Reducing Mean Time To Resolution: Developing A Tool To Solve Customer Issues With A Real User Monitoring Service

Leveraging Cloud Computing To Enhance Global Quality Of Life

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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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Introduction

Technological advancements have significantly contributed to the growth and efficiency of the global economy and in doing so have improved the global average standard of living. With that being said, given the massive disparities that still exist today between developed and developing nations, it is of paramount importance to figure out how to provide access to the most impactful innovations in all nations that may benefit. My technical project and STS project investigate this topic through different lenses.

Specifically, my technical project discusses one of my recent internship experiences at a large technology company specializing in cloud computing, and how my work in improving the product I worked on contributed to greater customer satisfaction. Reflecting on this experience is important in allowing me to understand what I did well and what I could have improved further (with regard to technical knowledge, team work, etc.) so that I can mature as a software developer. My STS project focuses on studying how cloud computing can be leveraged to accelerate quality of life improvements in developing nations. I believe that a society that does as well as ours has an obligation to ensure the benefits are available to all, so it is important to consider this topic. Both deliverables focus on cloud computing, but discuss different topics within the field. The remainder of this paper will discuss the technical project and STS project in more detail while also providing information on the research that has been conducted thus far.

Technical Project

In the summer of 2022, I had the opportunity to work at Amazon as a software engineering intern on the CloudWatch Real User Monitoring (CW RUM) team. CW RUM, a service developed and maintained by Amazon Web Services (AWS), has found that when AWS software developers resolve (i.e., debug) customer issues with CW RUM, the experience is often

difficult, slow, and overly reliant on assistance from customers. To address this, I developed an application that allows CW RUM team members to quickly, securely, and independently access information about customer accounts and numerous details about the CW RUM service's operational status. I wrote the application in the Python programming language; it contains twelve different commands, each retrieving and displaying different information, that the user can execute.

Furthermore, the major outcome of developing this application was a significant reduction in the average time taken for CW RUM team members to resolve customer issues. The application has thus contributed to markedly improved customer satisfaction, as well as notable simplification of the debugging experience for the CW RUM team. Future work on this application will extend the tool by adding commands not just to display data about the CW RUM service but also to automatically perform various types of analyses of the data so that issue resolution can be further accelerated. In all, developing the project was an incredibly useful experience in molding me into a better software developer and team member.

STS Project

My STS project examines cloud computing: "the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing" (AWS, 2022). In particular, it examines how cloud computing can be used to accelerate quality of life improvements in developing nations. These quality of life improvements can come through various mechanisms, such as through poverty alleviation, increases in business activity, and educational empowerment. Such massive economic success in the developed world leaves us with a duty to ensure no nation falls too far behind, so I feel that it is essential to provide the rest of the world with the innovations capable of skyrocketing their average standard of living. I am particularly interested in focusing on how

nations which are developing, but somewhat close to developed, can utilize cloud computing to make the leap and grow into a high-income, developed country. I feel that the greatest opportunity for cloud computing to have a positive impact is here; nations which are very low-income and lack more basic infrastructure will not benefit tremendously from cloud computing, and should instead direct their efforts towards improving sanitation, transportation, education, and the stability of their governments.

The relevant social groups in this project are primarily individuals and households in low-income, developing countries along with government and business leaders in both developed and developing countries (between which significant collaboration will be necessary to integrate cloud computing services into low-income communities). The one other group that may be worth looking into more would be the individuals in developed countries — it may be useful to consider how their quality of life has benefited from their access to cloud computing services, so that the same principles can be applied to developing countries.

Furthermore, my STS paper will utilize a wide range of STS concepts, theories, and research methods. As a general concept, I plan to engage in reflective practice, whereby I will consider how I personally have benefited from cloud computing services, and how I could derive even greater benefits from it in the future. Doing so will allow me to understand exactly how cloud computing benefits people, so that it can then be rolled out to developing countries in the best way possible, and with confidence in the impact that we expect to observe. Another concept that I will use is responsible research and innovation. Namely, I will consider the social implications of cloud computing in all forms, including its inclusivity and flexibility, when conducting my research. The way in which cloud computing is implemented must be tailored to the specific needs and conditions of each nation. Solutions need to be customized to ensure that

the maximum benefit can be achieved, requiring me to conduct my research while keeping in mind the key goal of being responsible for improving the lives of the nation's inhabitants.

