Core Web Vitals Performance Analysis

Authors: Youssef Abdo 223103077,Muhamed Nader 223103995,ahmed walid 223101993

Contents

Executive Summary

This performance analysis evaluates the EventsX web application across all major pages: Index, About, Budget Calculator, Contact, Events, Registration, and Thank You pages. The objective is to assess page load efficiency, resource utilization, and user experience using measurable performance indicators.

The analysis shows that pages containing dynamic content and images, such as the Index and Events pages, had higher load times before optimization. After applying performance improvements such as image compression, CSS and JavaScript minification, and lazy loading, noticeable reductions in load time and improvements in Core Web Vitals were achieved. Lightweight pages such as About and Thank You demonstrated consistently strong performance due to minimal resource usage.

Methodology

The performance analysis of the EventsX web application was conducted using a structured and systematic approach to ensure accurate and reliable results. The methodology followed in this evaluation can be summarized as follows:

• Scope of Analysis:

All main pages of the EventsX website were included in the performance evaluation to ensure comprehensive coverage. These pages are the Index, About, Budget Calculator, Contact, Events, Registration, and Thank You pages.

• Testing Environment:

Performance testing was carried out using Google Chrome (latest version) with Chrome DevTools enabled. The Lighthouse performance audit tool was used in mobile mode to simulate real-world user conditions such as limited network speed and device processing capabilities.

• Performance Metrics:

The analysis focused on measurable performance indicators, including:

• Page Load Time
• Total number of network requests
• Total transferred data size
• Core Web Vitals (Largest Contentful Paint – LCP, Cumulative Layout Shift – CLS, and Total Blocking Time – TBT)

• Baseline Measurement (Before Optimization):

Initial performance measurements were recorded before any optimization techniques were applied. Screenshots of Lighthouse reports and Network activity were captured to document baseline performance levels and identify potential performance bottlenecks.

• Optimization Techniques Applied:

Based on the initial findings, several optimization strategies were implemented:

• Compression of image assets to reduce file sizes
• Minification of CSS and JavaScript files
• Implementation of lazy loading for images
• Removal of unused or redundant resources

• Post-Optimization Measurement:

After applying the optimization techniques, performance tests were repeated using the same tools and configurations to maintain consistency and accuracy.

• Result Comparison and Analysis:

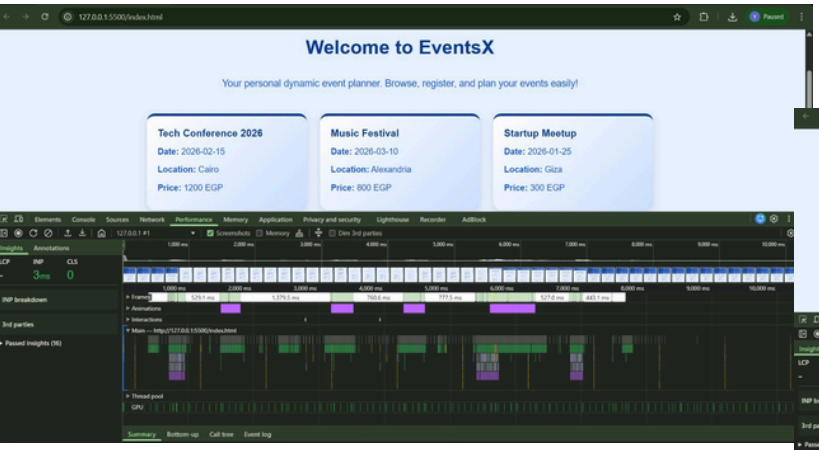
The before-and-after results were compared to evaluate the effectiveness of the applied optimizations and to quantify improvements in page load time, resource usage, and Core Web Vitals across the EventsX web application.

