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SMART FACTORY

Industry 4.0   Internet of Things   Energy Management

CONTENT

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EDITORIAL

Dear readers,

In the recommendations for implementing the strategic initiative Industry 4.0 from the German National Academy of Science and Engineering (acatech), the discussion concerns the importance of horizontal integration through value networks, of vertical integration and networked manufacturing systems.

Calling all zenon users, does this sound familiar to you? In zenon the function called "horizontal transparency" has, of course, existed for years. And the helpful support of "automatic engineering" has been in place for even longer. And isn't zenon, with its variety of drivers as well as diverse connections to commercial systems such as SAP, ICCP and many others, predestined precisely for vertical integration?

You will read a great deal about Smart Factories, Industry 4.0 and the Internet of Things in this edition of *Information Unlimited*. zenon users already have a suitable tool for this in hand.

In this spirit, I would like to wish you much success with your Smart Factory projects!

THOMAS PUNZENBERGER, CEO

SPOTLIGHT

FROM THE STEAM ENGINE
TO THE

SMART

FACTORY

THE INTERNET OF THINGS
IN AUTOMATION

*The 'Internet of Things' and 'Industry 4.0' are two
terms that are increasingly used in discussions,
in specialist publications and even in the daily
press. New buzzwords? Or a concise description
of the future of automated production? Whatever
you think, the two visions are much closer to
implementation than many realize.*

WE ARE NOW FACING THE FOURTH REVOLUTION:
CYBER-PHYSICAL SYSTEMS (CPS), WHICH
NETWORK MACHINES AND COMPONENTS, AND
VERY FLEXIBLE AND INTELLIGENT SOFTWARE,
WILL PAVE THE WAY TO THE SMART FACTORY.

THE INTERNET OF THINGS – often abbreviated to IoT – is not a completely new invention. And the ideas for further automation of production are also part of a logical progression. Everybody is, in principle, speaking about the same future: that of flexible communication, flexible interaction and flexible production. Of horizontal networking factory to factory. Of vertical communication from automation through to the ERP. From embedded systems and global industrial networking. And this provides many new perspectives and opportunities. Not just for production lines and products, but also for employees. However, there are also new security questions that need to be considered.

THE INTERNET OF THINGS AND CYBER-PHYSICAL SYSTEMS

On April 1, 1998 the Hyper Text Coffee Pot Control Protocol (HTCPCP)[1] , for the control and monitoring of networked coffee machines, was published as RFC 2324 – a successful April Fool's joke. At the time. It was a joke back then but, from today's perspective, this was one of the first implementations of the IoT.

The IoT describes how the conventional computer is being replaced by "smart" objects. Kevin Ashton coined the term in 1999, but the approach had already been pursued by Mark Weiser in 1991 in his essay entitled "The Computer for the 21st Century". The IoT became more widely known through Auto-ID Labs[2] and their involvement with automatic identification by means of RFID. Today, in the automotive industry, for example, we have production-ready implementation with vehicles which can establish connections to the Internet, communicate with one another and with other road users, react to changing traffic situations, and automatically seek help in the event of an accident – with the next step being navigating through traffic without a driver.

The possibility of having things communicate with one another changes not just our everyday lives. It will also change how we produce things. Slowly but surely; because industry tends to undergo evolution rather than revolution. Long machine lifecycles and proven processes are just two good examples of this. Over one hundred years passed between the first Industrial Revolution, powered by the steam engine, and the second, which brought us mass production by means of a production line. At the start of the seventies, automation followed with the introduction of electronic controllers and thus began the third industrial revolution. We are now facing the fourth: cyber-physical systems (CPS), which network machines and components, and very flexible and intelligent software, will pave the way to the Smart Factory.

Cyber-physical systems arise from the linking of embedded systems to digital networks of machines or product components. They can log and process data from the natural environment independently – and in turn influence their environment with the results. If CPSs have IP addresses, they can be controlled online – and there are now enough addresses thanks to IPv6. With sensors, actuators and small embedded computers, CPSs organize production autonomously and can thus overcome barriers between companies, such as between suppliers and producers.

THE NEXT STEP: THE SMART FACTORY

The future belongs to the Smart Factory. Many corporate processes are controlled and coordinated in real-time depending on the requirements, even over long distances. This means that individual steps must be standardized as modules and made addressable. Robust networks ensure the necessary continuous exchange of data that is needed for the automatic adaptation of the processes.

Process control is now no longer necessarily central; it can also be taken over directly by components in some cases, thanks to CPS. Embedded systems can be used to interpret environmental data and deduce control commands. Production as a whole becomes more flexible. Machines also

[1] Source: http://en.wikipedia.org/wiki/Hyper_Text_Coffee_Pot_Control_Protocol
[2] Source: http://en.wikipedia.org/wiki/Auto-ID_Labs
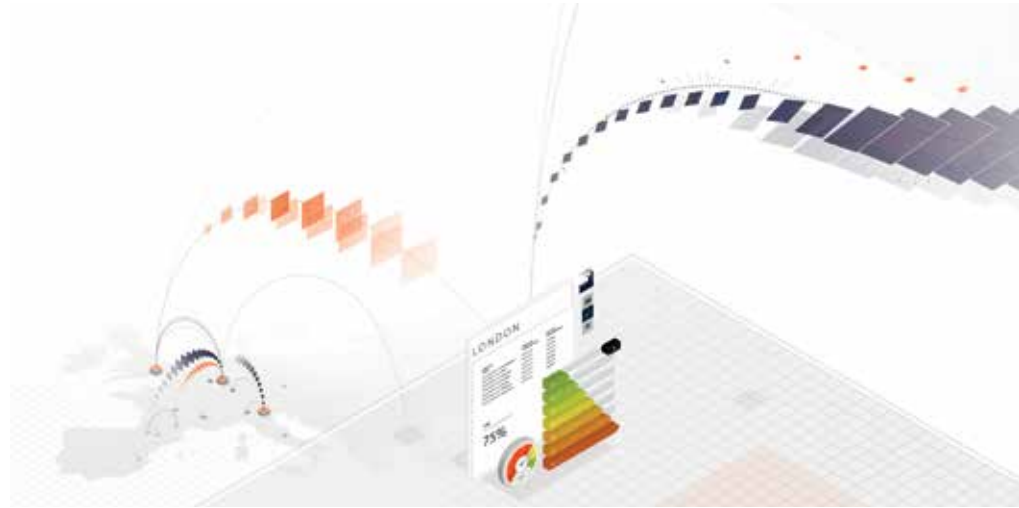
contribute to this new flexibility because they are designed to be open for different applications. They are in a position to complete different tasks in a colorful sequence and to employ different tools. The software for process control and visualization must also be designed accordingly to be open and flexible.

The German Fraunhofer Institutes have conceived a type of DNA of the factory. A triple helix symbolizes the intertwining of information technology, product and production. In the future, products will be so intelligent that they can organize their configuration themselves, coordinating with the company's production equipment and planning software. The factory DNA is present in each individual part and in each machine component; together they organize themselves into an autonomous "organism". What does the Smart Factory mean, then, in practical terms? It could mean the flexible production of small batch sizes without major retooling costs. If components require processing, the machine selects the appropriate tool. Maintenance is organized by the machine itself. The ordering of materials and consumables is also automated. Industrial robots are becoming lighter and more agile. They are breaking free from their limitations and taking on a variety of tasks. Festo, for example, won the Deutscher Zukunftspreis (German Future Prize) in 2010 for its innovative elephant key with grabbing fingers.

Energy management can also develop flexibly: machines organize themselves independently and organize cost-effective energy procurement. You can read more about this in the article entitled "Energy Experience Day UK: Insights into the future of our energy supply" starting on page 46. Higher-level modules for planning and control will be cloud-based in part and will change the previous, familiar automation pyramid. The automation level will increasingly provide administration and analytical tasks; the planning of manufacturing will already start in the ERP. In order to be able to act as flexibly as this, complex computing tasks must be achievable at the different control levels in a company.

Starting with the processing of the order, through planning and manufacturing to logistics and resource management. The process of connecting different levels in the company will further establish itself and continue to accelerate. It will push beyond company limits. However, all processes will have to be permanently coordinated with one another.

The implementation of the Smart Factory requires greater harmonization of interfaces and languages. Joint data pools and equal access to this is also required. Nevertheless programs must increasingly work independently of certain hardware and obtain data from different sources, process this and be able to output it in different formats. Only in this way will new opportunities prevail such as: the evaluation of manufacturing processes according to effectiveness and efficiency, the ergonomics of workspaces, and the problem-free supply of material. Correctly implemented, companies will benefit from considerably increased flexibility with production costs being reduced at the same time.

EVOLUTION

The requirements of a Smart Factory have, in part, already been realized – or are now being created. This means that the procurement of new machines and new software, the forging of new alliances and the purchase of professional services must already be orientated to future ways of working. It is not a matter of being the first to produce goods in a Smart Factory. It is a matter of using new possibilities effectively. This means, for example:

- Targeted preparation for flexible production – in extreme cases down to a batch size of 1.
- Readiness to incorporate suppliers and consumers more closely in the company's own processes and to also share information with them in an automated manner.
- New machines for IPv6 and communication with components, as well as flexible production.
- New software for planning, control, visualization or analysis must adapt flexibly and individually, and be operated ergonomically.

- The networking must allow communication beyond corporate limits – and nevertheless remain secure.

However, new thinking is required. The people involved must get themselves acquainted with the new concepts. This is because – in order for comprehensive networking to work – supervisors and other employees must recognize and accept its benefits. Initial cross-company and interdisciplinary cooperation makes the Smart Factory a successful concept.

The change does not need to be a revolution, but must – as is common in industry for good reason – come at the right pace. Machines have long lifecycles; functioning concepts should be changed as little as possible and the engineers and operators should use what has been tried and tested. In their study entitled "Automation 2020", the Association of German Engineers raised the issue of what

we already have many necessary tools; others are on the way to completion. Phillip Werr explains what we have already achieved, what the Smart Factory means for our thinking and what steps will get us to the destination in the article entitled "On the Road to the Smart Factory" starting on page 12.

Research and development will also remain the key to innovative products in the future. COPA-DATA has traditionally been very heavily involved in partnerships with universities and technical educational institutions, research institutes and innovative companies. This always leads to exciting results. In the article entitled "Does the Thought of Industry 4.0 Intimidate You?" by Johannes Petrowisch on page 14 onwards, you can read what this has to do with multi-site analyzes and seamless, manufacturer-independent integration – and what this means for your company.

CORRECTLY IMPLEMENTED, COMPANIES BENEFIT FROM CONSIDERABLY INCREASED FLEXIBILITY WITH PRODUCTION COSTS BEING REDUCED AT THE SAME TIME.

their members need to deal with in industry. Complexity was one of the most significant limiting factors. In light of upcoming technologies such as CPS, we should also see that as a warning: if the IoT and the Smart Factory are to be successful, we should not think solely about technical requirements and implementations but, most of all, we must prepare engineers, automation experts, business administrators and IT experts for it – and improve their tools accordingly.

What will be required in the future, more than ever before, is software that can analyze quickly, provide data in an intelligible format and, most of all, can be operated easily and safely. This is because, despite all the progress in mechanical engineering, humans remain the decisive factor. We must interpret events correctly, and react and make decisions quickly. Therefore we also require people who adapt to the quicker pace of change, update their knowledge constantly and are open to new technology.

Humans thus continue to play an important and decisive role in the Smart Factory. They will, however, increasingly need to be highly qualified, to have more competencies and be in a position to analyze diverse information meaningfully to make use of it.

READY TO GO

Where do we actually stand today on the journey to the Smart Factory? As some of the articles in this *IU* will show,

In this vein, Werner Reuss, who is intensively involved with the IoT and smart factories, also reports on the challenges he expects to come – and how Microsoft is supporting its partners – in "Combining Two Previously Separate Worlds" starting on page 15.

With Eco.On, Köhl AG is providing its customers with a comprehensive, process-orientated solution for energy management. In addition to the pure consumption data, actual production data flows into the analysis, which allows a valuable evaluation of the efficiency of a facility or a production line. You can read what this has to do with COPA-DATA and its energy management in the interview with Thomas Winter starting on page 19: "Energy Management for the Smart Factory of Tomorrow".

The fight against insular knowledge silos and overcoming the barriers that form communication islands will become an important arena for engineers and software. Both impair effectiveness and efficiency. You can read how COPA-DATA already supports teams to think and act on an interdisciplinary basis with effective communication between machines and smart information management from the sensor through MES and ERP to the cloud in a report by Phillip Werr in "Horizontal and Vertical Integration with zenon" starting on page 22.

Networking and diverse communication from machine to machine – what does that actually mean for security? We cover this interesting question in our interview with the

Italian security expert Marco Ramilli. You can find answers starting on page 24 in the article entitled "Security for the Smart Factory".

OUTLOOK

The Smart Factory will change automated production significantly. Individual customer requests will be able to be met more easily. Open and closed production networks will exist in parallel, machines will communicate throughout the company and thus further automate maintenance and material supplies. To the same extent that smart assistance systems change work, the working conditions for engineers, operators and control-room staff must also be adapted. This includes a clear focus on ergonomics as well as new operational concepts. Multi-Touch will become the standard and gesture control may be a further simplification in the relationship between humans and machines.

The Smart Factory creates new business opportunities: for manufacturers as a result of individualized products, but also for mechanical engineers and security experts. How far are you, your company, your customers and your suppliers along the way to the Smart Factory?

And, finally, a quick update: the RFC 2324 coffee protocol was enhanced on April 1, 2014 with RFC 7168: it can now also be used for the making of tea.

RECOMMENDED READING

BITKOM - Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e.V. [German Federal Association for the Information Economy, Telecommunication and New Media]: The Platform of Industry 4.0 - The Fourth Industrial Revolution

http://www.plattform-i40.de/finalreport2013

ON THE ROAD TO THE SMART FACTORY

Cyber-physical Systems, the Internet of Things and Today's Production Environment

FUTURE CONCEPTS of cyber-physical systems and the Internet of Things in production involve discussions of fully networked, self-organizing production systems which have the objective of a "Smart Factory". These are also an important part of the high-tech strategy, Industry 4.0. However, until we reach the objective of completely digital manufacturing, there is still a great deal of research and development ahead. The networking of sensors and actuators via the internet means that with our current level of technology, we still face unanswered questions such as real-time compatibility and security, which are needed in an industrial context.

However we do not necessarily need to consider the concepts of the Internet of Things (IoT) as the prospect for the future. Nowadays, with hybrid architectures, we can already increase previously-unexploited potential in resource efficiency, effectiveness and flexibility in manufacturing. As long as network infrastructures and protocols do not allow real-time-capable processes via the internet, we will work with architectures that function with a "division of labor" – both decentralized and central intelligence. And because humans will continue to play a significant and increasingly important role in production for the foreseeable future, the continuous improvement of ergonomics and thus a reduction in employee efforts is also an important factor in production.

The Internet of Things is now present in virtually all areas of life and work – from fitness wrist bands that communicate with the cloud, to parking sensors that provide information for higher-level parking guidance systems. But what is the significance of the IoT in production?

The journey to the digital factory will be, as with so many developments in industrial manufacturing, a continuous evolution rather than a revolution. Existing heterogenic production equipment, long investment cycles and limited possibilities for "experimenting with ongoing production" are the typical prevailing conditions.

Let's consider the way to the Smart Factory as a journey that started over 40 years ago with the invention of the programmable logic controller (PLC). With a little imagination, it is also possible to consider PC-based automation as an intermediate step to the digital factory.

For a long time, the reliable control of industrial processes was considered the main task of automation. In order to be able to produce more intelligently, focus on a consistent flow of information assumes greater significance in addition to the control aspect. If we manage to establish this and control it, we can set up applications and logics with it, which in turn allow us to save resources, become more effective and produce more flexibly.

However, if the technology is (in part) still in development – what concrete steps can we take in order to make our manufacturing "smarter" today?

SEVEN STEPS TOWARDS A SMART FACTORY

1. BRING PEOPLE TOGETHER
One of the biggest challenges at the moment is not technological, but organizational. We need to bring the people who look at the company's objectives – what do we want, what can we do; when, how and to whom do we sell it; and why? – at the table with those who know what is technologically possible. This requires cross-discipline teams in which representatives from the areas of production (including automation), IT, marketing and sales, as well as supply chain management, can contribute.

2. FIND A COMMON LANGUAGE
The Internet of Things, cyber-physical systems, PLCs, information flows, ergonomics, business processes, total cost of ownership, return on investment, investment cycles … there is the risk that we all lose ourselves in babylonic linguistic confusion before the discussion has even started.

This is why we should concentrate on the actual problems that we would like to have solved and we attempt to leave out technological or business jargon.

3. DEFINE BUSINESS OBJECTIVES

People who are technology enthusiasts are often subject to the temptation of concentrating on what is technologically feasible or what is not yet feasible but could become feasible. If we see technology as a lever, used to better fulfill the purpose of the company, the business objectives should be the main focus. Such questions and similar ones could help to shape the discussion: can we acquire additional customer groups if we were to produce with more flexibility? What costs (for energy, raw materials etc.) present a risk for our business model? What should our production be able to do in order to make our customers happier and more loyal? What can differentiate us from the competition in the future?

4. DETERMINE THE IDEAL STATUS

If the business objective we wish to achieve is clear, it is possible to work out what the intended ideal status would be. An energy-autonomous factory? Product customization down to a "batch size of 1"? Shorter cycles from product design to delivery?

