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Getting IIoT data into a SCADA system

In this installment of Automation Zone, learn how mobile devices and the IIoT are upending data delivery models.

By Ed Nugent, PcVue

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The Industrial Internet of Things (IIoT) is a sea change for many in the manufacturing industry and beyond. It has brought about not just an incredible amount of new information but also new methods for acquiring this data. SCADA projects will benefit greatly from the integration of this intelligence.

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SCADA has evolved over the years, and now our attention will be on supporting the architectures to acquire IIoT sensor information and consolidating it with the rest of the SCADA data in real time. This means adding IIoT data feeds into SCADA hosts that are currently using hardwired industrial IP networks, often with legacy serial communications in the mix.

Connecting to IIoT sensors

There are two emerging business models for Low Power Wide Area Networks (LPWAN) to connect to IIoT sensors. In the first, providers offer a complete infrastructure. An example of this kind of provider is Sigfox. The Sigfox business model is to provide a standard API for consumers for connecting to any IoT or IIoT sensor in the sensor's environment. Sigfox provides the complete LPWAN including cell towers and servers. These systems are designed for updates on an infrequent basis when minimal data is exchanged. There is a fee charged each time the Sigfox infrastructure is used to acquire data.

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A different approach is taken by the LoRa Alliance™ with its LoRaWAN™ technology. LoRaWAN is quite interesting for SCADA applications because it is not a turnkey infrastructure. The LoRa Alliance is an open, not-for-profit association of members who are collaborating on the LoRa protocol, LoRaWAN. It is possible to purchase LoRaWAN gateways and associate the gateways with IIoT sensors reporting back to a network server. The user (or third-party service provider) owns the equipment and therefore the data architecture and costs associated with transmission. This means that SCADA data does not have to go through the cloud but can be acquired and consumed at the local plant or facility.

This webinar explores how the Industrial Internet is changing the traditional condition monitoring landscape.

Based on our industry's history, we expect that SCADA data acquisition from the IIoT will have different flavors, and very likely we'll see these in use in parallel. This is consistent with what has happened in previous networking evolutions, which is why SCADA platform providers still have and support serial communications. In the case of the IIoT, there will be some data in a cloud platform that our customers will want to integrate into their SCADA environment and other data that they need to acquire locally; our architecture options must support both.

Risks and rewards of IIoT data within SCADA

The prevalence of workers using their mobile devices for real-time SCADA data access will only increase. This, along with the ease of incorporating IIoT sensors into the SCADA system, means an uptick in the amount of data expected to be integrated into the platform.

Consider the substation automation vertical, a market growing quickly as the smart grid becomes reality. As renewable energy production is increasingly done within the distribution network and microgrids proliferate, there has been a push to put intelligence into the distribution network. There are many new intelligent electronic devices coming online in this environment.

The information generated by these intelligent devices is critically important to understanding loading and performance of the network and the current status of the devices; however, there are also risks associated with a deluge of data. The risk that the operators ignore the new data is one consideration, but of more importance is the risk that operators get confused by the amount of data presented and potentially make bad decisions because of it. We need to help operators filter that data so that they can obtain actionable data which they can actually work with.

SCADA started as a control-room solution. Modern control rooms typically have a large number of screens to keep track of various aspects of the system. As operators become more mobile and rely more on their mobile devices, we have what we call a "real-estate problem." The amount of screen real estate available to display SCADA information is shrinking as the amount of data to display is increasing. To make sense of the SCADA data and maintain operator situation awareness, it's necessary to get smarter about the way SCADA information is presented, whether it comes from the IIoT or from traditional SCADA systems.

Mobile location analysis

Contextual mobility is the ability to use location and user profile as a filter to provide the right information securely to the right person at the right time in the right location. With contextual mobility, it's possible to declutter the operator's screen and automatically provide the information and control elements that the user needs to do his or her job.