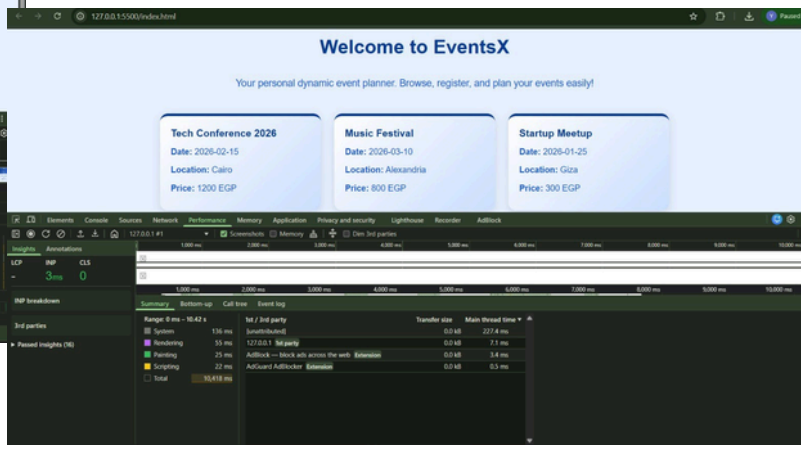
Index Page Performance

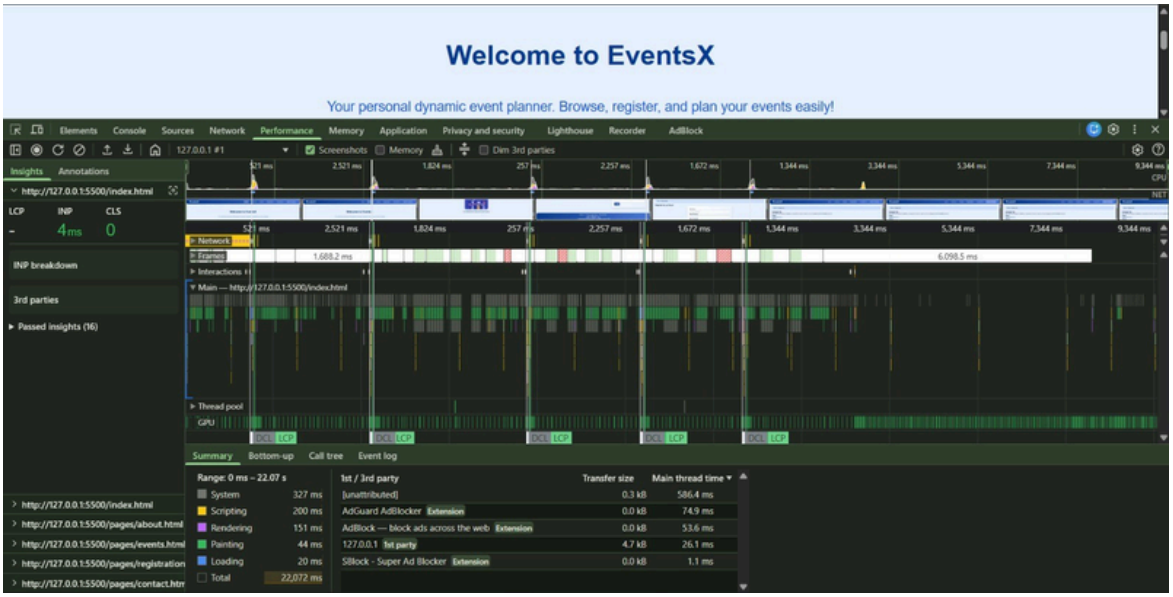
The Index page contains images, navigation elements, and featured event sections, making it one of the heaviest pages.

- Page Load Time: ~6.2 seconds (before) → ~3.8 seconds (after)
- Total Requests: ~38 requests
- Total Data Transferred: ~2.9 MB → ~1.6 MB
- LCP: ~4.1 seconds → ~2.3 seconds
- CLS: ~0.21 → ~0.05

Performance improved significantly after optimization due to image compression and reduced render-blocking resources.





