Wireshark Basics

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Prerequisites

This lesson assumes basic knowledge of networking concepts.

Introduction

This article will be covering Wireshark including the following topics:

- Getting Wireshark
- Software overview
- Basic filtering
- Example usage

What is Wireshark

Wireshark is a network packet analyzer. It is used to capture data from a network and display its content. Being an analyzer, Wireshark can only be used to measure data but not manipulate or send it. Wireshark is open source and free which makes it one of the most popular network analyzer available.

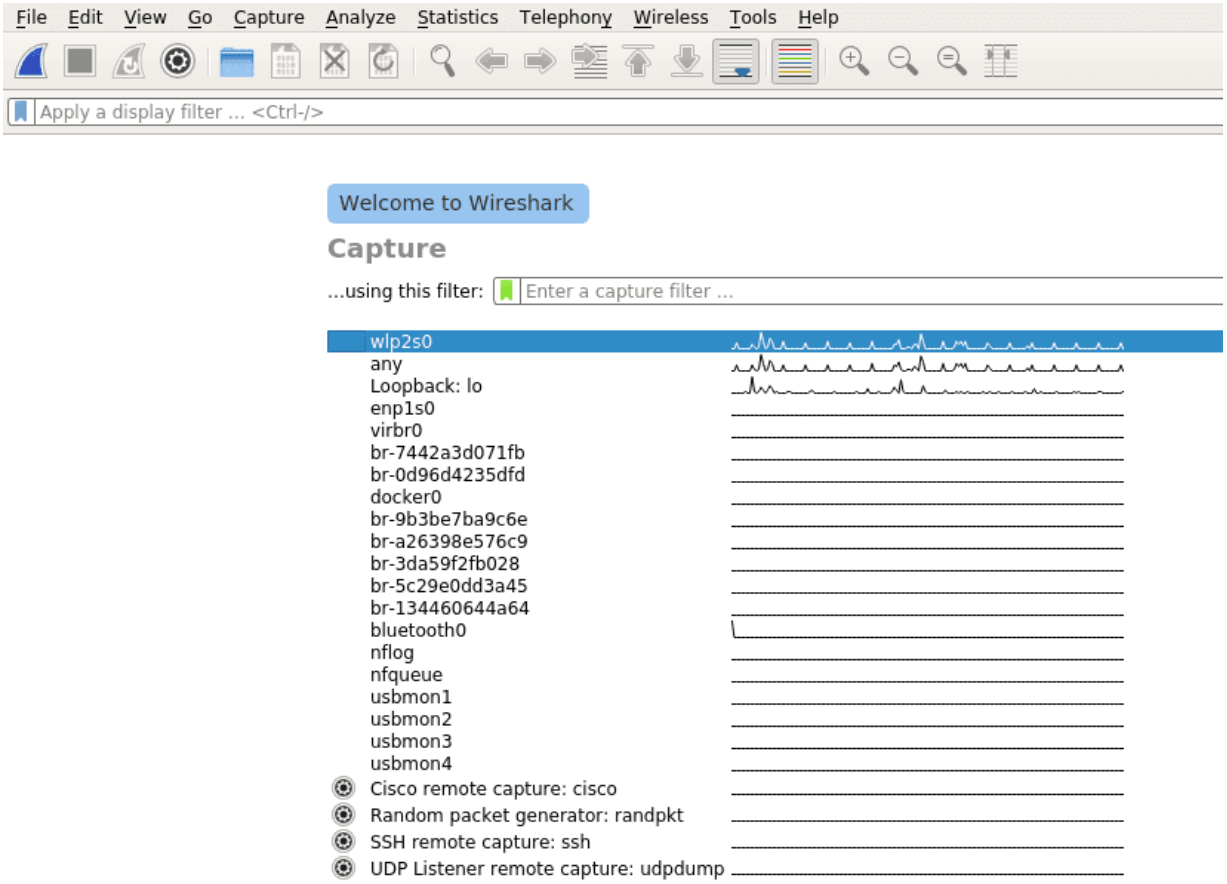
Getting Wireshark

Wireshark is available for Linux, Windows and Mac through the official website. Formore information about building Wireshark from source please take a look at the official developers guide.

