Final Paper

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Table of Contents

Introduction

As I progress further into my education and extracurricular research/development, my goals and ambitions become polished and refined. Throughout this process, I have been attempting to gain experience with every aspect of technology outside of school hours. There are simply so many facets of the technology industry that intrigue me, and I do not want to limit myself to one discipline/specialty. Consequently, I sought out online resources for teaching myself how to start programming with Java. This progressed until I had gained experience with not only Java, but Python, C#, Golang, and JavaScript (alongside HTML & CSS).

I also wanted to gain experience with the physical hardware that lies at the heart of these operations, so I began working on computers and other devices. This included upgrades, repairs, and modifications which are both interesting and critical aspects of technology. In order to familiarize myself with the technology commonly present in the enterprise environment, I began scavenging local classifieds for used equipment like network switches and servers.

It was through my search for used networking equipment that led me to my role as an IT technician at Edery Technology. I was offered a job under the premise that I first acquire my CompTIA A+ and Network+ certifications. Edery Technology is an MSP (managed service provider) based locally in Virginia Beach. A managed service provider can be described as a "third-party company that remotely manages a customer's information technology (IT) infrastructure and end-user systems" (Gillis, 2024). The responsibilities of an MSP range widely, rendering this an excellent opportunity for academic and professional development.

In my employment at Edery Technology, I had many goals relating to the continuation of my education in this field; however, three of them stood out. The first and foremost learning objective that I aimed for was to strengthen my capabilities as they relate to Active Directory and adjacent technologies that allow for the streamlined management of an IT infrastructure. Considering the scale of the operation, it is of critical importance that I am well versed with Active Directory. This would not only directly enhance my capabilities in the context of my internship, but it would also allow me to strengthen my understanding of standard management and security controls and their corresponding implementations. The second critical learning objective of my employment was to familiarize myself with the implementation of common security controls. This includes endpoint protection, network security, and data loss prevention. These concepts are incredibly important in the field of cybersecurity, and it would be virtually impossible to operate as a cybersecurity professional without these capabilities. The third notable learning objective would be to establish a concrete understanding of how secure, efficient networks are designed. This would provide opportunities for a ground-up approach to building secure operating environments.

This paper aims to comprehensively reflect on the progression of my work at Edery Technology, and how it correlates with my curriculum and extracurricular education. In doing so, I will strengthen my understanding of the processes and methodologies which complement my ability to digest new, relevant information.

The beginning

Edery Technology is a managed service provider whose primary operations reside in the Hampton Roads area, and whose operations extend "across the East Coast as a full-service IT company" (Edery Technology, 202). As a managed service provider, our responsibilities extend beyond those of a single focal point. We offer services including data recovery, infrastructure provisioning, persistent network/security monitoring, disaster recovery, and employee cybersecurity awareness training. We leverage many technologies/services that offer outstanding performance, enhance productivity, and align with modern security standards. These technologies include networking infrastructure that enables remote configuration, monitoring,

and recovery such as Dell SonicWall and Cisco Meraki. We also use various products/services offered by Barracuda, Lenovo, Synology, and Buffalo for the purposes of Network Attached Storage (NAS) and backup storage. Considering the span of Windows devices in these networking environments, we also are very comfortable with implementing and maintaining Active Directory (AD) environments and adjacent technologies/services. Although we provide services for varying company types and demographics, we primarily deal with real estate agencies, law firms, and construction companies.

I did not necessarily have an allocated time-period for training/orientation; however, I was presented with certification requirements prior to my employment. I was required to obtain my CompTIA A+ and Network + certifications, which are effective at showcasing my familiarity with the foundational concepts pertaining to my future responsibilities. Not only did this familiarize me with the foundational concepts of information technology, but it also fostered the strengthening of my critical thinking capabilities and established mental processes for network/system design and troubleshooting. This is my first official employment opportunity in the context of information technology and cybersecurity, so I had no prior familiarity with the professional environment/industry. Although I was aware of the duties and responsibilities carried out by a managed service provider, I was certainly not expecting the scale of work responsibilities, and the amount of knowledge I would acquire throughout. After obtaining the required certifications, I was employed at Edery Technology as an IT technician. The company impressed me with their granular attention to detail, level of care for clients, and the knowledge/capabilities of the other employees.