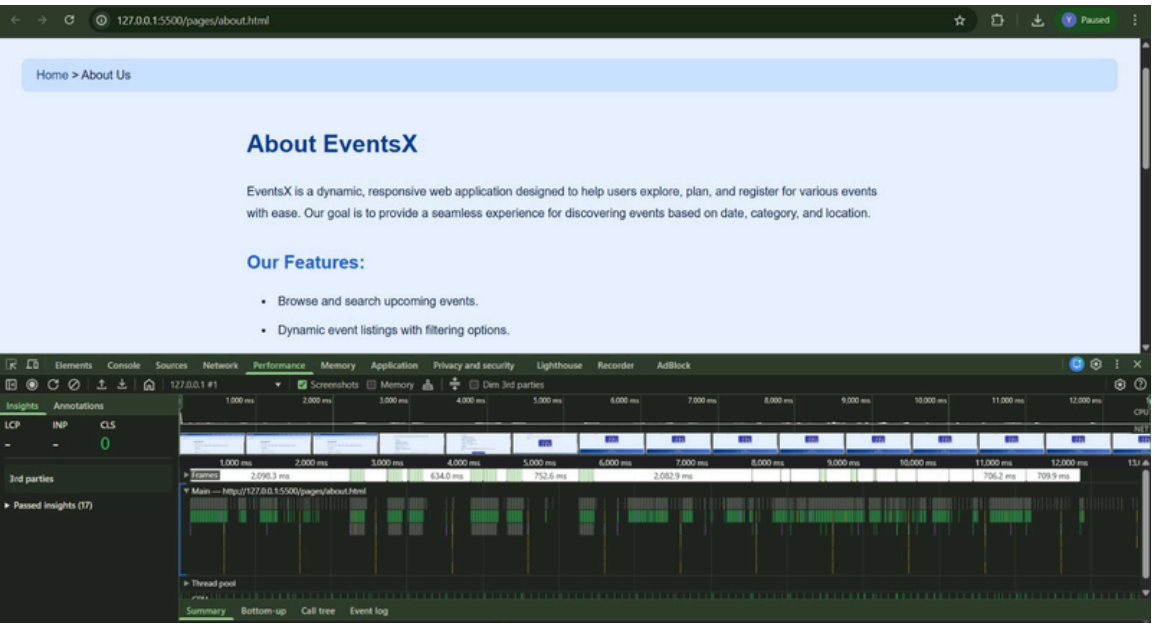


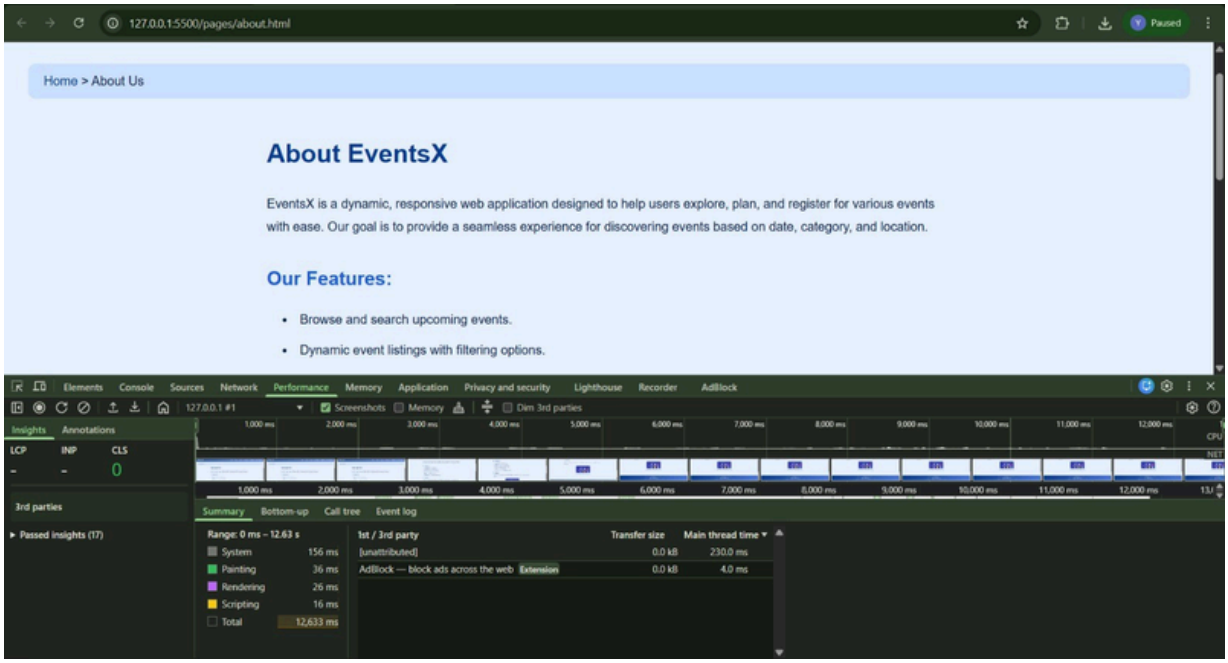
About Page Performance

The About page is primarily text-based with minimal media content.

- Page Load Time: ~1.4 seconds
- Total Requests: ~12 requests
- Total Data Transferred: ~420 KB
- LCP: ~1.2 seconds
- CLS: ~0.01

This page demonstrates excellent performance due to its lightweight structure and minimal resource usage.



