Network Monitoring SOP (Wireshark):

Purpose:

Process to implement Wireshark to monitor network activity to identify nefarious activity or employee misuse.

Scope:

Wireshark will be utilized to monitor all network activity within the organization’s infrastructure.

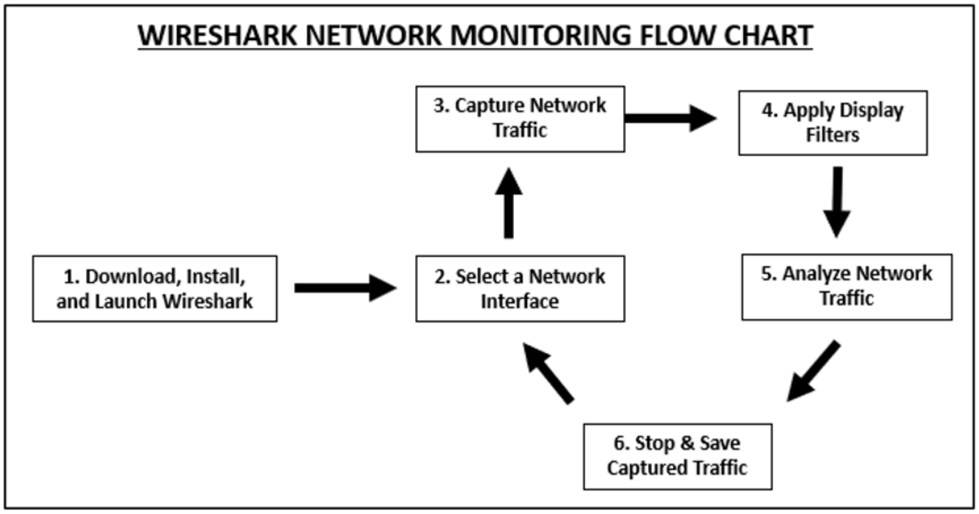
Responsibilities:

Information Technology (IT) department has sole responsibility for monitoring the organization's network. IT Department is required to conduct real-time monitoring of traffic based on an established network baseline.

Prerequisites:

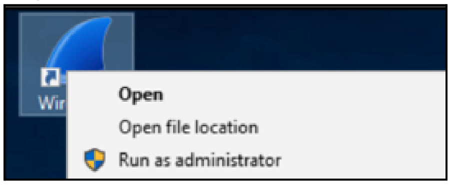
Wireshark - world's most popular network protocol analyzer
Wireshark should be run as an administrator for full functionality.

Procedure:


WIRESHARK NETWORK MONITORING FLOW CHART
1. Download, Install, and Launch Wireshark
2. Select a Network Interface
3. Capture Network Traffic
4. Apply Display Filters
5. Analyze Network Traffic
6. Stop & Save Captured Traffic

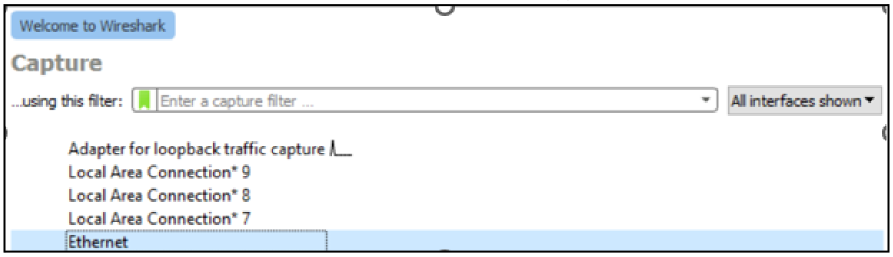
· **1. Download, Install, and Launch Wireshark**

- Download Wireshark from the official website wireshark.org (Wireshark)
  - Ensure you select the correct install file for your Operating System (OS)
  - Select all defaults during installation wizard
- Launch Wireshark as an administrator
  - Right click on icon > Select Run as administrator



· **2. Select a Network Interface**

- After launch available network interfaces are displayed
  - Left click twice on the network interface you would like to monitor



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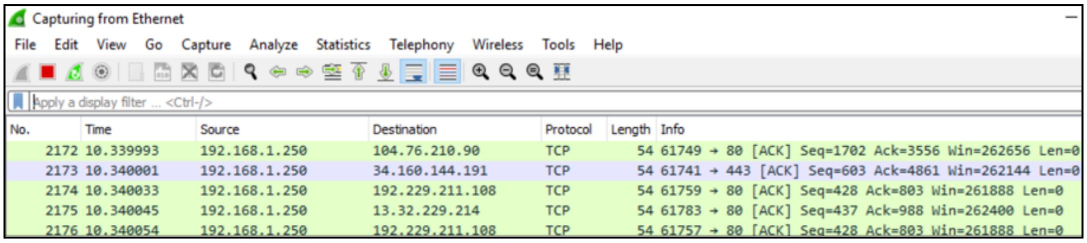
3. Capture Network Traffic

- After selecting the appropriate network interface packet capture initiates

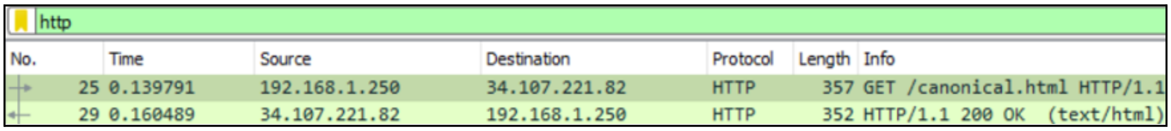

Capturing from Ethernet
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>

```
No.     Time        Source          Destination       Protocol Length Info
   2172 10.339993   192.168.1.250   104.76.210.90     TCP        54 61749 → 80 [ACK] Seq=1702 Ack=3556 Win=262656 Len=0
   2173 10.340001   192.168.1.250   34.160.144.191    TCP        54 61741 → 443 [ACK] Seq=603 Ack=4861 Win=262144 Len=0
   2174 10.340033   192.168.1.250   192.229.211.108   TCP        54 61759 → 80 [ACK] Seq=428 Ack=803 Win=261888 Len=0
   2175 10.340045   192.168.1.250   13.32.229.214     TCP        54 61783 → 80 [ACK] Seq=437 Ack=988 Win=262400 Len=0
   2176 10.340054   192.168.1.250   192.229.211.108   TCP        54 61757 → 80 [ACK] Seq=428 Ack=803 Win=261888 Len=0
```

