

## ABSTRACT

*The growth of the internet is characterized by an increase in the number of users supported by new technology concepts. Implementing Software Defined Network (SDN) in network architectures that handle large-scale services, such as data centers, can support this. These services must be equipped with a load balancer system to prevent server failure in handling a significant increase in traffic simultaneously. Thus, load balancing is developed to distribute network traffic in a balanced and efficient manner.*

*This final project proposes a new algorithm using a P4-Programmable Switch that performs better than the existing SDN algorithm. The implementation uses software with a network topology scaled based on the data center owned by Direktorat Pusat Teknologi Informasi (PuTI) at Telkom University to develop and evaluate the algorithm. The algorithms tested include Round Robin, Weighted Round Robin, and Resource Based. Each algorithm is tested using a performance test and fault tolerance test. The best algorithm is assessed and selected based on the test results and the predetermined solution selection criteria. Overall, this Final Project contributes to proposing high-quality algorithms for data centers implemented in SDN based on a P4-Programmable Data Plane.*

*The test results show that the Resource Based algorithm provides the best performance with throughput reaching 795,5 KBps and response time as low as 27,33 ms, and no request loss. The Resource Based algorithm can distribute requests efficiently and consistently with low variability, making it ideal for data centres with high and varied workloads. These advantages confirm that the Resource Based algorithm is not only capable of handling high workloads efficiently, but also with very high reliability. The flexibility and control provided by SDN with programmable data plane enables rapid adaptation to changing workload and network requirements, improving overall data centre performance and efficiency.*

**Keywords:** *Load Balancing, Data Center, Software Define Networking, P4-Programmable Data Plane, Round Robin, Resource Based, Weighted Round Robin*