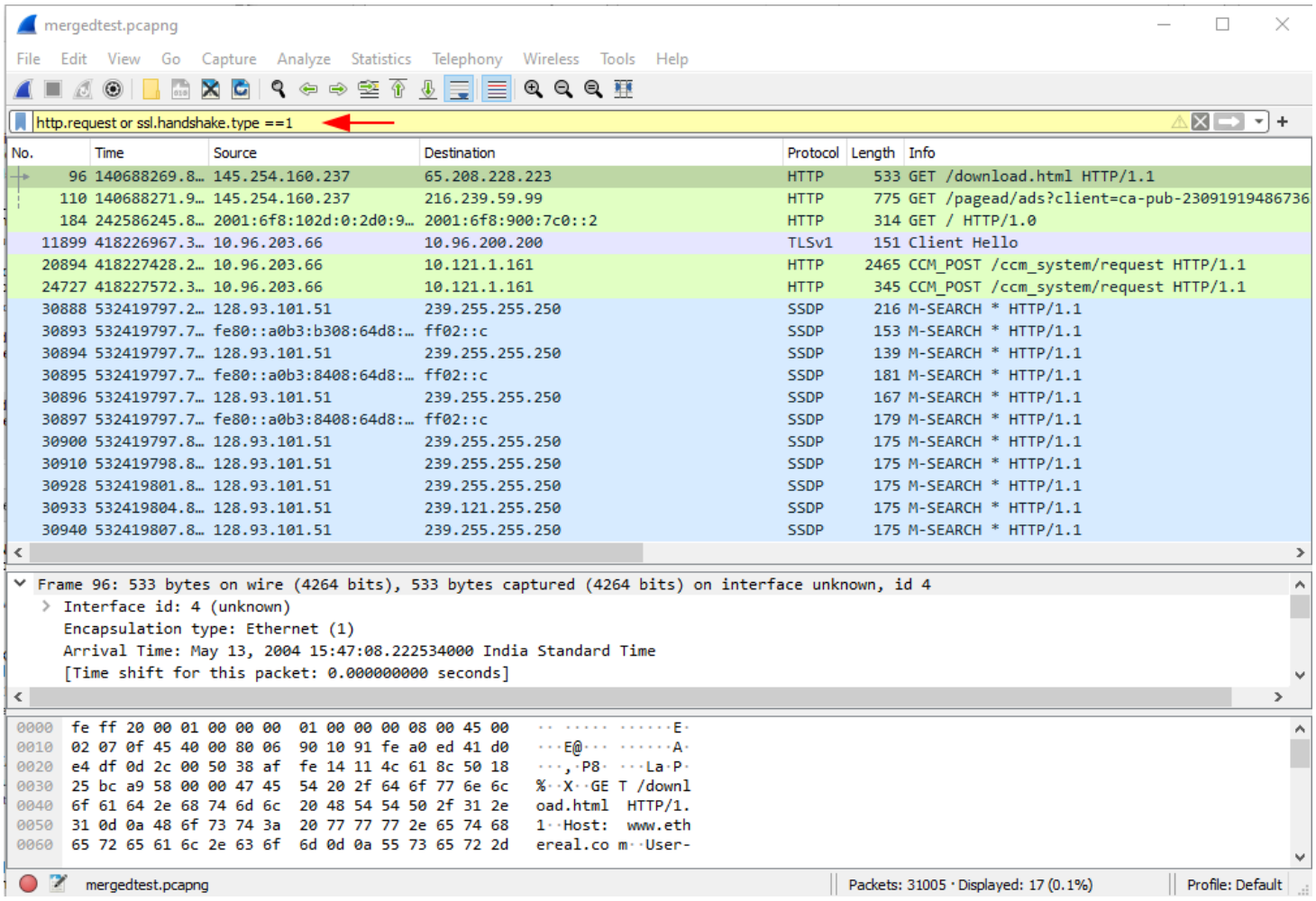
```
http.request
```



After that to reveal all the URLs for HTTP requests, Domain names we can use the following expression as a way to quickly review web traffic

```
http.request or ssl.handshake.type == 1
```

The value ***http.request*** reveals URLs for HTTP requests, and ***ssl.handshake.type == 1*** reveal domain names used in HTTPS or SSL/TLS traffic. Filtering with this display filter can outline the flow of events for the web traffic.