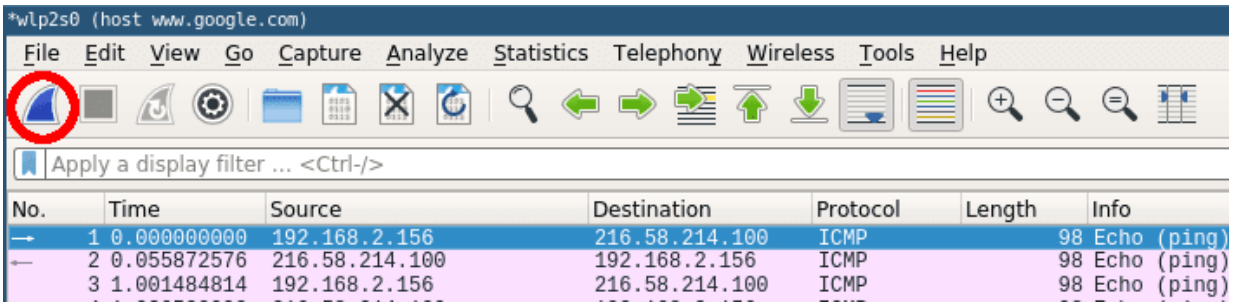
Running Wireshark

Depending on your operating system and user settings you might have to run Wireshark with admin privileges to capture packets on your network. If your welcome screen is blank and does not show any network interfaces it usually means that your user account is lacking the necessary access rights.

