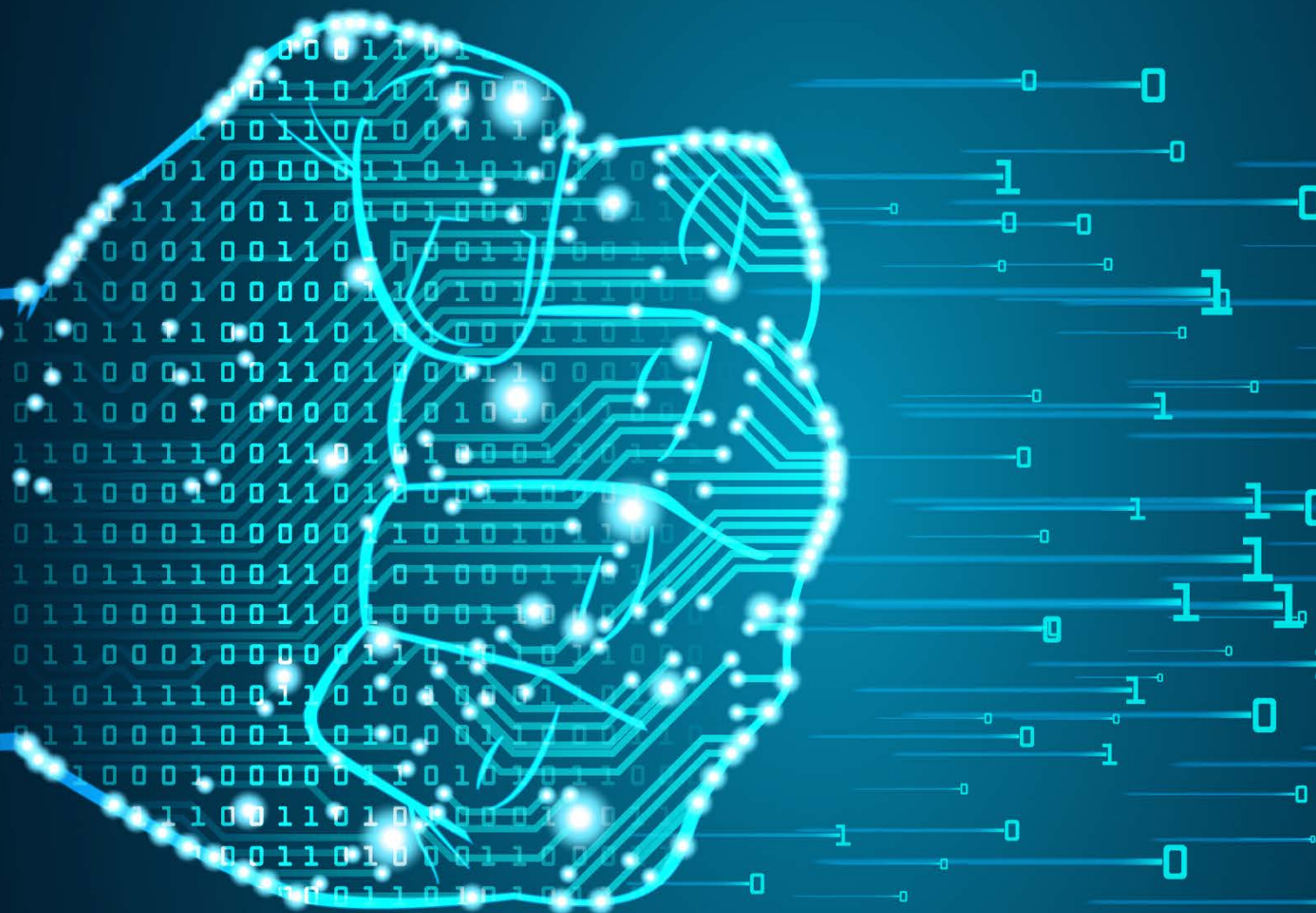


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TABLE OF CONTENTS

Chemical Makers Embrace the Cloud _____ **4**

Its significant potential advantages are spurring increasing adoption

IIoT Spurs Vendor Collaboration _____ **10**

Alliances allow chemical makers to more easily pursue digitalization opportunities