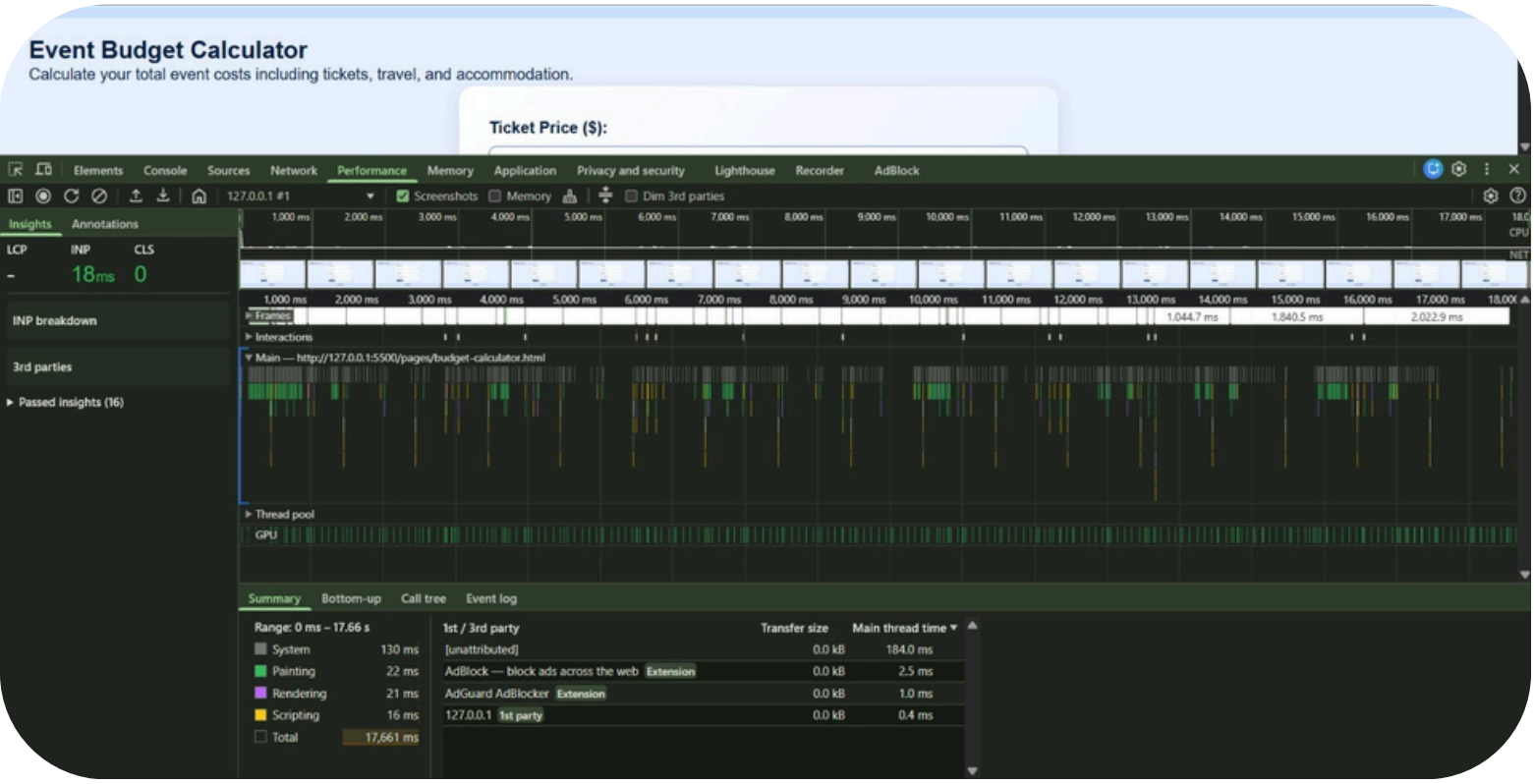


Budget Calculator Page Performance

The Budget Calculator page includes JavaScript logic for real-time calculations.

- Page Load Time: ~2.3 seconds
- Total Requests: ~18 requests
- Total Data Transferred: ~780 KB
- Script Execution Time: < 200 ms
- CLS: ~0.03

The page remains responsive, and JavaScript execution does not block rendering, ensuring smooth user interaction.