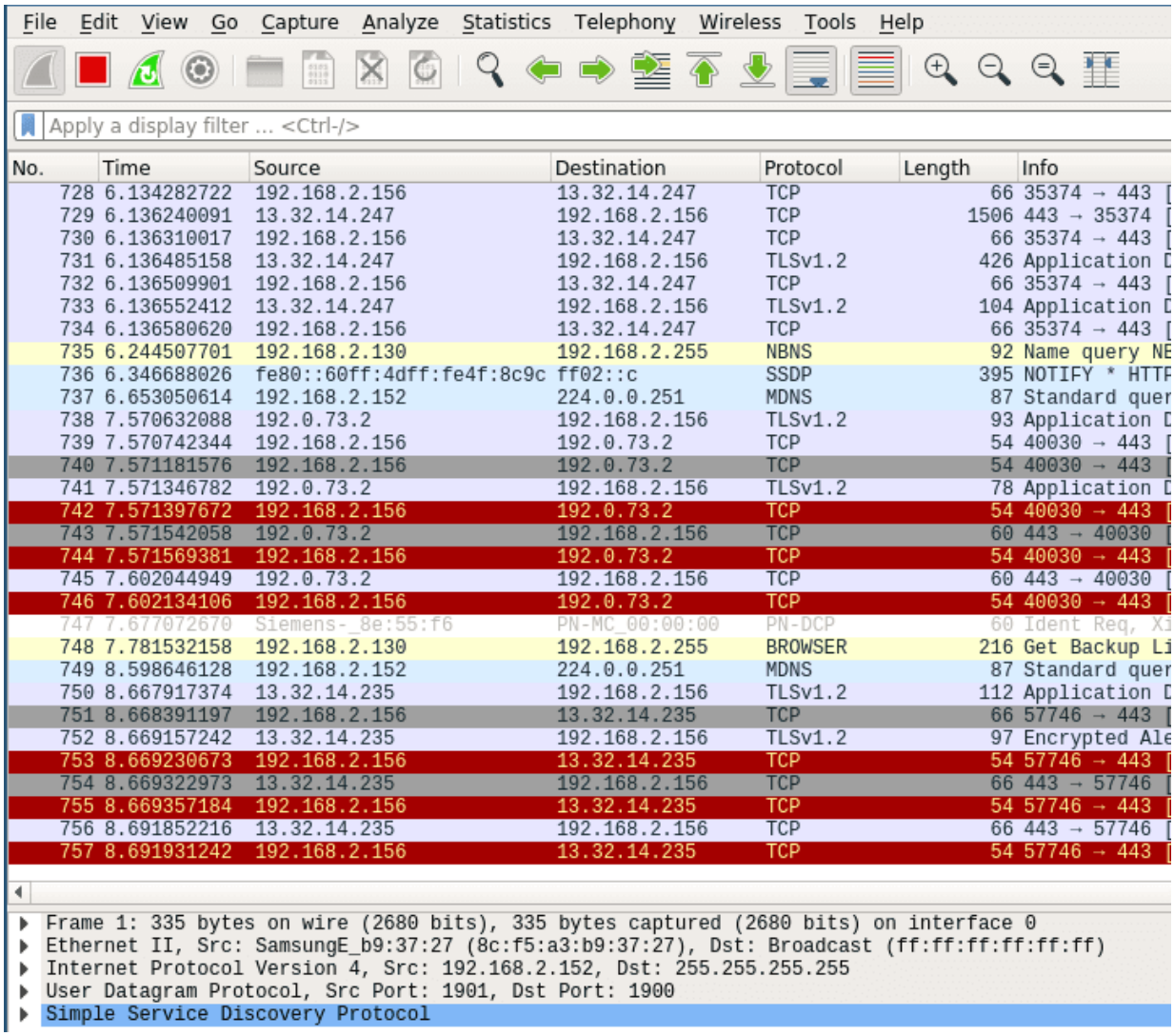
Your first capture



Once Wireshark is started you will be greeted by a welcome screen like the one shown above listing all available network connections. A small traffic preview is shown next to the interface names so it is easy to distinguish between interfaces with or without direct network access. To finally start capturing data on your network you first have to select one or more of these network interfaces by simply clicking on them. To select multiple interfaces at once just hold down ctrl and select all interfaces you want to listen on. Once selected you can start recording packets by clicking the start icon in the top left of the user interface.



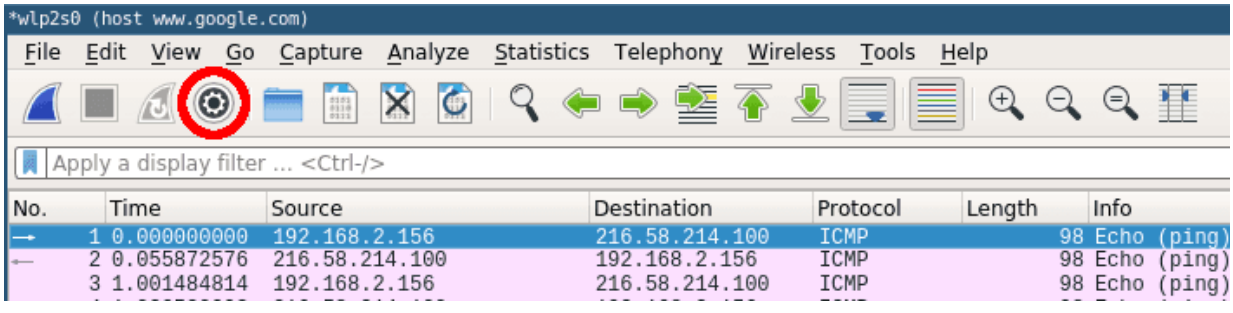
The window will change to the main capturing view and immediately display everything passing the network on your selected capturing device as see below.