Digitalization Drives Development _____ **17**

German firms BASF and Evonik are funding technologies that further advance R&D efforts

Additional Resources _____ **20**

AD INDEX

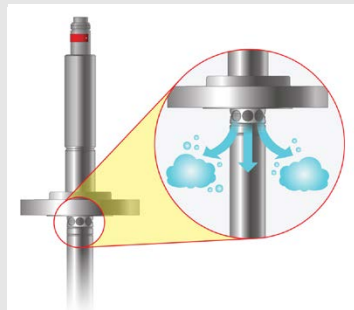
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PRODUCT FOCUS

Steam Probe Withstands Condensation for More Accurate Measurements

The Magnetrol Eclipse guided wave radar (GWR) steam probe incorporates decades of steam application experience in applying level controls to boilers and steam drums. The company continues to gain invaluable insight into aggressive steam applications with one of the largest installed bases of GWR globally, and now offers an innovative probe design that includes new Condensation Control Technology (CCT) coupled with Automatic Steam Compensation (ASC).

Condensation naturally occurs in steam vessels, which can result in level measurement errors due to delays in signal transmission down the probe. The GWR steam probe with CCT eliminates inaccuracies caused by condensation so that optimal performance can be achieved in power generation, chemical processing, pulp and paper, petroleum refining and other industries that allocate a significant portion of energy consumption to the production of steam.



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Chemical Makers Embrace the Cloud

Its significant potential advantages are spurring increasing adoption

By Seán Ottewell, Editor at Large

Use of Internet-based information storage and services — the so-called cloud — instead of traditional direct connection to servers is gaining adherents in the chemical industry — and, thus, challenging traditional conservative information technology (IT) habits, notes Lauren McCallum, solutions manager, industry business solutions — chemical, SAP, Philadelphia. Indeed, companies including Dow Chemical, BP and BASF are rapidly expanding their adoption of cloud-based applications — and reaping substantial benefits.

For example, Dow Chemical, Midland, Mich., says it has saved over \$85 million as a result of the improved supply-chain visibility offered by cloud-based services.

The importance of this was highlighted for the first time when Storm Bill approached Texas in June 2015. The company quickly was able to identify 5,900 railcars in the storm's impact zone. This allowed Dow to warn customers of any potential delivery problems well in advance and, for critical deliveries, to arrange for shipping from other locations. Similarly, when a cargo ship caught fire in 2016, it took Dow's supply chain team less than ten minutes to determine what containers were on the vessel. Again, the company alerted customers and organized alternative supplies.

Dow also is using three cloud-based Oracle applications to improve its human resources (HR) operations. Together, the three form the backbone of the company's HR analytics

“The cloud would be unthinkable without security.”

system that delivers real-time personnel data throughout the company to enable matching people with the most appropriate jobs.

For its part BP, London, has been working with Amazon Web Services (AWS) over the last few years to improve the efficiency of its workplace practices. In 2016, the company decided on a fully cloud-based strategy. Using AWS tools and services, BP recorded a 30–40% reduction in the total cost of IT hosting even before the system was fully optimized.

ENSURING SECURITY

Nevertheless, for any cloud-based activity, security remains key. “The cloud would be unthinkable without security. By outsourcing data and applications to the cloud, companies entrust the authorization to use their data to the external cloud provider. Before doing that, they need to define their own compliance security guidelines,” stresses a spokeswoman for BASF, Ludwigshafen, Germany.

For BASF, this means that any cloud provider must pass a security assessment for the classification needed before processing

company data. This ensures compliance with security criteria including encryption and periodic security updates as well as contractual agreements such as the location of jurisdiction and data-privacy regulations.

The company’s involvement with different cloud environments has enabled it to retire and consolidate IT infrastructure. “For example, we have leveraged the facilities of our former onsite data center for the new BASF supercomputer,” she says. (For details on the company’s plans for the supercomputer, see “Digitalization Drives Development,” <http://goo.gl/9PNQPw>.)

