Some Emerging Trends in the SCADA System

Supervisory control and data acquisition (SCADA) system is a significant type of information system (IS). It is considered a vital part of industry/social day-to-day running. For example, A SCADA system could collect data to monitor critical instruments and send control commands remotely. There have many SCADA systems running on countless manufacturing factories, power plants and subways.

Since the 1960s, SCADA has been introduced and evolved multiple times. However, SCADA progress was plodding for almost 20 years, especially if you compare it with the modern internet business. Fortunately, recently we can see SCADA has started introducing some new technologies, and we can look at some emerging trends in this area.

1. Data mining. Data mining is used to find the hidden pattern in massive datasets, and people often adopt this way to construct an AI or Machine Learning. Collecting real-time data is a vital task for a SCADA system, and SCADA shows them to operators and could persist them into a historical database just for reporting. However, some SCADA systems start using historical data to evaluate the working condition of devices and tell users when equipment should be replaced or repaired in advance. As people introduce Data Mining into the SCADA area, condition monitoring functionality is increasingly in demand in a modern SCADA. For example, a SCADA system for wind turbines could integrate a condition monitoring system (CMS), and CMS could use SCADA data to analyse gear conditions. Research shows a good CMS can detect a device to be failed in months advance (Bangalore, P. and Patriksson, M., 2018.).

2. IoT-based SCADA are becoming increasingly popular. Before IoT, a SCADA system could have to use satellite to communicate devices at a long distance, and it could in high cost and limited by bandwidth. Recently, more and more modern SCADA systems have started using IoT devices to monitor and control devices through the internet (Myint, A.K., Latt, K.Z., Hla, T.T. and Tun, N.M., 2021.). Imagine a SCADA system that can show users power plants in different locations; the information can be shared with operators in other physical places with various devices, like smartphones or tablets. IoT-Cloud based SCADA to bring effectiveness with low cost. Traditional SCADA systems rely on programmable logical control (PLC) to get data, and you have to update modules in PLC to add a new sensor. Nowadays, many sensors have supported transferring data to the internet with a wireless network, and the user no longer needs to rely on PLC. On the other hand, IoT can provide good scalability that traditional systems lack (Saravanan, K., Anusuya, E., Kumar, R. and Son, L.H., 2018.).

3. Increasing focus on cyber security. Traditional SCADA was designed on-site, standalone style, and people could not pay much attention to cyber security (Nazir, S., Patel, S. and Patel, D., 2017.). However, as a modern SCADA system connecting the internet, it forces people to spend many resources to prevent intrusion into the system. Many SCADA related to critical infrastructure and hackers or malware could have disastrous consequences for organisations. One of the more notable recent SCADAS attacks is Russia trying to disable Ukraine's power grid during the war (Tidy, J. (2022).).
Except for common ways to enhance cyber security, for example, deploying advanced firewalls that can detect abnormal activity; enable encrypted protocol in communications.).Research recommends constructing a SCADA system network using a segmentation strategy that can reduce impacting of damage (Hasan, M.M. and Mouftah, H.T., 2016.) and taking the regular security assessment for the whole system (Nazir, S., Patel, S. and Patel, D., 2017.).

Reference:

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