5. COST/BENEFIT ASSESSMENT/INVESTMENT PLAN

If the business objective we wish to achieve is clear, it is also possible to estimate what additional profit we can expect from it as a result. This will also define, taking into account the risk, how much we want to invest in order to get closer, step by step, to the ideal status.

6. MATCH TECHNOLOGIES,
TAKING INTO ACCOUNT COSTS AND BENEFITS

With the knowledge of what we actually need, of where the journey will take us, and the investment framework, we can evaluate how close we can get to the ideal state with the technology that is available today. With the background of the results from steps 1-5, we will in many cases be positively surprised at how much can already be implemented today. As a side effect, it also becomes clear which technologies are still missing in which areas, in order to take the next steps.

7. IMPLEMENTATION AND
CONTINUOUS IMPROVEMENT

In this step, we return to the usual routine and look into the implementation, integration and continuous improvement of the previously-defined measures. With regard to "continuous improvement": if you are ready, go back to step 1 now!

We would be happy to move towards a Smart Factory together with you and are available as a discussion partner, advisor and technology provider.

PHILLIP WERR
MARKETING MANAGER

COPA-DATA TECHNOLOGIES FOR THE JOURNEY TO A SMART FACTORY

CONNECTIVITY
manufacturer-independent connectivity for the networking of heterogeneous production landscapes.

INTELLIGENCE FROM THE EMBEDDED DEVICE TO THE PC UP TO THE CLOUD
with straton and zenon Logic, the IEC 61131-3 development environment and Runtime. Can run on microcontrollers, PCs and in the cloud.

M2M COMMUNICATION
with "straton binding", we offer a powerful protocol for horizontal communication at machine level.

FLEXIBLE VERTICAL PLACING OF INTELLIGENCE
with the components straton, zenon Logic, zenon and Batch Control, flexible architectures can be implemented as required.

CLOUD INTEGRATION
for data used across sites and computationally-intensive applications.

SECURITY/SAFETY
integrated security and safety technologies and design concepts in order to fulfill networked production requirements.

DOES THE THOUGHT OF INDUSTRY 4.0 INTIMIDATE YOU?

We Equip You with All You Need for an Ergonomic Transition to the Smart Factory

THE INTERNET OF THINGS (IoT) and the growing number of internet-enabled devices in use offers manufacturers a fantastic opportunity to significantly increase their productivity, quality and flexibility with innovative solutions based on the latest technologies. With Industry 4.0 and the Smart Factory in mind, the challenges are obvious and those concerned may get overwhelmed by the many questions that arise: which state-of-the-art technologies help us to be more successful throughout the entire organization? How can the different systems and devices ideally communicate with each other? Or, to start with the essential, what does a smart factory even look like?

At COPA-DATA, we develop innovative solutions based on the latest technologies in order to enable our customers to continuously improve their processes. Many innovations have already found their way into the zenon Product Family and many others especially pertaining to the smart factory will follow.

MULTI-SITE REAL-TIME DASHBOARDS AND REPORTING

One of the most recent developments is a multi-site architecture using Microsoft Azure, which was developed in close collaboration with our strategic partner Microsoft. This easily-scalable, high-performing and cost-efficient architecture – where machine-generated data is transferred to the cloud in near real-time – allows the analysis of data across organizations and borders, enabling you to make "smarter" and faster decisions. The solution is completed by making the data and reports available on mobile devices such as smartphones and tablets – providing the data anywhere and anytime.

SEAMLESS CONNECTIVITY FROM SENSOR TO ERP

zenon establishes a direct integration from field level data and HMIs to ERP systems. This helps to more closely integrate production and business processes. Information can be processed in real-time and shared with ERP systems. Having real-time transparency to ERP-level business functions such as sales, supply chain management, accounting, and pricing delivers great benefits. Also, communication from the ERP back to the process is possible with zenon. Machine operators, for example, can receive messages from the ERP system directly to their HMIs.

VENDOR-INDEPENDENT INTEGRATION

Thanks to zenon's communication capabilities you can integrate machines and equipment from different vendors into one system. This enables a holistic and transparent control of the entire infrastructure – delivered in an ergonomic way for the operators. Autonomous communication between different production entities is enabled as well.

Besides those features which are already available, there are many new developments in the pipeline which can be expected in the coming months and years. This is made possible through strong partnerships and research projects in conjunction with universities and research facilities. The list of ongoing research projects is long. Over the next few pages, you will find more information about a selection of these projects. Many of the results of these research projects will contribute to the development of zenon and new functions will be available in future zenon releases – stay tuned!

JOHANNES PETROWISCH
PARTNER ACCOUNT MANAGER

COMBINING TWO PREVIOUSLY SEPARATE WORLDS

Interview with Werner Reuss

PHOTOGRAPHY: BERNHARD MÜLLER

WERNER REUSS, IoT Commercial Lead at Microsoft Germany, is one of the driving forces behind the development of the machine cloud solution based on Microsoft Azure and zenon. In the following interview, he shares Microsoft's perspective on Industry 4.0 and COPA-DATA's innovative contributions to the advances of automation and IT.

From your perspective, what are the biggest challenges when making factories smarter?

WERNER REUSS: Today we see significant differences in the standards of design, implementation and operation between a traditional manufacturing environment and enterprise IT systems. For example, we typically have much longer investment and operation cycles for equipment used in a manufacturing or an industrial environment. Usage cycles of 15 years+ are very common in these scenarios, while a typical IT system has a usage cycle of less than ten years.

We also frequently see that both worlds have been designed and operated more or less independent of each other. This leads, for example, to the situation that necessary infrastructures are not implemented or procedures and processes are not synchronized. Additionally, it is sometimes difficult from an organizational perspective to bring the people together who represent these two worlds in order to implement a complete solution, as the two groups present many different requirements and perspectives.

All that said, we also agree with the view expressed in the final report about Industry 4.0 issued by the working committee of the Industry 4.0 initiative. It clearly outlines the advantages of implementing Industry 4.0 systems across the board, ranging from potential efficiency gains to the opportunities for new business models.

Which technologies and solutions are required in order to be successful in the world of Industry 4.0?

WERNER REUSS: From Microsoft's perspective, we think it makes most sense to start with an assessment of the current situation with regards to devices and services. Based on this knowledge, a user can decide which components (for example, cloud services or machine learning) make the most sense in each particular situation to achieve the largest impact.

Furthermore, it is crucial to use technologies and software products which provide the required connectivity to the device level and can be used at different levels across the entire organization. With this vertical integration and data availability, processes can be optimized accordingly and valuable insights can be created which significantly help the organization to stay competitive in the future.

Which technologies does Microsoft provide in order to support its partners such as COPA-DATA to implement IoT solutions and to make the "Factory of Tomorrow" happen?

WERNER REUSS: We describe ourselves as the productivity and platform company. This holds true in the context of Industry 4.0 or the broader Internet of Things. We enable our partners by providing the services and tools (e.g. Azure Intelligent Systems Service, Azure Machine Learning Services or CRM online) and operating systems targeted for the embedded world (like Windows Embedded 8.1 Industry) to build world-class Industry 4.0 or IoT systems.

What is your opinion on the research and development completed by COPA-DATA in the context of Industry 4.0?

WERNER REUSS: I think a lot of great work has been done by the COPA-DATA team, not only with regards to the "native" Industry 4.0 scenarios, but also in regards to their core business. In the context of Industry 4.0 I want to particularly highlight the machine cloud system that COPA-DATA exhibited during our collaboration at the Hannover Messe trade fair in 2014. It is a perfect showcase of an "Internet Of Your Things" scenario. Essentially, the machine cloud concepts start with the devices already deployed in the field. By consolidating the information coming from such devices in the cloud, combining them with data from ERP systems and allowing a global view on multiple sites,

the machine cloud enables real-time information and multi-site analysis. With this kind of solution, it is now possible to benchmark production sites based on their energy efficiency and other important KPIs, to create valuable insights and learning as well as to optimize certain business processes, such as power consumption.

Where do you see the biggest contributions from COPA-DATA to smarter factories?

WERNER REUSS: The COPA-DATA team is bringing a lot of experience in the space of integrated PLC systems, embedded HMI, SCADA and production reporting to the discussion. In particular, the native connectivity to almost any industrial hardware in the field is an important point, giving the end customer the required flexibility to access the data, to analyze it, to improve specific processes and to be successful.

I also see that COPA-DATA is highly committed to improve the ease of use and effectiveness of these systems. Along with its background in Industry 4.0 and its deep industry knowledge, I see it as a perfect partner to work with on the concept of smart factories.

Thank you for your comments.

THE INTERVIEW WAS CONDUCTED BY JOHANNES PETROWISCH, PARTNER ACCOUNT MANAGER AT COPA-DATA.

ABOUT WERNER REUSS

Werner Reuss is the IoT Commercial Lead at Microsoft Germany and leads the Go To Market of Microsoft in the Internet of Things space. Prior to this appointment, he was the Director of Windows Embedded in Germany and Central and Eastern Europe regions, focused on helping users build intelligent systems that unlock the power of data and translate it into insights and action. Prior to this role, he was responsible for the Server and Tools Business in CEE Multi-Country, overseeing 22 small and emerging markets. He joined Microsoft in 2000. Prior to Microsoft, Werner Reuss held various leadership position in sales, marketing and services in Compaq Computer and Digital Equipment.

For the development of innovative IoT solutions, the strategic partnership with Microsoft is key for COPA-DATA. Learn more about Microsoft's approach and the Internet of (Your) Things at **www.microsoft.com/internetofyourthings**

COPA-DATA R&D PROJECTS SUPPORTING THE SMART FACTORY

At COPA-DATA, we are continuously working on innovative solutions together with our strategic partners, educational institutions and research facilities in order to provide our customers with everything that is needed to make businesses and production facilities smarter. In this *IU* issue, we would like to give you insights into three innovative projects: the already available machine cloud solution developed together with Microsoft and the two ongoing research projects 'prOnto' and 'zenon Smart Interfaces'.
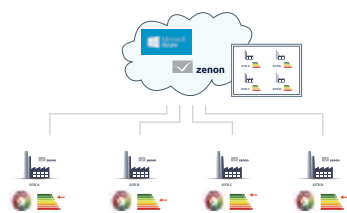
ZENON CLOUD SOLUTION

Multi-site Analysis and (Near) Real-time Information for Higher Productivity

The strong collaboration with our strategic partner Microsoft has led to a recent innovation: COPA-DATA's machine cloud solution. The Microsoft-Azure-based machine cloud by COPA-DATA allows multi-site analysis of any data from the field level around the world in one place.

This solution enables users to bring production sites into a single system for benchmarking and creating cross-site KPIs. Company-wide energy management, quality management or performance optimization are possible areas of application. The solution can be completed with mobile terminal Windows Phone and Windows 8.1 Apps, iOS or Android Apps to show near real-time consumption and performance data on the mobile device – having everything under control on the move.

Benefits at a glance:
· Company-wide analysis and reporting
· Benchmarking of multiple production sites
· Company-wide consumption management

http://kaywa.me/SzBp0

Discover more about the zenon Cloud Solution

PRONTO

Advanced Process Automation Based on Ontology-Driven Agents

The research project 'prOnto' is dealing with dynamic fluid routing in complex pipe systems. It is being undertaken by COPA-DATA together with the Vienna University of Technology (Automation and Control Institute) and supported by the Austrian Research Promotion Agency.

The scientific approach based on ontology-driven agents is creating the next generation of process automation; introducing semantics into automation systems. The structure of the equipment used for liquid transfers is modeled within the ontology and this model represents the knowledge base for the application of sophisticated routing algorithms in a functional module called prOnto. During the equipment operation (automatic or manual), the prOnto module is responsible for identifying available transfer routes dynamically by taking various aspects into consideration, such as: current status of the equipment, damaged components, material compatibility or hygiene status. If the equipment configuration is changed, or in the case of damaged or blocked components, the ontology is quickly updated and the routing algorithms continue working properly without the need for complex engineering work.

Benefits at a glance:
· Safe processes and a high level of hygiene
· Increased speed of operator decisions and process operations
· High production equipment availability
· Dramatic reduction of system integration and update costs

http://kaywa.me/UdHa4

Discover more about the prOnto research project

ZENON SMART INTERFACES

Better User Experience in the Professional Environment

Within the framework of the research project "zenon Smart Interfaces" in collaboration with the University of Applied Sciences Salzburg, COPA-DATA is addressing new market demands for use of tablets and smart phones and thereby extending its range of automation solutions for mobile devices. The research project is focused, on the one hand, on intelligent user interfaces which can adapt to the particular situation and to the user and, on the other hand, to the associated interaction concepts which surpass common operating design. The aim is, amongst other things, for an automation system to independently detect the hardware on which it is running and automatically adapt for optimum operability on that particular device. The solution resulting from the research should feature the following four innovations:
1. new operating/interaction concepts
2. intelligent control elements (user interface)
3. adaptions for use on mobile devices and
4. support during engineering and application design.

Benefits at a glance:
· Efficient engineering of smart interfaces
· Adaptive interfaces
· More ergonomics for the end user

http://kaywa.me/271rM

Discover more about the zenon Smart Interfaces research project

ENERGY MANAGEMENT FOR THE

SMART FACTORY OF TOMORROW

WHAT ACTUALLY MAKES a production plant into a smart factory? Naturally, it is about the integration capability of various equipment and systems as well as intelligent devices and ergonomic technology. An essential component, however, is energy management. Because the smart factory of tomorrow exemplifies a sustainable, energy-efficient and environmentally-friendly production.

In order to achieve this, all relevant production, consumption and energy data must be gathered, analyzed and correlated with one another. Only those who have an overview of their company-wide energy consumption can continuously improve on a long-term basis. We asked an expert what exactly is needed to achieve successful energy management. Here, Thomas Winter, Technical Manager at our Partner Company, KÖHL AG in Luxembourg, gives us insights in a question and answer session.

Mr Winter, how did the cooperation between KÖHL and COPA-DATA come about? For how long has KÖHL been a member of the COPA-DATA Partner Community?

THOMAS WINTER: Our first contact was back in 2008 in connection with a project tender for a customer in Luxembourg. From our point of view, the zenon product was the best choice because of its diversity of drivers. Together with this customer and Mr Alexander Punzenberger from COPA-DATA, we were able to visit a BMW plant as a reference. Unfortunately, however, the project went to a competitor. Nevertheless, we acquired our first zenon license at the beginning of 2009, when we used zenon as part of a thesis based on a KÖHL substation control system. Our increasing use of zenon, particularly in the tobacco industry, convinced us to join the COPA-DATA Partner Community in 2012.

What has been your experience with the COPA-DATA Partner Community? With what requirements

and expectations did you join the network? What advantages have you gained?

THOMAS WINTER: The idea of the community as an active worldwide network is particularly interesting for us, as we also operate across the world. Recently, during our activities within the framework of energy management, we were able to establish some interesting contacts and have gained a great deal of positive inspiration. The network offers interesting insights into industry areas that are normally kept undisclosed.

You have a long history of experience with various software products. What encouraged you to choose the COPA-DATA technology as a basis for your Eco.on® product?

THOMAS WINTER: COPA-DATA's products are based on current technologies and positively stand out in areas such as ergonomics and innovation when compared with other products. At the same time, the driver diversity allows zenon to be open to almost all hardware connections. A further important advantage is the integration of VSTA, which helps by giving the complete Windows and .NET level of performance. If there would be customer approaches or requirements that have not existed before, VSTA allows one to develop these independently. Whereas, with a closed, black-box solution one would often be unable to proceed further.

Please tell us more about Eco.on. What differentiates your product from competitors' products?

THOMAS WINTER: Eco.on encompasses not only a sustainable and holistic Energy Management System that can meet both the requirements of DIN ISO 50001 and Overall Equipment Effectiveness (OEE), it also draws on advice and expertise gained over many years in the industry and the production world. It is our goal here, as well as in our other projects, to offer our customers not simply a

product, but a solution. Certainly, the main difference that Eco.on offers in comparison with other products on the market is the close proximity to the process. Effective energy management can only really be successful if it is possible to collect the individual energy consumption data in conjunction with the plant data within a single system. Only when, in addition to the pure consumption data, the actual production data flows into the analysis, is it possible to give a valuable evaluation of the efficiency of a facility or a production line. This is the only way that consumption can be realistically assessed and accordingly reduced.

THOMAS WINTER: As automation experts, it is our goal to operate plants securely and effectively. Production data is already being accurately collected in many companies. Equipment faults are logged exactly according to time and then these details are also evaluated. We would like to take this "typical" approach at an automation level and implement it for energy data as well. With zenon we are in the position to gather all relevant data (PDC and energy) systematically in a single system, archive it appropriately and evaluate it user-specifically. Thanks to current technologies, individual user information is available at almost any time and everywhere.

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*Only when, in addition to the pure consumption data,
the actual production data flows into the analysis, is it possible to
continuously improve the energy-related performance and, as a result,
reduce energy costs in the long-term.*

THOMAS WINTER KÖHL AG

It is thereby possible to continuously improve the energy-related performance (operation, consumption, efficiency) and, as a result, reduce energy costs in the long-term.

How do you assess market opportunities for energy management? Are there tendencies in certain industries and application areas where energy management is particularly in demand?