By modifying these types of filters, you can drill down the infectious traffic.

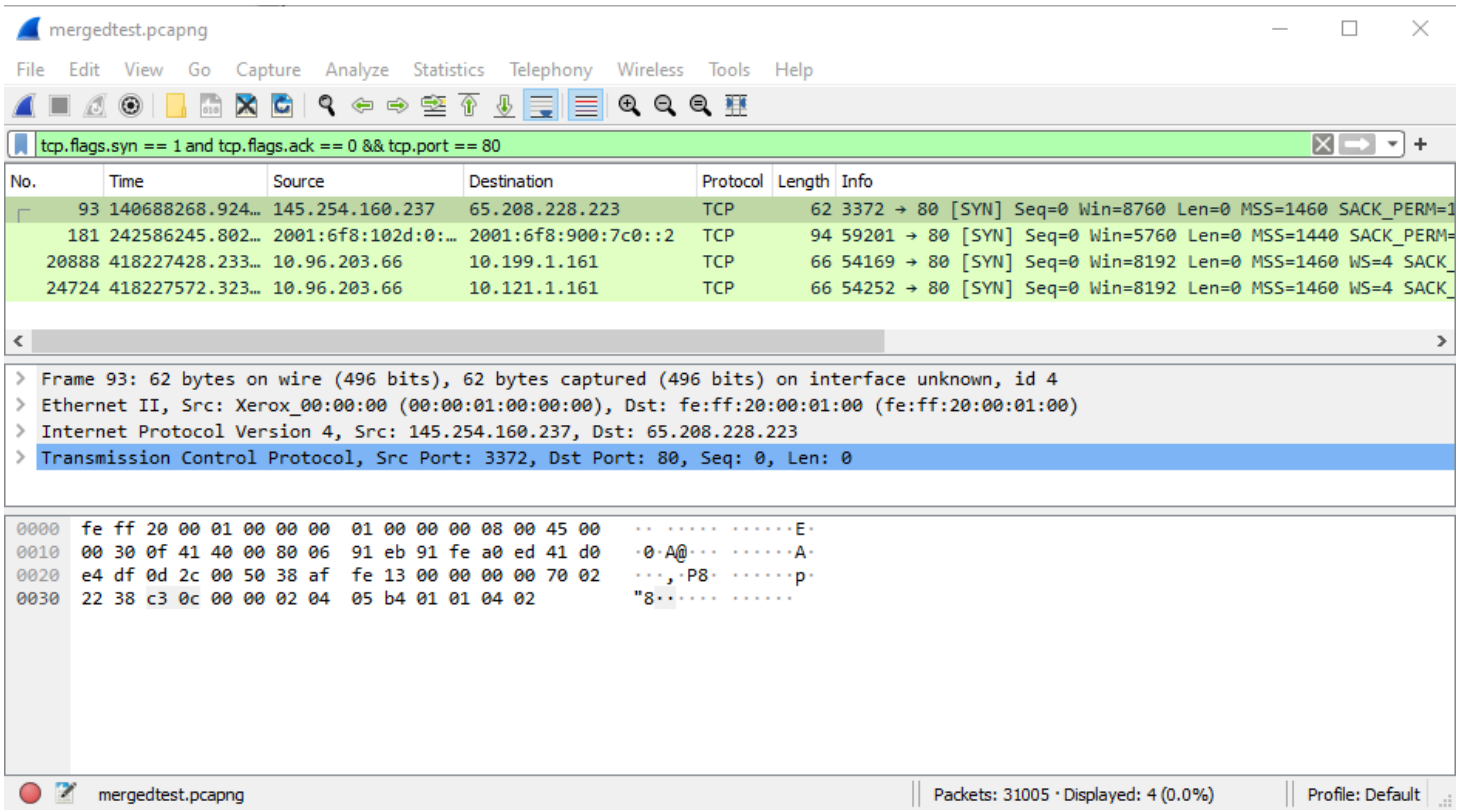
Hands-On Practice

Let's understand Wireshark with some sort of Questions

Q1. Find out the total no. of TCP syn packet for port 80

Answer: – To reveal all the TCP syn packets we can use the following expression as a way to quickly review web traffic for port 80. Also, you can find the total no. of packets at the bottom of the Wireshark screen that are 4 of these packets.

