Evaluasi kinerja load balancer menggunakan algoritma Round Robin dan Least Connection berbasis Docker Swarm

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Abstract
The use of clustering technology in virtualization environments increases server capacity and performance without adding physical servers. In this context, the open-source Haproxy platform is used as a web server load balancer engine that utilizes the Docker virtualization technique. However, its implementation on a single server can be challenging when the traffic load increases. Docker Swarm, which manages Docker clusters on multiple nodes, allows the implementation of load balancing algorithms, such as Round Robin and Least Connection, to improve load balancer performance. This study evaluates the performance of both algorithms in a local virtualization environment considering real-world web server conditions. The tests compare CPU and RAM resource usage, throughput, and response time, and consider variations in workload and traffic scenarios. The analysis results show that the Least Connection algorithm performs better than Round Robin, with a final score of 0.4684 compared to 0.4244. The effectiveness of Least Connection in distributing workloads makes it more recommended for load balancing with high loads, thereby increasing system efficiency and optimizing the use of computing resources.

Keywords: Docker Swarm, Performance Evaluation, Load Balancer, Virtualization, Web Server