THOMAS WINTER: The subject of energy management is currently of great interest across all the industry areas we cover. Particularly when an Energy Management System according to ISO 50001 is introduced into energy-intensive production processes, there is a further possibility of cost savings as a result of legal regulations. Generally, the subject of energy conservation is a current topic in almost all industry sectors. Detached from government and saving programs, it makes sense for companies across all sectors to focus on their own consumption. This is particularly the case when the sum of all energy costs adds up to an amount that cannot be ignored. Often information regarding energy and media consumption is already available, but cannot be read in connection with the production data. Therefore, many customers have the desire to be able to allocate the actual consumed energy of individual products in order to take that knowledge into account for their pricing strategy. In order to be able to guarantee this, it is necessary to take a product-oriented approach.

Your energy management certainly goes beyond simple reporting. What vision are you pursuing here?

In your view, for effective energy management, how should data be correlated? What conclusions can then be made?

THOMAS WINTER: At the top of the list is, of course, the consumption relating to the individual types of media. Here, all relevant energy data is involved; such as electricity, gas, heating, water etc. This also includes the so-called metadata for individual energy references such as price data, tariffs or quotas. In order to be able to gain conclusions from the process data, information about the equipment condition is also of importance. Here, process-oriented values also come into play, such as temperature or flow rates, as well as the condition of motors, fans and valves. This is the only way that it is possible to analyze the direct effects of optimizations and answer the process-oriented questions: for example, does the exhaust air motor have to run at full speed? When should it run and when is it unnecessary for the process? If all this data can be practically gathered then optimizations and their concrete effects can be directly evaluated: production plants or operation halls can gain optimized energy efficiency, without having to lose productivity or availability.

How are your customers benefiting from utilizing Eco.on?

THOMAS WINTER: Eco.on is a tool that our customers intuitively use on a daily basis for their work. The knowledge that is gained with the help of this tool supports our customers in attaining an energy-efficient production. Improvement measures can be evaluated and

documented so that not only ISO 50001 requirements for energy are fulfilled but also the user is able to optimize the complete production process for energy efficiency and achieve cost savings.

What opportunities do you see for Eco.on in the smart factory of the future?

THOMAS WINTER: Today, Eco.on enables us to meet the exact needs of the customer. Eco.on offers modular scalability and therefore future enhancements are possible. One has to start with individual areas and gradually expand the system. Multi-site and real mobile operation is possible by using a browser-based or Smartphone client. VPN and remote technologies put us, as the system integrator, in a position to assist with rapid and effective support. Multiple site administration and networking are simple to achieve today.

What's next for KÖHL Maschinenbau AG and COPA-DATA?

THOMAS WINTER: We hope to continue jointly developing the topic of energy management in the market, to win new customers together and, in turn, continue to deliver successful projects.

Many thanks for the interview.

http://kaywa.me/O3zsV

Video: OEE and ISO 50001 should team up – here's why!

ABOUT MR. WINTER

As Technical Manager, Thomas Winter has been responsible for system technology in the KÖHL Group since 2000. His area of expertise covers the electro-technical planning and engineering of KÖHL-delivered plants as well as general automation projects with external equipment suppliers. Customers come from the food, pharmaceutical, chemical, and automotive industries, as well as, heavy industry and foundries. The topic of energy has always been his focus through many years of project experience in the areas of regenerative energies (wind, biogas and photovoltaic). This presented an opportunity to let his experience in the areas of industrial automation and energy flow into an energy management product. Energy technology is a subject that has accompanied Mr Winter since the beginning of his career. After his studies in electrical engineering at the Saarland University he worked for ABB Kraftwerke AG in Mannheim for seven years.

KÖHL
SOLUTIONS WITH POWER

ABOUT THE KÖHL GROUP

KÖHL offers innovative solutions for more profitability and sustainability in the energy, automation, intra-logistics, tobacco technology and building services industries. Over 630 employees develop intelligent products and systems that secure a leading edge in the global market for its customers worldwide. The success story of the KÖHL group is coupled closely with the courage of their founders Edith and Wilfried Köhl. In 1971 they established the company Elektro KÖHL in Trier. In 1982, the company moved to the industrial region, Trier-Euren. The founding of KÖHL Schaltanlagen GmbH in 1986 allowed the company to satisfy the increasing demand for automated production processes. The next major expansion was in 1987 with KÖHL Maschinenbau GmbH, which specialized in the manufacturing of customer-specific machines and plants. Since 2002, the areas of equipment and system technology, robot, logistic and information systems are managed from Wecker (Luxembourg). Further locations in Dresden, Moscow and St. Petersburg secure a close proximity to the customer.

You can also find more information at
www.koehl.eu

NETWORKING, COMMUNICATION, EFFICIENCY

Horizontal and Vertical Integration with zenon

PRODUCE WITH GREATER FLEXIBILITY, react more quickly and, in doing so, become even more efficient – with minimal consumption of resources of course. How can that work?

The Internet – the mother of networking – was invented in order to use the capacities of mainframe computers more effectively. Even now, more than 30 years later, networking and the integration it makes possible are still important factors for increased efficiency, for example, in the case of correlating production data from different sources within a manufacturing operation.

Two of the most important factors for smarter production are horizontal and vertical integration. Horizontal integration means networking between individual machines, items of equipment or production units. Vertical integration networks beyond traditional production hierarchy levels – from the sensor to the business level of the company.

COMBAT THE KNOWLEDGE SILOS AND COMMUNICATION ISLANDS

In "typical" modern production, there are usually different machines and equipment from different manufacturers in use, which differ in terms of the degree of automation, the technology and even the communication standard.

Vertical integration entails additional hurdles. In addition to technical challenges, such as different networks and standards between automation and IT, it is most of all organizational aspects that play a role.

Communication islands leave technological gaps that must be compensated for on a daily basis – by means of notes, verbally or via third-party systems. This is laborious, slow and liable to error. This also distracts the employee from their most important task – creatively and intelligently driving forward continuous improvement. Different teams must therefore work throughout disciplines and open up existing knowledge silos.

HORIZONTAL INTEGRATION WITH ZENON

When using zenon on several machines and items of equipment, multi-project administration and the *straton binding* protocol offer very powerful integration capabilities.

It is precisely in such a heterogeneous environment where zenon's native ability to communicate plays a decisive role for horizontal integration with other solutions. It also allows different areas such as machines, storage systems and resources to be networked.

Example of usage:
A company produces with machines and equipment from different manufacturers, which are integrated in parallel with zenon. Relevant information on status and performance is available on each machine and also on all other machines. Machine operators thus have complete transparency over the entire process, and can optimize the equipment effectively and avoid downtime. In addition, the machines communicate with one another autonomously in order to synchronize the individual process steps optimally.

CLOUD

REAL-TIME DASHBOARDS · DATABASES · THIRD PARTY APPS · ANALYTICS/ REPORTING

DATABASES · ERP SYSTEMS · REAL-TIME MONITORING AND CONTROL

HMI/SCADA · EMBEDDED SYSTEMS · HMI/SCADA · ...

SENSORS

MACHINES, EQUIPMENT, UTILITIES, BUILDING, AUTOMATION,...
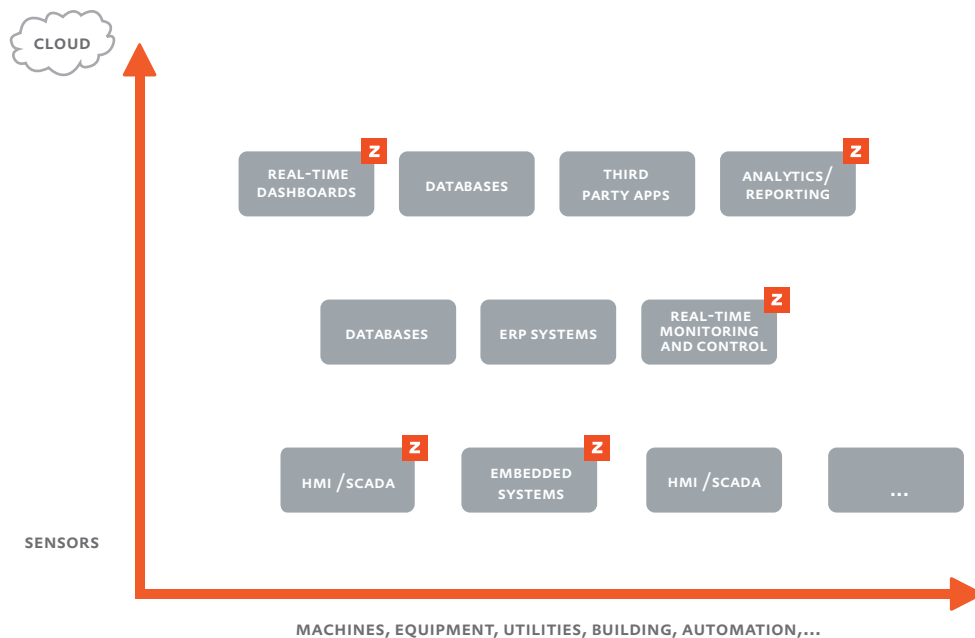
Horizontal integration and vertical integration with zenon.

VERTICAL INTEGRATION WITH ZENON

Vertical integration with zenon ranges from the sensor through to the ERP – or the cloud. What is particularly useful is that the integration functions entirely bi-directionally. This allows both the exchange of data and status messages, as well as control commands.

Example of usage:
A manufacturing company with several locations operates energy management throughout the company. zenon collects and processes energy and process data from the complete infrastructure. In doing so, a full impression of all consumption is obtained, from production through to resources and building services systems. The data is processed in near real-time in a zenon machine cloud and is available for dashboards and analysis. Energy managers use the company-wide transparency of all consumption to identify savings potential. They can thus further the process of continuous improvement with the local production teams.

PHILLIP WERR
MARKETING MANAGER

TECH FACTS

HORIZONTAL INTEGRATION WITH ZENON

- Over 300 native communication protocols
- Multi-project administration
- Client/Server – Server/Client topology
- straton Binding
- Application programming interface (API)

VERTICAL INTEGRATION WITH ZENON

- Over 300 native communication protocols
- ERP interface (SAP ERP, Microsoft Dynamics)
- SQL Server Interface
- Web Server
- Everywhere Server (Smartphone Apps)
- Cloud integration

HOW SECURE IS YOUR SCADA?

Security for the Smart Factory

REGARDLESS OF WHETHER we are talking about the Internet of Things, the Smart Factory or Big (Smart) Data, all these trends which characterize Industry 4.0 involve increasing connectivity, optimization, efficiency and data aggregation. However, they also have significant implications for security and production companies need to prepare their SCADA systems for potential cyber threats and external vulnerabilities.

We recently met with Marco Ramilli, a computer science researcher from Italy with an extensive background in identifying and protecting against hacking, and asked him about the evolution of industrial security. Get first insights in this *IU* interview: In the next issue's follow-up article, Mr. Ramilli will discuss the topic of cyber-security in detail and answer your questions.

Mr. Ramilli, what are your thoughts on the Internet of Things (IoT)? How will it affect businesses and private life in your opinion?
MARCO RAMILLI: The ability to connect, to communicate with, and to remotely manage an incalculable number of networked, automated devices via the internet will become pervasive: from the factory floor to the hospital operating room to the residential basement.

The transition from closed networks to enterprise IT networks to the public internet is accelerating at an alarming pace and justly raising alarms about security. For example, let's think about a simple smart meter able to send energy usage data to the utility operator for dynamic billing or real-time power grid optimization. The system must be able to protect that information from unauthorized use or disclosure. A security breach involving that data might have deep impacts on daily life: from increasing the cost of energy bills right through to shutting down the public power service.

It also raises more questions: how to deliver security updates to millions of mobile, wearable and wide-ranging systems? What about privacy? Where is my heart rate data stored after leaving my mobile cardio app? Are there any patterns or any silver bullets to limit cyber threats on the IoT? How easy is it for users to protect themselves? Do they need specific tools or procedures?

The short answer is: no. There isn't a silver bullet for these threats. But users could do a lot of things to avoid well-known threats by adopting specific behaviors and security approaches.

**How has industrial security changed over the years and what are the implications for SCADA systems?**
MARCO RAMILLI: Years ago, cyber-attacks were expensive and hard to realize. The average cyber-attack success rate was estimated to be around 20% of all attempted cyberwarfare. For these specific reasons, cyber-attacks were not so common and only a few companies were affected by such a threat. MarketsandMarkets[1] estimates that nowadays cyber-attack is one of the top five threats to business. Thanks to exploit kits and to a new underground economy called "exploit as a service", the cyber-attack price dropped and the success rate swelled from 20% to around 80%.

Usually data is protected on servers, networks and even at the end-user access point, but what about data on SCADA systems? Are they sufficiently secure? Since SCADA systems are frequently less secure than other business systems, attackers often decide to directly attack the company's SCADA system rather than trying to implement a more "traditional attack path" such as malware propagation or system exploitation. Nowadays, attacking SCADA systems is much less expensive and carries a higher success rate. Therefore, it is essential to block those attacks and to increase the awareness about how to discover and identify such attacks.

Mr. Ramilli, many thanks for sharing your experience with us.

GIUSEPPE MENIN
INDUSTRY MANAGER, COPA-DATA ITALY

[1] Source: www.marketsandmarkets.com
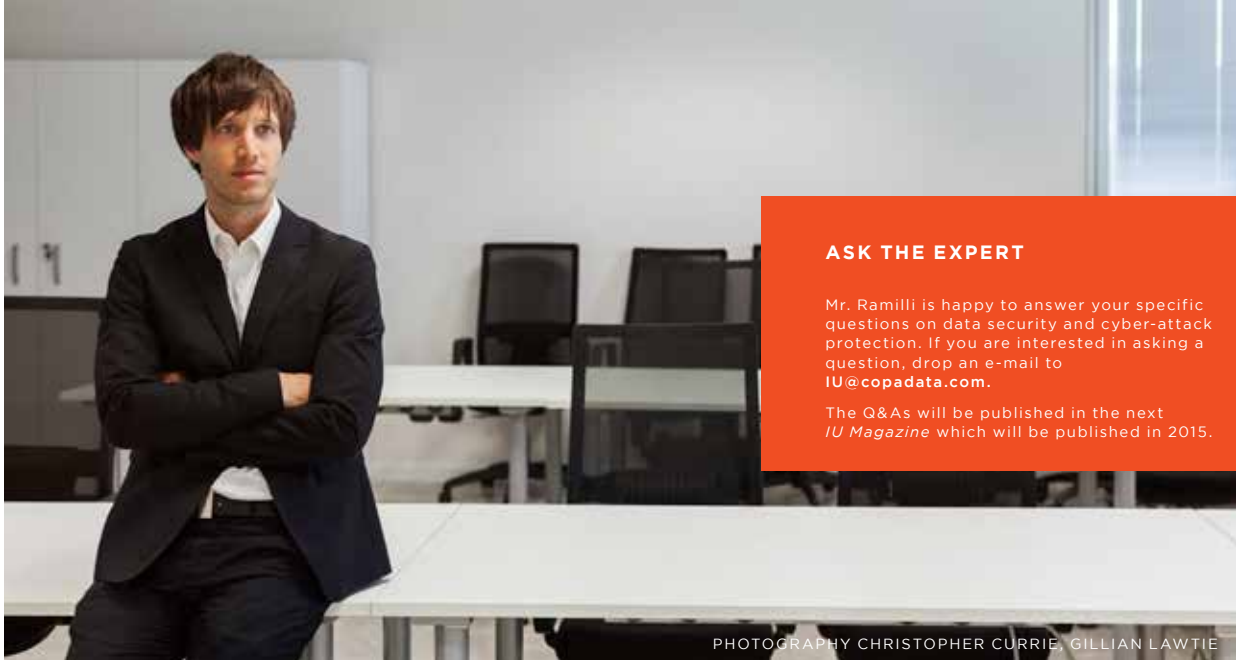
ABOUT MARCO RAMILLI

Marco Ramilli received his PhD in Computer Security following study at the University of California at Davis (USA) and the University of Bologna (Italy). He worked on computer security, in particular on malware evasion techniques and voting machine reverse engineering at UC Davis and, later, with the US Federal Government (National Institute of Standards and Technology (NIST), Security Division). He then worked in cyber security intelligence at Palantir Technologies and is now one of the founders of YOROI, a very promising start-up which protects industrial data from cyber-attack. According to Mr. Ramilli, SCADA and ICS security plays a key role in today's attacks on industrial data. To find out more about Mr. Ramilli and his activities in the field of cyber security, visit **www.marcoramilli.com**.

ABOUT YOROI

YOROI gets its name from the ancient name of the Samurai's armor. Today, YOROI protects its customers as the YOROI protected the ancient Samurai. The goal is to use our experience and education to "map a company": understanding the business processes, assessing the business risks and thinking as an attacker would do in order to apply security measures to protect the company. For each customer we have an active map (see Figure 1) which is able to geo-localize the threat callbacks, to interact with Active Directory in order to localize an attack, to analyze malware and threats, and to monitor email metadata in order to discover covert channel information leakage or attack. The "map" is active 24/7 and is even available on monitors in the company's IT offices. Our system strategically checks the company's vulnerabilities, dynamically checks the malware propagation status, and guarantees fast and deep analysis for our customers. We offer a 24/7 cybersecurity service, where our security samurais analyze the customer network flows using our technology in order to find intrusions and threats, such as vulnerabilities, email flows, data moving between entities, and so on, which might be exploited by attackers. We promptly act to block that specific flow, according to the customer's process policy, and proactively work to secure the customer's private, SCADA and public networks. For further information visit **www.yoroi.ninja**.