Two current projects particularly are benefiting from using cloud infrastructure.

The first is a joint project with SAP to evaluate digital cooperation with business partners. This involves the SAP Asset Intelligence Network, a collaborative network that brings together information from manufacturers, service providers and plant operators in a cloud-based platform. “The goal is to establish a fully integrated and centrally located asset information repository. With this single source of truth for

asset information, it is intended to further improve the efficiency of engineering and maintenance processes throughout the asset lifecycle,” she explains.

The SAP Asset Intelligence Network allows BASF to collaborate with its customers in a digital ecosystem and manage smart devices in the industrial Internet of Things (IIoT). The evaluation project likely will run for several more months and is part of the BASF 4.0 digitalization initiative.

A second example of cloud use is an online platform named Lab Assistant (Figure 1) developed by BASF’s Dispersions & Pigments Division. This tool helps customers find the right chemicals for their own products. The cloud platform provides information about BASF’s dispersions and additives portfolio, e.g., pH levels and viscosity, or regulatory status in a given country. Customers also can find recommendations for decorative paints, including formulations or active ingredient calculations.

Also, since the 2014 deployment of cloud-based Microsoft Office 365 to better integrate the working environment of its 100,000 staff, BASF has been working on a broader Connected Enterprise project to improve global collaboration both within the company and with its external partners. Via a seven-step process, BASF has introduced modern communication



CUSTOMER RESOURCE

Figure 1. Cloud-based platform enables customers to access information on dispersions and additives. Source: BASF.

and collaboration tools — including smartphones, tablets and notebooks — so employees can work at maximum efficiency wherever they are located. However, ensuring success has demanded a strong focus on training.

“These big technical changes also demanded a sophisticated change management. That is why we started an extensive initiative to support our employees in learning new ways of working. We chose an approach with multiple formats and media: a smartphone app, training videos, live online trainings, a change agent network, handbooks and some face-to-face trainings. We provided our documents in 24 languages and took care to early engage executives and offer specific workshops to target groups such as assistants and employee representatives,” notes the spokeswoman.

Chemical industry adoption of cloud-based applications is about middle of the way when compared with other industries.

“The BASF project involves digital transformation of their entire source-to-pay process using Ariba solutions and Ariba Network. The project is progressing well,” says SAP’s McCallum. “A number of other chemical companies are also currently implementing Ariba solutions, including one which is using Ariba Strategic Support Suite to implement a structured and consistent sourcing process and centralized document management system,” she adds.

KEY DRIVERS

McCallum cites two main drivers for chemical industry adoption of cloud-based applications. First is the need to increase margin in a historically low margin business, especially for companies with activist investors on their boards. Profitability is critical, and applications with subscription contracts and lower IT costs look more attractive to shareholders than expensive perpetual licenses, she notes.

“Secondly, the need for agility is driven by extraordinary amounts of merger, divestiture and acquisition activity. For companies who are growing by acquisition and who want to get all their business units/acquired entities using the same

software quickly, without a large capital expenditure, cloud solutions are the best option. Or, conversely, for spin-offs who need their own software landscapes ASAP, cloud solutions provide a faster and cheaper way to get there. Less hardware. Less IT support required. Faster user adoption. More scalable as the company grows or shrinks,” she stresses.

Chemical industry adoption of cloud-based applications is about middle of the way when compared with other industries that SAP is involved with — although uptake has been more rapid than expected given the industry’s historically conservative IT habits.

“Perhaps this is the case because many, if not most, chemical companies have had the same ERP [enterprise resource planning] system for years, even decades, during which time old configuration and customizations have accumulated. This results in systems that are difficult to upgrade and that impede adoption of new business processes. Those companies whose competitive advantage is hampered by cumbersome on-premises systems see the move to the cloud as an opportunity to start afresh with software that will

automatically be upgraded as business processes evolve and change,” she explains (Figure 2).

Early adopters of cloud applications in the chemical industry started with “shared services” applications such as HR and procurement. “Solutions like these provided an easy way for companies to test the waters of [the] cloud, without risking mission-critical activities. Pretty quickly, we saw companies moving more differentiating business processes to the cloud, such as sales and operations planning, and some chemical companies are currently considering moving even their manufacturing operations to the cloud,” notes McCallum.