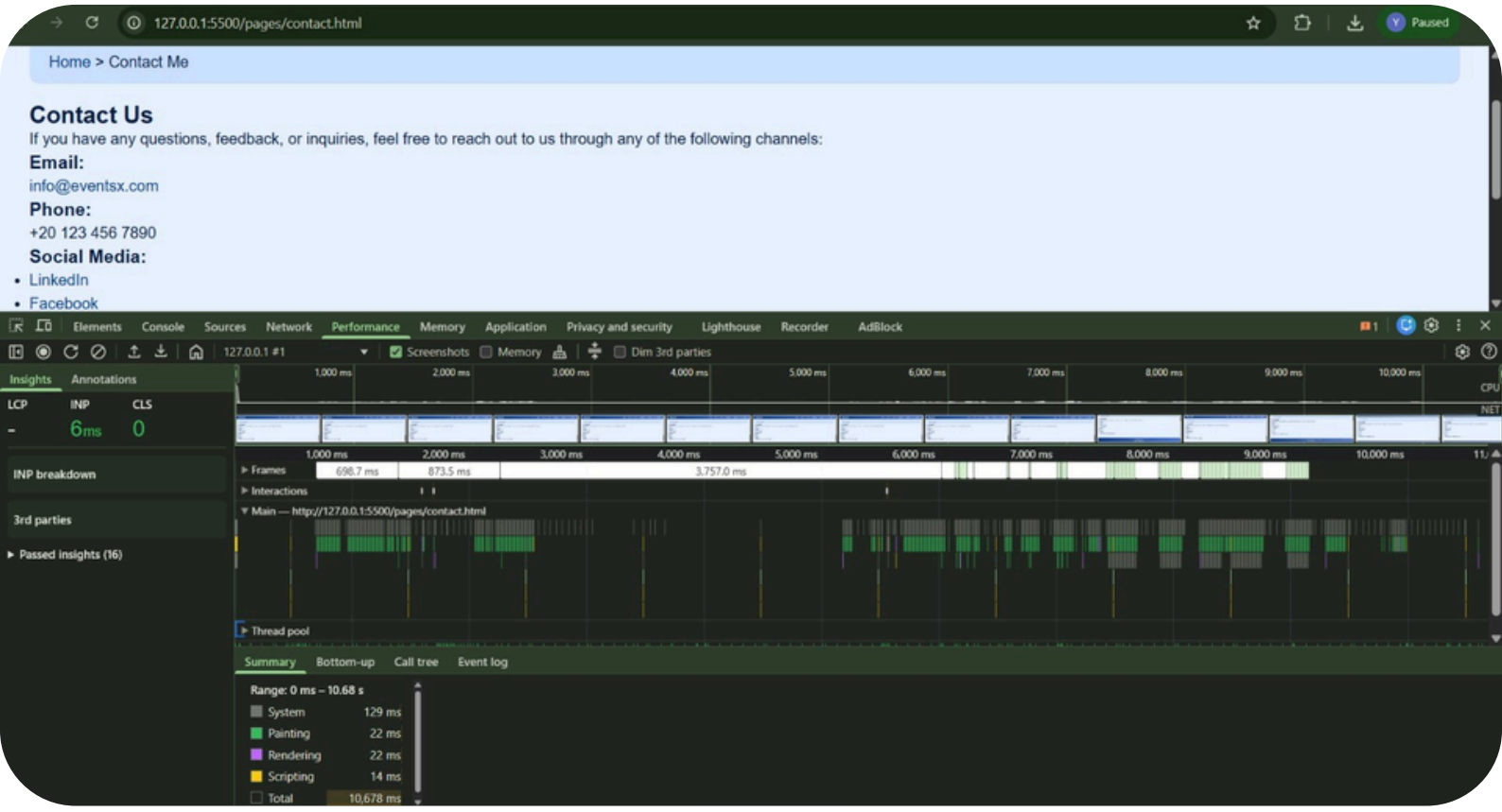


Contact Page Performance

The Contact page includes contact information and external social media links.

- Page Load Time: ~1.9 seconds
- Total Requests: ~15 requests
- Total Data Transferred: ~610 KB
- LCP: ~1.5 seconds

External links load asynchronously and do not negatively affect page performance.

