

Deployment of Monitoring Functions in a Software Defined Network

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Key words : *SDN – Monitoring – Scripting – Ansible – Grafana – ODL – Prometheus*

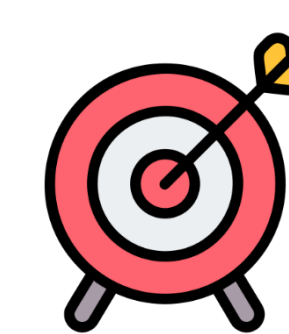
About TNO



TNO is a dutch organization for applied scientific research. It has 24 sites in the Netherlands and also 1 in Belgium and 1 in Japan. More than 3500 employees work at TNO. The organization is divided in 6 main units :

- Mobility & Built Environment
- Energy & Material Transition
- Defense, safety and security
- Healthy living & work
- High Tech Industry
- ICT, Strategy Policy

Objectives of the Internship



- Learn about Software Defined Network (SDN)
- Establish a strategy to monitor the state of the devices on a Software Defined Network (SDN)
- Develop code to retrieve and display the topology of the network
- Create user friendly interfaces for the network administrator
- Deploy automaticaly the different through scripting

Work Done



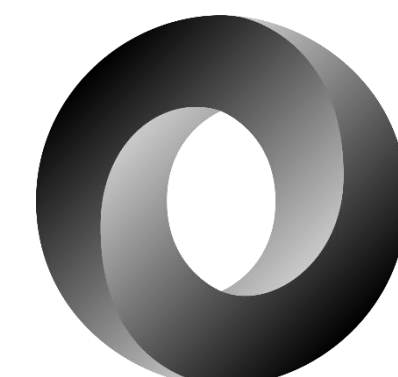
Import metrics from the devices



Importing the metrics from the different devices is the core component of our project. To efficiently monitor our devices, the main metrics that we pull are the actual bandwidth and the capacity of every links.

Technologies used: Prometheus, SNMP, sFlow

Retrieve the topology



It is important for the network administrator to see the topology of the network. In order to get it, and as in the context of SDN, we can request this information to the network controller.

Technologies used: OpenDayLight, REST API

Display the results



To have a powerful graph we fuzed the metrics pulled from the devices with the network topology.

That way, the network administrator can see in one graph the topology as well as the usage percentage of every links.

Technologies used: Grafana, Javascript

Automatic deployment



Scripting is an important part of work. It allows us to deploy easily our monitoring features on different architectures without needing someone to install everything manually

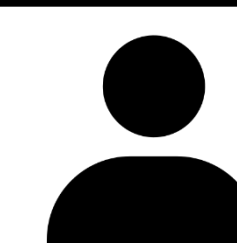
Technologies used: Ansible

Technical developpement



- Software Defined Network
- Monitoring functions
- Ansible scripting
- New technologies

Personal developpement



- Expressing in English
- Discovering a new culture
- Being independant
- Confirmation of my professional project

Conclusion



To conclude, this professional experience abroad was very interesting and enriching as much technically than personally. I had the opportunity to meet people pationate about their work and it reinforces my wish to be a network engineer in the future.

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