

Title: Using Programmable Chip and Open Source Software to disaggregate Network Packet Broker (NPB) and 5G UPF

Abstract:

SK Telecom is trying to enhance flexibility in the network infrastructure toward 5G mobile network to satisfy unprecedented use cases that require ultra-low latency and high throughput. To this end, SKT and our technical partner, Kulcloud who is an innovative SDN solutions company focused on bringing high performance and highly scalable virtual network service to 5G mobile networks., are focusing on programmable chip such as a programmable switching ASIC and FPGA, as well as P4 data-plane programming language. In this talk, we introduce our work on disaggregating Network Packet Broker (NPB) and offloading 5G UPF (User Plane Function).

High-end NPB is a proprietary and multi-million-dollar network appliance to aggregate, packet-process and distribute traffic from production network to out-of-band network analyze tools. In this talk, we share an experience on P4 (a high-level data-plane programming language) and Barefoot Tofino (Programmable Ethernet Switching ASIC) to implement npb.p4- 16. It includes not only basic features of NPB such as filtering and load balancing, but also Telco specific features including GTP inner header-based load balancing and 64b h/w timestamping. Soon npb.p4-16 will include h/w metadata generation and GTP session aware traffic steering and load balancing which are now experimenting. We share our current status of npb.p4-16 going to production. Finally, we will introduce and want to discuss a research topic to support more advanced features such as regex matching and packet deduplication using FPGA.

We present PRISM-P4 solution that can accommodate existing Openflow-based SDN applications and Linux-based network applications with network disaggregation way. Network disaggregation gives customers the freedom to choose switch hardware and to use & develop software applications. PRISM-P4 allows new functions developed in P4 language to be used directly in Linux, allowing 5G functions to be easily extended and interoperable. Based on this, Kulcloud is developing and testing the hardware-accelerated UPF and INT-based fabric solution at the commercial level with the customer.

Finally, we introduce our activity on P4 and Programmable Chip for ecosystem in S.Korea.