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Intro to computer network

HW2

1)

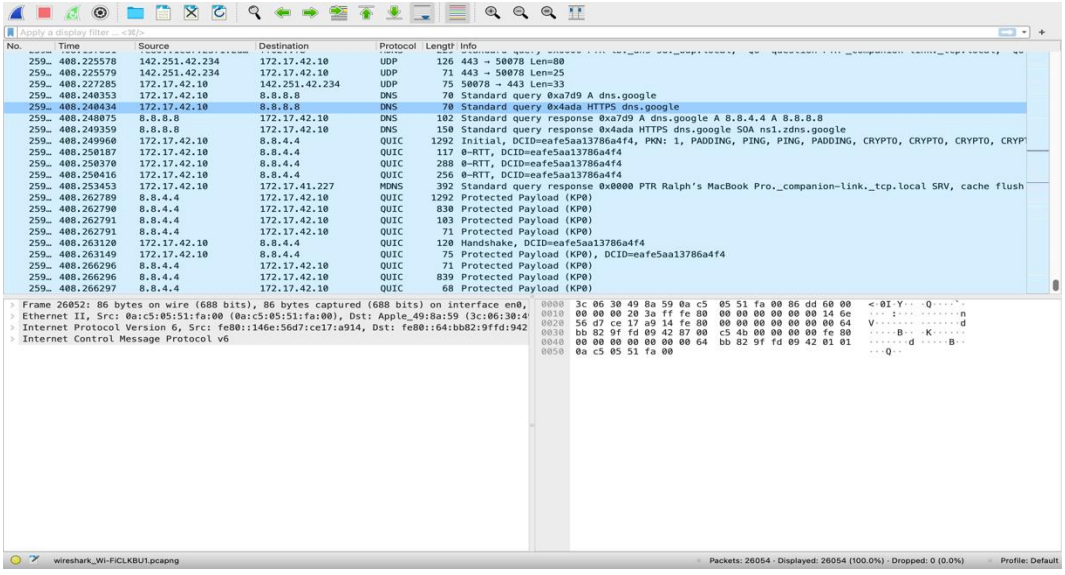
List 3 different protocols that appear in the protocol column in the unfiltered packet-listing window.

UDP: For especially time-sensitive transfers like video playing or DNS lookups, the User Datagram Protocol, or UDP, is a communication protocol that is used throughout the Internet. It speeds up communications by not formally establishing a connection before data is transferred.

DNS protocol: The Internet's phone book is the Domain Name System (DNS). Humans use domain names like espn.com or nytimes.com to access content online. Through Internet Protocol (IP) addresses, web browsers may communicate. For browsers to load Internet resources, DNS converts domain names to IP addresses. Each Internet-connected device has a distinct IP address that other computers can use to find the device. DNS servers take the place of the necessity for people to remember IP addresses like 192.168.1.1 (in IPv4) or more complicated modern alphanumeric IP addresses like 2400: cb00:2048: 1::c629:d7a2 (in IPv6).

QUIC: QUIC (Quick UDP Internet Connections, pronounced quick) is an experimental transport layer network protocol designed by Google. The overall goal is to reduce latency compared to that of TCP. Think of QUIC as being like TCP+TLS+HTTP/2 implemented on UDP.

Here is the screenshot:

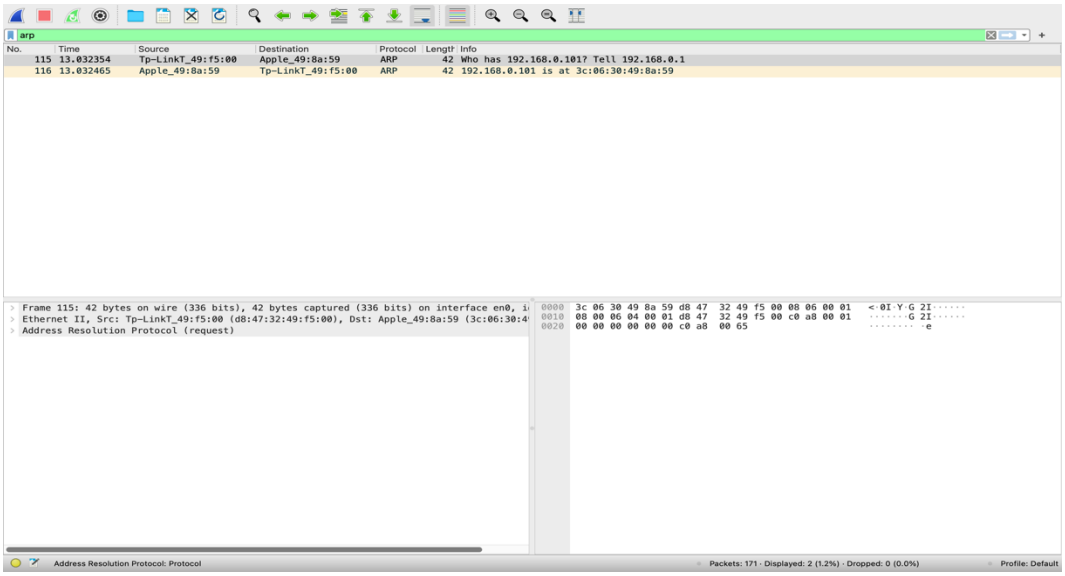


2)

ARP protocol: **Address Resolution Protocol (ARP)** is a procedure for mapping a dynamic IP address to a permanent physical machine address in a local area network (LAN). The physical machine address is also known as a media access control (MAC) address.

How do you find out ARP packets by using Wireshark?
First, I observe the traffic captured in the top Wireshark packet list pane. Look for traffic with ARP listed as the protocol. To view only ARP traffic, I type arp (lower case) in the Filter box and press Enter.

Here is the screenshot:

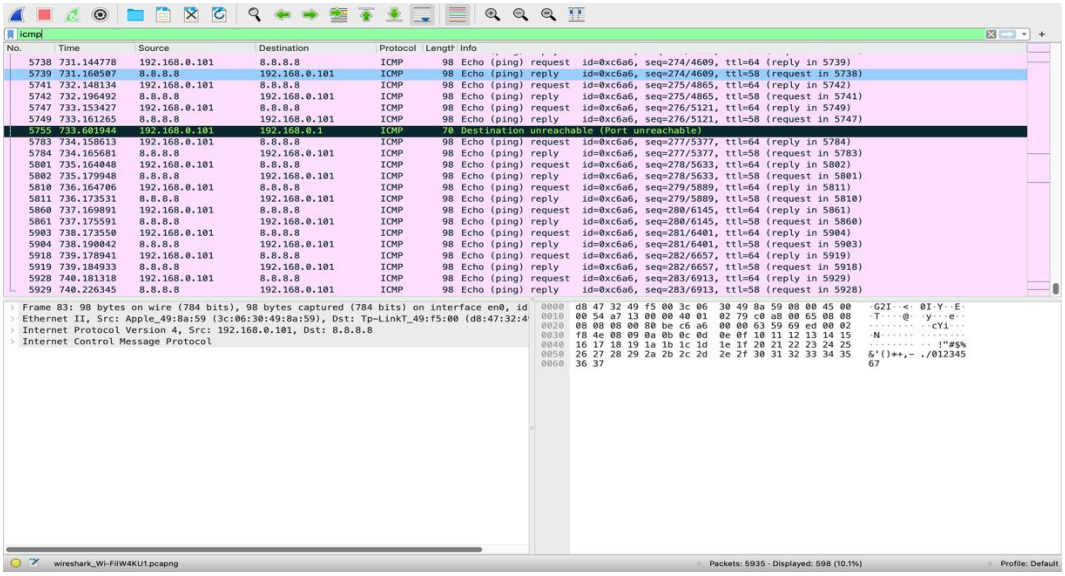


3)
ICMP protocol: **The Internet Control Message Protocol (ICMP)** is a network layer protocol used by network devices to diagnose network communication issues. ICMP is mainly used to determine whether data is reaching its intended destination in a timely manner or not. Commonly, the ICMP protocol is used on network devices, such as routers. ICMP is crucial for error reporting and testing, but it can also be used in distributed denial-of-service (DDoS) attacks.

How do you find out ICMP packets by using Wireshark?