Management Environment

Prior to my employment at Edery Technology, I have worked at a couple of different establishments. One of these establishments was a large retail chain. The work was repetitive and unfulfilling; however, it was tolerable, and I worked very hard. The management environment was optimal in the beginning. Of course, there were some factors which negatively impacted the health of the workforce. The most notable being the constant surveillance of each employee. This of course, was justified in the context of loss prevention; however, I found this constant surveillance to occasionally hamper my performance. A few months prior to my resignation at this workplace, a new manager was introduced to the location. This individual was very kind outside of the workplace; however, their management style was overbearing and ingenuine, which eventually pushed me to my resignation.

I feel that an effective management environment is crucial in establishing a healthy and productive workforce. At Edery Technology, I have found the management environment to strongly exceed my expectations. They allow me to work without constantly looking over my

shoulder and provide me with assistance when needed. They also ensure that I am able to continue prioritizing my schoolwork and have fostered a workplace where I can further continue my education. They are also incredibly kind, patient, and most importantly, human. These factors make it much easier for me to excel in my work and have allowed me to progress at an incredibly quick pace. Overall, I am very thankful for the management environment present here.

Duties, Responsibilities, and Projects

As an IT technician at a managed service provider, my duties and responsibilities vary greatly and span across many different facets of information technology and security. There are some responsibilities that I handle on a daily basis, and then there are some duties that are carried out as needed. One of my primary responsibilities that occurs daily is to troubleshoot technologies, whether it is a logical issue or a physical problem. I oftentimes find myself resolving issues relating to printer/device connections, drivers, network connectivity, software licensing, software compatibility, and software conflicts. At Edery Technology, we also handle provisioning and repairs of physical electronics; therefore, I am oftentimes either configuring new devices or spending time troubleshooting hardware failures/issues. Another few routine tasks are those which relate to more physical/hands-on work including running cables, installing/maintaining/removing server/networking equipment and probing preexisting cable runs. There are many more activities which take place commonly (nearly daily); however, I feel as though this list effectively represents the nature of these responsibilities.

One major assignment/project that stands out is upgrading machines from Windows 10 to Windows 11 before the End-of-Support date. This has certainly been a challenge, considering we are responsible for the monitoring and maintenance of over 1,000 endpoints running the Windows operating system. There are many difficulties involved due to compatibility issues, timeline constraints, and coordination requirements; however, it is of critical importance as it contributes to strengthening the overall security posture of our clients. Considering that client cybersecurity is of paramount importance to us, this project is absolutely necessary for the business.

Although this major assignment in particular stands out, it effectively encompasses the duties and responsibilities of patch management and vulnerability assessment. It is incredibly important that we as a managed service provider, stay up to date on the latest security threats and constantly ensure that the respective endpoints receive timely security updates and patches. It also effectively highlights the importance of maintaining an optimized/productive workplace. Quality updates and bug fixes can eliminate downtime and inefficiencies within the workforce, allowing the employees to be more productive. This essentially encompasses the driving goal behind the work of a managed service provider.

My work duties also include programming solutions for certain problems. One good example that depicts this is my development of "Remux," a Powershell utility that converts a physical computer running Windows to a virtual machine (P2V) in Proxmox (see work samples section). This project was presented to me due to a lack of P2V utilities that work with Proxmox. Most of these utilities work well for other hypervisors such as ESXi; however, the only one we had found that works for Proxmox was not in a functioning state. I chose to use PowerShell as this language is used a lot in my environment, and I viewed this as an excellent experience to further familiarize myself with the language. The utility stands on the shoulders of a few giants, such as preexisting command-line utilities for creating an image of a Windows system, and SSHFS libraries for remote-mounting volumes. This was immediately necessary due to multiple machines needing to be converted to a VM, and I believe it was necessary for my further education and understanding in this profession.