Figure 1: Complete threats analysis for optimal safety and control. The map shows dynamic flows from an anonymized customer network.
Source: http://www.lastmap.net.

So far, we have always found security breaches in any company that has asked for our help. Often our customers have no idea about the information leakage and the information that is constantly flowing out of their companies and they are not aware of the new threat paradigms that might affect their business.

MARCO RAMILLI, YOROI

PRODUCTS & SERVICES

● Site Bozen	● Site London
● Site Frankfurt	● Site Site New Jersey
● Site Seoul	

OEE
- ✔ Availability: %
- ✔ Performance: %
- ✔ Quality: %

PRODUCTION DETAILS
- ✔ Production: bottles/h
- ✔ Energy Consumption
- ☐ Energy Consumption per machine
- ☐ Energy Consumption per lot

Dynamic Production Reporting with zenon Analyzer

Q&A

HOW YOU CAN KEEP PRODUCTION AND
CONSUMPTION DATA UNDER CONTROL AND
ENGAGE IN SUCCESSFUL ENERGY MANAGEMENT.

IT HAS ONLY BEEN THREE YEARS since the first version of zenon Analyzer. Three years in which a lot has happened: the quick entry into the market was followed by an equally-quick growth period – both in features as well as installation figures. But how did zenon Analyzer even come about?

COPA-DATA is known for reacting flexibly to customer wishes. When more and more customers from different industries enquired about a solution for the increasing need for production-related data evaluations, we created Dynamic Production Reporting as the response. A reporting solution with the typical COPA-DATA approach – flexible and easy to operate. This was very quickly expanded to include the areas of energy consumption and operating data. There are now, for example, over 50 report templates available for many different requirements. But can zenon Analyzer also support your Smart Factory?

Q&A ZENON ANALYZER

In our Q&A, we gathered the most frequently asked questions and requested Thomas Lehrer, Technical Consultant at COPA-DATA, to answer these. Find out more about the areas where zenon Analyzer is used and how it operates in the exchange below.

**What are the main tasks
and functions of zenon Analyzer?**
Simply put: the preparation and display of process and consumption data in reports. Reports are often vital for analysis or decision making and require a specialized reporting system. The range of applications that zenon Analyzer covers is extremely wide. For many applications, there are pre-made report templates that are very easy to set up, starting, for example, with alarm management and the monitoring of production processes. The analysis of losses in production processes leads to reports for quality management, such as OEE reports or reports that comply with the Weihenstephan Standard. There are also templates for evaluations in relation to energy management in accordance with ISO 50001 available for selection. This data is recorded in zenon Supervisor, which works together optimally with zenon Analyzer.

**The term "Dynamic Production Reporting"
is often heard in relation to zenon Analyzer.
What does this entail?**
This is the creation of production-related evaluations. The first part, "Dynamic" is the essential part of this term. It means the ability to incorporate different sources of data, loading the required data for report generation. The following are possible data sources:

- Live data direct from Runtime
- Historic data from Runtime
- Data from database servers such as Microsoft SQL Server, Oracle Server or an ODBC data source

In which industries is the product used?

zenon Analyzer is not geared to a specific industry, but can be used throughout different industries. COPA-DATA has already implemented solutions in the core industries of Energy & Infrastructure, Food & Beverage, Automotive and Pharmaceutical. Highly-specialized reports are offered in the areas of Energy & Infrastructure, Food & Beverage and for use as an Energy Data Management System (EDMS).

zenon Analyzer is one of four products from the zenon Product Family. What relationship does the reporting software have with the other COPA-DATA products?

zenon Analyzer is designed for optimum communication with the zenon Product Family. Each product has its own orientation and task. zenon Analyzer is a reporting solution that meets high demands. It evaluates the data available and displays the results in reports. The range of applications ranges from reporting throughout equipment or production lines to factory-wide evaluations and comparative analyses. For example, in addition to individual production lines, a complete building infrastructure and the use of resources – per factory or throughout a company – can be taken into account for an evaluation. For data recording, zenon Supervisor, zenon Operator or even the Data Concentrator can be used. In some cases, it makes sense to pre-process the process data directly after recording; zenon Logic is utilized here. Compatibility with older zenon versions allows simple implementation of zenon Analyzer even if zenon Supervisor has already been in use for a long time.

What are the benefits of the combined use of zenon Analyzer and zenon Supervisor?

In contrast to conventional reporting solutions, zenon Analyzer is designed to be able to create reports without programming. If reports have been defined, these rarely remain unchanged for a long period of time, but are also subject to the dynamics that characterize our daily working life. Production machines are added, infrastructure components change, etc. It is often the case that the reporting solutions cannot keep up with these dynamics. Only long after the machine is put into operation can the report be updated, the energy counter included and so on. These delays do not exist in zenon Analyzer. Changes to the zenon Supervisor project can be easily transferred to zenon Analyzer. New variables, for example, are then immediately available in reports. The step from a project change to the adapted reports is only very small with zenon Analyzer. Often an adaptation of the reports is not required, because changes are automatically updated in the reports.

zenon Analyzer has been on the market since 2011. What developments have been made with the software since then?

The market launch in 2011 was carried out after an intensive development stage, in which we prepared the fundamental components of zenon Analyzer for the market. However, at the same time we were also aware that this was only the start and our ambitious development objectives still meant that we had a lot of work to do. From the functional additions that we considered necessary and the feedback from our pilot customers, there was an additional extensive development of zenon Analyzer just one year later. At the heart of this development was the zenon Analyzer Management Studio (ZAMS), the central tool for creating reports and administration of zenon Analyzer. In line with the annual product release cycle, the next version was released in 2012, which was most notable for its new report templates, for example for energy management in accordance with ISO 50001, analyses with user-defined formulas, OEE and packaging reports, hydro-electric power plant analyses, etc. The most recent release, zenon Analyzer 2.20, shows the consistent continued development that the system is undergoing.

Around the world, there is an increasing demand on companies to produce more energy-efficiently and to introduce energy management measures into their companies. Does zenon Analyzer support sustainable energy management in accordance with ISO 50001?

zenon Analyzer is, in combination with the zenon Product Family, the optimum product for sustainable energy management. This is also evidenced by our certificate from TÜV SÜD. In order to be able to produce more energy-efficiently, it is of course important to know how much and where energy is consumed. It is necessary to put energy in interrelationships and to show energy flows. Meaningful reports are thus required, which can aid in underlining losses and inefficiencies. These analyses primarily – but not exclusively – relate to energy in all forms. Normally the consumption of water, compressed air, chemicals, etc. is to be analyzed. In doing so, there should already be cost calculations in the reports; these should be presented in relation to production quantity and should be able to be compared to the previous year. zenon Analyzer offers a range of reports for precisely this task. In addition, reports can be created with independent calculation forms, power consumption can be analyzed in an annual duration curve, an individual Sankey diagram can be modeled and displayed in a report, and many other similar scenarios.
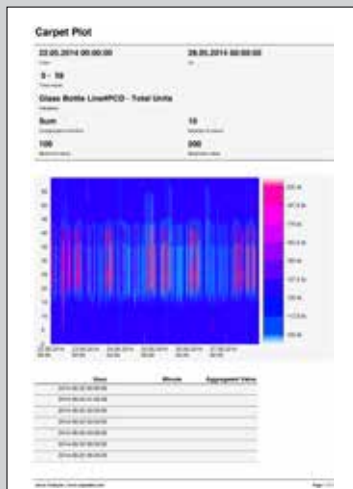
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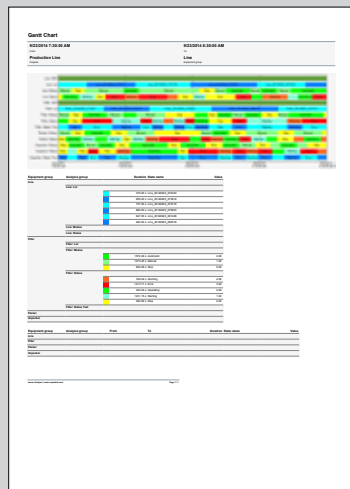
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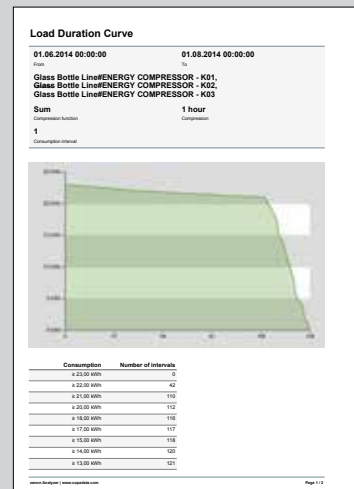
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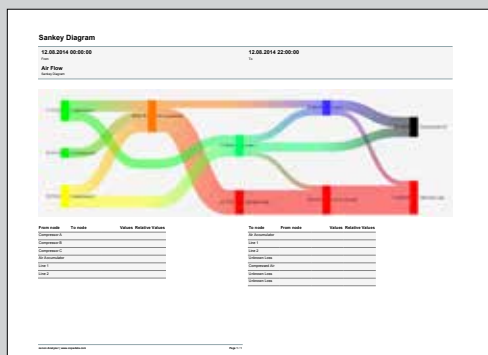
Figure 4

Figure 1: The Carpet Plot report shows measured values – such as consumption of resources for example – in their time-related context and thus makes the potential for savings evident at a glance.

Figure 2: The Gantt Chart gives information about the performance and availability of equipment or equipment components by analyzing the status information of a particular machine.

Figure 3: The Load Duration Curve displays energy consumption over the year as a line chart or area chart. It shows the amount of hours a certain output was consumed. The filter time can be freely configured in the process.

Figure 4: In the Sankey diagram, resource flows are shown with a clear overview. This is particularly suitable for use as part of certified energy management systems (for example in accordance with ISO 50001).

In which areas can potential for savings be shown with zenon Analyzer?

zenon Analyzer is not limited to a specific area of application. Potential for saving can be shown in both production as well as building services and building automation. Presently, in most companies, the primary focus is on energy-intensive areas of production. In the case of large company grounds, infrastructure-related energy consumption from building services (such as for HVAC) is particularly important.

Energy data management is a very dynamic process, which is subject to continuous challenges. How does zenon Analyzer approach this challenge?

The essence of energy data management is the continuous improvement process. If the decision has been made to introduce an energy data management system, the focus is generally on the areas that are most important for the respective customer. An EDMS usually grows over the course of time. More and more areas are incorporated and available data is analyzed. zenon Analyzer is optimally equipped for this change and expansion process. Simple changes, such as just adding variables, archives, equipment models, etc. do not require the report to be changed, because the data used for the report can be individually selected each time a report is generated. For fundamental changes to definitions, the report templates in ZAMS can be set up accordingly. In this case, the changes are easy to carry out and are quickly completed.

What are your personal highlights from the latest version, zenon Analyzer 2.20?

The Sankey diagram is certainly a particular highlight; this

can be independently and simply modeled in a wizard. Many customers asked that existing databases be incorporated, in order to be able to analyze the data contained therein. These can be integrated with the connector for third-party databases. This simplifies the use of zenon Analyzer, if the recommended partner, zenon Supervisor, is not available.

THOMAS LEHRER
TECHNICAL CONSULTANT

http://kaywa.me/vLm1X
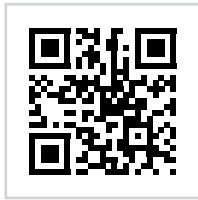
The road to successful energy management with zenon: watch the video.

ZENON ANALYZER 2.20 WHAT'S NEW

SANKEY DIAGRAM
Create, conveniently and simply, a graphic display of your energy flows or any other quantity flows.

ANNUAL DURATION CURVE
This allows you to visualize the required output. In doing so, the period under review and the granularity (hours, days, …) can be freely selected, which means you have even more flexibility for your evaluations.

CARPET PLOT DIAGRAM (GRID DIAGRAM)
This well-known diagram offers extensive evaluation possibilities for your energy data management system.

GANTT CHART
With this new report template, you can analyze the performance and availability of your equipment or equipment components. Subsequently, you gain an overview of the efficiency of your production processes.

CONNECTOR FOR THIRD-PARTY DATABASES
The connector establishes the connection to the databases of third-party systems and is able to read off this data. Process data saved therein, such as consumption values, can be evaluated in the report.

ADMINISTER REPORT TEMPLATES
The new administration allows you to read off the design of the reports (such as when using an individual header with logo) and to save your own, specific report templates. With templates that have been newly-created, this design is then automatically applied.

EXTENDED TIME FILTER
Depending on the requirements, the time filters can now be set up with more flexibility. Some examples: you would like to generate monthly reports and quickly and easily enter the desired time period in the process? Then you only need to deactivate the hours, minutes and days in your time filter. Does production at your company start at 7:00 am every day? Simply set the standard start time of the time filter to this time. You have a "golden batch", with which you want to compare your current production? Simply define it as a fixed period for your comparative reports.

CROSS-DOMAIN USER ADMINISTRATION
If your company works with several domains, you can now also grant users of other domains access to zenon Analyzer.

ZENON SUPERVISOR FUNCTION FOR REPORT CREATION
The incorporation of reports into the Runtime is now even easier, because parameters for report creation can easily be set up in zenon Editor. As a result, zenon Analyzer reports in the Runtime can be generated at the press of a button or are event-triggered, for example: at the end of a batch, when an alarm sounds, etc.

IEC 61508 and the Safety Integrity Level

THE SAFETY INTEGRITY LEVEL (SIL) is a system to evaluate the reliability and safety of electric, electronic and programmable electronic systems (E/E/PE systems). It is based on the IEC 61508 standard. COPA-DATA is SIL 2 certified which means zenon can be used for process visualization and control in safety-critical applications. But why should software development be certified in accordance with SIL?

IEC 61508

The task of safety functions is to minimize the risk stemming from processes that entail dangers for people, the environment and material assets. More and more safety-critical processes are regulated, controlled and measured by technical systems. The processes themselves are becoming increasingly more complex and demanding with regard to safety. The use of the IEC 61508 standard is intended to not only ensure that systemic errors are avoided, but also to ensure that system failures or problems can be managed safely. Systems are thus deemed "functionally safe".

The IEC 61508 standard describes methods and requirements for "functionally safe" systems. Their type and extent is oriented towards the Safety Integrated Level (SIL) that the operator of a safety-related system must achieve. Software development can be designed in accordance with these standards: from conception through to development, use and maintenance of software systems, and the integration into safety-critical hardware systems in a corporate environment.

As a result, IEC 61508 is considered a basic standard from which various, sometimes industry-specific, specifications have been derived. This includes:
· EN 50129 Railway Applications –
  Communication, Signaling and Processing Systems
· EN 62061 Safety of Machinery
· ISO CD 26262 Road Vehicles – Functional Safety

SAFETY INTEGRITY LEVEL (SIL)

IEC 61508 demands, as part of a risk analysis, the allocation of all safety requirements to individual, safety-related functions. To do this, a benchmark for the reliability of these safety-related functions is necessary. To what extent can operators trust safety-related equipment to work properly?

This benchmark is subdivided into levels and called SIL – the Safety Integrity Level. The SIL is considered a benchmark for the reliability of safety-related functions that work in accordance with the specification. The safety integrity of a system is defined as "…the probability that a safety-related system executes the required safety-related function under all stipulated conditions within a defined time period".

The specification of the safety-related functions thus covers the action that is to be taken in response to the existence of certain conditions as well as the time that is required for this response. In doing so, the standard defines four levels to be applied: SIL 1 to 4, whereby level 4 is the highest safety integrity level and level 1 is the lowest. Other classifications, such as SIL 0, are not permissible and must not be used for safety-related functions.

RELEVANCE FOR SOFTWARE AND COMPONENT MANUFACTURERS

The set of standards describes the lifecycle of the complete safety-orientated system. This starts with the planning and ends with the decommissioning of E/E/PE systems with safety-related functions.

IEC 61508 is subdivided into seven parts, whereby only parts one to four are normative; parts five to seven are for information only. Of the seven parts, Parts 1 and 3 are of particular interest to the software industry.

PART 1: GENERAL REQUIREMENTS

IEC 61508 defines part 1 as a "general basic standard". This can be used if there is no application-specific standard derived from it. It primarily defines a superordinate safety lifecycle in order to be able to handle all necessary activities and tasks systematically. In all phases of this lifecycle, measures for the management, verification and evaluation of the functional safety are carried out and – most of all – documented. This also applies for the creation and maintenance of software. The requirements for this are primarily defined in Part 3.

PART 3: REQUIREMENTS FOR SOFTWARE

This part describes techniques and procedures for how software should be developed and documented. A detailed safety lifecycle is also defined for software for the overall system. The individual safety requirements for the software must be derived from the requirements of an E/E/PE system and the safety requirements defined there. In addition, Part 3 describes development techniques for each SIL and provides notes on how to select the appropriate procedure for designing and developing the software.

Software planning and development in accordance with IEC 61508-3 forces the manufacturer to precisely define its processes and procedures. Working stages must be documented and checked with precision. The work in each working stage must be checked by a second person.

We have been practicing all these measures for many years with the development of our zenon Product Family and thus benefit from a correspondingly large knowledge base. Because we already meet the requirements of the IEC 61508-3 standard in many areas, it was a no-brainer that we should subject ourselves to SIL certification.

