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Data Islands and IoT

1. Describe two or more future IoT devices that would be expected in your sector.

Two expected future IoT devices in the energy sector include emissions monitoring and control devices, and cloud-based IoT devices. Considering the current heightened awareness of human impact on climate change and the fact that "the United States' power system alone takes up 40% of the country's carbon dioxide emissions" (Halim et al, 99), it is to be expected that the American Bulk Electric System (BES) will monitor and control its carbon emissions. Smart meters offer several benefits to help to solve this problem. A smart meter "is a component of Advanced Metering Infrastructure (AMI), which provides accurate measurement and automate remote reading of power consumption," (Halim et al, 99). Remote monitoring and administration of power consumption reduces transit-related emissions of service personnel and helps consumers adjust and monitor their own consumption with readily available data provided by the smart meter. "The effects of climate change have made developing carbon-neutral energy solutions imperative," (*How IoT Enables the Smart Grid - Applications, Benefits, and Use Cases,* 1) and smart meters are a big step in this direction. The second type of device are next-gen cloud-based IoT devices which provide full historical data retention and data independence. Many IoT devices, called 'black box' devices, "may not log its cybersecurity and privacy events or may not give organizations access to its logs," (Boeckl et al, 9). A cloud-managed IoT device solves this problem. The logs are sent to the cloud and continuously monitored remotely, and "sends automated alerts with relevant operational logs to engineers who review the data, troubleshoot situations remotely, and determine if a system has deviated from normal behavior," (*IOT: The Electric Grid's Final Frontier*, 1).

2. Specific to your sector, explain the complexities and/or failures associated with perimeter-based security.

Perimeter-based security is based on the ideology of a trusted internal network and an untrusted external network. Once users authenticate into the internal network, they became trusted. However, as smart grids become more evolved and connected, more and more IoT devices appear that do not follow standard IT cybersecurity practices. The problem with IoT devices is how "to authenticate and authorize users (maintenance personnel) to such devices in such a way that access is specific to a user (person), authentication information (e.g. password) is specific to each user (not shared between users), and control of authentication and authorization can be centrally managed across the utility and updated reasonably promptly to ensure only intended users can authenticate to intended devices and perform authorized functions," (Smart Grid Cyber Security Potential Threats, Vulnerabilities, and Risks, 55). Such devices include, but are not limited to, Intelligent Electronic Devices, Smart Meters, and Outdoor Field Equipment. A malicious actor can easily compromise the confidentiality, integrity, and availability of data transmitted or collected by these devices. Using and securing data islands do not particularly solve this issue as constant monitoring and bidirectional communication is needed from this particular equipment. Industries, including the energy sector, are rightly moving towards implementing the zero-trust model for authentication and authorization to address these shortcomings.

Works Cited

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