

Performance Comparison of Thread-Based and Event-Based Web Servers

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Abstract : Today, web servers are expected to serve thousands of client requests concurrently within stringent response time limits. In this paper, we evaluate experimentally and compare the performance as well as the resource utilization of popular web servers, which differ in their approach to handle concurrency. More specifically, Central Processing Unit (CPU)- and I/O intensive tests were conducted against the thread-based Apache and Go as well as the event-based Nginx and Node.js under increasing concurrent load. The tests involved concurrent users requesting a term of the Fibonacci sequence (the 10th, 20th, 30th) and the content of a table from the database. The results show that Go achieved the best performance in all benchmark tests. For example, Go reached two times higher throughput than Node.js and five times higher than Apache and Nginx in the 20th Fibonacci term test. In addition, Go had the smallest memory footprint and demonstrated the most efficient resource utilization, in terms of CPU usage. Instead, Node.js had by far the largest memory footprint, consuming up to 90% more memory than Nginx and Apache. Regarding the performance of Apache and Nginx, our findings indicate that Hypertext Preprocessor (PHP) becomes a bottleneck when the servers are requested to respond by performing CPU-intensive tasks under increasing concurrent load.

Keywords : apache, Go, Nginx, node.js, web server benchmarking

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