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The Role of SCADA Systems in Protecting Critical Infrastructure

SCADA systems are very important when it comes to the operation of critical infrastructure. Although, as these systems become more connected, they also become more vulnerable. It is important to understand all the risks and roles that the SCADA plays into managing. They are crucial for keeping vital systems secure.

SCADA stands for Supervisory Control and Data Acquisition. It is the technology behind factory like things for example: power grids and gas pipelines. They consist of systems that go hreough a process of collecting data from equipment within a field, and then sending it back to human operators through a Human Machine Interface (HMI). Water pressure systems or turning things like pumps are taken care of by devices called PLCS which stands for Programmable Logic Controllers or Remost Terminal Units (RTU). The SCADA system allows operators to monitor the systems and then step in when something with one of the systems is not going correctly.

A lot of these systems however, were not made to adapt to modern cybersecurity threats. There are a lot of older SCADA systems that were made and were believed to stay disconnected

from other outside networks. Unfortuntaltelty, there are a lot more sysrtems going online using protocolos like TCP, and they are more likely to be exposed to risks. There is a common misconspeciton that a system not being connected diertctly to the internet means that it is safe. Though, this is not the case, and attacks can even come from inside a network or through a third party device that has been compromised.

SCADA has two main types of vulnerabilities. One of them is unauthorized access. This is when someone gains access to the software and are able to control or whe malware makes changes to the system. There is also packet access, when someone is able to send data to the SCADA device when its not secure. This means someone on the outside would be able to control valves, switches, or pumps remotely, leading to serious damage. In 2010, there was an attack called the Stuxnet attack. This is a perfect exmaple as a piece of malware targeted PLCs in n Iran's nuclear program and caused physical damage to the centrifuges. This tells us cyberattacks on SCADA aren't just a risk, they can destroy things in the real world (Zetter, 2014).

SCADA systems give operators time visibility into what is going on within the field and makes it easier to catch issues amd address them before it gets worse. They have alarms that are able to log strange behavior within the systems. More recently, vendors are building better security into the systems and including things like industrial grade firewalls, and whitelisting that limits what software or commands are allowed. This makes it harder to attacks to mess with operations and go unnoticed.

SCADA systems are important when it comes to how infrastructure runs. However, this makes them a target for threats. The more connected systems become, the more important it is to

protect them. With the right safeguards in place, SCADA is a powerful to to detect issues before it get disastrous.

References:

SCADA Systems. (n.d.). *Supervisory Control and Data Acquisition*.

Zetter, K. (2014). *Countdown to Zero Day: Stuxnet and the Launch of the World's First Digital Weapon*. Crown Publishing Group.