Basic Wireshark Intro

Debug Project 1 by capturing and analyzing packets

Administrivia

- HW2 is released on Gradescope
  - Due on Monday April 26
- Project 1 due on Monday
  - Today: a short section followed by additional office hours

Wireshark

Download: https://www.wireshark.org/download.html

- Also available in most Linux package managers

User's Guide: https://www.wireshark.org/docs/wsug_html_chunked/

What is Wireshark

It's a tool that captures and analyzes packets sent over the network

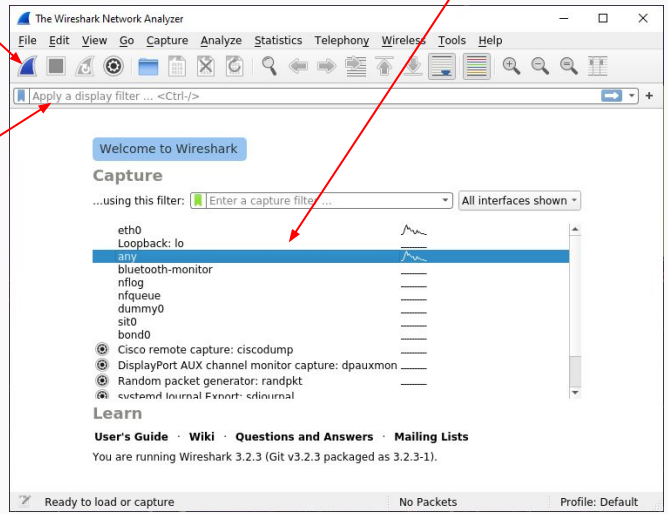
- Very commonly used in Network Forensics
- Captures all packets through a network interface (ethernet, WiFi)
  - Can capture packets on all network interfaces at the same time
- Analyzes packets and decodes raw data if the protocol is recognized
- Filters packets based on user's input

Wireshark Interface

Start Packet Capture

Interface Selection

Display filter for captured packets



Debugging P1 with Wireshark

Lots of packets are being sent while your computer is connected to a network.

- *Filtering packets to/from **attu's IP address***
  - How to find the IP address of attu?
    - Run `ifconfig` on attu (through SSH)
    - `nslookup attu2.cs.washington.edu` (from any computer)
    - traceroute will print out the IP address as well
  - `ip.addr == 128.208.1.138`
- *Filtering on the **port number***
  - `udp.port == 12235`
  - `tcp.port == portNumber`
- *Applying boolean logic to combine filters: ==, &&, ||, !*
  - `ip.addr == 128.208.1.138 && udp.port == 12235`
    - Will only show packets to/from attu2 on udp port 12235

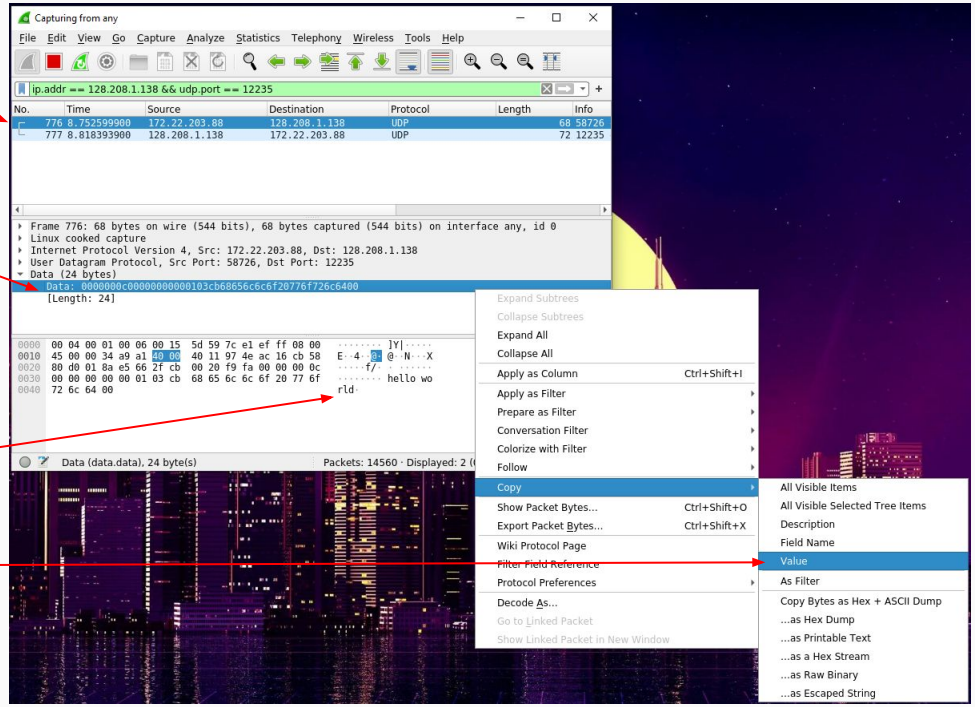
Wireshark Captured Packets Interface

Captured packets

Hexadecimal data contained in the UDP packet

ASCII Decoding of data

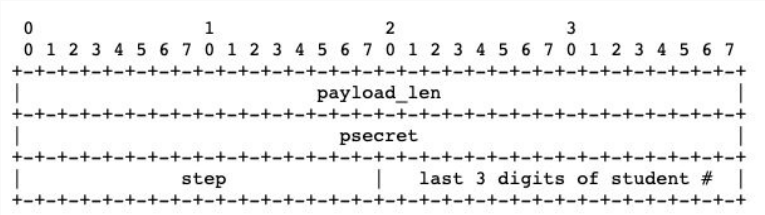
Copy data value as hexadecimal string



Debugging using Hex Dumps

The data structures in p1 aren't recognized by Wireshark

- You will only be able to view the data you sent in hexadecimal or binary format
  - It will attempt to decode ASCII data - so you should see 'hello world' at the end of the first packet
- Viewing the integer values of data will require manually decoding/converting from bytes



Debugging using Hex Dumps

- Copy the hexadecimal string of data from wireshark
- Python console can be handy for decoding - or use any other tool you like
  - `pbytes = bytes.fromhex('0000000c00000000000103cb68656c6c6f20776f726c6400')`
    - Be mindful of endianness - wireshark displays data in Big Endian
    - Make sure the endianness of what you copied matches what is displayed in Wireshark
  - You can now take slices from pbytes and convert them to the appropriate types
    - `header_payload_len = int.from_bytes(pbytes[0:4], byteorder='big')`
    - `header_student_id = int.from_bytes(pbytes[10:12], byteorder='big')`