Thesis Project Portfolio

RESTful API Design: A Device Deployment Microservice

(Technical Report)

Product Digitalization in the Automotive Industry

(STS Research Paper)

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BohengMu

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Sociotechnical Synthesis

Software as a Service (SaaS) refers to a method of offering software services to end-users through internet interfaces, instead of having the software installed directly on a computer. SaaS has transformed our way of viewing, building, and interacting with services, the music and movie industry for example. Contents that were once stored in a physical medium and has its access limited to physical proximity, can now be accessed anywhere and anytime given the proper internet access. This transition from tangible ownership to intangible access opens an abundance of new opportunities and raises questions about its effect. Over the summer of 2022, I had the pleasure of interning with a leading SaaS provider in the industry. Throughout my time there I was able to garner the experience of how services are built and some of the design decisions around them. This experience also cultivated my interest in the subject and the industry, which lead me to the STS research topic of exploring the effects of SaaS outside of pure software settings.

As a part of my summer internship experience, I worked on a team that provides a deployment and development platform for IoT devices. The testing framework for their service is monolithic and is deployed per test case, resulting in inefficient allocation of resources and interference from test cases using the same devices. As an intern, I was tasked with decoupling the device provisioning process as a micro-service in the form of a RESTful API designed to follow industry standards and internal specifications for path, method, and payload. The implementation exclusively utilizes company-provided technology and draws on industry practices such as testing and OOP, namely the Swagger Open API specification. The API I designed was ultimately able to deploy devices for the company's cloud computing service and fully utilize the scaling capability that was ostracized before. I successfully demonstrated the API using an

internal device testing service. However, due to the time constraint and the scope of the project, I had to forgo integration with the existing test framework. Further development is currently in the process of integrating with the existing test framework and the physical device lab the team manages.

My STS project seeks to investigate how the automotive industry has enacted closure around the subscription model, powered by SaaS. Subscription services have become an integral part of our daily lives, and they are all around us. These types of services have a plethora of benefits to both the consumers and the providers. Subscription services offer consumers the convenience of regular access to products and services at a predictable cost without worrying about managing individual purchases. For the service providers, providing their service as a subscription brings in a constant and predictable revenue stream. Given its benefits and its increasing popularity, the subscription has been adopted by many different industries, some more surprising than others. One such industry is the automotive industry, which was the centerpiece of my STS research project. To answer my research question, "How have auto manufacturers enacted closure by redefinition of the problem around software as a service model", I analyzed PR materials and marketing materials from the manufacturers and opinion editorials from numerous news outlets. From the sources, I conducted a discourse analysis to assess the position each group has around this offering subscription service in vehicles. Furthermore, I borrowed from the STS framework Social Construction of Technologies (SCOT) to help me analyze how societal and technological domains co-exist. From my research, I concluded that the consumer did not find closure in this technology being imposed on their vehicles and the automotive manufacturers should reconsider the use case for such technology.

By working on the STS project, I was able to reflect on my internship experience and put a different lens on it. At the internship I was surrounded by technically literate people, they have technical skills beyond average consumers and have different needs than those same consumers. Throughout the design process, I mainly interviewed my peers and now I am considering what other conversations I could have had to make my product more inclusive and more accessible. At the time, the product was designed for internal users, but it was ultimately aimed at end consumers using the platform. The API was built with the current testing workflow that we internally use and have access to internal utilities that might not have been exposed to outside users. Furthermore, the internship experience has brought insight into the SaaS space that I have not had before. The company is a provider of SaaS service in the IoT industry which has a similar physical proximity to its users in the automotive case. Throughout the internship, I was able to talk with some of the industry leaders about such adoption and learned about the benefits that it could bring. This allows me to compare and contrast this experience with the automotive industry and shed light on the subject from an industry that had successfully adopted such a SaaS strategy.