The cloud is ideal for any non-specialized functionality that multiple users need to access from many different places and that can be standardized across the company, she counsels. “HR, travel, indirect procurement are obvious examples. The selling point here is ease of use and standardization, in addition to lower implementation, support, and license cost.”

However, chemical companies must understand issues the cloud does pose: for instance, compliance with data-privacy legislation in different countries and the impact of where specific servers are physically located; uptime, i.e., how often will the system be down for upgrades and how long will these take; and disaster recovery.



FRESH START

Figure 2. A move to the cloud can do away with issues posed by legacy software.

Source: SAP.

ALTERNATIVE SCENARIOS

Chemical companies can choose from among a number of options to avoid the security, legal or transition costs that typically raise most concern with cloud computing, says Michael Risse, vice president of Seeq Corp., Seattle, Wash.

“Given chemical company financial and governance investments in existing data collection and storage systems, some organizations are uninterested in beginning their cloud efforts with a massive project to move their data to the cloud. At the same time, with a reasonable Internet connection, data movement is not necessarily a prerequisite for end users to unlock insights in their data,” he notes.

By using a cloud deployment of analytics software, a secure (HTTPS) connection, and a remote connection agent, a chemical maker can take advantage of browser-based applications running on the cloud that connect back

to its on-premise data. “The advantage here is that the solution is deployed and accessible in a matter of hours. So, the cloud is the deployment platform for analytics, but the data stays where it is, enabling deployment and insight in hours rather than months,” he explains.

Another option is to make the cloud the destination for monitoring datasets collected from remote or IIoT end points. This, he emphasizes, frequently is a natural and easier option than trying to reroute data from carriers and wireless systems into IT systems and then to the cloud because data “born on the cloud” is a popular option for many monitoring applications.

“In this case, end users can then access the data by either running analytics on the cloud or by running the analytics solution on premise with a remote connection to the cloud-based data. In either scenario, the monitoring data may be complemented or contextualized by connecting the analytics solutions to other data sources — historians, manufacturing execution systems, etc. — to get a complete view of all data. For chemical companies, this scenario can be used to enable new insights into supply chain and operations by complementing existing data with data from wireless or cellular networks,” he adds.

A third scenario is accessing multiple sites from a cloud deployment of analytics

software. While moving or copying the data to the cloud also could facilitate cross-plant comparisons for yields, quality, etc., a simple remote connection for occasional queries and comparisons may suffice, depending on the frequency and requirements of the end user.

“These early comparisons may be a proof point to demonstrate the value of cross-plant analysis, after which a company may choose to begin the process of moving data to the cloud for future leverage. As with the other scenarios, taking a cloud-based analytics software approach with connectivity to on-premise data enables rapid deployment of new software while maintaining the status-quo for data collection, storage, access and governance,” notes Risse.

Cloud computing provides many advantages to organizations in typical IT scenarios for on-demand capacity in storage and computing power, he says. However, this should not preclude companies from leveraging other benefits of cloud computing such as rapid deployment, remote access and low cost, advises Risse.

“Leveraging software as a service (SAAS) offerings to reduce overhead and capital expenditures are additional opportunities. If data lakes and data aggregation are the goal, the cloud is certainly an option, but it’s not the only model, and other approaches may be a better fit for chemical companies,” he concludes. ●



IIoT Spurs Vendor Collaboration

Alliances allow chemical makers to more easily pursue digitalization opportunities

By Seán Ottewell, Editor at Large

The promise of the Industrial Internet of Things (IIoT) is so huge that vendors are realizing they must team up to offer customers a more comprehensive way to take advantage of digitalization. For instance, Rockwell Automation, Aspen-Tech and Endress+Hauser exemplify how collaborations with data acquisition and analysis companies are easing chemical makers' efforts to use the IIoT for asset optimization.