Another responsibility that stands out is the requirement for documentation. I have been in a position where I had to work with very little or no documentation detailing the infrastructure/environment, which has taught me the incredible value within good documentation. I have made it my mission to ensure any new documentation is excellently formatted and organized and have been taking time to go through old documentation and organize it accordingly. Although this task is tedious, it comes with its challenges. This responsibility is critical to our operations, as poor documentation can hinder our ability to effectively navigate and troubleshoot. Personally, it has also contributed to my familiarity with our client's infrastructure and granted me insight into the network infrastructure design process.

Finally, the final responsibility that I believe is important enough to be presented is communicating with clients. Throughout my academic and professional progression, I have witnessed many instances of miscommunication, and how it greatly hindered the corresponding experience. It is incredibly important that we properly communicate issues, needs, and other work-related queries/quandaries to establish an effective course of action. Failure to properly communicate needs and intentions with clients can cause more harm than good and leave clients unsatisfied with the service. Whether this is due to unexpected downtime, cybersecurity concerns, or unwanted changes, it can negatively impact the relationship with our clients.

Specific use of cybersecurity skills/knowledge

One pleasant surprise of my employment with Edery Technology is the magnified focus on cybersecurity and secure implementations. An increased focus on cybersecurity and its adjacent areas of focus allows me to leverage my prior knowledge in the real-world. These prior capabilities were derived from both my education at Old Dominion University, and my own

asynchronous learning. It also allows me to develop new skills relating to cybersecurity and refine my preexisting knowledge into a more actionable understanding.

The first capability of note that I gained throughout my asynchronous learning is a strong understanding of data security and confidentiality concepts. This had already been a core interest of mine; however, these capabilities were further refined by my asynchronous learning and also by my education at ODU. This allowed me to effectively design solutions/implementations that properly solved an issue whilst ensuring data remains confidential. This capability is crucial for an IT technician at an MSP that deals with sensitive information. Failure to properly secure confidential information in the modern world is an irrevocable offense that can permanently taint one's reputation. I have effectively integrated this knowledge into virtually every applicable facet of my employment, whether it be the direct handling of client data, ensuring the devices responsible for interfacing with the corresponding devices/data is secure, and sufficiently erasing data in accordance with industry standards and regulations. My on-the-job experience with this content area has greatly impacted my understanding of the subject matter and taught me that all the technical controls in the world can still fall short to a lack of education. This has granted me with real-world understanding of the importance of properly educating end-users on safe habits and foundational cybersecurity awareness that can mitigate the most pressing security threats.

Another point of knowledge that I have found to be incredibly prevalent in my workplace is the satisfactory understanding of commonplace regulations and procedures that necessitate our compliance. Prior to my education at ODU, my knowledge in this context was infantile. During my coursework, I evaluated multiple different cybersecurity policies and strategies which developed my understanding of these concepts. I have since observed the effect these policies and strategies have on our operations and am incredibly thankful that the coursework prepared me for this. My experience with this subject matter in my employment has filled in gaps of knowledge as it pertains to cybersecurity strategies and policies.

One incredibly valuable skill in this field is the design and implementation of secure networking environments. My prior familiarity with this subject has been developed and refined by both my academic experience at ODU and my asynchronous learning activities. In my work, we oftentimes need to make changes to or create entirely new networking environments. In these proceedings, I have leveraged skills relating to network segmentation and VLANs, effective firewall rules, secure configurations and protocols, and many other routes which otherwise contribute to the overall security of a network. Much of my prior knowledge and understanding as it relates to this was theoretical, complemented by a few labs that were specific to a specific environment. My experience during this work has taught me how to effectively apply these concepts to different networking environments and technologies, regardless of the manufacturer or configuration. It also contributed to my realization that these technologies are constantly evolving, and it is incredibly important to monitor and maintain the security of these components as opposed to setting it and forgetting.

