Instrument Training Enables IIoT Implementation

The first step to implementing digitization, IIoT, Industry 4.0 and other modern technologies is proper use of smart instrumentation.

By Jerry Spindler, Endress+Hauser

Process instruments have been digital (smart) for many years. In fact, microprocessor-based measuring devices for flow, level, pressure, temperature, etc. have been available since the 1980s. However, a vast majority of units purchased and installed still rely on the 4-20 mA analog output of the process variable, with the digital interface completely ignored.

Smart instruments can provide a wealth of information via HART, EtherNet/IP and other digital interfaces, but most plants don't use these communication protocols. And there's even a surprising percentage of instruments with no outputs connected and users relying only on the displayed values as a visual indication.

In many cases the problem is a lack of training for the plant technicians expected to work with these smart instruments. A skills gap often exists which can only be filled with some type of training. Whether it be formal internal onboarding and mentoring: informal institutional knowledge absorbed organically; online eLearning; classroom instructor-led events (Figure 1); or some combination of these—there's no doubt that training is needed to take place before a plant undergoes digital transformation.

Figure 1: With instrument training, such as this Endress+Hauser class, students learn how modern instruments provide digital data to IIoT cloud services.

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Figure 2: Modern training isn't just conducted in a classroom. Students at Endress+Hauser classes get to apply what they learn hands on in a PTU ® (Process Training Unit).

Learning the New Technology

Some of the leading buzzwords in the process industry include Industrial Internet of Things (IIoT), digitization, Industry 4.0, edge computing and the cloud. A lot of people are getting excited about these technologies but are not sure how to implement them. Most believe it's coming, and will be a reality someday in their plants, but how do they go about selecting the best approach? There are so many solutions being touted nowadays that it can be overwhelming. Last count was 260 different definitions of IoT and the subset IIoT.

On top of that, there's an abundance of new apps released every day for mobile devices, exploding WiFi, Bluetooth and RFID connections, a growing portfolio of Ethernet connected devices, IO-Link, etc., plus new handheld Windows 10 tablets that are intended to be an integral part of this evolving IIoT ecosystem. Control engineers working on a new design will also need to start thinking beyond how the process can be made to work on day one when commissioned, and how that "system" can evolve, improve and keep getting better.

A good place to start is by learning what the instrumentation currently installed in their plants can do. The data in those instruments are the "things" in the IIoT. That is, the diagnostic data, status, process value, calibration and other data a modern instrument can provide often form the basis for maintenance and process management decisions made by sophisticated software higher up in the digitization chain.

Learning the capabilities of smart instrumentation is thus the starting point before one can proceed to more complex software applications such as a computerized maintenance management or other asset management systems, or a distributed control system. The good news is most plant engineers and technicians already know how flow, level, pressure and temperature instruments work to provide a process value; they just aren't familiar with all their capabilities.

Training should include working on actual smart instrumentation connected to an IIoT system (Figure 2). Here, students can see how the data is generated, how it's transmitted, what kind of software processes it and what the results can be.

Getting Ready for IIoT

Many companies look for easy targets to cut expenses, and training programs have often fallen victim to this short-sighted approach. But when considering a long-term strategy for IIoT adoption, it cannot take place without the right skillsets in place.

Instrument training makes engineers and technicians aware of how modern digital technology works. They can evaluate the installation of new devices and the use of the data generated from them to improve operations. With this preparation, the plant will be well prepared to implement IIoT installations.

Low cost flow, level, pressure, temperature and analytical devices are available today, some less than $500 per measuring point. These can be a modern upgrade for older devices that fail, so plants could consider sapping out to a more capable smart device instead of just ordering an exact replacement.

Ask the supplier if they offer a more modern alternative. You can still achieve the same measurement as before with the same accuracy, but you are preparing for the future by thinking ahead.

Development is occurring at a dizzying pace. Some of the newest devices are smarter now than they were just one or two years ago. And innovations never imagined, like self-calibrating RTD temperature sensors, and flowmeters and level measuring electronics with self-monitoring and verification capabilities built in, are hitting the market.

But this capability isn't available to you unless you know that these devices exist and can be installed in your process. Again, ask your vendor what's new, read the ads in this magazine or attend a trade show to see them first hand or attend an IIoT seminar.

IIoT and digitization are here today and will soon be a competitive necessity. With proper training, including seeing it in action during training or at a trade show, users can realize a path toward adoption.

Summary

IIoT and digitization can be daunting to understand, especially in plants that aren't taking advantage of the digital capabilities of instruments they've been using since the 1980s. Modern instruments provide the things in the IIoT, and instrument training will acquaint engineers and technicians with how these instruments work. And, in a modern training class, they will also see advanced instrumentation. Such training is readily available from most instrument manufacturers.

About the Author

Jerry Spindler has been Training Manager for Customer and Field Service Training at Endress+Hauser since 2012. Previous positions at Endress+Hauser were in product marketing and business development. Spindler has a MBA in product management and advertising, and a BS in electronics and mechanical technology.

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