Consider an architecture that is centered on the mobility server and its contextual logic engine, which is responsible for delivering the content to the mobile device based on the user profile and the geo-zone(s) that they are currently located in. With an app on a mobile device that senses and reports nearby geotags, the

mobility server is able to sense the movements of the mobile device and populate the user interface with the information and controls necessary for the person logged into the device to perform his or her work without the need to navigate through miniaturized versions of control-room screens scaled down to the size of a smartphone or tablet.

Cyber-security

Mobile device management practices and attitudes toward bring-your-own-device (BYOD) are indicators of the security culture of the SCADA user relying on contextual mobility. Both suppliers and end users have a role in securing mobile devices.

If control information has been downloaded to a personal mobile worker and the user leaves a defined geofenced area, the information provided by the mobility server is wiped off the phone. This avoids any confusion on the user's part about operating a control attached to equipment in a different zone, which would be both an operational and a safety issue.

Mobility & logic = IIoT data magic

The combination of an increased volume of sensor information from IIoT devices and adoption of mobile devices as the primary interface to industrial SCADA and HMI systems presents challenges and opportunities. Less real estate available for more SCADA and HMI data can be a confounding issue for all users, and the status quo of SCADA design does not fit well with this emerging environment.

A model that relies on users accessing a proprietary portal to ostensibly get whatever they need from the cloud is, we believe, overly simplistic, as this model will do little to help users understand the SCADA data and translate that to situational awareness.

An alternative approach is a model based on the inclusion of a mobility server equipped with a contextual logic engine to deliver the information and controls for users to do their job when they are on-site and in a position to make use of good and clearly presented data.

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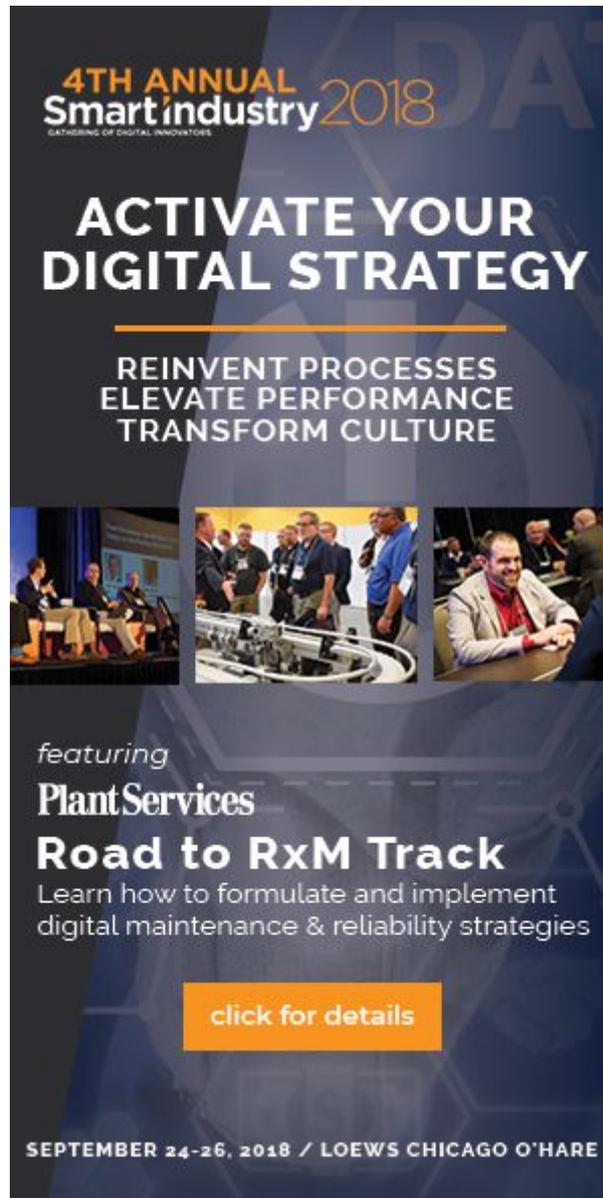


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