

Assignment 4 (Due Mar 27th)

Both security experts and attackers study network traffic to search for vulnerabilities. In this Lab, you will examine a network traffic trace, commonly known as a “pcap” file, to identify suspicious behaviors, e.g., *port scanning*.

Port scanning is a technique used by attackers to find vulnerable hosts that have services listening on certain ports. In a SYN scan attack, the scanner sends TCP SYN packets and wait replies from hosts that send back SYN+ACK packets. Since most hosts are not prepared to receive connections on any given port, during a port scan, a much smaller number of hosts will respond with SYN+ACK packets than originally received SYN packets. By observing this phenomenon in a trace file, you can identify source addresses that may be launching a port scan.

You are asked to develop a Java program, e.g., `scannerfinder.java`, which analyzes a pcap file in order to detect possible SYN scans. You might want to use a library for packet manipulation and dissection, e.g., jNetPcap. The jNetPcap library is available at <https://sourceforge.net/projects/jnetpcap> or <https://github.com/ruedigergad/clj-net-pcap> (the original jnetpcap.com page is down for unknown reason). You can find more information about parsing a .pcap file via <https://javatutorial.net/tag/jnetpcap> (there are quite a few such pages on Google). Your program will take the pcap file to be analyzed as a command-line parameter, e.g.,

```
java scannerfinder ./capture.pcap
```

The output of your program should be the set of IP addresses (one per line) that sent more than 3 times as many SYN packets as the number of SYN+ACK packets they received. A sample .pcap file captured from a real network can be downloaded from D2L (under Assignment 4). This trace file is provided by the LBNL/ICSI Enterprise Tracing Project. For this input, part of your program’s output should look like (order of IP addresses could be different):

```
128.3.23.5  
128.3.164.249  
128.3.23.158
```

Submit your solution, the `scannerfinder.java` file as well as the `output.txt` file, on D2L and put your names in the comment section of both files. You could assume that jNetPcap library is available on the grader’s computer.