Wireshark: Network analysis and interception

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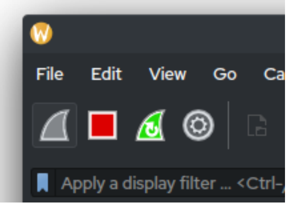
What is Wireshark?

- Free (GPLv2) network analysis software. Implementation of `libpcap`, which is also used by nmap.
- "Promiscuous mode" allows Wireshark to work on insecure routers, like most consumer routers.[1] An interface in this mode *asks* the router for all of the network's traffic.
- In more sophisticated man-in-the-middle attacks, a device running Wireshark can pretend to be the router.

[1] like the one I bought for today

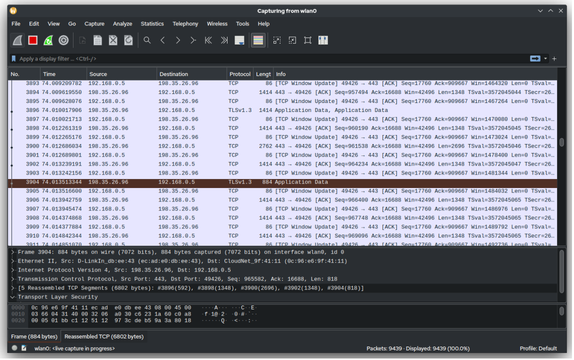
Wireshark setup

- In Kali Linux, Wireshark should be ready for use.
- In general, select the interface that has the most traffic, or the one that you know is connected to the network of interest.
- Control packet capture using these buttons:



Apply a display filter ... <Ctrl-/

Wireshark tour



No.	Time	Source	Destination	Protocol	Lengt	Info
3893	74.009209782	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1464320 Len=0 TSval=…
3894	74.009619550	198.35.26.96	192.168.0.5	TCP	1414	443 → 49426 [ACK] Seq=957494 Ack=16688 Win=42496 Len=1348 TSval=3572045044 TSecr=26…
3895	74.009628076	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1467264 Len=0 TSval=…
3896	74.010017906	198.35.26.96	192.168.0.5	TLSv1.3	1414	Application Data, Application Data
3897	74.010021713	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1470080 Len=0 TSval=…
3898	74.012261319	198.35.26.96	192.168.0.5	TCP	1414	443 → 49426 [ACK] Seq=960190 Ack=16688 Win=42496 Len=1348 TSval=3572045045 TSecr=26…
3899	74.012265176	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1473024 Len=0 TSval=…
3900	74.012686034	198.35.26.96	192.168.0.5	TCP	2762	443 → 49426 [ACK] Seq=961538 Ack=16688 Win=42496 Len=2696 TSval=3572045046 TSecr=26…
3901	74.012689801	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1478400 Len=0 TSval=…
3902	74.013239191	198.35.26.96	192.168.0.5	TCP	1414	443 → 49426 [ACK] Seq=964234 Ack=16688 Win=42496 Len=1348 TSval=3572045047 TSecr=26…
3903	74.013242156	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1481344 Len=0 TSval=…
3904	74.013513344	198.35.26.96	192.168.0.5	TLSv1.3	884	Application Data
3905	74.013516600	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1484032 Len=0 TSval=…
3906	74.013942759	198.35.26.96	192.168.0.5	TCP	1414	443 → 49426 [ACK] Seq=966400 Ack=16688 Win=42496 Len=1348 TSval=3572045065 TSecr=26…
3907	74.013945474	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1486976 Len=0 TSval=…
3908	74.014374868	198.35.26.96	192.168.0.5	TCP	1414	443 → 49426 [ACK] Seq=967748 Ack=16688 Win=42496 Len=1348 TSval=3572045065 TSecr=26…
3909	74.014377884	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1489792 Len=0 TSval=…
3910	74.014842344	198.35.26.96	192.168.0.5	TCP	1414	443 → 49426 [ACK] Seq=969096 Ack=16688 Win=42496 Len=1348 TSval=3572045065 TSecr=26…
3911	74.014851070	192.168.0.5	198.35.26.96	TCP	86	[TCP Window Update] 49426 → 443 [ACK] Seq=17760 Ack=909667 Win=1492736 Len=0 TSval=…

```
> Frame 3904: 884 bytes on wire (7072 bits), 884 bytes captured (7072 bits) on interface wlan0, id 0
> Ethernet II, Src: D-LinkIn_db:ee:43 (ec:ad:e0:db:ee:43), Dst: CloudNet_9f:41:11 (0c:96:e6:9f:41:11)
> Internet Protocol Version 4, Src: 198.35.26.96, Dst: 192.168.0.5
> Transmission Control Protocol, Src Port: 443, Dst Port: 49426, Seq: 965582, Ack: 16688, Len: 818
> [5 Reassembled TCP Segments (6802 bytes): #3896(592), #3898(1348), #3900(2696), #3902(1348), #3904(818)]
v Transport Layer Security
```

```
0000  0c 96 e6 9f 41 11 ec ad  e0 db ee 43 08 00 45 00   ····A··· ···C··E·
0010  03 66 04 31 40 00 32 06  a0 30 c6 23 1a 60 c0 a8   ·f·1@·2· ·0·#·`··
0020  00 05 01 bb c1 12 51 12  97 3c de b5 9a 3a 80 18   ······Q· ·<···:··
```

