Quinn Doak **11/3/2024**

Vulnerabilities inside SCATA systems

SCADA Systems are crucial for controlling and monitoring critical infrastructure, which includes things such as energy grids, water systems, gas pipelines, and more. However, these systems being connected to networks makes them vulnerable to cyber threats and attacks. These vulnerabilities could cause catastrophic consequences so it's important to do our best to protect these systems.

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1. **Overview of SCADA systems**

   SCADA Systems play a very important role in critical infrastructure to help in the process of monitoring and ensuring that everything is going according to plan. A few examples would be ensuring that power is properly generated and distributed, or controlling the processing for wastewater treatment plants, or even ensuring that railways monitor train speeds and ensure track safety.

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2. **Vulnerabilities within SCADA Systems**

   As SCADA systems continue to evolve, they are increasingly using networks for communication. This opens the door for threat actors to break into these systems and infect them with malware, record data, or many other ways to disrupt these systems. The largest attack on SCADA systems ever recorded was the Stuxnet Attack in 2012. It spread through USB drives and its primary goal was to disrupt the speed of centrifuges that were used for uranium enrichment. The attack destroyed about 1,000 centrifuges, setting back Iran's nuclear program. This was the first time the world saw anything like this, and it opened the door for many more attacks like this.

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3. **Mitigating risks for SCADA Systems**

   Just like anything else, it's important to have proper security in place to try and mitigate attacks against SCADA systems, a few ways that this can be achieved would be actively monitoring data to ensure everything is working normally, having security protocols in place such as encryption, or having some sort of anomaly detection system. Threats towards SCADA systems are real, which is why it is

important to have these systems in place to limit the amount of damage as much as possible.

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4. Conclusion

In conclusion, SCADA systems play an important role in critical infrastructure, from energy and water management to transportation and industrial processes. However, their use of networking makes them vulnerable to cyberattacks, as shown by the Stuxnet incident. These vulnerabilities highlight the need for security measures, such as real time monitoring, encryption and anomaly detection. By ensuring the defenses for SCADA systems are strong, we can help protect crucial infrastructure and ensure that these essential services continue with no problems.