Comparative Analysis of Web Server Performance on Docker and Podman Containers Using the Stress Test Method

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ABSTRACT

This research presents a comparative analysis of web server performance using Docker and Podman container platforms under various stress levels. The experiment involved deploying WordPress-based web servers in two different environments (Local VM and VPS) running Debian 12, and subjecting them to low, medium, and extreme workLoad levels using Apache JMeter. Performance was evaluated based on response time, throughput, error rate, and resource consumption (CPU and memory), with monitoring conducted using Grafana Stack. The results revealed that Podman consistently outperformed Docker under high-Load conditions. On Local VM at extreme Load, Podman achieved a lower average response time (26,418.99 ms), higher throughput (23.57 requests/sec), and a lower error rate (3.06%) compared to Docker. Similar trends were observed on the VPS, where Podman recorded better performance across all metrics, including lower memory usage. However, Docker showed slightly better CPU efficiency in certain cases. Overall, Podman is recommended for environments demanding high responsiveness and resource efficiency, while Docker remains a viable option for moderate workLoads with emphasis on stability and ecosystem support.

Keywords: *Docker, Podman, Web Server, Stress Test, Performance Analysis.*