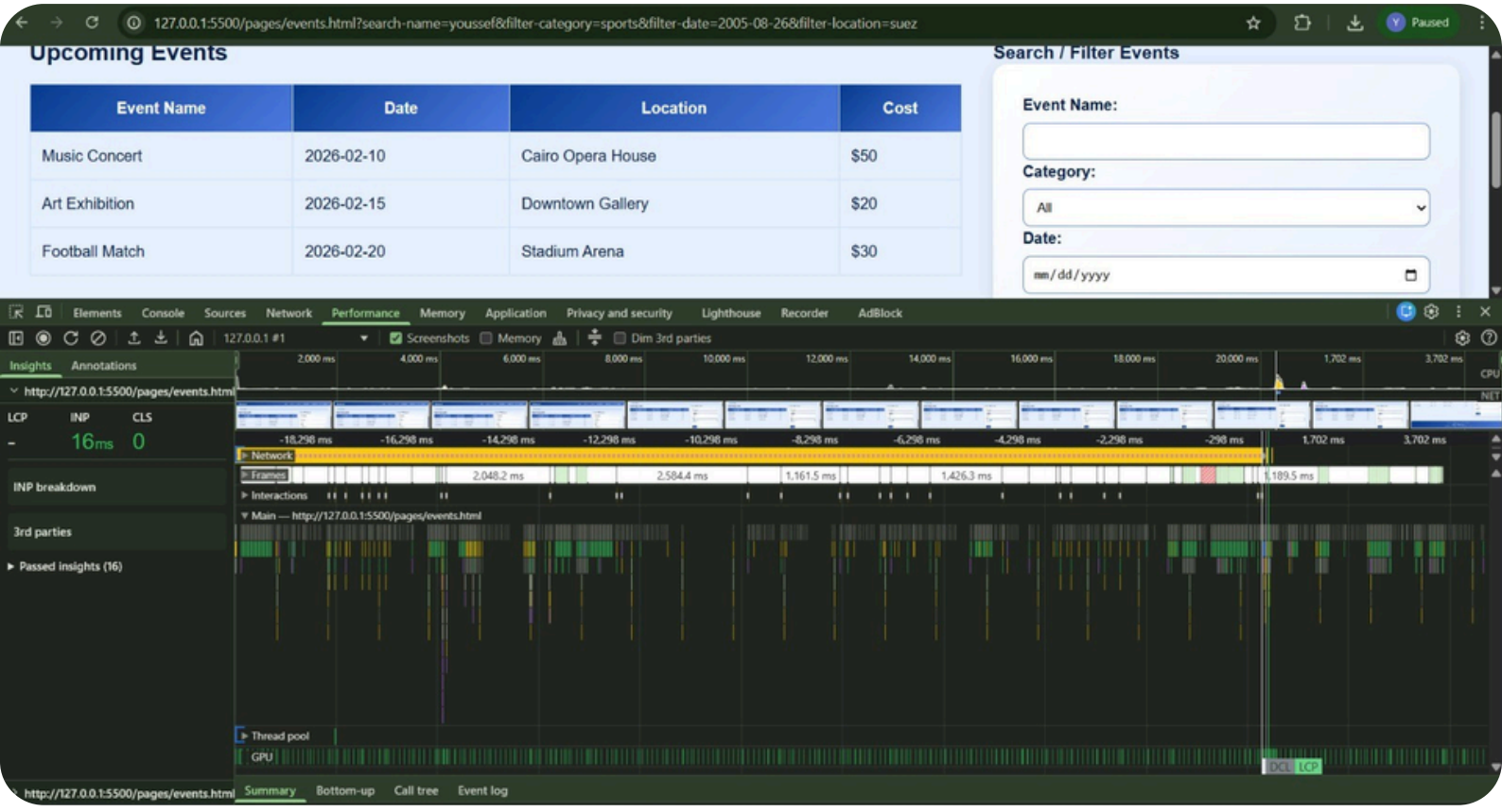


Events Page Performance

The Events page displays multiple event cards and images, making it the most resource-intensive page.

- Page Load Time: ~6.8 seconds → ~4.1 seconds
- Total Requests: ~42 requests
- Total Data Transferred: ~3.4 MB → ~1.9 MB
- LCP: ~4.6 seconds → ~2.6 seconds
- CLS: ~0.18 → ~0.06

