Litcoder
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Code Productivity

Case Reference: Facebook

About Facebook

Facebook is a social media platform that was founded by Mark Zuckerberg in 2004. Since its inception, it has profoundly impacted the way people communicate, share information, and connect. Over the years, the platform has evolved significantly, introducing innovative features such as News Feed, Timeline, Groups, Events, Marketplace, and more. One of Facebook's most influential features is its algorithm-driven News Feed, which curates content based on user interactions, including likes, comments, and shares.

Problems Faced by Facebook

As Facebook ascended to become a tech giant catering to billions, its PHP codebase grappled with numerous challenges. Slow code execution, inherent to PHP's interpreted nature, led to sluggish page loads during traffic surges. Additionally, the architecture demanded substantial RAM, causing memory bloat, especially with larger codebases. The prevalence of subtle bugs and security vulnerabilities within PHP resulted in frequent outages and potential data breaches. Specific issues included requests consuming over 512MB to 1GB of RAM and significant outages due to PHP bugs. One, such infamous incident happened in May 2018 where a code flaw inadvertently exposed private posts of 14 million users. XSS and CSRF vulnerabilities were also common. Consequently, PHP ceased to be a viable primary backend language for Facebook, impeding innovation, disrupting user experience, and necessitating constant upkeep.

Facebook's Solution

To address PHP's deficiencies at scale, Facebook engineered its own systems programming language – Hack: statically typed to catch bugs at compile time, JIT compiled for optimized execution efficiency, multi-threaded to leverage multiple CPU cores, memory efficient requiring less RAM than PHP for the same workload, secure to prevent entire classes of vulnerabilities, and backward compatible to leverage existing PHP code. Key capabilities Hack provided include 2x faster execution than PHP, a 70% reduction in memory usage, a boost in developer productivity, and built-in security features like XHP. By augmenting PHP rather than replacing it, Hack gave Facebook a tailored language for its engineering needs, improving the manageability of its massive codebase.

Facebook methodically introduced Hack, their programming language, and migrated critical infrastructure over several years. Hack was launched in 2014 following extensive internal development, and gradually integrated into the codebase across multiple years with a focus on high-traffic services. By 2016, Hack powered vital components such as the News Feed, key social plugins, and mobile apps, with over 100 million lines of Hack code in Facebook's web infrastructure. Subsidiaries of Facebook also adopted Hack. The benefits were profound, including significant improvements in page load times, drastic reductions in crashes and outages, noticeable increases in developer productivity, and drastic reduction in security incidents.

References: [Click Here]

Litcoder Parameter

Code Manageability focuses on the ease with which the codebase can be managed, maintained, and extended over time. It advocate modularization, separation of concerns, and the use of design patterns to break down complex functionalities into smaller, more manageable units.

Code Productivity, a subset of code manageability, refers to the qualities that enable efficient and effective high-quality code development within a given timeframe. It includes various factors such as writing clean and maintainable code, leveraging reusable components, utilizing efficient development tools and frameworks, adopting best practices and design patterns, collaborating effectively within teams, and continuously improving skills and workflows.

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