

How Industrial Ethernet Makes Networks More Scalable

Ethernet Makes Networks More Scalable

The adoption of industrial Ethernet solutions has been rising for a while now, as the automation industry shifts from serial protocols such as PROFIBUS and CANopen to Ethernet-based alternatives like PROFINET® and EtherCAT®. According to a 2013 study from IMS Research, the use of industrial Ethernet in the process industry alone should double from 2011 levels by 2016.¹ A 2015 vendor report revealed that while industrial Ethernet protocols still trail fieldbus in overall market share (33% to 67%), they are growing more than twice as quickly (17% vs. 7%).²

What Is Driving Industrial Ethernet Adoption?

The reason why Ethernet solutions have been gaining so much ground on traditional fieldbuses mostly involves the superior bandwidth and speed of Ethernet supplies, as well as their excellent flexibility and cost-effectiveness due to a large, established product ecosystem. Plus, Ethernet is a familiar technology, having first entered office LANs decades ago.

There is another main driver of Ethernet adoption out there: the rise of the industrial Internet of Things. The vast scale of the IIoT, with its myriad devices and IP networks, is pushing hardwired transmitters and serial fieldbuses to their limits. This trend can be seen in the evolution of the HART family of protocols, for instance.³

More specifically, the spread of WirelessHART means that many dynamic variables for measurement are now being exchanged by devices, instead of the single variable movements of many legacy automation protocols. Mapping all of these figures within a Modbus RTU register would be slow, painstaking work. Serial-based protocols like Modbus RTU, et al., are also ill-equipped to perform the intelligent device management that is increasingly central to the IIoT.

IIoT Is Pushing Hardwired Transmitters to Their Limits

Accordingly, HART-IP was developed with support standard IEEE 802.3 Ethernet and IEEE 802.11 Wi-Fi. Like many other industrial Ethernet protocols, it brings enterprise IT and automation and control systems closer together by handling both real-time data and other forms of traffic. This allows for greater scalability of plant networks, along with savings from being able to use one group of technologies (Ethernet) instead of many.

Converged Ethernet-Based Networks vs. Ad Hoc Systems

Because of the many advantages outlined above, Ethernet is the ideal physical layer for the IIoT. Industrial protocols running on top of it can help consolidate much of the work once done by disparate serial-based fieldbuses, allowing discrete pools of plant equipment to be incorporated into a converged network. Picking the actual industrial Ethernet protocol(s) for a given setting will largely depend on factors such as determinism requirements, what infrastructure is already in place, and whether the organization wants or needs additional hardware and software components.

Ethernet Simplifies Industrial Networks

HART-IP is suitable for handling real-time data and other forms of traffic because it shares an application layer with HART and WirelessHART. In other applications, something like EtherNet/IP might be preferable for working within standard Ethernet infrastructure and connecting TCP/IP traffic. Or, EtherCAT might be the right choice for on-the-fly processing that reduces CPU loads and removes the need to rely on switches and hubs.

For many manufacturers, a mix of Ethernet solutions will be the optimal route. Using a solution such as the RapID Network Platform Interface with PriorityChannel™ can help support all of the leading protocols while also eliminating the adverse effects of Ethernet network traffic.³

References

¹ “HART at the Speed of Ethernet.” *Control Engineering Europe*, November 2015.

² “Fieldbus Market Is Still Twice as Big as Industrial Ethernet.” *Drives & Controls*, January 2015.

³ **Industrial Networking Solutions.** Analog Devices, Inc. (formerly Innovasic).

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