SIL CERTIFICATION FOR COPA-DATA

The most important objective in relation to our intended SIL certification was to amend the structures, processes and requirements that had existed for years at COPA-DATA to the requirements of IEC 61508. The requirements should be implemented in such a way that they can be integrated into our daily working life.

In doing so, it was helpful that our product development was operated on the basis of a V-model and

on well-established tools used in lifecycle management for example, which have been in use for years.

As part of the SIL project, special central definitions for safety-related developments were created and amendments to existing methods were carried out together with TÜV Süd. The most important were:

Safety lifecycle Defines the complete lifecycle of a safety-related component. From planning through development and testing to defect management and the provision of the components.

Safety plan The safety plan is used during a development project as a type of project management handbook.

Templates for requirements and performance specification Special templates for safety-related components ensure complete coverage of the requirement and forwards and backwards traceability.

SIL programming guidelines Special coding guidelines on the basis of MISRA 2012 and corresponding checks through static code analyses ensure that there are no systematic programming errors.

Safety handbook Describes the implementation and test results of a safety-related component and provides the user with information on correct use.

Tools Adaptation of all tools that are used as part of the lifecycle for the enhanced processes and requirements of IEC 61508.

Training Training of the employees involved in the specifics of IEC 61508.

The audit for our certification in accordance with SIL 2 ultimately took place at the end of July 2014 and was carried out by TÜV Süd Munich, an independent and neutral body. In doing so, our processes, procedures, tools, quality standards and documentation were tested for their suitability for safety-critical systems. In October 2014, TÜV Süd confirmed that all necessary requirements for the display of the official certificate for SIL 2 had been met.

zenon can thus be used in safety-critical applications for process visualization and control. Numerous safety-related functions support our customers in the creation of safe applications. In addition, certification by TÜV Süd creates the necessary underlying conditions for safety-compliant implementation.

REINHARD MAYR
PRODUCT MANAGER

FAQs

zenon SAP Interface –

A Seamless Connection of SCADA and ERP

**COULD THE ZENON SAP INTERFACE ALSO MAKE YOUR PRODUCTION FASTER AND MORE RESPONSIVE?
READ MORE IN OUR FAQs ABOUT ITS OPTIMUM DEPLOYMENT.**

What data can I transfer via the SAP interface?
The SAP interface offers three possibilities for communication with an SAP system:
1. Process data and counter readings can be saved cyclically as measurement readings in SAP. In doing so, allocation to a measurement point is carried out via the variable properties.
2. The alarms can be transferred as maintenance messages directly to the SAP maintenance module. These are also allocated a functional location or item of equipment by means of the variable properties.
3. Ultimately, any desired SAP function module can be called up. The transfer parameters are linked to zenon variables in the process.

Is it possible to call up function modules that return several data sets or a list?
In principle, the function parameters are always linked to zenon variables. If a function module is called up, the values from the SAP system are written to the linked variables. If a function module has a table as a parameter, an array can be linked instead of an individual variable. This way, complete tables from a SAP system can be loaded into the zenon project. When configuring the project, always ensure that you use a suitable data type and a sufficiently large array size.

How do I have to license the SAP interface (Server/Standby/Client)?
The SAP interface must be licensed for each zenon installation (Editor and Runtime). In a network project, you decide whether you want to use the interface only on the server (for maintenance messages for example) or also on clients (for example, to query workspace-specific order data).

ZENON AND SAP? A really good connection, as a customer recently said to me during a training session: "Yesterday I heard during the lunch break that a new order from our most important customer had been won. This order was the highest priority and had to be processed particularly quickly. I couldn't believe that all the order details were already present for production, but I nevertheless rushed to get back to my desk. There, I immediately updated the list of production orders in zenon that are saved in the SAP system – and, indeed, the order that I had just been told about was already appearing. Seconds later, all process-related order data from SAP was saved in a recipe in zenon and production on the order could start."

For this particular customer, it was very helpful that the current process data and counter readings are constantly sent to the SAP system. This means that management can also see the production status and statistics at any time and nothing gets in the way of processing the order successfully.

Do I have to be an SAP expert in order to be able to use the zenon SAP interface?

No. You only need to know which SAP functions are to be called up. zenon then reads the function and parameter description from the SAP system and supports you in the configuration of the function call. You then only need to link the variable that is necessary to call up the function module. No SAP expert knowledge is required for maintenance messages or measurement readings either. However, in order to allow an allocation of the value, you do have to know the names of the function locations or measurement points in SAP.

Do I need to be familiar with ABAP programming?

No ABAP knowledge is required to configure the SAP interface in zenon. However, if special functions that SAP does not offer as standard are needed, an SAP specialist should be consulted.

What data do I need in order to be able to establish a connection to an SAP system?

In addition to the designation of the application server, the router string and the system number, you also need user data (client, user name, password). This data is defined once in the Editor and cannot be changed in Runtime.

Does the SAP server need to be in the same network as the zenon Runtime server?

The SAP server and the zenon Runtime server can be in different networks. However, the use of a SAP router may be necessary in some circumstances. If the SAP GUI is already used at the same location, this is generally already set up.

Does SAP need to be configured specially?

zenon can only access function modules that can be executed remotely. All function modules that are to be used in zenon must be configured accordingly. Furthermore, you must ensure that the respective user has sufficient authorizations in SAP in order to be able to execute the desired functions. No other special settings are required in the SAP system.

Are there requirements for the use of the SAP interface?

Some special DLLs are required in order for zenon to be able to access a SAP system. For this reason, SAP GUI, the front end of the SAP system, must be installed on the same computer. Note that a connection to the SAP system is necessary not just in Runtime but also in the Editor. Only then can function modules and the description be read.

How can I check if data that has been sent has arrived correctly in the SAP system?

The result of each function call (success/error) can be saved in a zenon variable. If an error occurs, detailed information can be stored in another variable. With the help of these variables, you can react quickly to faults and avoid incorrect configurations. Of course, corresponding CEL and log entries are also written in the event of an error.

What do I do if I still have questions or want to see more functions?

For further information, please take a look at our Documentation, Knowledge Base and Forum at *www.copadata.com/support* or contact your local COPA-DATA support representative.

ALEXANDER FRÖHLICH
PROFESSIONAL CONSULTANT

ZENON TRAINING

Learn how to use zenon optimally – as part of the COPA-DATA training program.

All our lecturers have completed a comprehensive "Train the Trainer" program.
This is how we ensure the quality of our trainings courses and you benefit from
an enjoyable transfer of knowledge.

In the previous edition of the *IU*, we introduced the zenon Supervisor,
zenon Logic and zenon Analyzer training courses. This time,
we focus on our industry-specific solutions.

MARTIN SEITLINGER
DEVELOPMENT OF COMPETENCE
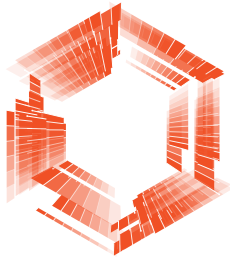
zenon Operator Training

LEARNING OBJECTIVE
The participants of the zenon Operator training course gain an overview of zenon's range of functions and the philosophy behind it. They become familiar with the basic structures of the development environment and Runtime and will be able to use these with confidence.

REQUIREMENTS
Basic PC and Windows knowledge.

CONTENT
The first three training days are devoted to topics such as set-up, licensing, visualization, event handling, operation and the network. The basic structure of a project is covered, as well as details on data types, variables, frames, screens and much more.

OTHER TOPICS
· System messages and alarm management
· Recipe administration
· Production & Facility Scheduler
· Distributed Engineering
· zenon network and Remote Transport
· Integrated solutions with zenon Logic

On the last day, the focus is on optional modules in zenon Operator, such as reporting or automatic line coloring (ALC).

Duration: 4 days
Recommended maximum number of participants: 8

zenon Energy Edition Training[1]

LEARNING OBJECTIVE
To familiarize participants with the basic structure of zenon Energy Edition, gain an overview of the range of functions and will learn how to implement single-line circuit diagrams.

REQUIREMENTS
Basic knowledge of zenon from a zenon Basic, zenon Operator or zenon Supervisor training course.

CONTENT
The zenon Energy Edition training course builds on the zenon Supervisor training course. The participants gain an overview of the following topics:
· Automatic line coloring and topology
· Command input and interlocking
· Symbols for process-related elements
· Status processing
· Configuration of single-line circuit diagrams and topologically-colored networks
· Use of the additional features of the topology package
· Application of command line interface and protocol specifics
· Configuration of interlocking objects
· User-friendly alarm management
· Status processing capabilities

Duration: 2 days
Recommended maximum number of participants: 8

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[1] You can get detailed information on the IEC 61850, IEC 61870 and DNP3 protocols in other COPA-DATA training courses.

zenon Pharma Edition Training

LEARNING OBJECTIVE
The participants become familiar with the basic structure of zenon Pharma Edition, gain an overview of its range of functions and will be able to use the zenon Batch Module.

REQUIREMENTS
Basic knowledge of zenon from a zenon Basic, zenon Operator or zenon Supervisor training course.

CONTENT
The zenon Pharma Edition training course builds on the zenon Supervisor training course and includes topics such as FDA CFR 21 Part 11 regulations and how zenon can meet these, as well as special functions in zenon Pharma Edition. The Batch Control module is another essential component of this training course.

OTHER TOPICS
· Archiving
· Reporting
· SQL export of data
· Extended Trend
· Recipe Group Manager

Duration: 2 days
Recommended maximum number of participants: 8

You can find further information on zenon training courses and forthcoming dates in your region at:
www.copadata.com/training

Process Overview

ONDON

75%

INDUSTRIES
&
SOLUTIONS

FOOD & BEVERAGE

ENERGY & INFRASTRUCTURE

AUTOMOTIVE

PHARMACEUTICAL

BREWING BEER CREATIVELY WITH ZENON

Enjoy the Taste of Ergonomics

The elegantly-shaped glass, the sophisticated concert of subtle tastes and complex aromas, the cool, refreshing euphoria – all of these things define, for many of us, the extraordinary experience of savoring a good beer. Behind this experience is great passion… and technology.

CURRENTLY creativity in beer production is again becoming a popular trend. Alongside well-known favorite brands, it is also delightful to try something new and special. The dynamic trend of *craft beer* has emerged, blending local tradition, special ingredients, unexpected flavors, secret recipes and slow brewing – which has more to do with brew masters' innovation than with industrial mass production.

The capacity of brewing equipment, however, is not decisive in achieving a good or bad result. The one thing that really does make a difference is how automation technology supports the brew master to put his ideas into practice and to refine his creations. Is automation flexible or limiting? Do changes have a reasonable or dramatic budget impact? Does the technology support a quick or slow time to market?

This article highlights for system integrators a way to integrate a brewing process control solution using zenon. The following generic solution is designed to widely fulfill general requirements in the food & beverage industry, while identifying opportunities to accommodate particular brewing-specific or individual requirements.

SYSTEM INTEGRATION IN 4 STEPS

In any given project, the system integrator typically requires the valuable input of a process specialist, such as the brew master, in order to define the user requirement specification (URS).

STEP 1: PROCESS CELL MANAGEMENT

In this instance, the URS refers concretely to a brew house – or, generically, the *process cell* – which is the subject of batch control. For every batch unit, such as the *mash kettle, lauter tun, wort kettle or whirlpool*, the functional capabilities (phases), such as *Transfer In, Add Water, Heating, Mixing,*

Transfer Out etc., must be specified. The mechanical components and the necessary *equipment modules* are described in detail – down to the level of single valves and sensors. These are all essential definitions which enable the next steps.

STEP 2: CHOOSING THE SYSTEM ARCHITECTURE

A typical architecture follows the principles of ISA-88 which separates the implementation of the *basic control* from the *recipe procedural control.* It usually consists of a PLC with all necessary I/Os for connecting actuators and sensors and a PC with display – for example: compact form factors without rotating hard disks and ventilators, which adapt to the specific environmental conditions. Through its universal connectivity, zenon Supervisor can be combined with practically any PLCs, whether in completely new projects or when refurbishing existing breweries.

Fans of completely hardware-independent software who want the ability to turn hardware into a true commodity have an even better option: an integrated solution using zenon Logic (for basic control) and zenon Supervisor (for recipe control and visualization). Choosing this approach means hardware architecture can be even more compact: just an (embedded) industrial PC with display and bus I/Os. Both zenon Logic and zenon Supervisor should run on the PC, in order to combine the advantages of the PLC and the PC/IT world. This way, in the event of a hardware upgrade or replacement, users retain complete freedom over their choice of hardware and the software application can remain unchanged.

STEP 3: PROCESS CELL ENGINEERING

In zenon Logic, the state models for every batch unit and equipment phase are programmed. For instance, Sequential Function Charts can be used, being one of the IEC 61131-3 languages. This includes the creation of all required phase parameters which will be later controlled from the batch recipe, such as *time duration, set temperature, material quantity,* etc. The engineering effort can be dramatically reduced by programming common state models for different and non-simultaneous running phases, so that the required function is preselected as a *control strategy* before execution.

In order to reduce the engineering time, zenon Logic offers a preconfigured state model according to OMAC (the Organization for Machine Automation and Control) guidelines – *see Figure 1.* Using a specially designed interface within zenon Logic Workbench, several states of the model can be activated or deactivated. This makes it possible to create a simpler model while maintaining compatibility with the standard. The integrator has complete freedom over how to write the programs to be executed in every state for process measurements, control and regulation. He can choose from the available IEC 61131-3 languages, and preconfigured libraries and can also create his own libraries – for example, for supporting

company-specific or unusual concepts within brewing process regulation and optimization.

After the equipment phases' implementation, the next step is to engineer the recipe control. This happens in the zenon development environment by configuring the Batch Control module. The batch units considered in Step 1 can now be modelled. The flexibility of the configuration makes the integration with both new and older equipment possible.

The recipe phases cover a wide range of functionalities, from bidirectional parameter communication through PLC variables, through *phase done* and *interlocking logic,* up to complete *exception handling* mechanisms. These specific recipe phases have sophisticated interfaces with the equipment phases. Hence, the two state models at control level (e.g. the OMAC model) and recipe control level (the ISA-88 model) are consistently correlated. Any status change or event occuring on one side will have a clear effect on the other side. This is key for a successful implementation which adheres to the ISA-88 principle of separating equipment capabilities from product manufacturing instructions.

For more efficient engineering, the preconfigured batch control components can be reused at the required level of detail.

STEP 4: APPLICATION ENGINEERING

Batch Control is a completely integrated part of the brewing application, together with all other required functionalities: brewing recipe management, recipe execution and process operation, process visualization (*see Figure 2*), alarm and event management, trend curves, data archiving, brewing reporting, etc. Out-of-the-box and reliable components are available for parameterization in the zenon development environment which deliver the optimum balance between flexibility and fast engineering. The symbol library offers preconfigured typical graphical symbols specific to general process control, and also those specific solely to brewing applications.

zenon reduces the integration time by enabling the definition of user-configured graphical templates and encapsulated symbols and by extended mechanisms to reuse
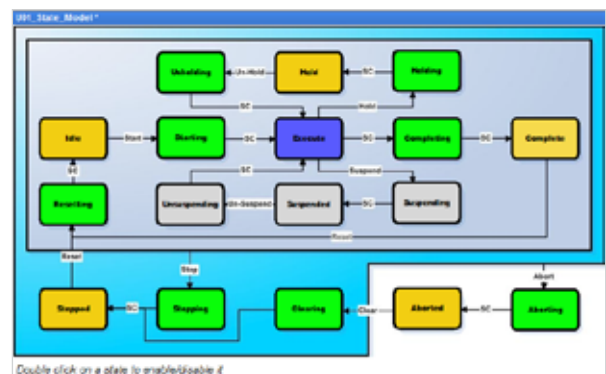

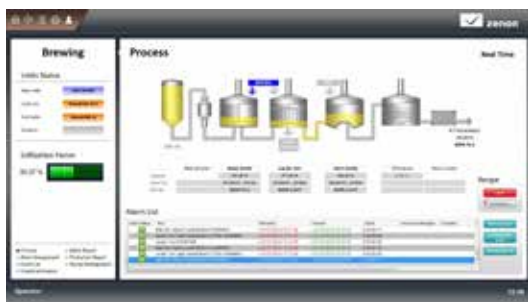*Figure 1:* OMAC-compliant state model definition in zenon Logic.

Figure 2: Brewing visualization at
the operator's required level of detail.

pre-engineered project components. OMAC and ISA-88 standardization, combined with generic design of brewing units make zenon's automatic engineering an ideal solution for rapid application generation. By programming adequate parameters (such as the selection of batch units composing the process cell, required application functionalities, user interface templates, etc.) into their individual zenon wizard, the system integrator assures the necessary level of flexibility.

The integrated zenon Logic and the simulation mode support the careful testing of the entire application before on-site commissioning. Afterwards, the detailed level of system events tracking and reporting enables the validation of every equipment phase and recipe phase – and supports ongoing optimization initiatives.

SOLUTION ATTRIBUTES

The zenon Product Family brings several essential features to the entire brewing control solution.