- Capture remains active until red square STOP button is selected

4. Apply Display Filters

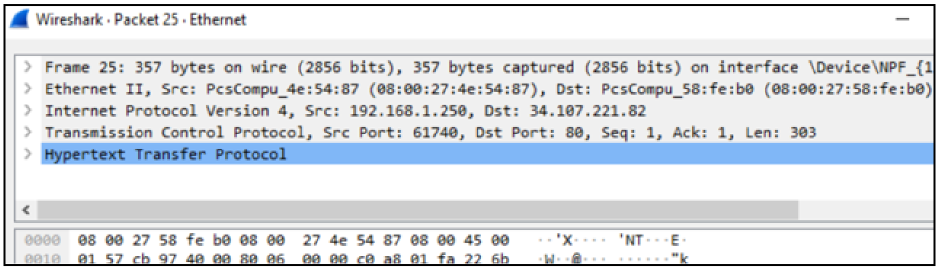
- Filters can be applied to look at specific traffic to include specific protocols
    - Below Wireshark's filtering is used to only observe HTTP traffic



```
http
No.     Time       Source          Destination     Protocol Length Info
     25 0.139791   192.168.1.250   34.107.221.82   HTTP        357 GET /canonical.html HTTP/1.1
     29 0.160489   34.107.221.82   192.168.1.250   HTTP        352 HTTP/1.1 200 OK  (text/html)
```

5. Analyze Network Traffic

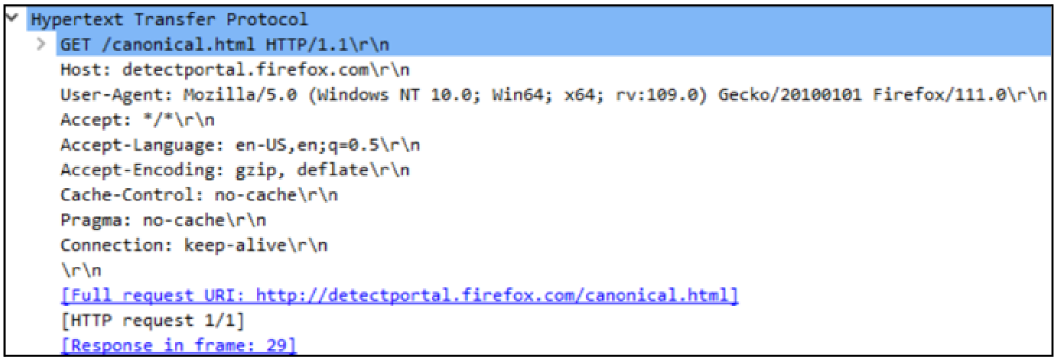
- To analyze a specific packet left click twice on the packet to select it



```
> Frame 25: 357 bytes on wire (2856 bits), 357 bytes captured (2856 bits) on interface \Device\NPF_{1
> Ethernet II, Src: PcsCompu_4e:54:87 (08:00:27:4e:54:87), Dst: PcsCompu_58:fe:b0 (08:00:27:58:fe:b0)
> Internet Protocol Version 4, Src: 192.168.1.250, Dst: 34.107.221.82
> Transmission Control Protocol, Src Port: 61740, Dst Port: 80, Seq: 1, Ack: 1, Len: 303
> Hypertext Transfer Protocol

0000  08 00 27 58 fe b0 08 00  27 4e 54 87 08 00 45 00   ··'X····  'NT···E·
0010  01 57 cb 97 40 00 80 06  00 00 c0 a8 01 fa 22 6b   ·W··@···  ······"k
```

- Once selected several headings can be expanded to observe additional details
    - In the example below the HTTP heading is expanded which provides us more detailed information on the HTTP GET request packet



```
v Hypertext Transfer Protocol
  > GET /canonical.html HTTP/1.1\r\n
    Host: detectportal.firefox.com\r\n
    User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0\r\n
    Accept: */*\r\n
    Accept-Language: en-US,en;q=0.5\r\n
    Accept-Encoding: gzip, deflate\r\n
    Cache-Control: no-cache\r\n
    Pragma: no-cache\r\n
    Connection: keep-alive\r\n
    \r\n
    [Full request URI: http://detectportal.firefox.com/canonical.html]
    [HTTP request 1/1]
    [Response in frame: 29]
```

- **6. Stop & Save Captured Traffic**
    - Left click on the red square STOP button to halt the capture
        - To save capture left click File > Save As… > Name .pcap file and select Save

References:

- How to Use Wireshark to Capture, Filter and Inspect Packets
- What Is a Network Interface?
- Display Filters
- PCAP: Packet Capture, what it is & what you need to know

Definitions:

- **Network Interface** - interconnection between a computer and a private or public network
- **Display Filters** - for general packet filtering while viewing
- **Pcap** – application programming interface (API) that captures live network packet data

Revision History:

4/4/2023 -- "Network Monitoring SOP" created by Rob Gregor
4/6/2023 – "Network Monitoring SOP" updated by Rob Gregor