DATA WITH INTEGRITY

by

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by

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Abstract

Cybersecurity is a fundamental piece of any business. No matter how big or small your business is, neglecting to fix your business's vulnerabilities could have devastating effects on your profits, effectiveness, and success. Unfortunately, small businesses tend to neglect this need in their businesses and only view cybersecurity as a 'means to an end'. I have partnered with Integrity Church with the mission of finding and fixing most (if not all) of their information technology vulnerabilities. The goal is to not only make sure that Integrity Church is secure from both external and internal threat actors, but also make their organization run more efficiently. I have been working with four other information and computer technology students throughout this endeavor. The project deliverables are first, running a vulnerability scanner on their network to spot potential vulnerabilities. Second, create a policy for their on-premise cameras that will mitigate as much risk as possible with resources available. Third, setup a network-attached storage (NAS) that will be able to store the cameras' video. Fourth, fix their auditorium access point (AP) that is experiencing consistent below-expected levels of throughput. Fifth, give their employees a presentation on best practices and on some of the most common threats that bad actors will use on organizations. By the end of this project, I have gained a greater understanding for how information technology is put into practical use within small businesses and gained familiarity with the tools we were using to accomplish the above tasks.

Introduction

At the end of your senior year at ECU, Information Technology students are required to take ICTN 4020 and ICTN 4022. Both these courses make up and guide students along their Capstone journey. In the fall semester (ICTN 4020), students are required to find a project, a sponsor, and start planning for the work ahead. In the spring semester (ICTN 4022), students begin the tasks they planned and researched about in the fall. For my capstone project, my team and I partnered with Integrity church during these two semesters. The scope of the project would include performing a network vulnerability assessment, network attached storage (NAS) setup and configuration, security camera policy design, optimizing access point (AP) performance, and staff training.

Purpose

The intention of this project was to come in and assess a real-world business on their IT security and performance. Then, we would create recommendations for Integrity and potentially implement those recommendations. Therefore, securing Integrity's network using best practices and optimizing performance of the internet for staff and members. The overarching goal was to make Integrity's network more secure from threat actors and train staff on best practices.

Background about Integrity Church

Integrity Church is located in Winterville, NC, about 10 minutes from ECU's main campus. Since Integrity was so close, our team was able to meet at the church every week in order to work on their network. Integrity currently has no IT members on their staff. All of their IT work is done by a member who volunteers his time to help them with their IT issues. As a

result, there is a lot of needed tasks that needed to be done that Integrity hadn't had the time or skills to do yet.

Results

During our partnership with Integrity, several initiatives were implemented to enhance the security and performance of their network infrastructure. One of the first steps taken was to establish a Security Camera schedule based on industry best practices, detailing when the cameras should be fully on versus motion activated. A Security Camera policy was also created, outlining guidelines, procedures, and access for interacting with the security cameras. Another key aspect of the partnership was the successful setup and configuration of a Network-Attached Storage (NAS) system, allowing for easy access to data from any local computer on the network. Additionally, Access Point (AP) performance was optimized, with consistent speeds achieved across multiple access points after thorough testing. To identify and mitigate any potential vulnerabilities within Integrity's network, a Vulnerability Assessment was performed using Nmap and the Vuln Script. Information on each device in the network, including hostname, IP address, ports open, vulnerabilities, potential OS, and potential OS version, was collected. Mitigation strategies for potential vulnerabilities were also developed and suggested to Integrity. To ensure that the staff at Integrity were aware of the best practices in cybersecurity and the importance of protecting their data, staff training was completed with the participation of our team and the core of Integrity's staff. The training covered various topics, including common cybersecurity attacks like phishing and password protection policies. Overall, these initiatives helped to strengthen the security and performance of Integrity's network infrastructure.

Scope Changes and Challenges

Not every project goes as initially planned. This capstone project was no different. There were a couple of things our team ran into over the course of the semester that were not originally known when we started this project. Initially, we found out that the Integrity staff could not access their Unifi network Portal which contained a list of all their IT devices and additional information about those devices. My team and I had trouble installing OpenVAS and Zenmap onto Integrity's computers since they were Macintosh as opposed to Windows. When setting up the NAS, my team ran into a problem getting it to show up on Integrity's network. After determining that a reset was the next step, my team found the NAS's reset button was physically broken off. Lastly, midsemester we added on the additional task of helping Integrity to switch ISP providers on all their network devices. On the bright side, none of these issues severely affected the end result and my team and I were able to find a workaround for every problem.

Lessons Learned

In retrospect, there were a lot of lessons I took away from this capstone project. I realized that things aren't always going to work out perfectly on the first try and not to be discouraged when things go awry. Throughout this process I have developed a greater understanding for successful customer service practices. I also learned that a small business's needs and priorities are much different then big companies. A small business often excels at their main goal or priority but have limited resources. Offering support for something so crucial as network security and ease of network operations has been extremely beneficial to Integrity.

Summary and Conclusions

In conclusion, the partnership between our team and Integrity Church allowed us to assess their network infrastructure and identify potential vulnerabilities that could be exploited

by internal or external threats. Through the implementation of various initiatives such as the establishment of a security camera policy, network-attached storage system setup, optimization of access point performance, and staff training, we were able to make Integrity's network more secure and efficient. Our team encountered a few challenges during the project, including the inability to access the Unifi network portal, difficulty installing software on Macintosh computers, and a broken reset button on the NAS. However, we were able to find workarounds for each problem and achieve the project objectives successfully. Overall, the experience has taught us valuable lessons about IT security in small businesses and the practical application of information technology in real-world scenarios. We hope to continue this partnership with Integrity Church with future capstone groups.