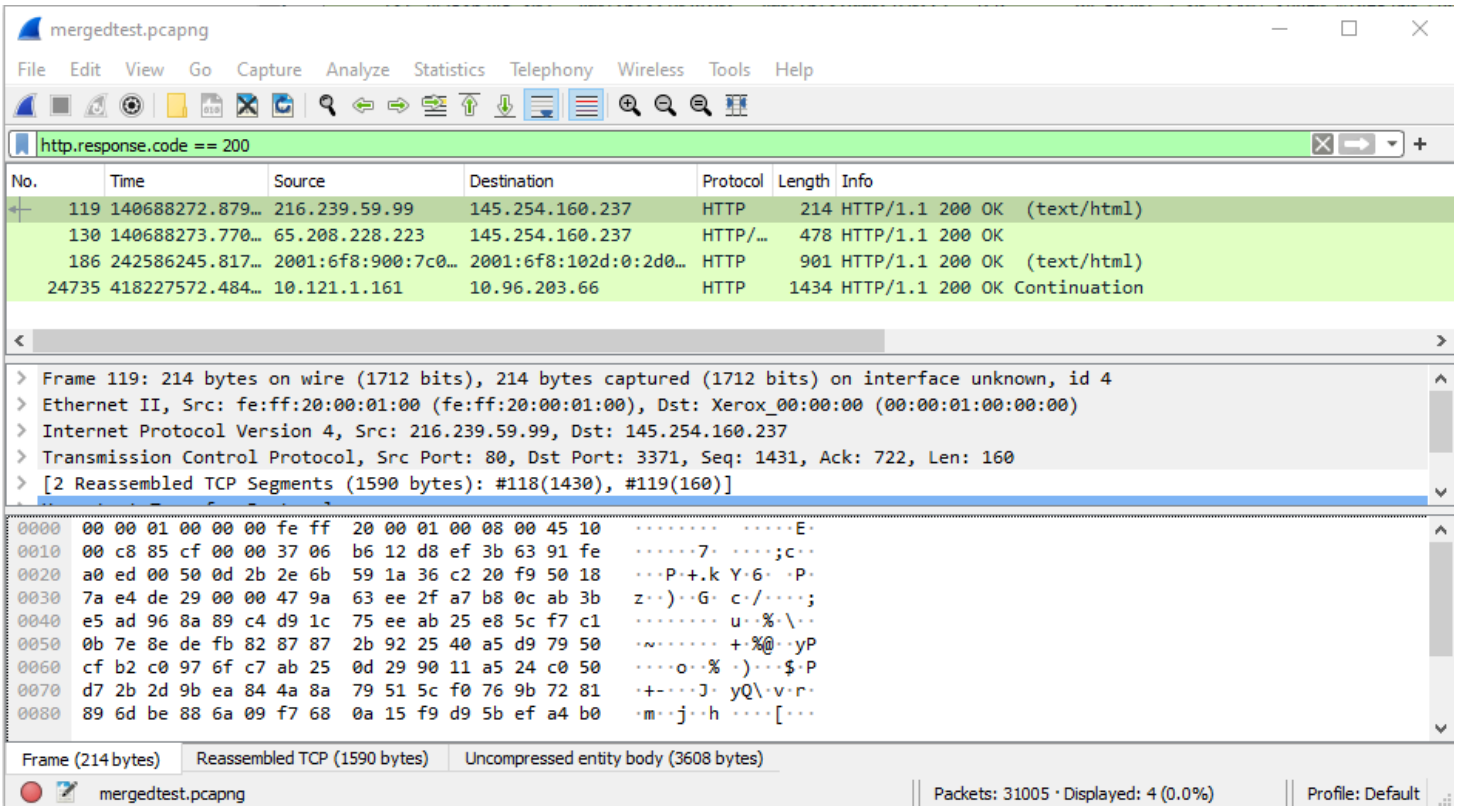
```
tcp.flags.syn == 1 and tcp.flags.ack == 0 && tcp.port == 80
```



Q2. Filter out all the packet with the http response code 200.

Answer: – The value ***http.response*** reveals URLs for HTTP responses, and ***HTTP status code 200*** means success. The client has requested documents from the server. The server has replied to the client and given the client the documents. Filtering with this display filter can outline the flow of events for the web traffic.

