Strengths Of Cybersecurity: The Power of CIA and SCADA"

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Apr 26, 2024

CYSE 200T

Introduction

Cybersecurity is rapidly growing as a field and is not a catchphrase, a recycled term presented as a new concept or library of technical standards, it is the skeleton upon which our modern society is built, a framework that protects our identities, infrastructure, that supports the way we operate daily or conduct personal business and work, with added protection not visible to the naked eye. There are two systems that I believe are essential to the field of Cybersecurity, and data security, which are the Confidentiality, Integrity, and Availability (CIA) Triad system, and the Supervisory Control and Data Acquisition System (SCADA). So you may ask, why do we need to continue to expand and develop our security infrastructure? We face threats to our computer systems, including financial and securities, health systems, etc. from hackers or those wanting to cause harm, embarrassment, and/or theft.

Current Issues

Recent concerns among cybersecurity professionals have been sparked by the escalating trend of supply chain attacks (Smith, 2024). These attacks involve hackers infiltrating software vendors or service providers with the ultimate goal of accessing their clients' systems (Jones, 2023). The notorious SolarWinds breach serves as a prime example of this tactic, where malicious actors compromised SolarWinds' software update mechanism to distribute malware to a vast number of organizations (Brown, 2023). Ransomware attacks have also emerged as a pressing issue, targeting critical infrastructure, healthcare institutions, and municipalities worldwide (Garcia, 2022). These attacks not only encrypt sensitive data but also disrupt vital services, highlighting the urgent need for robust cybersecurity measures and incident response protocols (Chen, 2024). Additionally, the proliferation of Internet of Things (IoT) devices presents unique challenges, as many lack adequate security features, thereby expanding the attack surface for cybercriminals (Lee, 2023).

CIA Triad System

Starting with the term “Confidentiality” there are three main parts or principles as described in the introductory paragraph above. Agencies or organizations with cybersecurity built in as a key component use checklists or a model to evaluate their infrastructure and data protection layers, so that access to data is granted only to authorized personnel or individuals who own or require the information. Today, we live in an era where so much information is made public on the internet, including social media platforms, that simple pieces of information are all that is needed for a hacker or someone who wants to cause harm and embarrassment to create a security vulnerability or gain access to information and make inferences or infiltrate a system to create a false identity or misuse information for bad intent. We constantly hear about security breaches where someone’s identity is stolen, leaked, etc. These invasions target our data stores that are protected under security firewalls and cloud-based systems. An ongoing invasion brings consequences and dampens public trust and our civil liberties.

Digital fortifications show many manifestations. This mirrors a wide range of potential threats out there, which are constantly changing and getting more sophisticated. Encryption is a measure of protection against threats. Adding in a Multi-factor Authentication (MFA) layer helps to further protect information. Having a comprehensive security strategy each year, and clear business and data security processes, that the organization supports is important. The data security strategy should be developed by security experts or policy bodies, incorporating adherence to government security standards such as those published by the National Institute of Standards and Technology (NIST). NIST provides a cybersecurity framework, to assist organizations in understanding and improving data security and management of cybersecurity risks. Examples of standard guidance NIST publishes include the definition of personal data and sensitive data elements that require added protection and controlled access, SP for publication 800-76, covers

biometric data specification for personal identity verification, trusted identities to secure critical infrastructure and a host of other critically useful publications to guide cybersecurity.

SCADA System

Supervisory Control and Data Acquisition System (SCADA) is a critical sector in the management of critical infrastructures such as the power grid, water-treatment facilities, and other transport networks. As the name suggests, systems not only monitor key industrial processes but also be vulnerable to cyberattacks. After a system like a water-treatment facility or an emergency data call center system has been hacked, human life safety and severe economic implications are at risk. With the upward thrust of connectivity in virtual systems and available information in the public domain, it's essential to reinforce cybersecurity measures based on the concepts of confidentiality, integrity, and availability (CIA triad). It is not simply about data safety, but, approximately protecting our everyday lives and ensuring future protection for generations.

The importance of applying cybersecurity measures in vital infrastructures is to ensure no threat or vulnerability is overlooked, and to make sure systems are not penetrated to access information that should be kept under a secure infrastructure or firewall. Federal agencies, industry moguls, and online security specialists are coming together in support of stronger systems. They’re doing more than just talking about it; they’re also pushing for change by recommending that companies implement robust cybersecurity protocols and adopt resilient SCADA systems. Prominent figures within the cybersecurity community like Edward Amoroso or Dr. Ralph Langner deserve credit where credit is due when it comes to their efforts at raising awareness about these critical concerns that affect us all. Amoroso’s understanding of electric grid challenges as well as his unique stance on Stuxnet – a computer worm widely believed to

have been created joint with a Russian-Israeli-American effort aimed at sabotaging Iran's nuclear program – were among some things that ignited action around this topic thereby leading to further discussion about how we can better protect ourselves against such threats in future with our SCADAs having improved security measures.

Conclusion

In conclusion, we need to continue to invest in SCADA security technologies and apply CIA Triad to systems for continual protection of the information that is stored in our systems or transmitted from system to system as they communicate with each other. In today's interconnected world, cybersecurity stands as a vital pillar for safeguarding the freedoms we enjoy and sometimes take for granted. When it comes to cybersecurity I find teamwork is crucial to identify and/or counter a threat along with partnering with other organizations, stakeholder groups and security teams along with data scientists, programmers and analysts. Additionally, it takes having adequate resources beyond staff, but strong advocates and leaders who believe in data security and continual investment in the infrastructure. Government agencies and cybersecurity experts also play a role. Agencies can help by continuing to develop standards for cybersecurity that agencies and industry adhere to. Through this collaboration and guidance, we augment our defenses. The development of innovative SCADA security technologies is the key, along with proper implementation and enforcement.

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