

ANALISIS PERBANDINGAN PERFORMA *WEBSOCKET* MENGUNAKAN *PUSHER* DAN *LARAVEL REVERB* PADA IMPLEMENTASI *LIVE CAM WEBSITE* MUNCAK.ID

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ABSTRAK

Aktivitas pendakian gunung di Indonesia mengandung risiko yang memerlukan informasi kondisi jalur secara *real-time* untuk keselamatan pendaki. Platform *website* *muncak.id* membutuhkan implementasi fitur *Live Cam* menggunakan teknologi *WebSocket* dengan performa optimal untuk menyediakan siaran langsung kondisi jalur pendakian. Penelitian ini bertujuan mengimplementasikan fitur *Live Cam* menggunakan *Pusher* dan *Laravel Reverb*, menganalisis dan membandingkan performanya melalui metrik teknis, serta memberikan rekomendasi solusi optimal berdasarkan hasil pengujian. Metode pengembangan menggunakan *Rapid Application Development* (RAD) dengan pengembangan dua versi *website* secara paralel yang diuji melalui tiga tahap: pengujian fungsional *end-to-end* menggunakan *Laravel Dusk*, pengujian beban menggunakan *Artillery.js* dengan simulasi 100 *virtual users* selama 300 detik, dan *monitoring* sumber daya server secara *real-time*. Parameter pengujian yang diukur meliputi latensi koneksi *WebSocket*, *throughput request*, penggunaan CPU, penggunaan memori, dan kemampuan menangani koneksi bersamaan. Hasil penelitian menunjukkan bahwa *Pusher* unggul dalam aspek latensi dengan median koneksi *WebSocket* 162,4 ms dibandingkan *Reverb* 2.186,8 ms (13 kali lebih cepat), stabilitas sempurna 100% tanpa *error*, dan efisiensi CPU 52% lebih baik dengan rata-rata penggunaan 23,4% versus 48,7%. Sementara itu, *Laravel Reverb* unggul dalam *throughput* 53% lebih tinggi (23 *request/detik* versus 15 *request/detik*), kemampuan menangani 52% lebih banyak koneksi bersamaan (2.114 versus 1.394 koneksi), dan efisiensi memori 6% lebih hemat dengan rata-rata penggunaan 41,2% versus 43,8%, namun mengalami kegagalan koneksi 28,07% pada lonjakan trafik mendadak. Berdasarkan hasil tersebut, penelitian ini merekomendasikan *Pusher* untuk aplikasi yang memprioritaskan latensi rendah, stabilitas tinggi, dan *auto-scaling* otomatis, sedangkan *Laravel Reverb* cocok untuk aplikasi dengan beban stabil, *budget* terbatas, dan tim teknis yang mampu melakukan optimisasi infrastruktur.

Kata Kunci: *WebSocket*, *Laravel Reverb*, *Pusher*, *Live Cam*, performa, *real-time*

**COMPARATIVE ANALYSIS OF WEBSOCKET
PERFORMANCE USING PUSHER AND LARAVEL REVERB
IN THE IMPLEMENTATION OF THE MUNCAK.ID LIVE CAM WEBSITE**

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ABSTRACT

Mountain climbing activities in Indonesia contain inherent risks requiring realtime trail condition information for climber safety. The muncak.id website platform requires optimal WebSocket technology performance for Live Cam feature implementation to provide live broadcasts of hiking trail conditions. This research aims to implement Live Cam features using Pusher and Laravel Reverb, analyze and compare their performance through technical metrics, and provide optimal solution recommendations based on testing results. The development method employs Rapid Application Development (RAD) with parallel development of two website versions tested through three stages: end-to-end functional testing using Laravel Dusk, load testing using Artillery.js with 100 virtual users simulation for 300 seconds, and real-time server resource monitoring. Measured testing parameters include WebSocket connection latency, request throughput, CPU usage, memory usage, and concurrent connection handling capabilities. Research results demonstrate that Pusher excels in latency aspects with median WebSocket connection of 162.4 ms compared to Reverb's 2,186.8 ms (13 times faster), perfect stability at 100% with zero errors, and 52% better CPU efficiency with average usage of 23.4% versus 48.7%. Meanwhile, Laravel Reverb excels in throughput with 53% higher performance (23 requests/second versus 15 requests/second), capability to handle 52% more concurrent connections (2,114 versus 1,394 connections), and 6% better memory efficiency with average usage of 41.2% versus 43.8%, although experiencing 28.07% connection failures during sudden traffic spikes. Based on these results, this research recommends Pusher for applications prioritizing low latency, high stability, and automatic auto-scaling, while Laravel Reverb is suitable for applications with stable loads, limited budgets, and technical teams capable of infrastructure optimization.

Keywords: *WebSocket, Laravel Reverb, Pusher, Live Cam, performance, real-time*