



Dissertation Defense

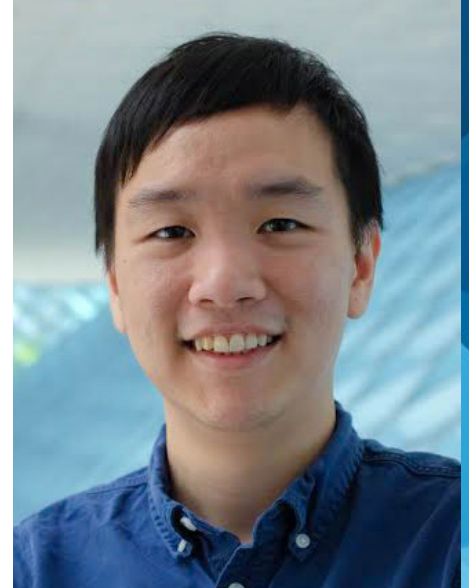
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Understanding and Improving the Performance of Web Page Loads

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ABSTRACT: The web is vital to our daily lives, yet web pages are often slow to load. The inefficiency and complexity of loading web pages can be attributed to the dependencies between resources within a web page, which also leads to underutilization of the CPU and network on client devices.

My thesis research seeks solutions that enable better use of the client-side CPU and network during page loads. Such solutions can be categorized into three types of approaches: 1) leveraging a proxy to optimize web page loads, 2) modifying the end-to-end interaction between client browsers and web servers, and 3) rewriting web pages. Each approach offers various benefits and trade-offs.

This dissertation explores three specific solutions. First, CASPR is a proxy-based solution that enables clients to offload JavaScript computations to proxies. CASPR loads web pages on behalf of clients and transforms every page into a version that is simpler for clients to process. Second, Vroom rethinks how page loads work; in order to minimize dependencies between resources, it enables web servers to provide resource hints to clients and ensures that resources are loaded with proper prioritization. Finally, I conducted a longitudinal study to understand how web pages have changed over time and how these changes have affected performance.

Chair: Prof. Harsha Madhyastha