

## ABSTRACT

Containers are one way to make services on the internet. By using Container, we can make services lighter and fast compared to virtualization. Because it is lightweight, the number of Containers is more than Virtual Machines. Required Container Orchestrator like Kubernetes. But in Kubernetes have several Network performance issues. Due to network are not optimal, because use the same interface for internal and external communication, the selection of tunneling protocols that are less precise, as well as features for monitoring traffic packets on the Kubernetes network.

In this final Thesis will explain about the performance of the Kubernetes network using Software Defined Networking (SDN), using SONA-CNI. SONA-CNI uses centralized network settings so that it can monitor traffic more easily, and separate the network interface used for management and access from the outside. There are 3 tunneling protocols that can be used by SONA-CNI is GRE, VXLAN, and GENEVE. Performance testing by comparing with CNI Flannel and Calico, and comparing the tunneling protocol used.

The test results of the three scenarios tested can be concluded, the large MTU on the network interface affects the tunneling protocol to be used. Only SONA-CNI that provides packet traffic monitoring without installing additional applications and is the best in testing on latency parameters with values around 29.63% - 48.46% smaller than Flannel and Calico. The SONA-CNI throughput parameter is still quite competitive with Flannel and Calico, although it is lower around 4.46% - 31.04%. However, the packet loss parameter SONA-CNI gets an unfavorable percentage of about 23.64% - 290.48% higher than Flannel and Calico.

**Keywords:** *Container, CNI, SDN, Kubernetes, Controller, Tunneling.*