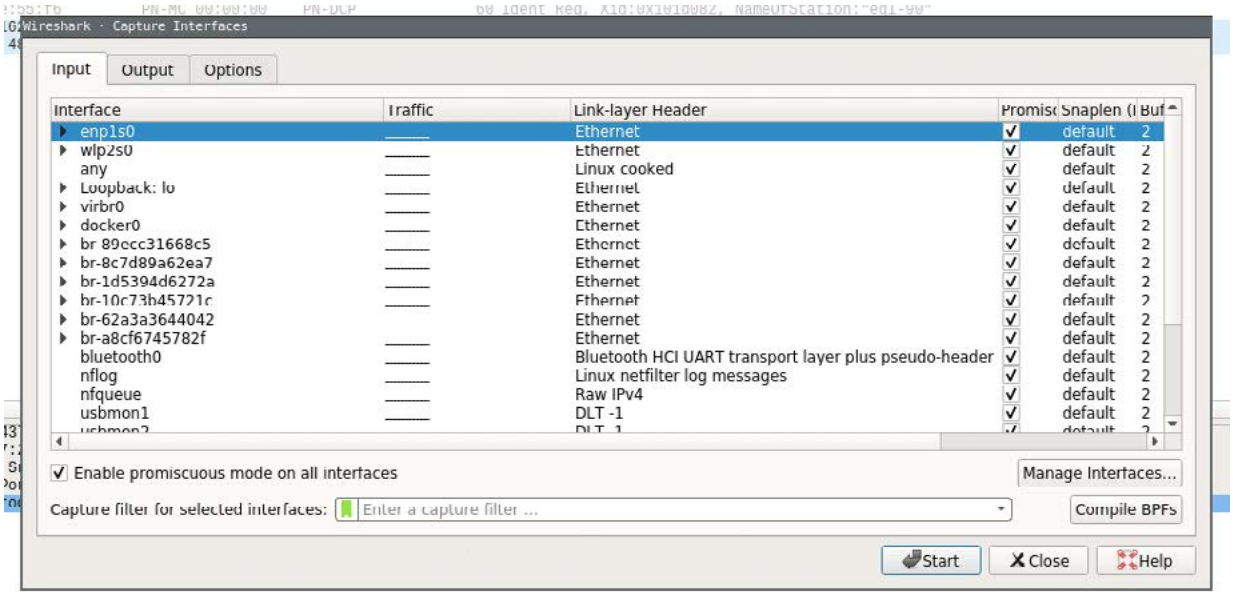
Stop the current capturing process by clicking on the red stop button.

Filtering Traffic

Even the smallest network will produce a lot of static data that can result in very large capture files. To avoid slowdowns you should not capture unfiltered network traffic. To do so open the capture configuration window by clicking on the cogwheel icon.



This will open the capture configuration menu. This menu provides options similar to those you already saw on the welcome screen. You can select network devices, set capture filters and configure the capturing process. This time we want to apply a filter before we start capturing data. Select the network interface of your choice and just type ‚tcp' into the capture filter dialog box on the bottom of the configuration window like below.



Now when you now start capturing again only packets applicable to the tcp protocol filter are captured and displayed.

More on Filters

Wireshark provides a powerful filter language which not only allows you to narrow down the packets you want to capture but also to sort, follow or even compare their content. This section will only scratch the surface of what is possible with Wireshark so for the time being please consult the Wireshark Wiki for further information about creating filters.

It is a common mistake to believe that capture filters and display filters work the same way in Wireshark. While capture filters change the outcome of the capturing process, display filters can be applied to already running capturing processes to narrow down what to display. Furthermore they use different filter language syntax.

Capture filter example

To narrow down our captured data to only include packets from a certain ip range:

```
src net 192.168.2.0/24
```

Display filter example

The same can be done to filter the already captured data in the main window:

```
ip.addr == 192.168.2.0/24
```

Combining filters

To find exactly what you are looking for on your network you can concatenate different filters. If you want to capture packets from a certain host and port you can simply add both filters together:

```
host 192.168.2.100 and port 20
```

You can specify data that you want to explicitly exclude:

```
host www.google.com and not (port 20 or port 80)
```

This would only capture data from a certain host which is not transferred on port 20 or 80.