Frame (884 bytes)
Reassembled TCP (6802 bytes)
wlan0: <live capture in progress>
Packets: 9439 · Displayed: 9439 (100.0%)
Profile: Default

- The middle table shows all captured packets and can be sorted and filtered. Click column titles to sort by ascending or descending
- Filters auto-fill with suggestions. Protocols like DHCP have filters.
- Below the table, information is shown about the current packet.
- Hover over protocol-specific info to see corresponding bytes.

Warm-up: which device is the router?

Can you use the protocols and destinations of the captured packets to discern which device is the router?

Warm-up: who is the programmer pinging?

You are in the offices of a technology company, and have caught word that one of their programmers is working on a new webserver. You know the programmer's ip address is `192.168.1.131`.
The same programmer uses ssh to compile software on another machine. Can you tell which machine?

What is the password?

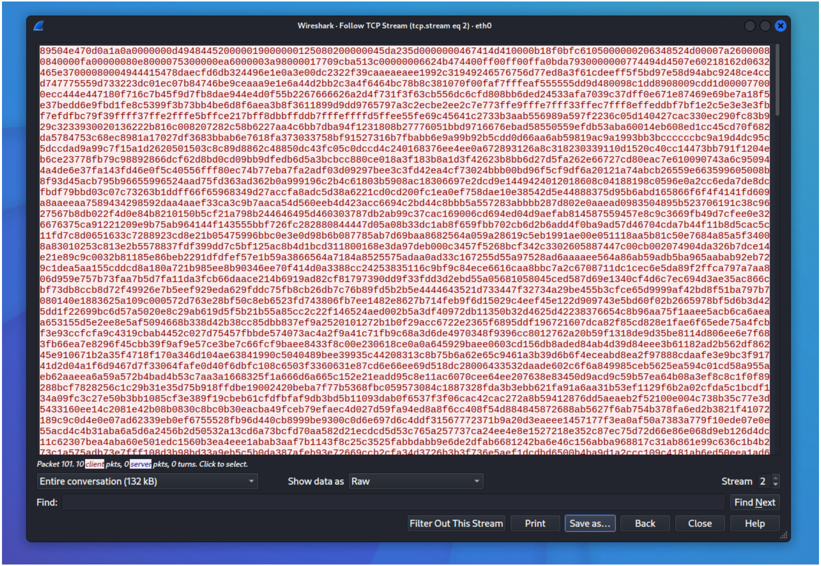
In another department, a team of programmers is devoloping a controversial new social media platform. It's password-protected, but you may be able to discern the password because SSL is not being used.

1. Can you intercept the HTML without the password?
2. What is the password? Now log in.

Steal files

An organization claims to have a proof of Poincare's Conjecture, a Millennium Prize Problem, on its **ftp** server. It could be worth one million dollars. Who is the author of the alleged proof?

Steal files (how to solve it)



Wireshark · Follow TCP Stream (tcp.stream eq 2) · eth0

```
89504e470d0a1a0a0000000d494844520000019000000125080200000045da235d0000000467414d410000b18f0bfc61050000002063 48524d00007a2600008
0840000fa00000080e8000075300000ea6000003a98000017709cba513c00000006624b474400ff00ff00ffa0bda7930000000774494d4507e60218162d0632
465e37000080004944415478daecfd6db324496e1e0a3e00dc2322f39caaeaeaee1992c31949246576756d77ed8a3f61cdeeff5f5bd97e58d94abc9248ce4cc
d747775559d733223dc01ec07b84746be9ceaaa9e1e6a44d2bb2c3a4f6464bc78b8c381070f00faf7fffeaf555555dd9d480098c1dd8908009cdd1d00007700
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73c1a575adb73e7fff108d3b98bd33a9eb5c5b0da387afeb93e72669ccb2cfa34d3726b3b3f736e5aef1dcdbd6500b4ba9d1a2ccc109c4181ab6ed50eea1ad6
```

Packet 101. 10 client pkts, 0 server pkts, 0 turns. Click to select.

Entire conversation (132 kB)

Show data as Raw

Stream 2

Find:

Bonus: find the Tor user

Some students at your university are abusing Tor. If you can find that only one student was using Tor at the time of a crime, you may have evidence of against them.

- Can you tell that someone is using Tor?
- If so, does a bridge look different?