Additionally, there will be many STS theories present within my project. For instance, the research will address cloud computing from a deontological point of view, which focuses on the idea that a sense of duty is a strong motivator. I feel that the tremendous economic progress of developed countries gives them a duty to aid less-fortunate countries, so studying cloud computing with this perspective is useful in hopefully being able to understand how to motivate and incentivize nations to help in this grand effort. I feel strongly that deontology will serve as a moral compass, guiding people in the decision-making process during the implementation of cloud computing systems. The most moral, positively impactful route should be taken every step of the way, making deontology a core idea within my project.

Research methods will also be used extensively in the project. I expect the primary one to be literature review. This will be useful as it is abundant and detailed, giving me reliable information into existing thoughts surrounding the benefits of technology with regard to improving quality of life. This can be used to form my own recommendations and draw accurate conclusions on how cloud computing can be implemented to improve lives. Another method that will be used is policy analysis. It is important to consider how governments have tried to accelerate standard of living improvements through technology, what degree of success they have had, and what approaches they took. Knowing this provides valuable insight that can be used to produce meaningful conclusions on how governments can best facilitate the betterment of lives through cloud computing.

Lastly, my timeline for this project is spread out over the next handful of months. I plan on continuing to gather sources of information, closely review existing ones, and compile it all into a report in early 2023. I expect the final report to be submitted around May 2023.

Key Texts

There are four sources that I have reviewed so far for my STS project. This section will briefly describe them, starting with "Cloud Computing in Developing Countries: Opportunities and Challenges" (Ahmed, 2017). This source indicates the world is being increasingly connected to broadband and the Internet, cloud computing can be used to grow economies and create more skilled workers, and even help to reverse effects of issues such as climate change. It also discusses some challenges of implementing cloud computing in developing countries, including the stability of governments, lack of support in implementing it, and reliance on existing business and IT infrastructure, which may not be present everywhere. These arguments are important in making me aware of benefits of cloud computing that I had not thought of previously, plus introducing me to important challenges to keep in mind. The second source is "Connecting developing countries to the cloud: Critical debates in data infrastructure" (Amin et al., 2021). The authors discuss issues that may arise through cloud computing with regard to data confidentiality. Cybersecurity will be especially important as cloud computing adoption increases, and the article emphasizes that collaboration between different actors (technology workers and the government, primarily) will be important for ensuring user privacy is upheld. This argument is important because it reminds me of the risks that come with technology, especially data breaches, mitigations and preventions for which are very important to consider as a nation implements cloud computing systems.

The third source is “Developing countries face challenges in reaping benefits from cloud computing” (UNCTAD, 2013). The authors highlight the increased economic efficiencies that can result from cloud computing, but note that closing the large technological gap between developed and developing countries will be difficult given affordability and lack of expertise. Though some companies are offering cloud computing training, the pace at which this is happening is not nearly fast enough. The report as a whole encourages the spread of cloud computing services, but recommends that governments exercise caution in adopting it. These arguments are useful in further making me aware of risks associated with the launch of cloud computing. The fourth source is “Cloud Computing Benefits” (Sether, 2016). This paper focuses heavily on describing the benefits of cloud computing, citing cost savings, scalability, mobile storage, security, and other benefits. The author emphasizes these advantages, which is an encouraging sign that strongly reinforces my thoughts and the motivation behind my project.

Overall, each of these sources is important to my project. They focus on the pros and cons of transitioning to cloud computing, addressing the topic from different perspectives given that the authors range from government organizations to researchers to professional associations. The varying perspectives that they offer together give me valuable insight into key considerations of how cloud computing can be leveraged to improve global quality of life, the central question of my STS project.

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