Collecting data

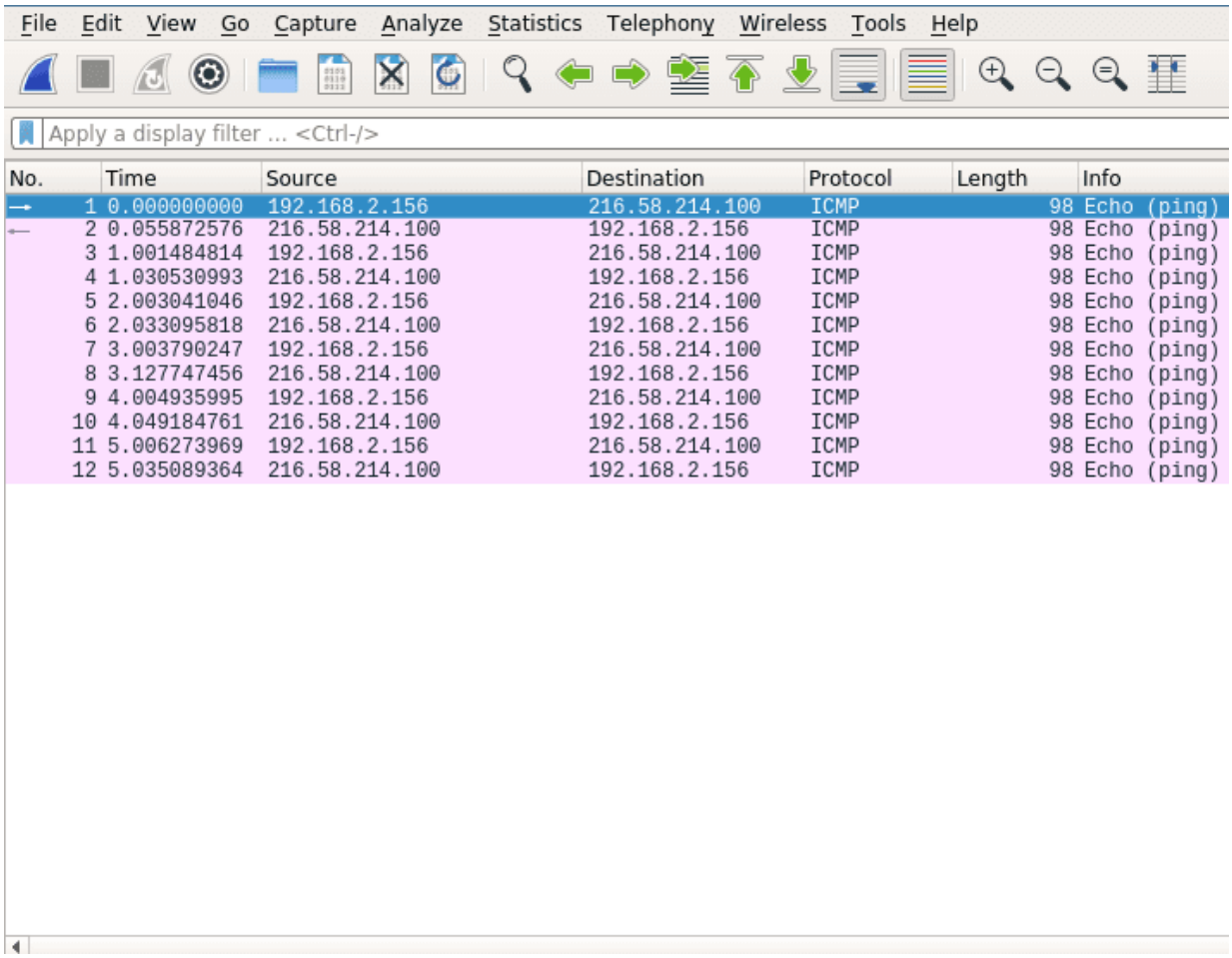
A standard example to see actual network traffic is to ping a host and collect the data.
Just run a capture and set the capture filter to the host you are going to ping (www.google.com would be a popular choice).

```
host www.google.com
```

