Paper review [1]

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1. The Problem

These years, the network is associated with our life in each area. As a result, it is hard to implement new idea in practice to test, because the enormous installed base of equipment and protocols and the reluctance to experiment with production traffic. And because the lack of test, there is hard to gain confidence for deploy. Therefore, we need an approach for researchers to run experimental protocols in network. That is OpenFlow.

2. Challenge

There has been the visualized programmable network before OpenFlow, while the range is very limited, because it is costly to facilitate it nationwide. So the main challenge is how to run experiment in the campus network. The persuade commercial equipment vendors restricts the flexibility of the switch. And the open software platform does not have the enough performance or port density. Even if they use the specialized hardware for line-rate processing it is insufficient for use. So we need a more promising approach to maximize the switch flexibility.

3. Key Insight

The paper mainly demonstrated OpenFlow in two aspects, the architecture and the example.

The paper exploits the fact that most modern ethernet switches and routers contain flow-tables and the OpenFlow exploits the common set of the different functions on them. And OpenFlow provides an open protocol to program the flow table in different switches and routers which means the researches could change choose their own routers and run their protocols. What's more, all the actions on OpenFlow is associated with each flow entry recorded on the flow table.

An OpenFlow switch consist three parts, flow table, secure channel and OpenFlow protocol. And the switch is divided into dedicated OpenFlow switch and OpenFlow-enable switch. The first one is a dumb datapath element that forward packets between ports and the second one is the other switches or routers enhanced with the OpenFlow feature. And with some additional feature and controllers the OpenFlow could realize a efficient, flexible and scalable programmable network.

4. Limitation

There are two main limitation for the OpenFlow. One is the OpenFlow in implementation is not secure as the paper Limitations of OpenFlow said because of the switch spoofing, link fabrication and controller fingerprinting. What's more, the implementation is also not as efficient as the paper said because there is no much evaluation on it in the paper to show how the switch could work in practice.

5. Future Work

The paper mainly focused on the theory and the example but not the real implementation and its evaluation, so the future work should focus on how to make the OpenFlow could work efficiently and stably in practice.

[1] M. Nick, A. Tom, B. Hari, P. Guru, P. Larry, R. Jennifer, S. Scott, T. Jonathan (2008). OpenFlow: Enabling innovation in campus networks. *ACM.SIGCOMM Computer Communication Review 38(2):69-74. April 2008*