SUPPORT FOR MANUFACTURING ROLES

In a compact architecture design (for example, for smaller breweries) the system utilizes a single user interface. Even in this situation, different people are involved in the brewing

process. The brew master is the one creating the template recipes for different beer types (so-called *master recipes*). He has all production equipment capabilities at his disposal, because they have already been created by the automation specialist as recipe phases. Not only can the phase parameters be flexibly configured, but also the execution order over time by using a Process Function Chart (PFC) or a matrix representation – *see Figure 3.*

Within the remit of preconfigured user access rights, the operator may undertake different tasks: creating control recipes based on templates, adjusting certain recipe parameters, starting recipes and supervising the process. He is able to monitor the process in real-time and take any corrective action, should any relevant alarms occur. For the best result, the brewing process planned by the brew master has to be followed accurately – *see Figure 4.*

In addition, the process data is archived for every brewing stage. The process documentation is not only essential for traceability; analyses of the process with respect to quality, efficiency or material consumption are typically required by management.

In this way, every involved member of the production team contributes to the high performance of the brewing process.

EXPANDABILITY

Any brewing system using zenon benefits from the technology made available within the whole zenon Product Family. A small project can be easily expanded to larger applications; for example: to encompass more production units with different volumes and more complex control modules.

zenon's connectivity can be used to communicate with other software systems in the plant, for instance with production planning tools. zenon's VSTA and .NET programming interfaces extend the system's openness with one more dimension: huge additional scope for user-programmed functionalities.

Figure 3: Brewing recipe management in PFC
and matrix representation.

Data archiving in SQL databases, Multi-Touch user interfaces, Dynamic Production Reporting, wider team involvement by leveraging the plant IT network and mobile communication are just a few examples of how such a solution can be extended based on the native functionalities available in zenon. As with any process in the plant, the brewing process has to be integrated with the quality, efficiency and consumption optimization initiatives.

RELIABILITY

A reliable automation solution plays a central role not only in reaching expected results in a timely manner, but also in creating the conditions of maximum reproducibility and in eliminating wastage. The zenon Product Family embeds technologies guaranteeing availability and exactness. The lifecycle-based management of master and control recipes is designed for the complete control of brewing process design and execution.

The configurable and pretested modules grant the entire application a high software reliability. The quality of the communication with hardware is continuously supervised. The sophisticated *exception handling* between the basic and recipe control components assures the consistency of the entire process. The *process image backup and restore* mechanism provides values in case of equipment failure.
The hardware independence of the software enables high equipment availability in case of PC or panel failure. This is because the software can even be temporarily executed on non-industrial PCs. The hardware reliability can then be improved at any time by replacing or updating hardware products – without the need to re-engineer the software.

EFFICIENT ENGINEERING

On their way to support innovation in brewing, automation specialists deserve more ergonomics in system integration – be it a new project or a functional extension. COPA-DATA's commitment to efficient engineering is reflected by the extended features of the zenon development environment. For beginners, basic zenon training can support the learning process and provide understanding in easy engineering.

Parameterization-based integration brings the user more rapidly to project completion and the desired results. Bringing together standardization and flexibility, zenon's automatic engineering provides an opportunity for a drastic reduction in the lead time required for system integration.

zenon also enables the efficient integration of international projects. For instance, the language or the measurement units can be quickly changed without restarting the application.

CONCLUSION

In response to today's appetite for creative brewing, zenon is prepared to make the difference and deliver competitive advantage through flexibility at reasonable cost. Good

Figure 4: Trend curve analysis of the brewing process.

automation technology can help everyone in food & beverage production and system integration to be more successful, with more satisfaction and less stress. This is what zenon delivers. This is the taste of ergonomics. Cheers!

EMILIAN AXINIA
INDUSTRY MANAGER FOOD & BEVERAGE

http://kaywa.me/B6E1l

Batch Control in Food & Beverage with zenon: watch the video!

Automated Substation

[PART 2]

ERGONOMIC IMPLEMENTATION

———————————

In the previous *IU Magazine* issue, we began a three-part Energy topic series with a focus on the ergonomic engineering of an automated substation. In part 2, we now take a closer look at ergonomic implementation.

TEXT JÜRGEN RESCH
INDUSTRY MANAGER ENERGY & INFRASTRUCTURE

COMMISSIONING, FACTORY ACCEPTANCE TEST (FAT), Site Acceptance Test (SAT) and trial operation are phases of a SCADA application which need to be looked at with particularly critical eyes. It is therefore important for a system integrator to have the correct tools available to achieve the required results even in highly stressful situations.

DRIVER SIMULATION

In order to present a customer with the entire functionality of the SCADA application for a FAT, even when only parts of the substation are available to start with, zenon offers a programmed driver simulation. It is therefore possible to simulate the performance of devices and processes, as if they really existed. One can carry out the demonstration with defined data points based on the correct driver. In this way, it is possible to show customers screens and functionalities as they will look in the real equipment, and it is not necessary to present switching elements which are marked with INVALID.

NETWORK TEST

For the SAT, standard communication is normally tested first, and after that each variable is checked. Via SNMP and a system driver, the entire network infrastructure can be monitored on a system overview screen. By means of corresponding variables the connection status with the individual devices is determined before the variable diagnosis is carried out. At first the variable status screen is used for the data point test. This is an individual screen type with which a list of variables according to filter settings can be connected. Alternatively several variable overviews can be constructed whereby a symbol with a variable name and value are created and can be used in a screen as often as desired. Once it is ensured that all variables have the proper connection to the devices, it is possible to focus on the correct representation on the screen.

DRIVER CONNECTION ANALYSIS

If the project happens to not function as it should, the Diagnosis Viewer can support you. This offers an excellent capability for analysis of driver connections which are not working as they should.

MANUAL DATA HANDLING

What can you do when the test operation should have started but not all equipment parts in the automation and control components have been set up yet? No problem: With zenon all variables can be displayed and simulated on the screen, even before they are connected to the process and are only known in zenon.

USER RIGHTS IN ENGINEERING

To clarify the liability question from the start regarding changes in the system: the zenon Editor (zenon`s engineering tool) can be provided with access rights. It is therefore ensured – even during test operation – that only authorized users can undertake changes.

FAST FACTS

- FAT: Process simulation via programmed driver simulation
- SNMP and system driver for system overview
- Variable diagnosis window
- Own variable overviews made easy
- Diagnosis Viewer, if driver connections are not working as they should
- Manual correction for not yet reported variables in the system
- User administration in the Editor: only in areas where change is permitted

ENERGY EXPERIENCE DAY UK

INSIGHTS INTO THE FUTURE OF OUR ENERGY SUPPLY

JÜRGEN RESCH
INDUSTRY MANAGER ENERGY & INFRASTRUCTURE

VOLATILE, RENEWABLE ENERGY SOURCES, such as wind and solar power, are growing constantly and are thus creating demand for powerful control systems for smart grids. The use of digital technologies in power grids provides great possibilities for this, but also entails a new type of safety risk. Therefore, in May 2014 industry experts from Intel, Bilfinger, Advantech, Mitsubishi, COPA-DATA, COPALP and researchers from the Salzburg University of Applied Sciences, met in Warwickshire (UK) at the first "Energy Experience Day". The main topic was the discussion of the future of intelligent infrastructure and smart grids, IEC 61850 and the best methods to safeguard energy supply.

The Internet of Things (IoT) is also an issue for the energy industry if, in a widely-distributed structure, a very large number of devices need to be networked with one another. On behalf of Intel, Ross Corfield, EMEA Market Development Manager of Intelligent Transportation, gave a presentation outlining his view of the topic. He showed how Intel, as a manufacturer of one of the key technologies necessary for this, can support this development. The exciting question: will every mundane technical device have a processor in the future? Certainly, this is an exciting perspective for Intel to consider, not just commercially. The possibilities that this could open up can only be imagined today.

SMART GRIDS PERFECTED

Just think of the interaction of all electrically consuming devices with the components from the energy generation and distribution. An example: A mixer, an oven and heat pumps communicate with one another, because they are equipped with the corresponding electronics, to determine which one needs how much energy in order to fulfill its task. At the same time, they also negotiate with the energy suppliers, to determine the price at which they receive power. This is because the energy suppliers, in turn, know what capacity they currently have available. However, the photovoltaic (PV) equipment on the roof now reports that it is providing full power again. The energy price of the local station is thus no longer relevant and the cake baking can happily continue. A vision that can become reality with the help of installed semiconductor assistance. For the consumer, this would be a perfect smart grid.

Nigel Allen, Sales Manager at Bilfinger Industrial Automation Services, showed us that we are not too far away from this anymore. A non-integrated system that comprises several sites, various energy sources, different interfaces, programming technologies and communication protocols, should evidently expect major problems. Bilfinger is working on bringing these issues together in order to give its customers new possibilities for increasing efficiency and to support them with the challenges of the energy revolution.

What Intel sees coming to the hardware front and to the world, is recognized by Sébastien Roberto, Sales Manager at COPALP, on the software side too. He highlighted the increasing presence of standardized communication protocols, such as IEC 61850, in particular. Coming from substation automation, this communication philosophy is now becoming widespread in all areas of the energy evolution, such as distributed engineering and electromobility. COPALP will, in the future, serve markets that are in some cases still partly unknown, with its platform-independent software for logical links, calculations and communication.

AN OVERVIEW AND ERGONOMICS

In such a networked system, it is in many cases important to know where a new component is and what its status is. Imagine a virtual power plant, consisting of PV equipment distributed throughout half of Europe. The precise location of the PV strings is available in the form of GPS data or as digital mapping. The status and current efficiency of the strings is sent to a central SCADA system and interpreted there. How is this data then best combined? How can the data from the one side (GIS – Geo Information System) be available to the other side (SCADA) and does this also work the other way round (SCADA to GIS)? Simon Back, a researcher at the Salzburg University of Applied Sciences, took a closer look at this. The comprehensive presentation of his research results showed what an ideal two-way interface between the two domains could look like.

At the end of the event, the outlook focused on upcoming developments in zenon Energy Edition, especially the topic of IEC 61850 Edition 2. In doing so, it was the service tracking that was evaluated in particular. Service tracking offers the possibility to put equipment into operation more quickly and to continually monitor successful or failed commands. However above all, it is possible to clearly see how other control points send commands to the devices. And if, after a reconfiguration, something does not work as it did before, it can be discovered very quickly this way. A significant aspect for the future is the topic of ergonomics. An example from practice: In zenon, it will soon be possible to simply and easily create its driver configuration with a new configuration tool for the IEC 61850 client, just by dragging & dropping.

http://kaywa.me/1DD1W

This was the Energy Experience Day UK. Did you miss it? Here's the video!

Due to the success of the Energy Experience Day in May 2014, there was a second event on October 30, 2014, in Hampton Manor (UK) with the IEC 61850 workshop. You can read details at http://kaywa.me/a0ruI.

MAXIMUM FLEXIBILITY FOR INDUSTRIAL ROBOTS

KUKA Robots Now
with zenon Plug-in

KUKA, one of the leading manufacturers of industrial robots,
counts on zenon for human-machine communication. A new zenon plug-in
allows customers and partners to expand the existing KUKA SmartHMI,
thereby providing more flexible and efficient operation, control and
monitoring in industrial production.

BERND WIMMER
INDUSTRY MANAGER AUTOMOTIVE

SINCE 2012 we have been working in close cooperation with KUKA Roboter. This collaboration allows customers to implement zenon-based solutions with KUKA robots. Production teams can access the individually-configured visualization interfaces with the KUKA SmartPads – operation devices with 8.4" touch screens. Thereby, all KUKA robots using the PC-based platform KR C4 can be controlled in their movements, sequences and processes – including complete robot security control.

can also be used in subsequent versions. This is an optimal investment protection for our customers."

OPPORTUNITIES AND BENEFITS

Using the graphically-based zenon Editor allows for simple parameter setting for the operation and control of the KUKA robot, so users don't need programming knowledge. Previously-created zenon projects can also be reused. Customers who would like to continue using the existing

The plug-in offers our customers completely new potential for using zenon with the KUKA control system. We can now cover all possible use cases and thereby create maximum flexibility for the customer.

PHILIPP KREMER KUKA ROBOTER GMBH

EXTENDED PARTNERSHIP

The successful collaboration was extended in 2014: Industrial and manufacturing companies can now integrate zenon-based applications and functions as a plug-in with the KUKA user interface, the KUKA SmartHMI. Users thereby benefit from all the functionalities and display possibilities of the KUKA SmartHMI and the integrated plug-in that are required for the engineering and control of the industrial robots. Furthermore, companies can choose to expand the KUKA software with the zenon-based plug-in – quickly and simply and without any programming efforts.

FLEXIBLE TO USE

The joint solution, developed with KUKA, is optimally suited for visualization and as a decentralized control unit for production cells in the automotive industry. Data from the robot, as well as data from third party systems, can be displayed on shared monitors. Furthermore, the system is utilized for machine control, to steer actuators, display sensors and perform diagnoses. Through the integrated network functions in zenon, it is possible to simply embed it into existing environments. Used as a process control system, the software can control complex production lines and display all system characteristics for comprehensive monitoring.

"The plug-in opens up completely new possibilities for our customers using zenon with the KUKA control system. For the first time, our customers can define their own plug-ins that are fully integrated in the KUKA SmartHMI. All control data can therefore be used via the KUKA driver without additional requirements for communication. We can now cover all possible use cases and thereby create maximum flexibility for the customer," explains Philipp Kremer from KUKA Roboter. "Once set up, the plug-in

solution for their KUKA robot can complement this with further functions via drag and drop in order to expand their applications. A solution that allows automobile manufacturers to draw upon ergonomic, modern user interfaces while remaining flexible during configuration.

Together with KUKA Roboter we offer modern, intuitive solutions that can optimally visualize and more efficiently establish processes.

ABOUT KUKA ROBOTER GMBH

KUKA Roboter GmbH is one of the world's leading industrial robot suppliers. Their core competencies lie in the development, production and sales of industrial robots, control systems and software. The company is market leader in Germany and Europe, and ranks third worldwide. Kuka Roboter GmbH employs ca. 3,400 personnel. In 2013, the business generated 754.1 million Euro turnover.

You can also find more information at
www.kukarobotics.com

Meet the Mr. Miyagi of Batch Control

Peter Bürgin, Owner and Manager
ControlTech Engineering

Specialist knowledge and experience blended with
innovative technologies is the decisive cocktail
which continually drives ControlTech Engineering's (CTE)
optimal customer automation
and IT solutions.

It was amazing and impressive to see that in a very short time COPA-DATA could come up with a fully developed new module. We arrived very quickly at the decision to use zenon as a batch control for any coming project.

PETER BÜRGIN, DIPL. ING. ETH/SIA
OWNER AND MANAGER CONTROLTECH ENGINEERING

PETER BÜRGIN, owner and manager of CTE, kindly held a presentation concerning the prosperous relationship between CTE and COPA-DATA at our Global Partner Academy in June 2014, describing the growth in technology and knowledge both companies have experienced since 2010. During the conference, I was able to have a tête-à-tête with Peter Bürgin and we realized that several milestones had passed. For me, this was a good time to look back at this strong collaboration between two passionate innovative companies.

Mr. Bürgin, as always, it is a pleasure to meet with you. Let's start with an introduction about what CTE is and what you do?
PETER BÜRGIN: ControlTech Engineering is an engineering company for industrial automation and IT solutions, mainly in the field of process control. We embrace the whole automation project from engineering concept to commissioning and quality compliance, field to MES, plus the interface to ERP level. Our company consists of innovative employees with many years of experience of plant automation. Six teams cover the wide spectrum of activities we support; three teams focus on 'Automation', one for 'Engineering' the hardware, and two teams for 'IT Solutions' and 'IT Services'.

We have touched on innovation, how do you keep ahead of competitors and push the limits of current solutions?
PETER BÜRGIN: This is what CTE is, our company has structured itself on innovation. This question can be answered in three sections: exposure, outlook, and skills. I'll explain: We are in connection with many different companies. Exposure on this scale allows for technology to be transferred, also the needs of one industry highlight positive opportunities in other areas. Our dedicated teams focus not only on the solution, but to the market and industry trends in their area. Dialogue and communication are natural elements in our daily activities. Finally youth, young employees mixed with experienced professionals, brings a kind of magic. Currently we employ two IT apprentices, and two Computer Science students from the University DHBW Lörrach.

You have a long history in batch and process control, can you give our readers a short overview?
PETER BÜRGIN: As a young engineer in the mid-80's, I was working at Roche on the first development of a batch system; this was long before the ISA-88 standard was conceived. For this project, we had to create a flexible software automation structure, connecting 4500 I/Os, involving many process units. In 1990 I started the company CTE and continued to develop batch systems in a flexible format. Our current batch control is a PLC system with equipment modules and recipes which are configured off-line. The PLC operates independently, with the batch dataset downloaded from the SCADA platform. A matrix sequencer executes the equipment module control and parameters, to control the process. This structure has worked for the majority of applications we have developed on PLC/SCADA systems. Our CTE batch has influenced the Batch Control module in zenon as the 'Matrix' editor reflects this sequencer behaviour.

How did the collaboration between CTE and COPA-DATA develop?
PETER BÜRGIN: I have known the company 'Satomec', COPA-DATA's distributor in Switzerland, for many years. They introduced zenon to CTE at a time when zenon had really started to grow in the process and pharmaceutical industry. Initial contact with COPA-DATA was at the SPS IPC Drives trade fair in Nuremburg; and we felt a connection, something more than the technology alone. Our batch control collaboration began with one question from Markus Helbok. Markus described the interest to develop a Batch Control system in zenon, and asked if CTE could provide the insight into what a batch system must have due to our

Integrated SCADA
displays full farm status

CTE batch project incorporating
the Batch Control Matrix editor

long experience we have in the process industry. Several meetings took place, in which we disclosed our batch system mechanics and the demands we face in the process industries. COPA-DATA continued to develop their Batch Control module, and so we at CTE got the SCADA batch system we wanted, and the development benefited both sides.