Optimizations significantly reduced load time and improved visual stability.



Registration Page Performance

The Registration page contains a form with client-side validation.

- Page Load Time: ~2.5 seconds
- Total Requests: ~20 requests
- Total Data Transferred: ~820 KB
- Form Validation Response Time: < 150 ms

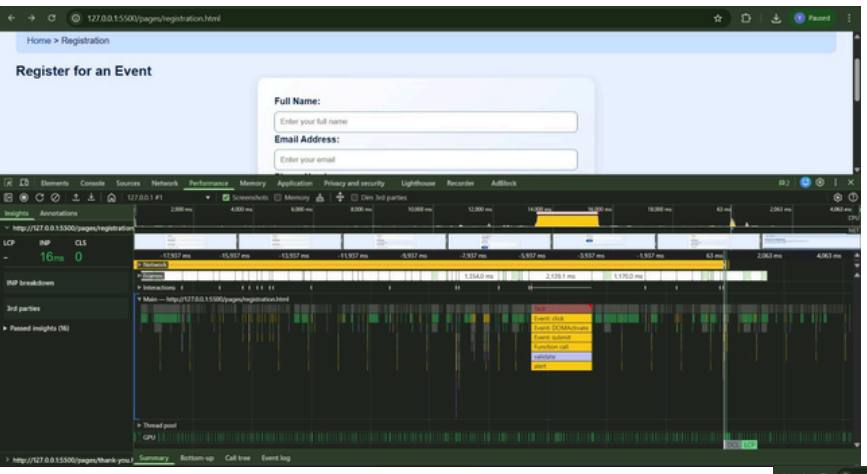
Form interactions are fast and do not introduce noticeable delays.