- I use the ping tool to get ICMP requests and replies.
- I open the terminal on Mac.
- Run Wireshark
- Run the below command:
  ping 8.8.8.8

Here is the screenshot:



4)

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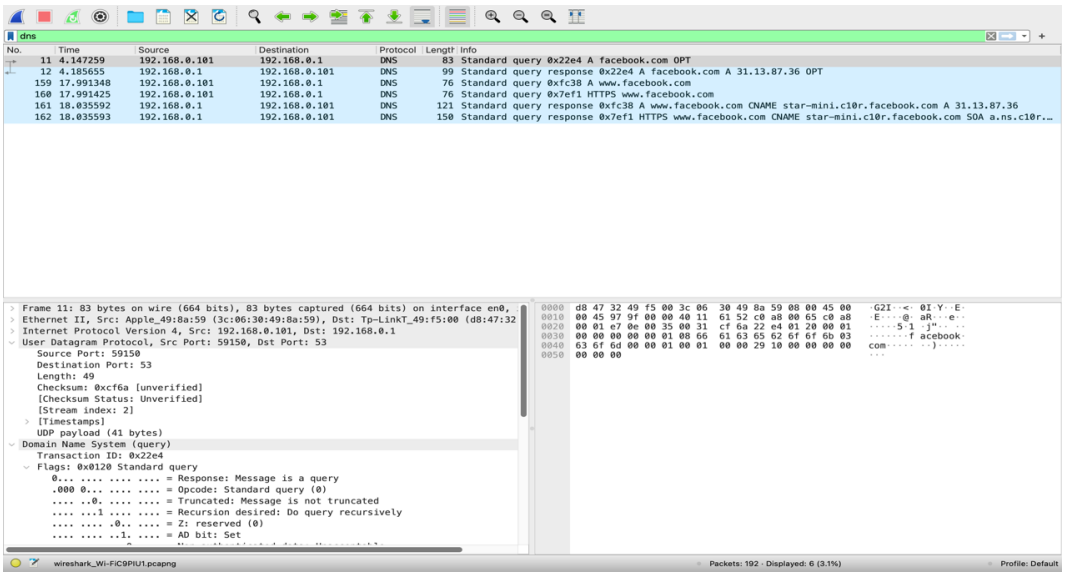
How do you find out DNS packets by using Wireshark?

- I use the dig tool to get DNS requests and replies.
- I open the terminal on Mac.
- Run Wireshark.
- Run the below command:

  dig facebook.com

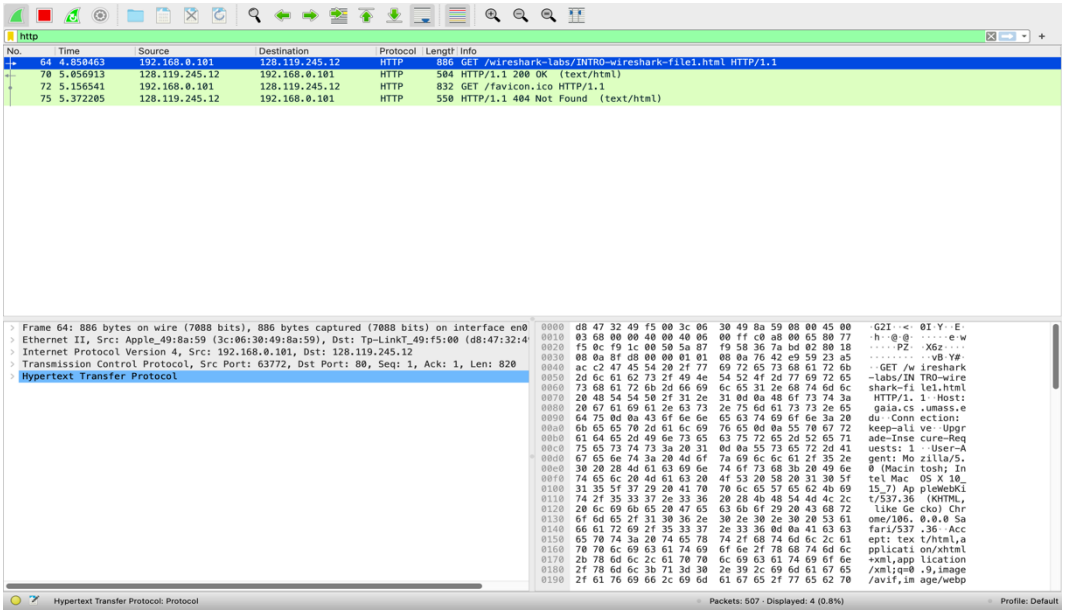
  Here is the screenshot:



5)

While Wireshark is running, I enter the URL:
http://gaia.cs.umass.edu/wireshark-labs/INTRO-wireshark-file1.html.
HTTP packets exchanges in Wireshark:
Before diving into HTTP, it's important to note that TCP and port 80 are used as transport layer protocols for HTTP. Let's examine what occurs on the network when we enter that URL into the browser and press Enter.