In 2011, zenon Batch Control was presented to us. It was amazing and impressive to see that in a very short time COPA-DATA could come up with a fully developed new module. We very quickly came to the decision to use zenon as a batch control for any coming project. In December 2012 we had intensive zenon training and in January 2013 we became a Registered Partner in COPA-DATA's Partner Community. Collaboration of this nature is not possible with any other company.

How were your first project experiences with zenon?

PETER BÜRGIN: What we have realized by the different structure of zenon, is that other SCADA products cannot achieve the high level of usability required in projects. Even with large inputs of programmed code the flexibility and connectivity is just not present in other systems. zenon is a flexible solution, nobody offers this flexibility and at a low license cost and low total cost of ownership.

The first project with zenon and the Batch Control module was an installation in a chemical factory with two processing plants consisting of three units, which feeds a storage tank farm with eleven tanks and three filling stations. The system includes 23 equipment modules, five HMI stations, three PLCs, four remote I/O stations, one packaging unit, two weighing scales and collectively about 680 I/Os. This project was a test to discover how zenon can be rolled out. This was naturally a success in

design, commissioning and validation; because of this we have moved into other projects now in the pharmaceutical area. This is where the flexibility and configurability of zenon saves a lot of time and effort for both us as the system integrator and with the end customer. Our pharmaceutical end customer was very impressed during both the FAT (Factory Acceptance Test) and the SAT (Site Acceptance Test) for this first pharmaceutical project, particularly regarding the time to validate the solution and prove regulation compliance.

How is it possible to achieve such fundamental improvements in life-science industries with zenon?

PETER BÜRGIN: Ease of use in a compact way. There are many batch systems on the market which are very complex. zenon with its two batch design environments, Matrix and Process Flow Chart (PFC), dissolves this complexity by its superior usability, and having one installation which gives a complete GMP (Good Manufacturing Practice) solution including reporting. For today's technology and needs, other systems are old and clumber-some in comparison to the newly developed zenon. The direct transfer of the high level mechanism in our CTE batch to zenon batch was a significant selling point to our customers. We were able to use the same structure to handle batch information, equipment module information, and operation by the user. Integrated reporting is also a huge advantage for design and validation. You cannot have a batch system without reporting.

We found that the flexibility of zenon offers big advantages, complete out-of-the-box functionality for GMP projects, self-contained installation, which are 100 % configured and not programmed. These advantages cannot

be overlooked. Cooperation with COPA-DATA has been very close over the last couple years. The customer also feels this closeness, and this is an advantage.

Mr. Bürgin, do you have any final comments?
PETER BÜRGIN: We enjoy the relationship we have with COPA-DATA, our experience has been very positive. zenon and its Batch Control is the only solution we will choose in future for SCADA systems and the only system we will choose in future for pharma plants with PLC systems.

Thank you very much Mr. Bürgin for this insight into CTE.

THE INTERVIEW WAS CONDUCTED BY
ROBERT HARRISON, INDUSTRY MANAGER
PHARMACEUTICAL AT COPA-DATA.

http://kaywa.me/lDrv5
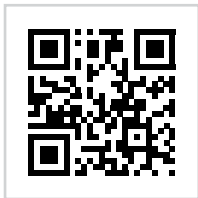
Batch Control in Pharmaceutical and Life Science – with zenon: watch the video!

CONVINCE CUSTOMERS
THAT ZENON IS THE RIGHT CHOICE

- Flexibility, connect different PLCs and different processes
- Different system configurations possible (Server, Client-Server, Server-Server)
- Easy system configuration and setup
- Only one tool for the realization of an HMI-SCADA-Batch application
- No separately written code or programs to realize required functions
- Faster and less effort for validation and qualification
- Easy reuse of an application for a further project
- Easy switch into our existing projects with our own CTE equipment modules and batch system

BENEFITS OF ZENON DIRECTLY
TO US AT CTE

- Reporting integrated as a module in the zenon system
- Batch Control integrated as a module in the zenon system
- Download of changes during runtime without shutdown the HMI
- Great number of pre-defined functions
- Great number of drivers to connect PLC systems of different manufacturers
- Attractive price, flexible license model (tags, functions)

CONTROLTECH
ENGINEERING (CTE)

CTE (ControlTech Engineering AG) leads automation solutions, IT solutions and IT services. Their location in Liestal near Basel, Switzerland was no accident, a hot bed of pharmaceutical, chemical and biotech companies. These industries have been the canvas where CTE has applied its broad and in-depth knowledge, providing optimal solutions for over 24 years. Extensive experience and a working culture which continually learns and pushes limits, proudly offers customers the best solution.

FOR MORE INFORMATION, VISIT **WWW.CTE.CH**

zenon – the Ideal Basis for an Ergonomic HMI

KHS: EASY OPERATION AND EFFICIENT CONTROL
OF FILLING AND PACKAGING

TEXT SUSANNE GARHAMMER

FOTOS KHS

Modern human-machine interfaces place efficient completion of working processes, an attractive visual design and an optimized usage experience at the forefront of human-machine interaction. KHS, one of the worldwide market leaders in the filling and packaging industry, has developed a new solution for the operation and control of production lines and machines in the drinks industry, on the basis of zenon HMI/SCADA software. It has already received many awards.

Ergonomics, simple and transparent navigation and innovative design –
these are the characteristic features of the new HMI design from KHS.

AS ONE OF the leading companies worldwide, with approximately 4,400 employees and offices in over 60 countries, KHS develops and produces machines and equipment for filling and packaging in the drinks industry. Because drinks manufacturing, filling and packaging consist of a number of highly-complex processes, the user-friendly and intuitive operation of equipment is increasingly gaining in significance. In order to design these processes as simply as possible for the user, KHS introduced a uniform, transparent and standardized solution: the new ClearLine HMI.

DEVELOPMENT IN ACCORDANCE WITH THE "HUMAN-CENTERED DESIGN" PROCESS

Together with Fraunhofer IAO, KHS developed a concept for a new HMI that meets the needs and requirements of people with different qualifications. The objective was to combine functionality and aesthetic effect and to create positive user experiences when carrying out day-to-day work through simple learnability and increases in efficiency. To achieve this, the project partners examined the different user groups carrying out their respective work at a production line or a machine. Another task when developing the new HMI concept was standardization across different machine types and thus the complete production line.

The information architecture, and the navigation and orientation mechanisms were then defined on the basis of individual user tests and in close cooperation with the KHS developers. "Our objective was to offer our clients a uniform and standardized platform which is characterized by the highest degree of user-friendliness. We wanted to ensure that our customers' employees could also operate the different machines on a production line without laborious training – in the national language desired. The recognition factor is very important for efficient and productive work," explains Dr.-Ing. Peter Stelter, Executive Vice President, Technology Management at KHS GmbH.

USER INTERFACE DESIGN WITH ZENON

In addition to the new concept for the ClearLine HMI, KHS and Fraunhofer IAO also examined the power and the range of functions of different HMI/SCADA solutions. After careful evaluation, KHS decided to use zenon from COPA-DATA for the implementation of the new ClearLine HMI. "The zenon HMI/SCADA platform offers precisely what we need for our machines and production lines. The zenon software has well-developed graphical display possibilities and numerous HMI elements already included as standard. In addition, there are other comprehensive functions for user administration and access rights, recipe and type administration, as well as protocol and alarm management," explains Karsten Vollmer, Product Manager in the Technology Management department at KHS GmbH. "In addition, zenon offers the option to create interfaces to other systems. This flexible expandability is of great significance to us – from a long-term perspective too."

STANDARDIZED AND USER-FRIENDLY USER INTERFACE

The focus of modern HMI design is the interaction of the different users with the system, optimum support for the

*With our new ClearLine HMI based on zenon,
a complete production line can be operated and
monitored with low personnel costs. A transparent, ergonomic
solution for the operation of the KHS machines and
equipment gives our customers an
indispensable competitive advantage.*

DR.-ING. PETER STELTER
EXECUTIVE VICE PRESIDENT, TECHNOLOGY MANAGEMENT, KHS GMBH

monitoring of the complete production line and simple and quick rectification of faults. New functions, forms of visualization and possibilities for interaction support the control and monitoring of a production line. Clear and efficient structuring of the content and functions also increases the security and efficiency of operation and always focuses the view of the user to the significant elements. Thanks to the use and design of consistent control and display elements, users can find their way quickly and intuitively. Controls that belong together are grouped clearly and easily distinguishable from other elements. In addition, many of these are marked with symbols, for example to delete, filter, reset, save, etc. Information is shown in the output fields, for example, current actual values.

The targeted use of colors supports orientation and monitoring and makes it possible to review all relevant information quickly. KHS chose anthracite as a background color, which – combined with their chosen font and font color – allows very good legibility and recognition of all screen elements in industrial environments. The other coloring has also been thought through. For example, service screens, trend displays and process screens have defined background colors that ensure quick orientation and operation. The new ClearLine HMI from KHS also uses functional, structural displays instead of semi-realistic, spacial displays. As a result there are, for monitoring tasks in particular, simple and clearly-understandable visualizations.

WELL-THOUGHT-OUT AND STRUCTURED DESIGN

The standardized user interface for all KHS machines consists of the title bar with information on the machine and the user, a status bar, the navigation, the main view, the menu and the machine functions. In the navigation bar, the machines of a production line are depicted by symbols, which portray the functions such as transport, cleaning, filling, labeling, stretch blow molding, sealing, etc. In the main view, detailed information and setting possibilities for the selected production line, machine or components are shown.

Within a view, the different display and control elements for control and monitoring are available. For certain tasks, the operators are offered additional, detailed instructions that serve as an explanation and a recommended sequence for the working steps. A machine is ultimately controlled by the machine functions. Here too, the functions are each shown as a button. In the main menu, the user can select language, help, login, etc. and also choose between different main functions such as production, type administration or putting into operation. It is also possible to change settings and make changes to the HMI here.

WORK EVEN MORE EFFICIENTLY

The favorites administration integrated into the KHS ClearLine HMI is another highlight of the user interface. Users can define their favorites individually and thus get to frequently-used views, functions and information more quickly. The help functions are also designed in such a way that employees with little experience and training can also orientate themselves using pictures which supplement the help texts. Messages and problems with a machine or individual components are also displayed very clearly in the status bar. In addition to explanations and information on error or fault rectification, the colored borders provide information on the priority with which a message is to be

With zenon, KHS has created intuitive user guidance. The operation, maintenance and management of a production line are shown clearly and simply, and are comprehensible immediately.

KHS Everywhere App by zenon makes it possible for current equipment states, alarms or status messages to be accessible on smartphones or tablet PCs at anytime, anywhere.

handled: for example, blue stands for "fault", yellow for "warning" and white for "information".

ROLE-BASED ACCESS CONTROL WITH RFID IDENTIFICATION

Access control is also an important component of the well-thought-out usability concept. KHS uses the user administration integrated into zenon for this. Instead of a conventional user hierarchy, role-based access is used. It is therefore ensured that machine operators or maintenance staff have precisely the functionality, overviews and screens that are necessary for them to complete their respective tasks. "The user administration integrated into zenon provides us with precisely what we need to implement our security standards: different user profiles with fine granular possibilities for definition, comprehensive tracing of all activities via an audit trail and saving and archiving of the log files," explains Karsten Vollmer from KHS.

MONITORING WITH A SMARTPHONE

KHS also uses the Everywhere App by zenon, in order to give users the possibility to display data from their HMI/SCADA system on their smartphone directly and in real-time. Authentication is carried out using the user administration in zenon. The users of the filling and packaging equipment, as well as management, can therefore get a comprehensive overview of a production line, its individual machines and their respective status. Users will see the corresponding icons of the machines on their smartphone. Information on the machine type, the operating type and the operating status is available in the detail screen. In addition, they can have message texts (alarm messages or neutral messages), the current program (production, maintenance,

cleaning, etc.), the drink types and other parameters displayed. "Mobile devices for monitoring and operation in industrial environments offer considerable potential to increase user-friendliness, acceptance and ultimately also productivity in human-machine interaction. Thanks to the integration of the KHS Everywhere App by zenon, we can offer our customers the right information at the right time at the right place," adds Karsten Vollmer from KHS.

MANY AWARDS: CLEARLINE HMI ON THE BASIS OF ZENON

KHS has already received several prestigious awards for the new user concept and the innovative user interface, including "red dot: best of the best", the "iF product design award" and the "iF gold award". Awards from independent institutions are one thing, but even more important is the very positive feedback that KHS is receiving from the market. The first companies to use the innovative ClearLine HMI include, among others, a major brewing group in Germany. Indeed, the system is already in use in many places internationally with great success.

AROUND THE WORLD

PICKING UP STEAM

HOW ZENON WON OVER THE HEART –
AND CURIOUS MIND – OF JIM MAIN, CO-FOUNDER AND
TECHNICAL DIRECTOR AT SYSTEM INTEGRATOR APD LTD.

Annan, somewhere in Southern Scotland, close to Dumfries.
Close by, Hadrian's Wall still reminds us of the fierce love that
connects the locals with the concept of independence. And,
cliché or not, they surely love their stories. When it comes to
the slowly simmering 'love story' between our new partner
APD Ltd. and COPA DATA, it definitely is one worth telling.

PHOTOGRAPHY: CHRISTOPHER CURRIE, GILLIAN LAWTIE

OUT OF SIGHT, BUT NOT OUT OF MIND

Jim Main has been programming HMI/SCADA for over 25 years and knows a thing or two about automation software. Mainly that, when it comes to functionality, you cannot have it all in one product. In 2007, COPA-DATA arrived on the UK scene and immediately sparked his interest. Still, investigating the new player was put on the 'backburner' because APD was using a competitor's product at that time.

Nevertheless, when industrial boiler manufacturer Cochran approached APD to tender for a new and more competitive HMI solution, Jim says: "The game was on! Technologically, the requirements were straightforward enough, with a HMI that works on CE and that can later be expanded to SCADA functionalities, but we were up against some serious competition." The APD team was thinking about using Beckhoff hardware, and Beckhoff was quick to recommend zenon as a software. "So we got back in touch with Beth," explains Jim, referring to Beth Ragdale, COPA-DATA UK Partner Manager.

AGAINST THE ODDS
FOR COCHRAN BOILERS

However, the budding business relationship faced some unexpected odds: An online webinar about the zenon standard including a demo of Multi-Touch and the zenon Editor, which was planned for some members of Jim's team, fell through.

"We are literally in the middle of nowhere, so the connection was too unstable," recounts Jim. Beth Ragdale decided to visit APD for a live demo. It clearly made an impression, and even Jim, who did not attend the meeting, was intrigued. "The lads were raving, but I still wanted to see it for myself, however, our choppy internet was ruling out a webinar" Jim tells us, and adding with a grin: "And people tell me my slight Scottish accent isn't really helping with phone conversations."

So Beth went up North again. During the demo, it instantly clicked between Jim and zenon: "It was an obvious choice. zenon not only exactly fitted the requirements for this initial project, it was also so easy to use. Almost every function that we had spent days programming and fudging into our old software was directly available within zenon."

A BREATH OF FRESH (H)AIR

Jim and his team immediately decided to put the software to the test, and in their signature style: "Bill, our electrical design engineer has quite similar hair to the Puli dogs he breeds in his spare time. So we took a shot at recreating his style with the zenon piping element and we quite pulled it off," he laughs. "This may seem a silly example, but after having spent many hours developing pipe systems on other products, we were amazed to see how easy the elements in zenon were to use."

With zenon, we have managed to do everything requested without writing a single line of VB code or complicated script.

JIM MAIN, APD

Jim also was impressed by the redundancy options that zenon offered, as well as its flexibility. "The scalability is as good as it gets. You learn one set of tools for a small HMI which also works for large systems. zenon seemed to 'just work', which is a breath of fresh air compared to our previous experiences."

BYE-BYE PROGRAMMING, HELLO ERGONOMICS

Fired up by the demo experience, Jim and his team went ahead and started working on a proposal for their clients. This included a complete redesign of standard boiler system controls with a modern touch-screen user interface, unlimited expandability and capabilities to create simple connections to a Building Management System (BMS) or other plants. The control panel which Cochran Boilers used up until then required APD to repeat all IOs with Phoenix contacts to transfer data into Modbus and out in order to share information.

Jim enthuses, "Now, with the combination of zenon running directly on the Beckhoff PLC, not only can Cochran have any flavor they want – Profibus, Ethernet, Bacnet, Modbus, we at APD also have a fantastically flexible, compact, scalable, future-proof and, importantly, cost effective OEM solution."

For the presentation, APD also prepared a demo of the software running on Beckhoff hardware with a 24inch Multi-Touch screen. The initial screen saver depicted a pond with fish swimming, with the water rippling when a finger touched the panel. Five fingers were depicted as drops on the water.

"Cochran were blown away by these Multi-Touch applications," reports Jim. "While this might not be relevant for them yet, it showed them future possibilities. Also, from using their smartphones, everybody now expects touch-screen functionality, even on these dirty big machines. So it's now up to us to provide them with systems that are at least as intuitive and easy to use as their phone in their pocket."

