ABSTRACT

The Simple Network Management Protocol (SNMP) has been used since 1990 for network management and is widely supported by network devices. The “pull the data” mechanism used in SNMP uses the request response method, the process affects processing time, the size of the SNMP request response header affects storage overhead, and generally runs on the CPU so that it slows down device performance.

Streaming network telemetry is a new approach to monitoring network conditions, using the ”push the data” method where the device as an agent sends data continuously in realtime to a centralized platform and using SDN technology with a bottom-up programming approach, the commonly used tool is NetFlow or sFlow. However, due to streaming, it results in high size overhead and the bottom-up method is limited only to the features provided (fix tables, pipelines, matching fields), while operator requirements are increasingly complex, such as end-to-end visualization.

To solve this problem is to use In-band Network Telemetry (INT), by inserting a small amount of information (INT header) directly into packets that pass through network devices based on flows, packets, protocols, to high-level names. This allows for end-to-end visualization. The top-down programming method allows for INT, the P4 language is the programming language to support this. This research was conducted to analyze the performance of In-band network telemetry on P4-based programmed network infrastructure.

Based on the results obtained in this study, P4-INT can reduce storage overhead compared to sFlow-RT and port-mirroring, but if there is only one traffic it is better to use sFlow-RT. In P4-INT every packet passing through a network device is appended with an INT header, causing protocol overhead, although in P4-INT there is protocol overhead, allowing hop latency for end-to-end visualization.

Keywords: SDN, P4, In-Band Network Telemetry, ONOS, P4Runtime