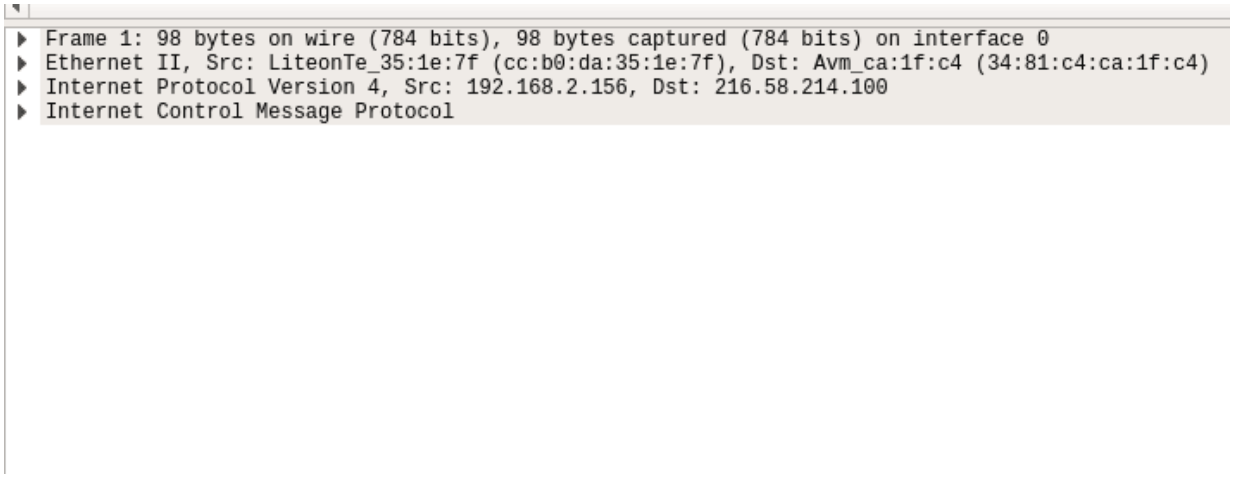
Go ahead and start the capturing process. Without any connections to your host open the main window should stay empty for now.
Next open a terminal window and ping the host you specified in the capture filter. Within a few moments you should see the first packets.
Once you have captured some packets press the stop button.

Analyzing at the data

After collecting data the user interface contains three main parts. Those being the packet list pane, the packet details pane and packet bytes pane.
On top is the packet list pane. This view displays a summary of all the captured packets. You can choose any of the packets by just selecting and the other two views will adapt to the selection. Go ahead and select any of the packets and notice how the other two views change.



The one in the middle is the packet details pane. It shows more details about the packets you select in the packet list pane.



On the bottom the packet bytes pane displays the actual data transferred in the packets.

```
0000  34 81 c4 ca 1f c4 cc b0  da 35 1e 7f 08 00 45 00   4....... .5....E.
0010  00 54 8d 63 40 00 40 01  3b 62 c0 a8 02 9c d8 3a   .T.c@.@. ;b.....:
0020  d6 64 08 00 28 9d 4e 69  00 01 3a ca 7e 5b 00 00   .d..(.Ni ..:.~[..
0030  00 00 03 00 06 00 00 00  00 00 10 11 12 13 14 15   ........ ........
0040  16 17 18 19 1a 1b 1c 1d  1e 1f 20 21 22 23 24 25   ........ .. !"#$%
0050  26 27 28 29 2a 2b 2c 2d  2e 2f 30 31 32 33 34 35   &'()*+,- ./012345
0060  36 37                                             67
```

Using these sections you can view the traffic and break it down for analysis.

Summary

Wireshark is a powerful network packet analyzer. It offers everything you need to capture, filter and view your local network traffic. After reading through this article you should have all the basic knowledge necessary to create and filter simple captures.

LEARN MORE

- Official Wireshark learn platform

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