

Thesis Project Portfolio

Reducing Mean Time to Resolution: Developing a Tool to Solve Customer Issues With a Real User Monitoring Service

(Technical Report)

Leveraging Cloud Computing To Enhance Global Quality of Life

(STS Research Paper)

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David Hasani

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Department of Computer Science

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Executive Summary

Cloud computing is fundamentally changing the way that businesses manage their IT infrastructure, with more and more firms moving from on-premise (i.e. physical IT centers managed by the firms) to the cloud. As this transition takes place, it is important to reflect on the benefits and challenges associated with migrating to the cloud. The following STS paper does exactly that, with a particular focus on the overwhelmingly positive potential that the current cloud computing revolution has to enhance standard of living globally. It starts with a discussion on the state of cloud computing today before highlighting the benefits that the cloud can have, especially on the economy and education. Economically, the cloud has an unmatched ability to lower costs, support entrepreneurship and job growth, and make advanced computing abilities more accessible and secure. With regard to education, the cloud can uplift entire populations from poverty by providing greater access to schooling resources, a more personalized learning experience, and greater efficiency for teachers. Importantly, underlying all of the arguments made is that we as a society, and our collective governments, have a responsibility to ensure the advantages of the cloud are fully taken advantage of, and done so in an equitable manner. The U.S. is undoubtedly a country that has done enormously well in history, and is certainly leading the cloud computing revolution, which fundamentally gives it the responsibility to support the growth of less-fortunate regions.

To that point, the paper is particularly interested in analyzing the rapid growth of quality of life that the cloud can bring to underdeveloped nations, where cloud computing has far less penetration when compared to developed nations. The potential growth in quality of life is significantly greater in regions such as South America, Africa, and Asia, making these regions of particular interest. The paper then has a discussion on how governments can cooperate to ensure a productive transition to the cloud. Namely, it considers how the government can promote and

incentivize firms to transition to the cloud, how it can use the cloud itself, and how to be transparent about all of its efforts, amongst other points. The paper ends by explaining how quality of life improvement, the central goal of a transition to cloud computing, should be measured, challenging the usual metric of real GDP per capita by introducing other reasonable measures.

Moreover, the technical report of this portfolio provides a glimpse into cloud computing by discussing a work experience I had last summer. Specifically, I worked as a software engineering intern at Amazon Web Services (AWS), the world's largest cloud computing provider. I worked on the AWS CloudWatch Real-User Monitoring (CW RUM) team, where we develop software that corporate customers use to monitor their applications for usage, errors, and other key data analytics. The team consists primarily of roughly fifteen software engineers, who often experience difficulty in resolving issues that customers have with our service. The technical report discusses the project that I worked on which addressed this challenge. I developed an application that allows our team members to easily and securely access important information about customer accounts and various data points on our software's operational status, through one of twelve different commands that can be entered on the application. The tool allows our software developers to replicate the steps that a given customer took before they experienced an error, and further provides essential data that allows our team members to diagnose the issue with our service.

The technical report goes on to outline the architecture of the application. At a high-level, the application consists of five different components. The first parses the command entered so that the tool knows what data needs to be retrieved. The second validates the command entered to ensure that it is syntactically correct and a supported function. The third uses the proper

credentials to gain access to the appropriate location where the requested data will be retrieved. The fourth retrieves the relevant data in a secure manner. The fifth processes the retrieved data to format it neatly before returning it to the user of the tool. The paper goes on to discuss these capabilities in more detail, giving the reader a better idea of the use cases of the tool and the impact it has had already. The technical report concludes by mentioning future plans for extending the tool to have greater scope and reach across several different teams at Amazon.