Technical advances and their successful uptake by other sectors are prompting a cultural change in the chemical industry, believes Gordon Bordelon, Greenville, S.C.-based global chemical industry technical consultant with Rockwell Automation. "It's a shift towards more agile plant performance and to getting more competitive with their

existing plant assets. We are starting to see real gains in the industry," he says.

Two other factors also are in play, he adds. First is the human capital issue. "Thirty percent of experienced operations staff are set to retire in the coming years. You need to capture their best practices and, at the same time, get the best data possible out of the plant so that you can empower the new generation of young operators hungry for data."

The second is a big drive in the specialty/batch area to change products by tailoring molecules to specific customers and applications. "This requires a real agility and flexibility in the manufacturing process to adopt change, which in turn means better leveraging automation technologies," he notes.

At the same time, there's been a huge upsurge in the technologies available, with many different software companies offering innovative ways to gather and aggregate data, plus more advanced analytics techniques that all are enabling the rise of the IIoT.

"However, as a company, we can't have too varied a technology stack. So, we have to decide on which enabling technologies can be added for the benefit of our chemical industry customers. That has been the driver behind our different partnerships and strategic alliances," he explains.

Bordelon points to the partnership with software specialist PTC, Needham, Mass., as being key in this respect.

"This partnership is all about enabling plant asset connectivity. A typical chemical plant today might have assets supplied and controlled by a dozen or more different vendors. The PTC portfolio can help with connectivity of disparate systems from multiple vendors and aggregate all this data and provide real-time insights. Operations today expect data on-demand, which is intuitive and can be securely served up on mobile devices anywhere in the enterprise. This is especially true for operators and maintenance personnel," he stresses.

Rockwell also has a strategic alliance with Endress+Hauser (E+H), Reinach, Switzerland. With so much chemical industry

data coming from instrumentation such as temperature, pressure, flow, level and other sensors and transmitters, the two have worked together to integrate E+H's instrumentation portfolio with Rockwell's automation architecture.

"What you get is a very straightforward application that ensures much better quality data that can be integrated and displayed through our HMI [human/machine interface] screen real-time and in an intuitive manner. This empowers operators and, for example, makes maintenance much quicker because the pertinent information is so easily accessed. This drives down mean time to repair (MTTR) and increases asset utilization."

Rockwell Automation also leverages its PartnerNetwork programs to find and develop other enabling technologies.

For example, the company uses the PI historian from OSIsoft, San Leandro, Calif., to tie in its own visualization, analytics and reporting packages — giving users real-time insights into their processes. "PI is a fantastic tool for capturing, analyzing, visualizing and sharing large amounts of high-fidelity time-series data from multiple sources to people and systems across all operations — and there was no point in us recreating the wheel," says Bordelon.

Other alliances include Cisco, San Jose, Calif.; Microsoft, Redmond, Wash.; and Panduit,



LIFECYCLE BENEFITS

Figure 1. Collaborations aim to assist in achieving asset optimization over the entire plant lifecycle.

Source: AspenTech.

Tinley Park, Ill. With a huge and growing emphasis on cybersecurity, Rockwell is working with all three to develop standard reference architectures and tools for how to protect industrial networks. “Today, chemical customers are looking to adapt IT/OT [information technology/operational technology] convergence to access data through a secure and standard unmodified Ethernet. Cisco is heavily involved in this, too” he adds.

Panduit’s expertise in turnkey industrial data centers (IDCs) also is important to Rockwell. “These preconfigured, fully assembled and tested IDCs are a cost-effective solution for chemical producers to build their modern infrastructure with. They are experts in deploying high-speed networks, Ethernet and data centers that OT folks on chemical plant floors don’t have experience with,” he notes.

One PartnerNetwork strategy Bordelon believes is unique is use of solution partners (SPs) and solution integrators (SIs). “Often

former workers from the local customer facility, they know the production facilities intimately and understand the processes and challenges involved. We find that this is a very powerful way to ensure that our technology is implemented.”

He expects the chemical industry unrelentingly to boost its reliance on data, as the cost of data collection and storage continues to fall. This, he feels, will lead to greater use of augmented reality and mobile devices to ensure that people understand in real time any issues they have with their processes. It also will drive improved standards of environmental performance and sustainability, cybersecurity and knowledge acquisition and transfer, he suggests.