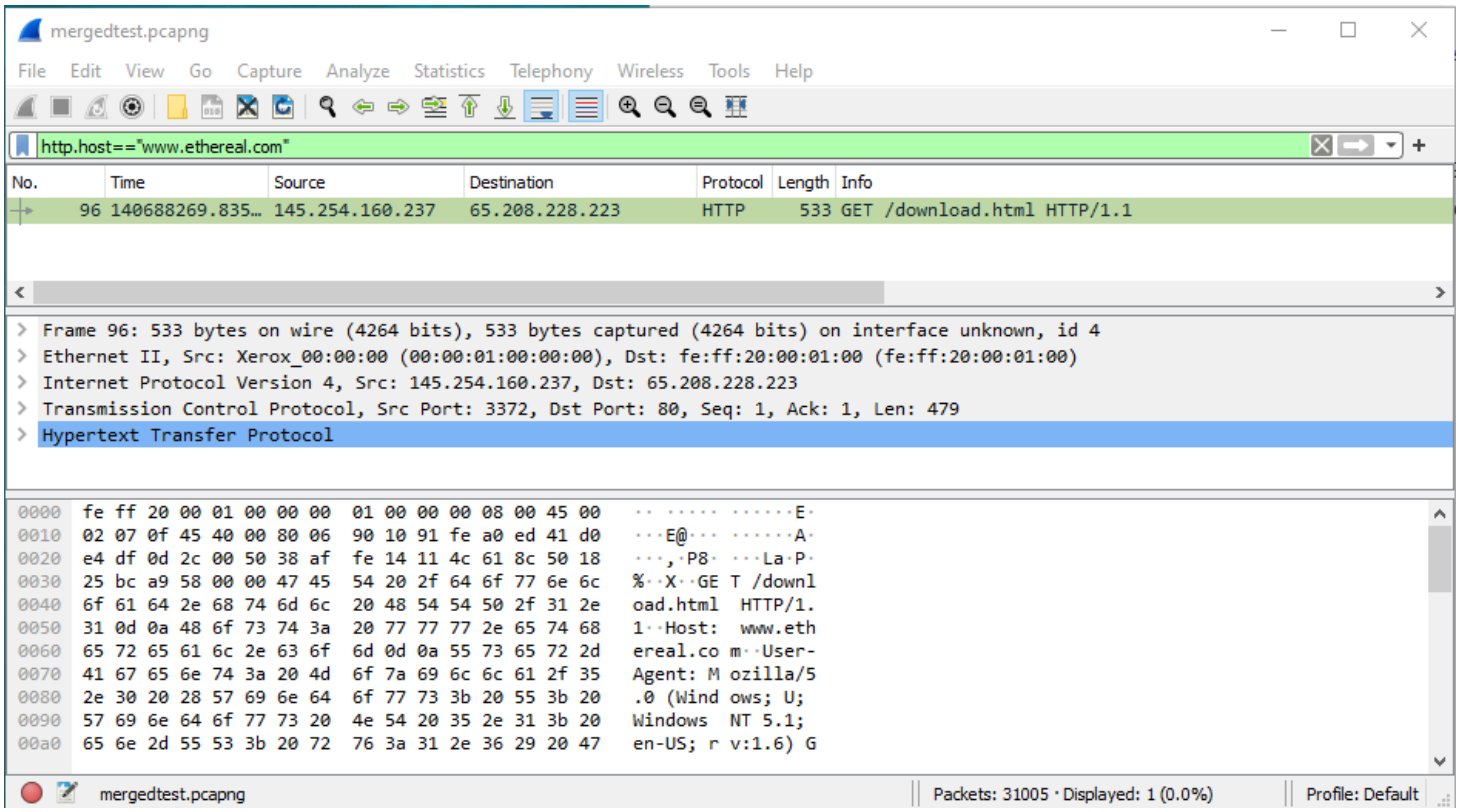
```
http.response.code == 200
```



Q.3 Attacker try to download the malicious file from www.ethereal.com. Write down the filter to identify the http host.

Answer: – In this case, we have to find out the host who have visited the malicious website. As we know each website have own URL. So simply we can find out the host by using the following expression who have visited a malicious website.

