Implementation and Performance Evaluation of PDM using eBPF

draft-elkins-ebpf-pdm-ebpf-00

Amogh Umesh
Chinmaya Sharma

IETF-119 maprg Meeting @ Brisbane, AU
Objective

- Exploration of use of eBPF in networking
- Implementation of IPv6 extension headers in eBPF
- Performance analysis of eBPF implementation over traditional kernel implementation
- Analyze performance overhead of eBPF implementation and optimize

Interested Working Groups,
- bpf WG
- v6ops WG

IETF 119 Agenda Slots,
- bpf wg
- v6ops wg
- map rg
- IEPG
Work Done

- Implementation of PDM extension header in eBPF (using tc bpf)
- Performance Analysis of eBPF program contrasted with kernel implementation of PDM
  - CPU Cycles
    - eBPF program: $8.60 \times 10^{10}$ cyc.
    - Kernel program: $2.29 \times 10^9$ cyc.
  - Network Throughput
    - Without PDM: 18.80 Gbps
    - Kernel PDM Implementation: 18.52 Gbps
    - eBPF Implementation: 18.03 Gbps
  - Packet Processing Latency (per packet)
    - PDM Kernel Implementation - 0.707 µs
    - eBPF Implementation - $(5.808 - 4.528)$ µs = 1.28 µs