

Title: Managing In-band Network Telemetry: ONOS INT Service and XDP

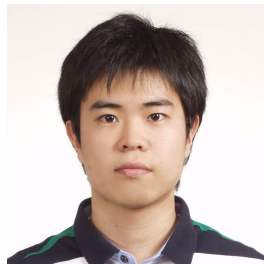
Abstract:

INT enables to collect packet-level network telemetry. To collect network telemetry efficiently using INT, it is required to have a centralized management system to control INT monitoring behavior. However, the implementation of INT-capable pipeline may vary, and non-P4-capable device can also support INT. Therefore we need a way to control heterogeneous INT-capable devices. Besides, the number of reports sent to the collector is too big.

In this work, we introduce an INT management service, using ONOS (Open Network Operating System) to manage heterogeneous INT-capable devices. ONOS INT service exposes northbound APIs to network applications to specify traffic slices to monitor, types of metadata to collect, and the information about collectors. On the other side, ONOS INT service exposes an interface called `IntProgrammable`, which is the common interface for both P4-capable and non-P4-capable devices. Each device driver implements this interface and then is provided to ONOS, so that ONOS INT service can manage heterogeneous INT-capable devices using a single interface.

We also implement a collector that can process high throughput of INT reports. `eXpress Data Path (XDP)` works at the lowest level of the kernel, right after the report packets are sent to the Collector machine. By this way, we do not waste CPU cycle for passing packet through network stack and switching between kernel and user space. The XDP program process reports at high speed and sends only useful information (such as network events, traffic statistic) to the user space program. The user space program gets the information and sends to monitoring servers such as InfluxDB or Prometheus.

Bio of the Speakers:



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Jonghwan Hyun is a Ph. D. candidate in the Dept. of Computer Science and Engineering at POSTECH. He also received his B.S. in the Dept. of Computer Science and Engineering at POSTECH. His research interests include network traffic monitoring and analysis. He is currently working at ONF (Open Networking Foundation) as an intern, participating P4 and Trellis project.



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