Sociotechnical Synthesis

STS 4600.022

Spring 2023

Bronte Sundstrom

Computer Science

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

Student  Date 4/20/2023

Bronte Sundstrom

Advisor _____ Date _____

Richard D. Jacques, STS Advisor

Introduction

The relationship between my capstone and STS research is due to my internship at JMA Wireless in Richmond, VA, over the summer of 2022. When I was there, the other intern, Jordan, and I worked on developing a security bundle for their 5G nodes by adapting the CIS Linux Benchmark into Salt audits and remediations. At the end of that summer, as we were parting, the person overseeing the project, Vishal, gave some parting advice: "Look into virtualization." As virtualization is something that JMA uses constantly, this was some good advice to get my toes wet on this subject. Therefore, my STS research focused on virtualization. I learned about the key technologies, the types, the benefits, the challenges, and how virtualization affects the society that we live in.

Project Summaries

My capstone started a month into the summer when Vishal came from Chicago to teach Jordan and me all we needed to know about Salt configurations. Our project was to take the most recent standardized CIS Linux Security Benchmark and adapt it into useable audits and remediations that could be combined into a security bundle for the company to use. It took a couple weeks to develop all of the audits, a couple weeks to do the remediations, and a couple more for testing. When the audits were initially run on the nodes, there was a 55% pass rate, but with the remediations that we developed, that pass rate increased to 86%. This project required the use of Linux, Python, Salt, and Bash. While I was familiar with the first two, this project allowed a deeper understanding of all four. Since the end of the summer, the bundle has been sent to QA for testing.

With JMA's advice to look into virtualization on my mind in the fall semester, I decided to look into it properly. Due to my limited knowledge on the topic, I did not do an in-depth

analysis on how it works but rather an overview to better understand it. As someone who values history, the first step is discovering where the concept of virtualization came from and how it has progressed to the present. Next, I get more technical with my discussion of the key technologies involved as well as the applications that virtualization has through its various types. Furthermore, due to the STS nature of this paper, I dissect the benefits and challenges that this up-and-coming technology presents before concluding the paper with the effects that I see it having on society.

Conclusion

As I was working on the security bundle for JMA, I learned so much more about Linux than I had known in the past, as well as many new skills that I had never heard of before. It was a great learning opportunity and, overall, a great summer. The community of people that I worked with were so friendly and caring, so when they asked if I would like to come back full time, there was little hesitation before saying yes.

While I had used virtual machines before in school and at JMA, I never quite understood the technology behind them. So, researching the types of virtualization and the technologies needed for it was really eye-opening. There were many times during my research that I recognized a form of virtualization that I had used in prior CS classes or through my work on the security bundle, and I could see how everything connects. This broader knowledge of virtualization that I now have will be very helpful to me going into this summer with my new full-time job at JMA Wireless.

Acknowledgements

Firstly, I would like to acknowledge my STS professor, Professor Richard Jacques, my capstone technical writing instructor, Professor Rosanne Vrugtman, and my capstone technical advisor, Professor Briana Morrison, for all of the help and support they have given me.

Next, I would like to acknowledge JMA Wireless for their incredible internship experience. Particularly, I would like to acknowledge Jeff Courington, Vishal Agrawal, and Jordan Brodie for everything they did for me over the summer.

Lastly, but most importantly, I would like to thank our Lord and Savior Jesus Christ for all of the opportunities, support, and love that He has given me throughout my entire life, bringing me to this point. I am so excited for my future, knowing that He will always be with me.