

## ABSTRACT

In this era, we put an immense load to Ethernet networks, especially for *data center* which empowering *cloud* or big network infrastructures in general. However, serve communication with high up-time and maximize the utilization of the network is not always possible considering *redundancy* in *Ethernet* problem is complex because large amount of network resource to be managed. Many solutions developed through years, but not solve the problem properly.

*Software-defined Networking* (SDN) is a paradigm and a dynamic and configurable mechanism which give *programmable* freedom to developer to implement solution which can solved the identified problem. Because of SDN nature, using *programmable open interfaces, control dan management plane*, network become easier and less error prone to configure.

The main objectives of this final project were to implements and evaluates of load balancing and fail-safe on SDN network using static load balancing based on statistic and fail-safe management scheme on Ethernet with redundant link with the data center scenario. The implemented solution using *data center* and SDN controller for calculating the network topology.

The evaluation presented based on the performance and focused on average throughput, packet loss and load standard deviation for load balancing performances, recovery time for fail-safe performances. From the experiment result, EWMA has a better stability compared to SMA based on standard deviation result and avoid N% busiest link has a better average troughput compared to existing solution in all background traffic speed. For fail-safe, the recovery time is 8.3% and 4% faster when link and switch down respectively, compared to existing solution in SDN.

Keywords : SDN, OpenFlow, *fail-safe, redundancy, Floodlight, load balancing, fast fail-over*