LIFECYCLE FOCUS

Asset optimization across the entire design, operation and maintenance lifecycle of chemical plants is the driving force behind AspenTech’s diverse collaborations. (Figure 1).

“While some take a reseller or implementation services provider approach, all of our agreements come about because our partners are interested in our best-of-breed asset optimization software,” says Robert Golightly, senior product marketing manager for AspenTech’s Asset Performance Management (APM) business unit, Houston. “Our goal is to make advanced analytics and machine learning software accessible to chemical companies by lowering cost and expertise barriers. Our asset optimization software is focused on real-world operational excellence use cases, prioritizing areas of impact and quantifying improvement targets — which are top priorities for chemical companies worldwide,” he explains.

Many recent partnerships focus on making the company’s APM software more broadly available. Included here are tie-ups with: Advantech B+B SmartWorx, Ottawa, Ill.; SAP, Walldorf, Germany; Microsoft (Azure cloud computing service); ProSensus, Burlington, Ont.; and PinnacleART, Pasadena, Texas.

The Advantech B+B SmartWorx agreement differs from others in that it relies on AspenTech’s deep understanding of the specific industrial and business environments of chemical companies, notes Golightly.

“These companies are looking to digitally transform, but they need compelling

ROI [return on investment], and that’s what is being delivered in a comprehensive out-of-the-box, drop-in solution that can reduce deployment costs by up to 70% — in most cases, a solution can now be implemented in days instead of weeks,” he stresses. “The connectivity and manageability of this simplifies the IIoT applications chemical companies need today and seamlessly integrates and interoperates with legacy systems and performs in rugged, demanding plant conditions,” he adds.

Connected assets are critical to improve performance and manage risk. However, AspenTech estimates up to 40% of plant assets remain stranded because of weak (if any) internet connections, old equipment lacking sensors, and multiple, incompatible protocols for data from assets on site from diverse vendors.

“It’s all about working with what chemical plants have on premises today to achieve ROI. Pushing analytics algorithms to sensors and network devices alleviates the processing strain on other systems within the network. Even as the number of connected devices and amount of data collected increase, so does the ability to both scale up and scale out,” notes Golightly.

So, for example, Aspen Edge Connect software on Advantech B+B SmartWorx edge devices implements buffering,

Connected assets are critical to improve performance and manage risk.

data aggregation, data compression and analytics to optimize and overcome communication barriers with stranded assets that rely on cellular and satellite connectivity.

Chemical firms, notably leading specialty chemicals manufacturers, are seeing excellent benefits because the technology puts them on the path to digital transformation without costly, disruptive “rip and replace” of existing infrastructure, he says.

“They’re getting a low-cost, highly scalable IIoT infrastructure — a drop-in solution that recognizes the reality of stranded assets in chemical plants and solves the connectivity issue in a way that works from a cost, deployment and performance perspective.”

In another example, the link between Aspen Mtell prescriptive maintenance software and SAP PartnerEdge is all about giving companies quick, easy access to a software application with the ability to deliver early, accurate warning of equipment failures and unplanned downtime and prescribe detailed actions to mitigate or solve problems.

Here, Golightly cites feedback from Borealis, Vienna: “Aspen Mtell predictive maintenance software’s ease of implementation will allow us to develop data analytics, including pattern recognition and early anomaly detection, in all operating functions, leading to increased performance in safety, quality, reliability and overall improved performance in manufacturing. With significantly earlier warning of asset degradation, we will have the time to work collaboratively to mitigate the losses of unplanned downtime and to minimize disruptions to our customers.”

“The company gained longer lead time detection of repeating failures, including 27 days advance notice for a central valve failure,” adds Golightly.

In October, AspenTech and Emerson Automation Solutions, Round Rock, Texas, launched a new integration technology to make creating digital twins across an entire plant’s lifecycle easier for users.