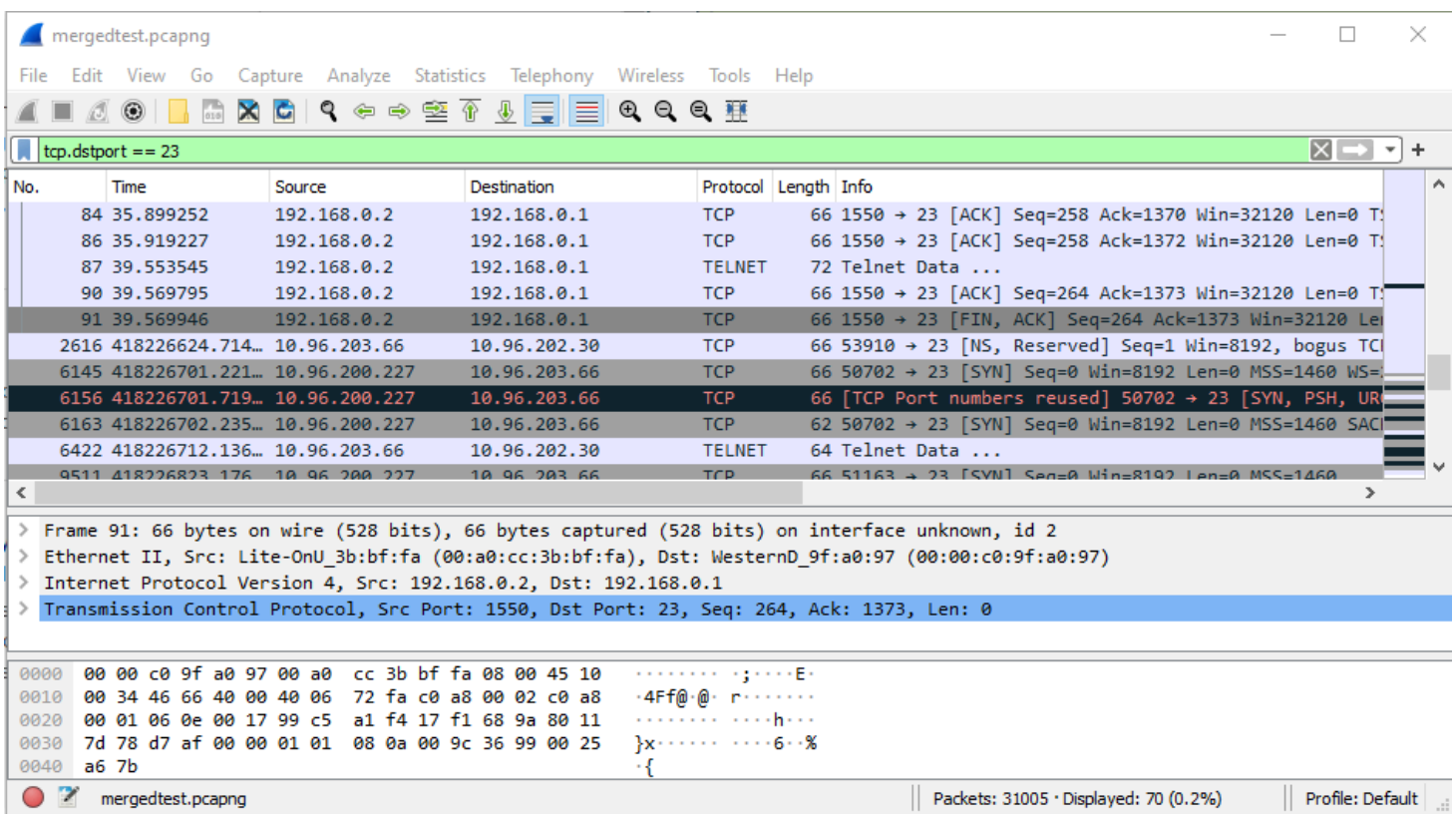
```
http.host=="www.ethereal.com”
Or http.host=="URL”
```



Q4. Write down the filter to identify the destination port 23.