Here is the screenshot :



6)

The time it takes when the HTTP GET message was sent until the HTTP OK reply was received is:

5.056913 - 4.850463=0.20645

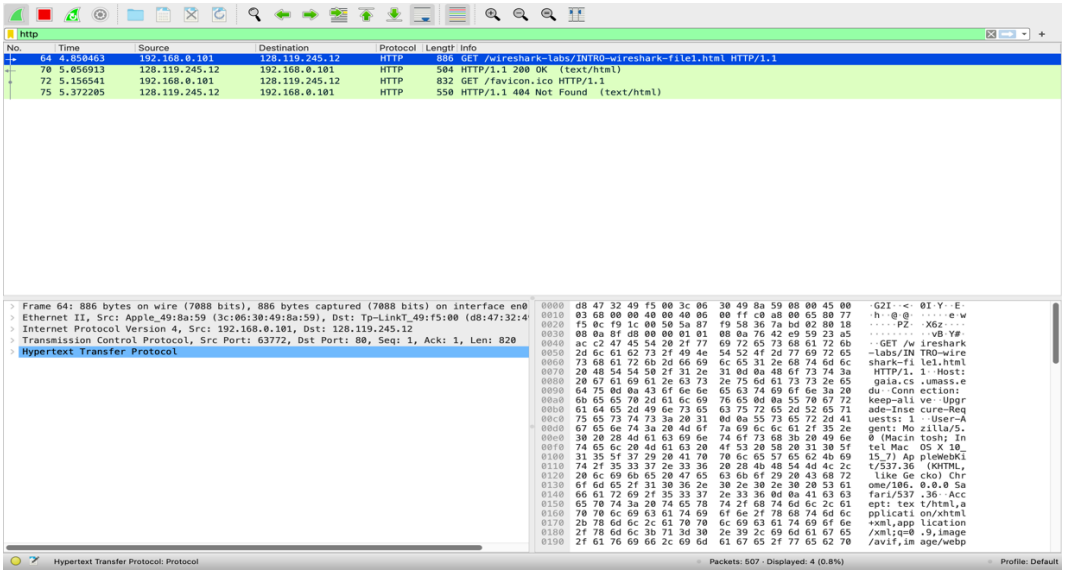
HTTP GET:

1.Request Method: GET ==> The packet is a HTTP GET.

2. Request URL: /wireshark-labs/INTRO-wireshark-file1.html==> The client is asking for file INTRO-wireshark-file1.html present under /wireshark-labs

3.Request version: HTTP/1.1 ==> It's HTTP version 1.1

Here is the screenshot.



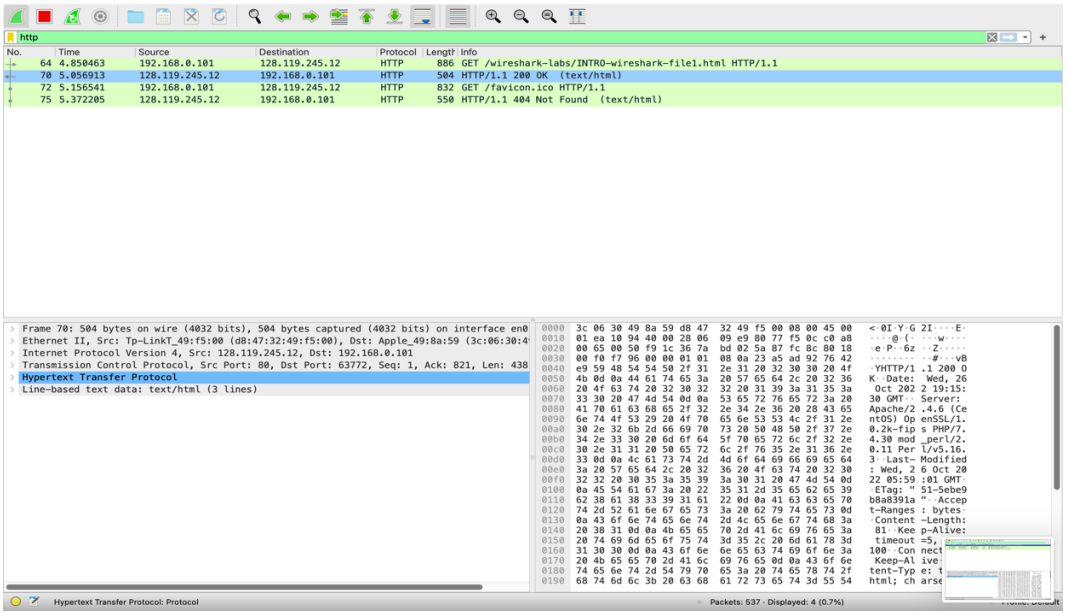
HTTP OK:

After TCP data [content of INTRO-wireshark-file1.html] is sent successfully HTTP OK is sent to the client and here are the important fields in the packet.

