

**ANALISIS PERBANDINGAN PERFORMA *WEBSITE AUTONOMOUS*
MAINTENANCE CHECKLIST (AM *CHECKLIST*) BERBASIS
FRAMEWORK CODEIGNITER DAN LARAVEL**

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ABSTRAK

Pemilihan *framework* PHP yang tepat sangat penting untuk performa aplikasi *website*. Penelitian ini menyajikan analisis perbandingan performa antara *framework* CodeIgniter 3 (CI3) dan *framework* modern Laravel 12. Metodologi penelitian meliputi pengembangan ulang aplikasi AM *Checklist* fungsional ke dalam kedua *framework*, diikuti dengan serangkaian pengujian performa menggunakan Apache JMeter di lingkungan lokal. Pengujian utama mencakup Uji Beban pada fitur inti dengan pengguna konkuren (10-50 pengguna), Uji Skalabilitas Data pada fitur Audit Trail dengan membandingkan teknik *Client-Side* dan *Server-Side* DataTables pada volume data hingga 50.000 baris, dan Analisis Performa Akses Database di Laravel dengan membandingkan *Query Builder* dan *Eloquent ORM* (*Eager Loading*).

Hasil penelitian menunjukkan bahwa CodeIgniter 3 secara signifikan lebih unggul dalam hal performa pada uji beban, disebabkan oleh arsitekturnya yang minimalis. Pada uji skalabilitas, *Server-Side* terbukti jauh lebih unggul dibandingkan *Client-Side* pada kedua *framework*. Analisis mendalam pada Laravel mengungkap bahwa metode *Eloquent ORM* dengan *Lazy Loading* menyebabkan N+1 Query Problem, yang menghasilkan beban kueri database lebih tinggi. Namun, dengan penerapan teknik *Eager Loading*, performa *Eloquent ORM* mampu mendekati kecepatan *Query Builder*. Penelitian ini menyimpulkan bahwa meskipun *framework* CodeIgniter unggul dalam performa, *framework* modern seperti Laravel menawarkan mekanisme optimasi yang kuat yang jika digunakan dengan benar dapat mencapai performa tinggi sambil mempertahankan keunggulan dalam produktivitas pengembangan.

Kata Kunci: Apache JMeter, CodeIgniter 3, DataTables, Laravel, *Load Testing*, Performa *Website*.

**PERFORMANCE COMPARATIVE ANALYSIS OF AUTONOMOUS
MAINTENANCE CHECKLIST (AM CHECKLIST) WEBSITE BASED
ON CODEIGNITER AND LARAVEL FRAMEWORKS**

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ABSTRACT

The selection of an appropriate PHP framework is crucial for web application performance. This research presents a comparative performance analysis between the lightweight framework CodeIgniter 3 (CI3) and the modern framework Laravel 12. The research methodology involved redeveloping a functional AM Checklist application in both frameworks, followed by a series of performance tests using Apache JMeter in an isolated local environment. The primary tests included Load Testing on core features with concurrent users (10-50 users), Data Scalability Testing on an Audit Trail feature, comparing Client-Side Rendering and Server-Side Rendering techniques across datasets up to 50,000 rows, and Database Access Performance Analysis in Laravel, comparing the Query Builder and Eloquent ORM (Eager Loading).

The results indicate that CodeIgniter 3 is significantly superior in terms of raw performance in load testing, attributable to its minimalist architecture. In scalability tests, SSR proved to be far superior and more scalable than CSR in both frameworks. The in-depth analysis of Laravel revealed that the Eloquent ORM with Lazy Loading causes the N+1 Query Problem, resulting in higher database query load. However, with the implementation of the Eager Loading technique, the performance of Eloquent ORM was able to closely match the speed of the raw Query Builder. This research concludes that while lightweight frameworks excel in low-latency tasks, modern frameworks like Laravel provide powerful optimization mechanisms that when used correctly can achieve high performance while maintaining advantages in development productivity.

Keywords: *Apache JMeter, CodeIgniter 3, DataTables, Laravel, Load Testing, Website Performance.*