Chair of Network Architectures and Services
Department of Informatics
Technical University of Munich

Thesis B.Sc.
Thesis M.Sc.
IDP

High Preci- sion Profiling of Network Paths

Motivation

To analyse the efficiency of routing algorithms together with TSN [2] on the networking path in a precise way is difficult with information such as positions of packets, qeueue filling level, and coinicidences between packets. Changing the payload or other important content of the packets is not possible, as the applications still need to be able to process them. A way is needed to generate and process data such as precise timestamps on ingress and egress of each node in the network and collect them together without loosing the information of packet and flow connections.

Moreover, using techniques such as eBPF together with XDP and Linux TC it is possible to access packet data at a early point and add information to the packet [1]. Furthermore, there are protocols such as Parallel Redundancy Protocol [3], which add information to the packet at points, which do not change the relevant payload part and do not bother the end-applications.

The aim of thesis is to implement a proof of concept for a new Protocol called Flexible Profiling Protocol using the concepts of adding information to a packet based on , develop the eBPF code to use the protocol and perform first analysis of the network path using the newly generated implementation of the protocol.

Your Profile

- General interest in computer networks
- Experience with C Programming
- Interest in Kernel Programming

Your Tasks

- Conducting research on profiling Packet paths
- Impelement the proof-of-concept for Flexible Profiling Protocol
- Analyse the possible results
- Evaluate and discuss the potentials of this solution

Literature

[1] A. Deepak, R. Huang, and P. Mehra. ebpf/xdp based firewall and packet filtering. In *Linux Plumbers Conference*, 2018.

[2] N. Finn. Introduction to time-sensitive networking. *IEEE Communications Standards Magazine*, 2(2):22–28, 2018.

[3] M. Rentschler and H. Heine. The parallel redundancy protocol for industrial ip networks. In *2013 IEEE international conference on industrial technology (ICIT)*, pages 1404–1409. IEEE, 2013.

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