More recently, I have been performing more vulnerability assessments and penetration attempts using technologies that were introduced to me by my coursework at ODU. This includes initial

assessments of the network topology, researching discovered vulnerabilities/fragilities, determining the likelihood of exploitation, and establishing a course of action. My prior experience with these concepts was also mostly theoretical, complemented by some labs that contributed to my understanding of routes of exploitation. This experience has granted me valuable insights into the potential avenues for attack, and how to determine the most effective approach to a situation. This more in-depth understanding also enables me to better articulate my findings into actionable insights for executives.

I had already established some foundational understanding of these skills prior to my employment; however, my experience here has evolved these "foundational understandings" into actionable capabilities that present direct value to both my employers and our clients. There are, however, some capabilities that I learned/conceived while on the job. The primary capability of note that I picked up while working here is establishing secure communications channels for clients. There are some instances where sensitive information must be shared electronically; however, implementing these channels in a manner that does not significantly reduce productivity for the corresponding individual/entity can pose a challenge. This challenge is oftentimes magnified by time and budget constraints. My work at Edery Technology has taught me how to effectively implement these channels in such a manner.

Overall, I have integrated much of my prior learning into my employment experience and have found that my employment has refined any preexisting knowledge. My employment here has also bestowed upon me a plethora of knowledge and nuanced insights discovered by veterans in this industry.

ODU Curriculum

I found that the ODU curriculum effectively prepared me for my internship. My coursework taught me many of the necessary, foundational concepts of cybersecurity. It also taught me how to learn and digest new information more efficiently, leading to me being able to learn complex concepts relating to cybersecurity in an asynchronous environment. The hours I spent attending online courses also likely contributed to this capability. Fortunately, I was able to establish many connections between what I learned at ODU, and the duties I perform in my employment. These connections particularly pertain to abstract tasks and logic, such as the troubleshooting process or identifying a security threat. It also includes the ability to properly quantify risk in terms of cybersecurity and articulate the threats in a manner that is actionable and easy to digest. In essence, the ODU curriculum has been incredibly effective at teaching me skills that are abstract or complimentary to cybersecurity, as opposed to direct technical skills which I primarily derived through asynchronous learning or as needed to fulfill my job responsibilities.

Learning Objective Fulfillment

In the introduction of this paper, I detailed three different learning objectives I wished to achieve throughout my employment. The first of these objectives was to further strengthen my capabilities as they relate to Active Directory (AD), and my employment far surpassed my expectations in this regard. Considering the scale of our operations, Active Directory is present in many of our day-to-day operations. This has provided me phenomenal real-world experience in interfacing with an AD environment. My second learning objective was to familiarize myself with the implementation of common security controls. As previously mentioned, the ODU curriculum was excellent at providing the necessary foundational knowledge for a cybersecurity professional; however, there was not quite as much focus on technical application/implementation of these controls. Granted, this may be due to the specific courses I chose throughout my academic career; however, the point still stands as it relates to my lack of experience with application/implementation in the context of my education. My employment has put a great emphasis on the implementation of common security controls and absolutely fulfilled this goal. The final learning objective I listed was to establish a concrete understanding of how secure, efficient networks are designed. Throughout my employment here, my superiors have done an excellent job at teaching me how to securely design networks and have certainly fulfilled this goal.

Motivating and Exciting Aspects

I have found the entire employment experience at Edery Technology to be incredibly motivating and exciting. I have been passionate about these subjects since I was young and finally have been presented with the opportunity to receive income for this passion. This means I can have fun at work where I learn new things and constantly challenge myself, as opposed to simply performing rote tasks that diminish my quality of life and willpower in the context of my career. My work here also has a more direct, tangible impact as opposed to contributing to abstract numbers in a sheet.

