Network Programming Laboratory

18 November 2022

Exercise

In the following you will implement a simple monitoring application for Linux to investigate how many IP packets and TCP segments carry the option field filled. You are requested to develop the traffic probe in two different ways.

Single Traffic Processor. A working thread captures the traffic and updates a stats record reporting:

- the number of IP packets carrying the option field filled
- the number of TCP segments carrying the option field filled
- the number of IP packets seen
- the number of TCP segments seen

A second thread reads the statistics and prints on screen every 5 seconds the percentages of IP and TCP packets with non empty option field.

Multi-Worker Traffic Processor. The traffic is distributed to a set of N working threads.Each thread captures traffic and updates its own stats record[1] reporting:

- the number of IP packets carrying the option field filled
- the number of TCP segments carrying the option field filled
- the number of IP packets seen
- the number of TCP segments seen

An additional thread reads the statistics and prints on screen every 5 seconds the percentages of IP and TCP packets with non empty option field for each thread as well as the aggregate values.

1. Write a C++ program that implements the *Single Traffic Processor* on the traffic captured from a network interface. Use one of the available network I/O frameworks (e.g., `AF_PACKET`, `pcap`) at will.
2. Write a C++ program that implements the *Multi-Worker Traffic* Processor on the traffic captured from a network interface. In this case you must use the `AF_PACKET` socket. Why?

Note: all library functions from the NPL repository developed in the course can be used.

[1] Note: each working thread has its own stats record