1. Response Version: HTTP/1.1 ==> Here server also in HTTP version 1.1
2. Status Code: 200 ==> Status code sent by the server.
3. Response Phrase: OK ==> Response phrase sent by the server.

So from 1 and 2, we get 200 OK which means the request [HTTP GET] has succeeded.

Here is the screenshot

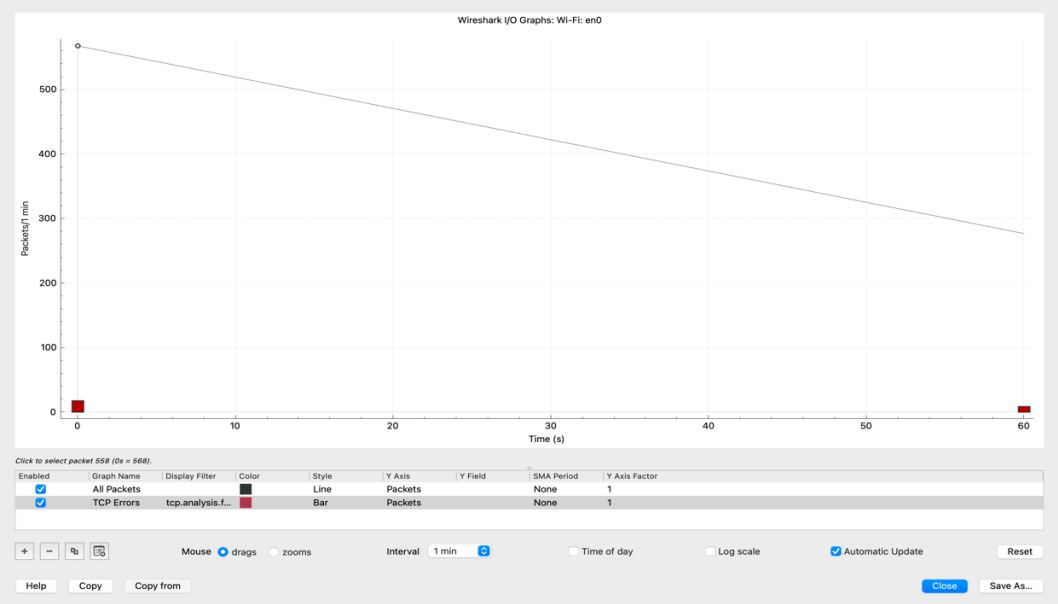


7)

I start the Wireshark by selecting the network we want to analyze. Then I go into the Wireshark and click on Statistics→ I/O Graph menu. This will then bring up Wireshark's "I/O Graph" window. I set up the interval per minute.

The screenshot below of the I/O Graph window displays the graph of the captured network packets that are highly configurable. This graph displays all the traffic present in a capture file which is measured in packets(bytes/bits) per minute. By default, the x-axis represents the time in seconds and the y-axis represents the number of packets per tick.

Here is the screenshot:



8)

TLS protocol: The most popular protocol for implementing cryptography on the web is Transport Layer Security (TLS). TLS uses several cryptographic techniques to offer safe network communication.

makes sure that data transported between client and server apps is encrypted with secure algorithms and cannot be viewed by third parties by enabling client and server programs to support TLS. TLS is now supported by the most recent versions of all major web browsers, and default TLS support is becoming more and more common on web browsers.

9)

Wireshark is a packet analyzer. Packets are captured, filtered, and analyzed using it. Because the remote hosts are not connected to the same network, Wireshark does not show their actual Mac address. If the remote host is connected to the same network, it is also considered a local host.

10)

There are capture filters and display filters in Wireshark. Only copies of packets that match the filter are retained by capture filters. When you've finished recording everything and need to cut through the background noise to evaluate packets or flows, you can use display filters.