Answer: – Answer is quite simple… you can use the following expression to filter out the destination port 23

```
tcp.dstport == 23
```

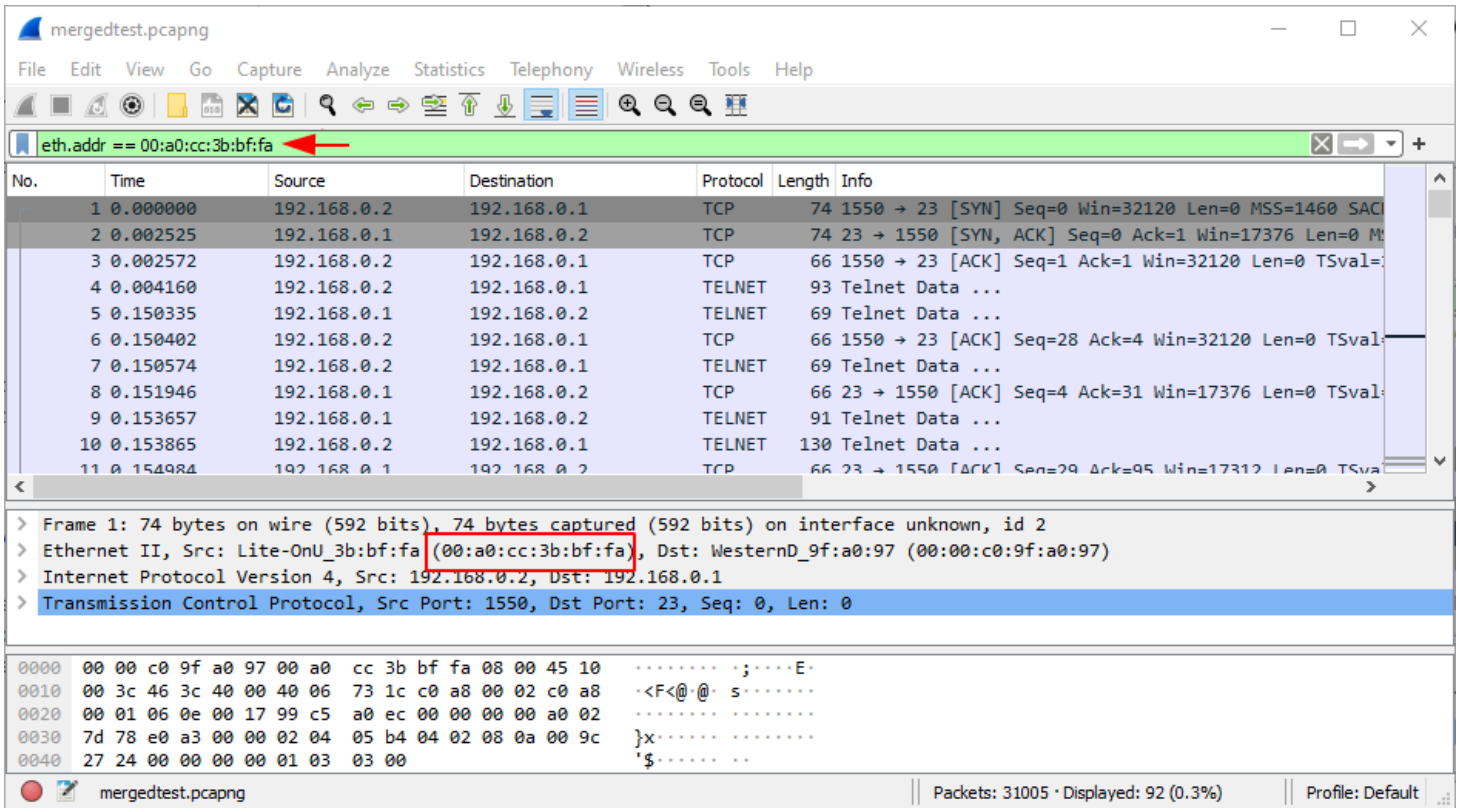


Q5. Filter out the packets on behalf of the mac address.

