Name: Eshwar N Kumar
UB Person Number: 50360363
UB Email ID: eshwarna@buffalo.edu

Date: 5/16/2022
Course: Independent Study(CSE700)
Professor: Bina Ramamurthy

Project Name: Nokia Optical Management APIs and Services

Project Overview:

Nokia Optical Management System consists of 2 units. The first is Network Functions Manager for Transport (NFMT) and Network Resource Controller for Transport (NRCT).

NFMT centralizes multiple network management and operations functions in one unified platform for the Nokia Optical Portfolio. It allows network planning and operations staff to plan, deploy, and manage the network over the total life cycle. NFMT has REST APIs for the software developers to integrate with their applications.

NRCT interworks with NFMT to form a carrier software defined networking (SDN) platform that unifies service automation with network optimization, allowing network operators to deliver on demand network services cost effectively and with scalability. Using NRCT, operators can define, provision, and activate network services across networks that span multiple layers from Layer 0 to Layer 2. NRCT is scalable and based on standard protocols with industry standard REST APIs.

The project focus is on NFMT REST API Development, Tools development for making the life of Support Engineers easier, and System Administration tasks.

Technologies Used:

Programming Language: Python, Bash
Tools & Technologies: Docker, Git, GitLab, Postman, RESTful Webservices, Pandas, Curl, PyCharm, PowerShell

During the initial few weeks, I had to go through all the existing NFMT APIs and get an understanding of the existing APIs. Then, I developed a python based tool that converts the output of NFMT REST APIs from JSON(JavaScript Object Notation) format to Comma Separated Values(CSV) format. The tool is a wrapper around the NFMT APIs which when called with proper arguments, converts the output of the NFMT API to CSV format and stores the data in a file. I also contributed to the team by developing a few python based APIs for NFMT.

Then, I started working on system administration related tasks. The entire NFMT system was running as a docker container in the customer's application. To simulate the same environment as that of the customer, I was provided with Red Hat Enterprise Linux Virtual Machines. I added the needed configuration to these VMs such as allocating sufficient memory, vCPUs, adding routing and firewall configurations and finally deploy the NFMT instance in the virtual machine.

After this, I started working on development of bash scripts. I was very new to bash and got an opportunity to learn this powerful tool during this Co-op. There were a lot of configuration files in every customer's machine that had to be picked up by the NFMT docker container. It was very important to check if the file in the docker instance is the same as that on the local instance. If there is a difference in the configuration files, then the configuration file must be transferred into the docker instance. In doing so, the task of checking the change in the configuration files became a tedious task. So, I automated it using bash scripts for such files.

Finally, the team was very new to Postman, Git and GitLab. So, I provided Knowledge transfer sessions for each of these topics separately by which the team was highly benefited. I also created cheat sheets for postman and git commands. I created a gitlab project for the team to exchange their code and added all my code into the Gitlab project.

Overall, the team was very flexible and provided me with the freedom to explore new technologies to solve their problems. I also got a chance to learn new technologies which is the ultimate motive of any Co-op. I enjoyed working with the team and very much like the team's culture. I would like to thank the team at Nokia and Prof. Bina Ramamurthy for providing me with this wonderful opportunity.