The technology — the first fruit of the two companies’ February 2018 alliance — allows bulk data transfer between Emerson’s

Mimic software for real-time simulation of plant behavior and AspenTech's HYSYS software for process simulation. This reduces integration time and engineering hours. The technology lowers two of the most significant barriers to digital twin utilization: total cost of ownership and maintainability, says Emerson.

FIELD INSTRUMENT INTEGRATION

Meanwhile, in June, E+H announced a collaboration with SAP. The goal of the pact is to fully integrate E+H field instruments as digital twins into the SAP cloud platform — essentially to realize end-to-end OT/IT integration from field instruments all the way to business processes.

Many of today's large-scale IIoT projects are developed from scratch, notes Rolf Birkhofer, managing director of E+H Process Solutions. "This involves selecting an IIoT platform software, then planning the field components and gateways and, as a last step, programming the application on the IIoT platform. Generally speaking, this is a tedious approach that requires entering uncharted territory at many different points, especially when it comes to the interfaces," he says.

So rather than re-inventing the wheel every time, the two companies want to develop a standardized approach that will allow them to offer, develop, execute and maintain customer projects.



BETTER INTEGRATION

Figure 2. Sharing cloud and field instrument expertise will give seamless access to tools and quality asset data. Source: Endress+Hauser.

"The advantage for our customers is that right up-front, they will have reliable information regarding components and tested interfaces," adds Birkhofer.

The SAP work also includes development of a standard interface between the SAP software and E+H's own cloud, so users get seamless access to tools and quality asset data.

This combination will offer shared cloud and application expertise that will completely

“What would have been nearly impossible ten years ago is suddenly within close reach.”

cover the chemical industry at the field level (Figure 2), he believes.

It also will help bring about two different types of innovations on the maintenance front, he expects.

One involves software applications to better help predict potential outages in a timely fashion. Coupled with the E+H's existing apps that use real-time data to warn of, for example, out-of-calibration electrodes, this could allow maintenance staff to determine the best timeframe in the production cycle to carry out their work.

The other is by linking real-time information from the plant to existing metadata in the company's IIoT portal. “Using algorithms which are fed from the vast amount of data we have in our repository we convert this information into useful insights,” stresses Birkhofer.

Besides its ongoing collaboration with Rockwell Automation, E+H is working with other vendors on an intrinsically safe physical layer for 2-wire Ethernet. It also plans to invite a number of software companies to join its IIoT ecosystem in an effort to generate additional value.

If you take a look at the opportunities that the Internet, cloud technologies and the globalization of knowledge offer from the standpoint of a sharing economy, it makes a lot of sense to focus on the utilization of various pools of know-how. I can well imagine that data analytics companies would be interested in analyzing the data that we acquire through the process automation assets in a neutralized, anonymous form and then identify patterns and optimization potential. What would have been nearly impossible ten years ago is suddenly within close reach,” he concludes. ●

Digitalization Drives Development

German firms BASF and Evonik are funding technologies that further advance R&D efforts

By Seán ottewell, Editor at Large

As part of its strategy to push digitalization in research activities, shortly BASF will start using the new supercomputer at its Ludwigshafen, Germany, headquarters. BASF describes the 1.75-petaflop device, dubbed Quiriosity by staff, as the 65th most powerful supercomputer in the world. It will allow the company to increase by ten-fold its scientific computing power.

Speaking at BASF's annual research press conference in Ludwigshafen on June 29, Martin Brudermüller, vice chairman of the board of executive directors and chief technology officer, said that the company's strategic goal is to take advantage of the enormous opportunities that digitalization offers along the entire value chain.

"In doing so, R&D plays a key role when it comes to further increasing innovative strength and competitiveness by using new technologies. In particular, the new supercomputer will enable BASF experts to very efficiently investigate complex questions and it will further shorten the time it takes to launch new products," he added.

Digital technologies have a rapidly expanding influence on R&D; managing large quantities of data has become a decisive factor for future scientific and economic success. With BASF's digital approach, Brudermüller noted, virtual modeling and computer simulation go hand in hand with physical experiments in the lab — they complement each other. Simulations help with the design

BASF researchers have already shown the enormous potential that digitalization offers in research.

of experiments and facilitate forecasting, while experiments deliver measurable results and evaluate the computer models. This results in a better understanding of chemical products and processes, and thus enables greater innovation to be achieved in a shorter period of time.