Answer: – Apply the following expression to filter out the traffic for the specific mac address.

```
eth.addr == 00:a0:cc:3b:bf:fa
```

```
Or eth.addr == “mac addr”
```

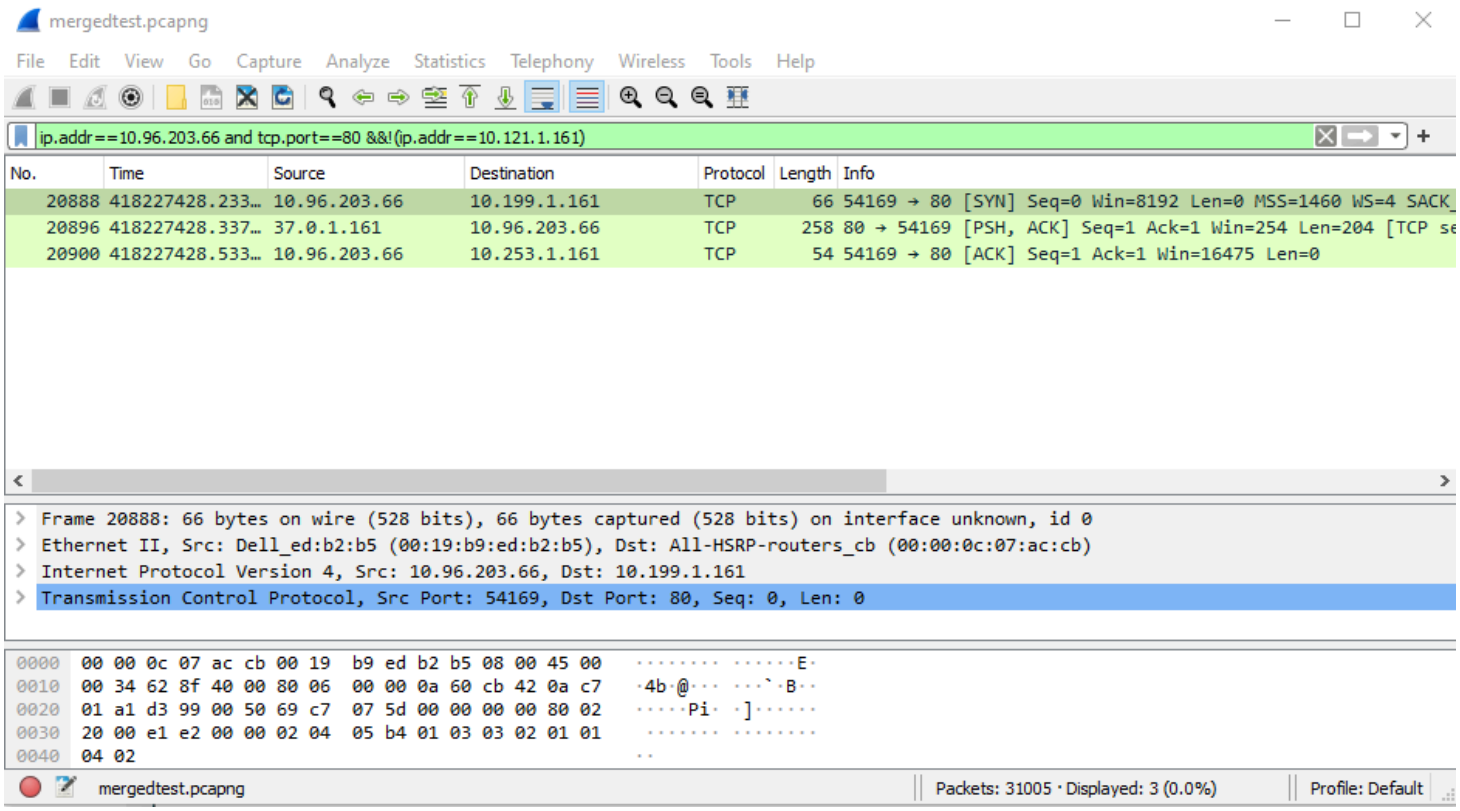


Q6. Write down the filter to identify the IP address 10.96.203.66 for port 80 also including the IP address 10.121.1.161. find out the total no. of the packet.

Answer: – In this situation, we can create our custom filter for these types of random scenarios by using logical operators such as

```
ip.addr==10.96.203.66 and tcp.port==80 &&!(ip.addr==10.121.1.161)
```

By applying this filter, we can easily find out the total packets that are 3 of these packets.



Q7. Find out the flag hidden in the provided pcap file that contains the user name for

1. All users of the Ftp session
2. Find out the credentials used for the Telnet session
3. Find out which command is being executed during the telnet session.

Answer: – Do it by yourself. By getting the flag to submit the flag in the comment section.

All the best.

You can download the pcap file from **here**.

Source: **https://www.wireshark.org/**