

A shortcut to network experience? Shrinking the 5 steps of troubleshooting.

Keeping pace with Industry 4.0 technologies can be a struggle for field technicians. It takes about four years to fully understand a protocol like PROFIBUS or PROFINET, but industrial solutions are coming onto the market at an ever-increasing rate. That puts enormous pressure on field technicians. Procentec looks at how to close this growing knowledge gap.

The shrinking pool of fully qualified, highly experienced network engineers

When Industry 4.0 swept across the manufacturing world, there was a consensus that new technology would not only revolutionize the way factories operate but also simplify the way humans work. What wasn't considered was how an exponential growth in interconnected industrial devices would quickly outpace a network engineer's capacity to learn.

"With unplanned downtime costing companies an average of \$260k an hour, the ever-widening gap between experience and expertise is becoming a serious problem for smart factories," says Jonathan Machin, Global Sales Manager at Procentec. "It's a troubling issue."

These observations are backed up by findings in 'After the Fall: Cost, Causes and Consequences of Unplanned Downtime', a survey carried out by market research company Vanson Bourne. More than seven in ten respondents admit that their organization needs help on their digital transformation journey.

"What we find", continues Machin, "is that field technicians are being increasingly promoted into roles for which they have inadequate training or inadequate experience—or both. This puts them under a lot of pressure when it comes to preventing unplanned downtime. And the results aren't always pretty."

Understanding the 5 steps of network troubleshooting

The relative decrease in hands-on expertise is why Procentec puts so much effort into designing and providing solutions that help field technicians maintain industrial networks in a constantly changing environment. These solutions are underpinned by the concept the company developed back in 2019: Industry4.human.

"Industry4.human is all about empowering humans who use Industry 4.0 technologies. Basically, it's putting the engineer at the heart of everything we do," Machin explains. "That's why we're constantly asking ourselves: How can we support engineers and how can we shorten the time it takes to become a troubleshooting expert?"

Procentec's approach to this widespread problem is to first understand the process of troubleshooting a potential or actual network failure. They've identified five clear steps and

assigned the time it takes on average for a Procentec technician (i.e. a protocol expert) to complete each step:

Step 1: Identify the error and take action

Procentec estimates that most physical layer errors take around just 20 minutes to impact a network and maybe force a shutdown, so waiting for a failure to occur is not a good idea. Permanent monitoring solutions like Atlas 2 use (among other things) a traffic light warning system to show immediate action is required.

Step 2: Access the right data

If an error can't be identified or averted, it's time to access the network for data. Specially designed devices help enormously at this stage. Permanent and mobile solutions such as ComBricks and EtherTAP can cut data access time from one, two or three days to less than an hour, depending on the operation and the error.

Step 3: Analyze the data

The trickiest part of any troubleshooting process is analyzing the data. It takes a Procentec technician between 10 and 60 minutes to perform message level diagnostics and interpret oscilloscope images. Inexperienced technicians can spend precious hours on this stage and still end up calling out a support engineer.

Step 4: Determine the best repair path

Having analyzed the data, the error can be categorized and located. The issue is then named and the best way to correct the error is decided. This stage usually takes an expert 15-30 minutes. For those less qualified, virtual engineering assistants like Delphi (part of the Osiris diagnostic platform) can often provide instant technical advice.

Step 5: Do the repair

The final stage is to fix the error. In theory, this stage shouldn't take too long, although several factors come into play. If, for example, essential spare parts aren't in stock, repair time is extended. Maintaining accurate network drawings and compiling a history of common faults always help to speed up repairs.

"Once we'd broken down the troubleshooting process," says Machin, "we could see clearly that it's in steps 2, 3 and 4 where field technicians need expert support. Shorten those steps and you shorten the long path to experience."

A convenient shortcut to years of PROFIBUS experience

Procentec's focus on bridging the knowledge gap has produced, among other innovative solutions, a powerful software monitoring tool called SNAP (which stands for *Synthetic*

Neurologic Analytic Processor). According to the global sales manager, SNAP slashes the time it takes to analyze a typical PROFIBUS network to just two minutes or less.

What's more, the technician doesn't need to be a PROFIBUS expert to achieve such incredible results. That's because SNAP has digitalized all the specialist knowledge that Procentec has accrued over 25 years or so. And the tool keeps on learning, thanks to its ability to recognize patterns, learn from data and become more intelligent over time.

“SNAP can analyze message level diagnostics and oscilloscope images and then tell the technician—in plain English—what the issue is with 92% confidence. The potential savings for any company using PROFIBUS are huge,” concludes Machin. “Best of all, it puts the field technician back in the driving seat. He or she now has instant access to user-friendly diagnostic information, giving them a convenient shortcut to years of experience.”