My workplace also fosters creativity, allowing us to apply unique approaches to complex situations which is incredibly beneficial towards my continued education. It has allowed me to further refine my capabilities not only in cybersecurity, but also software development and

professional/academic writing. It also enables me to experiment with new technologies which may further increase productivity, efficiency, and security for us and our clients.

Discouraging Aspects

I personally have found no aspects of this employment opportunity to be discouraging. Even on challenging days that may appear impossible, I am surrounded by kind people who want to help. This healthy workplace allows me to operate with a clear head and has greatly enhanced my employment experience.

Challenging Aspects

Considering this is my first employment opportunity relating to IT and cybersecurity – right out of school – I have found there to be many challenges. These challenges are not necessarily relating to my employment environment, but more so the work being performed. Considering the nature of the organization, our responsibilities range far and wide. This means that there is a lot more to worry about, and a lot less time. This can be incredibly stressful at times, but I feel that it overall heightens the fulfillment of the experience.

Recommendations for Future Employees

My one and only recommendation for any future employees, not only for here, but for any information technology/cybersecurity related job would be to ensure that this is what you want. If you are not particularly interested in these fields, find the work to be unfulfilling, or are simply pursuing the money, you will likely get burned out quickly. I feel as though this statement applies to any profession, and I do not think I would have lasted if I was not passionate about these subjects.

Conclusion

Overall, I have found this employment opportunity to be incredibly fulfilling for my academic and professional advancement. Everything about the management and workplace environment has been absolutely incredible, and I enjoy every day at my job. The challenges here not only build on my knowledge and skills, but they strengthen my character throughout my everyday life. I do not think my employment experience will have a particularly significant impact on the remainder of my college time at ODU, since I will be graduating in less than a month, but I do think it will have a gargantuan impact on my future professional path and planning. It has and will continue to grant me a wide range of experience in the subjects I am most interested in, allowing me to effectively refine my professional pathway. I am incredibly grateful for this employment opportunity and have found it to be one of the most transforming experiences of my life and career, and if presented with the opportunity, would not change how this timeline played out.

Work Samples
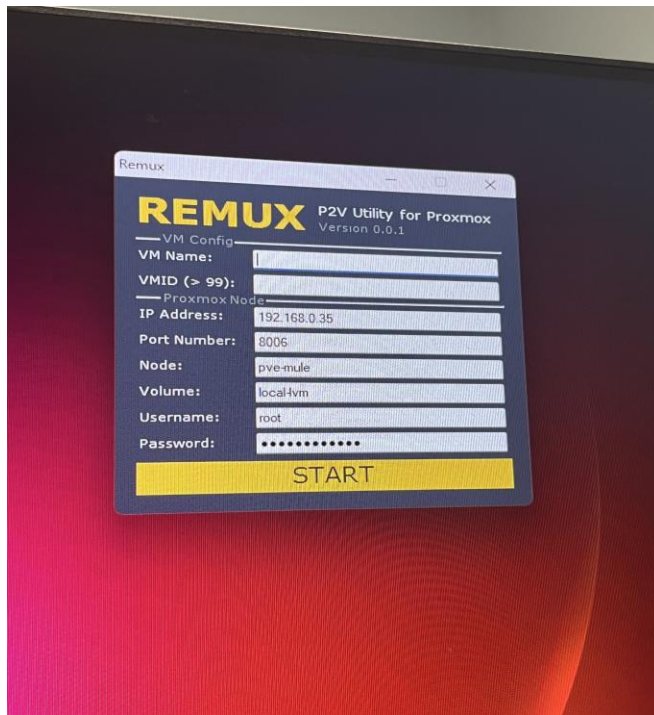
Remux, a P2V utility for Proxmox, referenced by section four. Picture is of the user interface of the script, and effectively encapsulates the functionality of the utility.

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