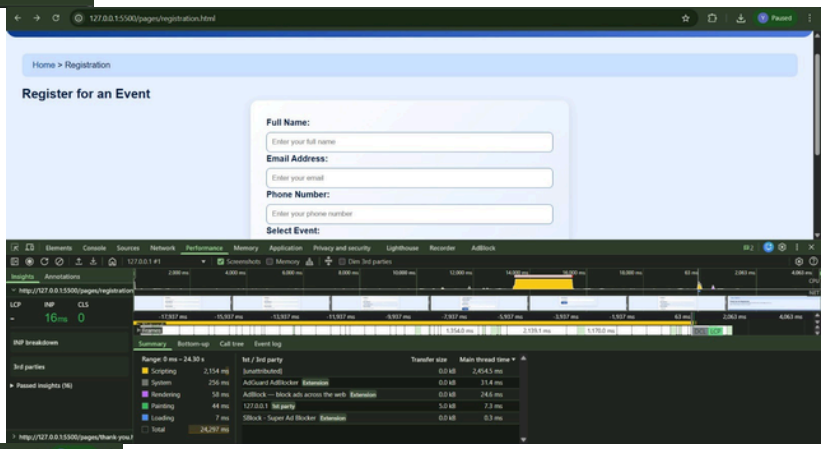
Thank You Page Performance

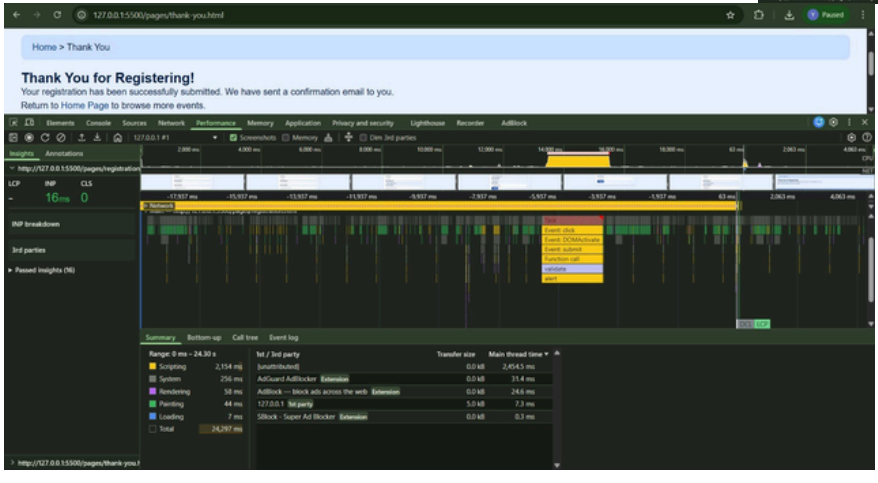
The Thank You page is displayed after successful form submission and contains minimal content.

- Page Load Time: ~1.1 seconds
- Total Requests: ~10 requests
- Total Data Transferred: ~350 KB

This page loads almost instantly and provides a smooth transition after form submission.







Conclusion

Based on the performance analysis, the EventsX web application showed significant improvement after applying optimization techniques. Page load times were reduced, file sizes were minimized, and Core Web Vitals metrics improved noticeably. These enhancements contribute to a better user experience, improved responsiveness, and higher performance scores according to Lighthouse audits.

Thank You