Digitalization also gives researchers additional opportunities to implement their creative ideas and to collaborate intensively with others around the world. In the view of BASF experts, it's essential to integrate digital technologies directly into the daily work of the R&D units. Direct access to knowledge-based systems is necessary to enable effective problem-solving and also opens up new horizons. A cloud-based app platform, for example, will make it considerably easier for all researchers to expand knowledge networks, they believe.

BASF researchers have already shown the enormous potential that digitalization offers in research.

In recent months, they were able for the first time to conduct a systematic

investigation of the data on catalysts used in producing the intermediate product ethylene oxide. The investigation found correlations between the formulations and the application properties of the catalysts that enabled their performance and lifetime to be predicted faster and more accurately.

In another project, digital technologies played a vital role in modeling a new functional polymer for the stable formulation of an active ingredient. From more than 10,000 possibilities, BASF experts were able to work out the appropriate polymer structure. The subsequent synthesis resulted in the desired formulation polymer, which enabled creating a significantly more concentrated emulsion. Modeling like this has now become an established component for developing formulations.

The conference also heard that BASF aims to maintain its R&D at the level of previous years: in 2016 this amounted to €1.8 billion (\$2.1 billion).

Meanwhile, a second German company, Evonik, Essen, has followed up January's

formation of the Evonik Digital subsidiary with a €100-million (\$114-million) allocation for digitalization. The company also is entering into a strategic partnership with IBM and the University of Duisburg-Essen aimed at forging ahead with the digital change in the chemical industry.

“For us as a specialty chemicals company, digitalization brings with it a world of possibilities. Now it’s about identifying them, testing them out, and being able to put them to good use,” said Christian Kullmann, chairman of the executive board of Evonik Industries.

The partnership with IBM will see Evonik benefit from the latest technologies and innovative projects IBM is spearheading,

such as cognitive and cloud-based technologies and the Internet of Things. The partnership also allows Evonik to tap into IBM’s R&D technological breakthroughs such as quantum computing.

The first pilot project began in July with Evonik and IBM co-developing a cognitive Evonik-specific chemical and life science knowledge corpus based on data analyzed by IBM Watson Explorer and Watson Knowledge Studio. (Watson Explorer is IBM’s cognitive search and content analysis platform; Watson Knowledge Studio is the company’s cloud-based app that enables developers to identify relationships in unstructured data.) ●

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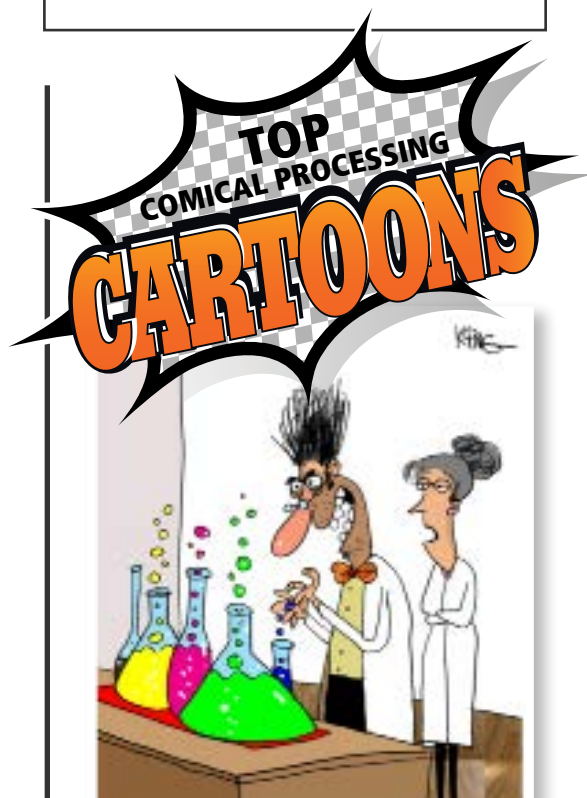
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