Why industrial standards can save a lot of heartache in the data center

In a chemical plant, when a critical process suddenly becomes unstable, lives are on the line. Dozens of systems may need to be shut down or adjusted in precise order – quickly.

Advanced software, backed by codified operating standards, provides automation to help bring conditions under control. When the risk has been abated, restarting operations may be just as complex, and the control system automates large parts of this too.

In a different scenario, during a severe storm, an electric utility might have to deal with damage to hundreds of distribution transformers, substations and other field assets in a matter of minutes. It must quickly reroute power and prioritize field repairs. Failure can result in lost revenue, displeased customers and steep penalties from regulatory authorities.

So utilities rely on data from smart devices spread across a wide service area to understand and respond to a cascading set of equipment issues.

These are just two examples of industries that, like data centers, must deal with complex, interconnected systems and processes in a high-stakes environment.

Data centers tend not to benchmark against oil and gas, chemical, biotech, utilities and other heavy industries. But Mark Reed, Director of ABB's North America Data Center Initiative, makes the case that managing a data center today is more akin to any of these than it is to running an office building – the evolutionary ancestor for many data center systems.

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"Even the most advanced control rooms are monitoring different aspects of the data center using software packages and systems that don't talk with each other," Reed says. "Often, these systems are developed by a small, entrepreneurial company whose only expertise is in the data center. They may work well for a single task, but when you have several of them, each operating independently, it can be extremely difficult to manage an entire facility."

The cost of such technology "silos" can be heavy – measured in service-level failures, temporary loss of processing capacity, downtime, electricity cost overruns, shortened equipment lifecycles, and unnecessarily high personnel and training costs.

Reed believes data centers could achieve gains in reliability and operating efficiency by borrowing industrial standards that have been developed cooperatively over years at billions of dollars in expense – with the very goal of allowing disparate systems and technologies to work together.

Here, he says, are a few key examples of industrial standards that have obvious application in data centers:

Alarm management
– Codified standard: EEMUA 191 (Engineering Equipment & Materials Users Association)

In the power industry operators routinely experience hundreds of alarms a day during normal operation – and considerably more during bad weather and other disruptions.

Research has demonstrated that ineffective management of alarms contributes to unnecessary outages, property damage, and serious injuries or fatalities.

Symptoms of faulty alarm management include display screens persistently covered with alarms, alarms standing for long periods of time, alarms being acknowledged in bulk without investigation, and audible alarms being disabled.

EEMUA 191 is a set of alarm management guidelines that emphasizes the usability of alarm systems from the operator's perspective – to make sure the most important alarms are easily identified and addressed in proper sequence. These standards have been integrated into leading control systems, which are used in the power generation industry, among others, to improve reliability, effectively respond to failures and outages, and minimize economic losses.

Design of control center displays
– Codified standard: ISO 11064-5 (International Standards Organization)

When something goes wrong at an oil platform or an arctic pumping site, help is never nearby. Even the smallest disruption can cost hundreds of thousands of dollars, with serious risk of environmental and property damage.

The design of control centers and the graphic interfaces used to manage such operations have been codified in ISO 11064-5, which addresses everything from control room layout and lighting to screen fonts and color palettes to information layering and navigation.

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In many industries, these standards are also integrated with industrial controls and supporting applications – allowing data from multiple systems to be monitored through a single interface. This reduces complexity for operators. It improves the speed and quality of response in the control room, while reducing the cost of training operators.

"Everything is designed to take the operator's eye toward the area that needs attention," Reed offers. "They don't have to deal with multiple input devices, and they work in an environment built with one thing in mind: to make them more effective when everything is on the line."

Communication among advanced instrumentation
– Codified standard: IEC 61850 (International Electrotechnical Commission)

Power distribution companies must monitor hundreds of thousands of remote assets to avoid or manage unplanned power outages.

IEC 61850 standardizes communication between equipment in electrical substations, but it has quickly been applied across entire electrical systems because it makes remote monitoring activities more reliable and more affordable. It

works like XML in a web-based environment – allowing data to be recognized from one system to another for integrated management of the data center.

When paired with properly designed interfaces and control systems that have integrated the standard, IEC 61850 makes it easier to identify performance anomalies and automate appropriate responses.

It also reduces the technical complexity of integrating new system components. And because it is based on open architecture, it eliminates dependency on any particular brand or component manufacturer – providing flexibility in designing systems and future-proofing against fast-changing technology.

It can be applied by data centers to improve reliability of electrical systems, backup power supplies, and electromechanical elements of cooling systems.

There are other industrial standards that data centers might apply to improve operations, Reed says. But the starting point is recognizing the industry faces common issues that are so ubiquitous nobody may have even thought to address them. "But in some other industry, that problem may be a matter of life and death – so they've already solved it."

What should you do today to take advantage of these standards? Ask your suppliers how their products and systems incorporate these standards, what benefit they can provide for your application, and how you too can take part in using these valuable, proven strategies.

Contact us

For more information please contact:

ABB Data Centers
12040 Regency Parkway
Cary NC 27518
Phone: +1 800 HELP 365

www.abb.com

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