

## **Revamping the Back-End: Improving Old File Systems**

(technical research project in Computer Science)

## **Designing for Customer Trust**

(sociotechnical research project)

A Thesis Prospectus Submitted to the  
Faculty of the School of Engineering and Applied Science  
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Technical Project Team Members

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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## **General Research Problem**

*How can software be simplified and optimized?*

Software early in development grows complex and unorganized. This is unfavorable for developers. A simple codebase helps developers fix bugs, add new features, and improve scalability. Optimized software is fast and reliable. Simplifying and optimizing software is a skill all software engineers must master to save time and energy. Users do not want simple software. Users want the functionality and features of complex software (Sha, 2001).

## **Revamping the Back-End: Improving Old File Systems**

*How can the advantages of Git serve legacy software?*

Legacy software lacks many features of modern software. This suggests improvement can be made in legacy software. I explored this idea at my last internship with the goal of adding file versioning to a filesystem for a warship simulator. I am a CS undergraduate enrolled in CS 4991. Professor Daniel Graham of the CS department is my technical advisor.

I interned as a software engineer at a private defense contractor. My task was to improve the reliability of a basic file system. The vision was for the customer to view the history of any simulation file uploaded to the application. The old file system was created barebones for a minimum viable product. Any simulation file that was uploaded lived purely on the native file system. If a file was erased, then it was gone forever. The issue is statelessness. The system processed the file and saved the filename but never tracked the file contents. The system needed a record of the file contents.

I was to design and implement a feature that tracks file versions and changes. I drew requirements, created use cases, made flow charts, and underwent a design review. Technologies were determined post-design review.

Git is a version control system that is designed to track changes in a file system. JGit is an open source Git library written in Java. Using JGit, I implemented a Java utility class that handles the tracking of user-uploaded files. The utility class managed a local repository and its associated Git procedures. The functionalities of the utility class were invoked through an API endpoint. I created the front-end necessary to hit the API endpoints.

There were few Java Git libraries with limited resources to learn from. Some resources were outdated. Mid implementation, the Github repository for the JGit source code was removed, but the library remains supported.

I delivered the ability for the user to upload files, view file history, restore past versions of a file, and compare versions of a file. The feature is merged into the project development branch on GitLab. Extensive testing is required for further integration into the end product.

## **Designing for Customer Trust**

*How are web designers attracting customers and earning their trust?*

Customer loyalty keep online businesses running. Trust is when a customer gives an ecommerce store their business (Gefen, Karahanna, & Straub, 2003). Consumers will give business to a trusted e-vendors with good reputations (Gefen, Karahanna, & Straub, 2003). At the first sign of unethical behavior, the consumer tends to avoid the business (Gefen, Karahanna, & Straub, 2003). Ecommerce businesses benefit from understand customer behavior when creating their online stores.

Storefronts are no longer glass windows but pixels. Businesses must adapt. A useful product that is poorly presented will not sell. Therefore online businesses may prioritize user interface and experience. The User Experience Professionals Association (UXPA) lists, “increased

sales and revenues, decreased training and support costs, reduced development time and costs, reduced maintenance costs, and increased customer satisfaction” as benefits to emphasizing user experience in the development process (UXPA, 2021).

UXPA is an organized, nonprofit, professional association seeking to, “promote the business value of UX, research, design, and evaluation to business and other entities (UXPA, 2021).” UXPA is organized into 59 chapters spread across 30 countries (UXPA, 2021). The organization holds annual conferences and chapter events furthering UX design (UXPA, 2021). UXPA owns the *Journal of Usability Studies* which is a peer reviewed, online journal focusing on UX research (UXPA JUS, 2021).

The Amazon Store is an ecommerce business that facilitates and fulfills the exchange of goods and services. Amazon profits through member fees, seller fees, and deliveries (Amazon, 2021). Amazon is studied due to the amount of transactions that go through the platform. Amazon depends on customer trust, so there is much to learn from their marketing and product development teams.

Customers who overtrusted are valuable for studying trust and web design. A small portion of Amazon users believe they received a counterfeit product and left negative reviews. These users tend to purchase their desired product and warn others about their negative shopping experience (Dumesnil, 2020). Fragrances are counterfeited by independent sellers. Kenneth Dumesnil states in his review, “I went to my orders on Amazon to initiate a return only to find out that this purchase is non-returnable. Go figure. If it was then there would be a lot of this fake cologne returned. Is that why they won't return it?” (Dumesnil, 2020). A business that loses trust loses customers.

The majority of Amazon users receive genuine products and leave positive reviews (Dunn, 2020). Customers may take risks despite alarming reviews. Dillon Dunn states in his review:

“Before I bought this fragrance I read many reviews of people's purchases, claiming the product was fake, and was rather discouraged from risking an online purchase” (Dunn, 2020). Dillon decided to take the risk of purchasing the fragrance. Dunn further states, “My worries about authenticity were immediately erased once the fragrance hit my nose” (Dunn, 2020). The win-win purchase is the happy path for ecommerce.

Good design begins with the user’s perspective. “User Experience - a research agenda” better defines user experience. According to Hassenzahl & Tractinsky (2006) user experience goes beyond the instrumental into emotion and affect. Emotions determine decisions. The extent to which designers have control over user emotions is unclear and remains a subject of study in UX (Hassenzahl & Tractinsky, 2006). Effective designers guide users on an emotional journey. According to Hassenzahl and Tractinsky (2006), the user experience is evident in the user’s “stream of self talk.” Users’ aesthetic responses are not limited to a product’s physical design. Designers who understand the user can earn the user’s trust.

The user’s mind is changing. According to Subramanian (2018), typical users’ attention spans have been declining, and product designers have been exploiting the trend. For example, online retailers promote featured projects, instead of depending upon customers to search for them.

A fast paced world means choices are made in a shorter time. According to Rabin and Schrag (1999), because consumers are subject to confirmation bias, designers must prioritize first impressions.

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