FULL STEAM AHEAD: A NEW PARTNERSHIP

The presentation made an impression: APD subsequently received a purchase order to develop a pilot system – which is currently being developed and is awaiting installation on a test boiler.

Jim is not really surprised: "As soon as the client saw that our proposal would leapfrog them over any solution their competitors could offer, the decision was made."

Another fact he was delighted about: making a big impression does not necessarily mean having to put in a lot of effort. "With zenon, we have managed to do everything requested without writing a single line of VB code or complicated script."

And so, in December 2013, COPA-DATA's Partner Community could welcome another family member. "We are very happy to have APD on board," says UK Partner Manager Beth Ragdale. "They are a versatile company with a strong reputation over various industries, which will be a fantastic addition to the knowledge and experience pool we have been able to attract and share already."

It is a partnership which had been a long time coming, but now has gathered plenty of momentum. Just like energetic Jim Main and his team in Scotland, it is unlikely to run out of steam anytime soon.

ABOUT APD

For further information on APD Ltd, visit www.controlwithpower.com.

WHO IS WHO

The concepts of flexible thinking, bold innovation and the willingness to address integration will play an even more important role in the future. Not only in Manufacturing Intelligence, but spanning across many other sectors. Particularly when the technical and strategic course is set to allow a business to efficiently make the move to become a Smart Factory. In our "Who is Who" today, we´d like to introduce people who are committed, in various forms, to the idea that our customers' visions may become reality: professionals from various departments within COPA-DATA. With clear goals, perseverance, taking pleasure in the discovery, and with a drive for a successful future. We proudly present:

George Yamanoglu

NEW MARKETS & PARTNER
CONSULTANT
COPA-DATA GERMANY
Cologne Office

AT COPA-DATA SINCE: 2013
RESPONSIBILITIES: Iamresponsiblefor
the partner management of educational
institutions, supporting our German
partner company program, process-
orientated quality management and
opening up new markets, such as for
Batch Control or energy management
with zenon.
I GET MY INSPIRATION FROM …
Jesus and from my girlfriend. Both form
a stable basis in my life. They invigorate
a fresh perspective and encourage me at
the same time.
**IF I COULD DO AS I WANTED, I
WOULD …** fly to the moon. A dream
of mine is to see our little world once
from a perspective that is only possible
for a few people. I would want to change
the world's view of the world.

You can reach me at:
george.yamanoglu@copadata.de

Andrea Grall

PRODUCT MARKETER

COPA-DATA HEADQUARTERS

AT COPA-DATA SINCE: 2013
RESPONSIBILITIES: Transforming
complex, technical information into
exciting marketing stories, in order to
subsequently distribute it around the
world in the form of newsletters, videos,
fact sheets, etc.
I GET MY INSPIRATION FROM …
the COPA-DATA team, from challenges
of all kinds, from music and always
when I am travelling.
**IF I COULD DO AS I WANTED, I
WOULD …** travel the world by train
and improve my foreign language skills
while doing so, learn the double bass
and play in a Rockabilly or New Orleans
jazz band.

You can reach me at:
andrea.grall@copadata.com

Alexander Glukowski

TECHNICAL CONSULTANT
COPA-DATA GERMANY
Ludwigshafen Office

AT COPA-DATA SINCE: 2013
RESPONSIBILITIES: My tasks
are both the support of customers
in technical issues in relation to the
zenon Product Family, as well as the
implementation of their projects.
Furthermore, I also support my
colleagues with my expertise and
provide support for our Ludwigshafen
site as person in charge of IT there.
I GET MY INSPIRATION FROM …
music and the advice I receive from my
colleagues.
**IF I COULD DO AS I WANTED, I
WOULD …** bring joy and harmony to
as many people as possible.

You can reach me at:
alexander.glukowski@copadata.de

Simone Bottin
TECHNICAL CONSULTANT
BUSINESS INTELLIGENCE
COPA-DATA ITALY

AT COPA-DATA SINCE: 2013
RESPONSIBILITIES: I am a member of the Consulting team for COPA-DATA Italy, with a special focus on zenon Analyzer, our product for Business Intelligence. I am involved in technical support and project consultancy activities, in close contact with our customers in Italy. I run workshops and help our vendors with pre-sales activities. I will also be joining COPA-DATA's Train the Trainer program as soon as possible, in order to be able to run zenon Analyzer training courses for our Italian customers.
I GET MY INSPIRATION FROM … my family and my girlfriend, the two most important things in my life.
IF I COULD DO AS I WANTED, I WOULD … travel all around the world to visit the most beautiful shores and seas.

You can reach me at:
simone.bottin@copadata.it

Nikolai Hübschle
SALES MANAGER
COPA-DATA GERMANY
Ludwigshafen Office

AT COPA-DATA SINCE: 2013
RESPONSIBILITIES: I am responsible for the area of Bavaria and field sales there. I am the contact person for our partners, customers and other people interested in our products there. A fixed part of my tasks are sales presentations of zenon, preparation and follow-up work in relation to customer visits and opening up new potential in key and large accounts in my area.
I GET MY INSPIRATION FROM … our common vision of building on our advantage through ergonomics and innovation in the market.
IF I COULD DO AS I WANTED, I WOULD … have breakfast with my family in Austria every day, enjoy lunch in Germany, dinner in France and go to Ireland to party.

You can reach me at:
nikolai.huebschle@copadata.de

Eric Gordon
SALES MANAGER
COPA-DATA USA

AT COPA-DATA SINCE: 2013
RESPONSIBILITIES: My responsibilities here at COPA-DATA USA are to expand COPA-DATA's market presence in North America, with a focus on the rapidly expanding manufacturing industry in Mexico and the rest of Central America.
I GET MY INSPIRATION FROM … Elon Musk, Michio Kaku, Carl Sagan, and The Multiverse.
IF I COULD DO AS I WANTED, I WOULD … go back to University and do Brazilian Jiu-Jitsu full time.

You can reach me at:
eric.gordon@copadata.com

SUCCESSFUL TOGETHER

GLOBAL PARTNER ACADEMY
2014

The Global Partner Academy 2014 was held in Munich June 4th and 5th. During these two days our partners had the opportunity to meet with zenon and straton experts, receive valuable insights and continue to grow their network of useful contacts. These were two days full of intense information and networking but also of fun and laughter.

*Hopefully this event
will be repeated.
If so, we will be happy
to attend once again.*

CARL-FREDRIK HANSEN
PÖYRY NORWAY AS

*The GPA is a great opportunity not only to meet
COPA-DATA employees but also to connect with
various partners from all over the world. It is vital to
stay in touch with the latest trends, particularly for
a university of applied sciences that is educating in
state-of-the-art information technology. This is only
possible by being up to date with the latest research as
well as understanding the requirements directly from
the people of the industry. Therefore, an event like the
GPA perfectly builds a bridge between academics and
professionals.*

SIMON KRANZER
SALZBURG UNIVERSITY OF APPLIED SCIENCES

*We grew our business thanks to zenon
and we continue to do so.
GPA 2014 was a great opportunity
to fuel this development.*

WERNER KROPF
PROZESSTECHNIK KROPF GMBH

Take a tour of the pictures
from GPA 2014!

http://kaywa.me/QBC8Y

THE AIM OF the Global Partner Academy 2014 (GPA 2014) was to give our partners in-depth, straightforward and clear communication regarding the zenon Product Family and new business opportunities. We therefore worked hard on attaining the right atmosphere and level of expert insight during the two days of GPA 2014. This was a great opportunity for our partners to meet and talk directly with the people behind product development, marketing and much more.

NETWORKING WITH ZENON EXPERTS
The GPA consisted of several parallel sessions and workshops covering a multitude of topics such as drivers, integrated ERP connectivity, batch control and usability. In addition, a workshop about mobile app solutions with zenon was held. However, what is work without fun? We wanted to give our partners an unforgettable experience at the GPA 2014; two days to remember not only for great zenon knowledge, but also for the fun and entertainment. Relaxing lunches in the sun, nice evenings by the bar and a spectacular tour and dinner at the Allianz Arena were some of the other activities we had on the agenda. The great thing for the team at COPA-DATA was that we had the opportunity to get to know our partners as people – not simply as business associates.

Attending COPA-DATA's GPA 2014 was a good experience for us. Interesting workshops, great seminars and also a good chance to meet other partners and employees in the COPA-DATA network.

GEIR ÅGE RASMUSSEN PÖYRY NORWAY AS

solutions, reporting, batch control, app development and more. Our partners also had the possibility to book personal meetings in advance directly with our Industry, Product and Technology Services Managers. The meetings gave the unique opportunity of face-to-face and in-depth discussions on specific topics defined by the partner.

Many COPA-DATA participants from Headquarters and subsidiaries around the world were in attendance to present, hold workshops, conduct personal meetings and enjoy the networking. All in all, it was a great chance for our partners to meet up, discuss and get immediate and direct answers.

PARTNERS FROM ALL AROUND THE WORLD
A partner event is, of course, nothing without its partners! And we were happy to see so many of our partners from so many countries attending the GPA 2014. In total, we had approximately 40 partner companies attending from all around the world. Partners from Malaysia, Korea, Norway, Germany, South Africa… the list can go on! The cultural mix, the different languages spoken and the varied knowledge that came together was a wonderful combination. We were happy to see that so many of our partners could join us, and that they also enjoyed the event enormously.

BUSINESS AND PLEASURE
With so many partners from across the world, we set our main focus on giving straightforward in-depth technical and business information. The agenda included presentations about Energy Data Management with zenon, reporting with zenon Analyzer, the integrated solution with zenon Logic,

FROM GLOBAL TO LOCAL IN 2015
The Global Partner Academy 2014 was a great success and we are, of course, looking forward to our next global gathering. However, the GPA is not an annual event and in 2015 the focus will be on local partner events to be held in several countries. With the goal of bringing the highest level of zenon knowledge to our partners, we continue our path of growing together for mutual success.

Want to learn more about the GPA 2014? Visit **www.copadata.com/GPA2014.**

Looking for a partner in your region? Visit **www.copadata.com/find-a-partner.**

Interested in becoming a partner? Contact your COPA-DATA sales representative or send an e-mail to **partner@copadata.com**.

LISETTE LILLO FAGERSTEDT
PARTNER PROGRAM MANAGER

JOHANNES PETROWISCH
PARTNER ACCOUNT MANAGER

FROM GLOBAL TO LOCAL
IN 2015

The Global Partner Academy 2014 was also a springboard for the planning of local and regional partner events around the world in 2015. Here, we look forward to a variety of events with different focuses built around the needs of the local market. For more information about a partner event close to you, please contact your local COPA-DATA Sales Representative.

COPA-DATA KOREA
2015

The Global Partner Academy 2014 has been our starting point for planning our very first Asian Partner Academy, which will be held in the middle of next year in Seoul, Korea. Organizing this event will be one of my very first tasks as the new Marketing Coordinator at COPA-DATA Korea and is top of my priority list. We'd like to bring together all members of the Partner Community in Asia to discuss the newest technologies and share ideas in order to give our partners a competitive advantage. We're planning great networking opportunities for all attendees and presenters and are looking forward to an exciting 2015!

FOR MORE INFORMATION CONTACT US AT
SANDRA.HANDKE@COPADATA.COM.

COPA-DATA UK
2015

Following consistent growth of our Partner Community in the UK and Ireland, we plan to hold a local partner event where we can come together and explore the current market trends and technologies, zenon implementations, future enhancements and detailed technical topics. We will be engaging with our partners, growing relationships and receiving valuable feedback to funnel into our future development. Product experts from COPA-DATA HQ and external speakers will present.
Are you a partner in the UK or Ireland? Save the date: June 9-10, 2015!

FOR MORE INFORMATION CONTACT US AT
BETH.RAGDALE@COPADATA.CO.UK.

COPA-DATA GERMANY
2015

In Germany we have hosted various local partner events during the years and the next event will be in the second quarter of 2015. The Global Partner Academy 2014 is a great foundation for good ideas and further possibilities using zenon, and we believe that the combination of the Global Partner Academy with our local event gives our partners the optimal means for long-term success.
All CDPC members from Germany: We will be taking zenon to your area too, don't miss out on it!

FOR MORE INFORMATION CONTACT US AT
PHILIPP.SCHMIDT@COPADATA.DE.

2015

CALENDAR

LOCAL PARTNER EVENTS 2015
At the time of press for this magazine, event planning is still ongoing for many countries. The following list is therefore not the final or complete calendar of 2015 local partner events, but will give a sampling of events planned so far:
• Q2: COPA-DATA Korea
• Q2: COPA-DATA UK
• Q2: COPA-DATA Germany
• Q3: COPA-DATA Scandinavia

ZENON CHALLENGE
2014

Meet z.T.

THE POSTER BOY
FOR OUR ZENON CHALLENGE

New York, USA

Stockholm, Sweden

Seoul, Korea

BECAUSE THE ZENON CHALLENGE is growing and gaining greater recognition around the world, we decided we needed our very own zenon Challenge robot follower. Our design team was set to the task and, inspired by the key words of the zenon Challenge – fun and innovation in a playful environment – they fulfilled the mission. They created a small robot that seems full of energy and emotion who will follow the participating teams throughout their "Steps to Success" towards a winning contribution.

However, there was still one thing missing – a name. The internal suggestions and ideas at COPA-DATA were many, but we finally selected three names (z.T., Zobo, Buzzer) that were put forward for voting on the zenon Challenge Facebook page. The winning name was selected, and z.T. was introduced to the world.

With a busy agenda, z.T. has taken part in a variety of different activities and travelled around the world. z.T. was the zenon Challenge ambassador during the Global Partner Academy 2014 in Munich and was present at the Microsoft Worldwide Partner Conference (WPC) 2014 in Washington D.C. z.T. also provided fun and interesting facts about the different teams in the zenon Challenge Buzz News.

Take the opportunity to download your own cut-out version of z.T. to create for yourself or your kids. Or why not take a selfie together with z.T. at your favorite city or place and post it on our Facebook page *www.facebook.com/zenonchallenge2014*? We would love to get more travelling pictures and fun input.

Download your z.T. cut-out

http://kaywa.me/sWVR1

Meet the zenon Challenge 2014 Teams

SINCE MAY 2014, we have had different teams working on their winning contribution to the zenon Challenge. The team constellations vary in size – some are very large teams, some a single person who might be working on the entire process. There are no rights or wrongs in the zenon Challenge – as long as the participants fulfill the general conditions, they can create what they want in the way they want. This is the charm – and the challenge – for the teams.

Depending on when you received your *IU Magazine,* you may still have the opportunity to vote for your favorite team! If you're too late for the voting – take the opportunity to see the different contributions at *www.zenon-challenge.com* and find out which team won the zenon Challenge 2014!

DEADLINES FOR THE ZENON CHALLENGE 2014

October 16	Final day of submission
October 28	Online voting began
November 18	Online voting ends and the winner is announced

The most fun part of the zenon Challenge was to work with zenon and LEGO bricks. However, it was also very challenging to come up with an idea that was both doable with LEGO as well as related to our business area.

LIFTECH, PORTUGAL
PARTICIPANT IN THE ZENON CHALLENGE 2012 AND 2014

THE COMPETING TEAMS IN 2014*

AGH - Akademia Górniczo Hutnicza, Poland

Alfanar Electrical Systems, Saudi Arabia

APD, United Kingdom

AVM Engineering, Switzerland

Bosch Packaging Systems, Switzerland

Conecta, Chile

DBIS Software and Automation, United Kingdom

EDAG Production Solutions, Germany

F.M. Automazione, Italy

Salzburg University of Applied Sciences, Austria

Impel Systems, Italy

Katholieke Hogeschool VIVES, Belgium

Liftech, Portugal

PRC Engineering, Sweden

Prozesstechnik Kropf, Germany

Sirius, Italy

Sisint, Portugal

SL Controls, Ireland

Techinova, Sweden

* This list makes no claim to completeness and may be subject to change.

Salzburg University of Applied Sciences, Austria

Alfanar Electrical Systems Saudi Arabia

Meet the zenon Challenge 2014 Teams

http://kaywa.me/23iiD

DO IT YOUR WAY

MANY CHANNELS,
MANY WAYS

Decide for yourself – how, when and where you would like to communicate with COPA-DATA. We place value on platform-independence, just like zenon. Active exchange, effective information searches or easy following of trends – which way do you prefer?

I'd like to be informed about innovations from COPA-DATA, and to discuss new trends and automation examples with experts.

linkedin.com/company/ copa-data-headquarters

Unfortunately, I cannot manage to accompany COPA-DATA at all its events around the globe. But nevertheless, I can be there in real-time!

twitter.com/copadata

I'd like daily updates from around the world, from A for automation to Z for zenon. Authentic and current. Typical COPA-DATA.

facebook.com/ COPADATAHeadquarters

I prefer animated images instead of long texts. Complex content, expressed simply, for example in short explanatory videos from COPA-DATA – that's me!

youtube.com/copadatavideos

I'm looking to increase my depth of knowledge about zenon, I regularly dip into short articles and I'm a fan of technically-detailed information.

blog.copadata.com

I'm confronted with a tricky problem with my zenon project. Luckily the COPA-DATA teams and other zenon users share their information and solutions with me.

copadata.com/support

Regardless of whether it is zenon industry news, general COPA-DATA updates or exclusive content for partner companies – I won't miss anything with my subscription!

copadata.com/newsletter

I'm interested in what moves COPA-DATA, which trends are influencing the automation sector what I can expect as a stakeholder, and what I can look forward to.
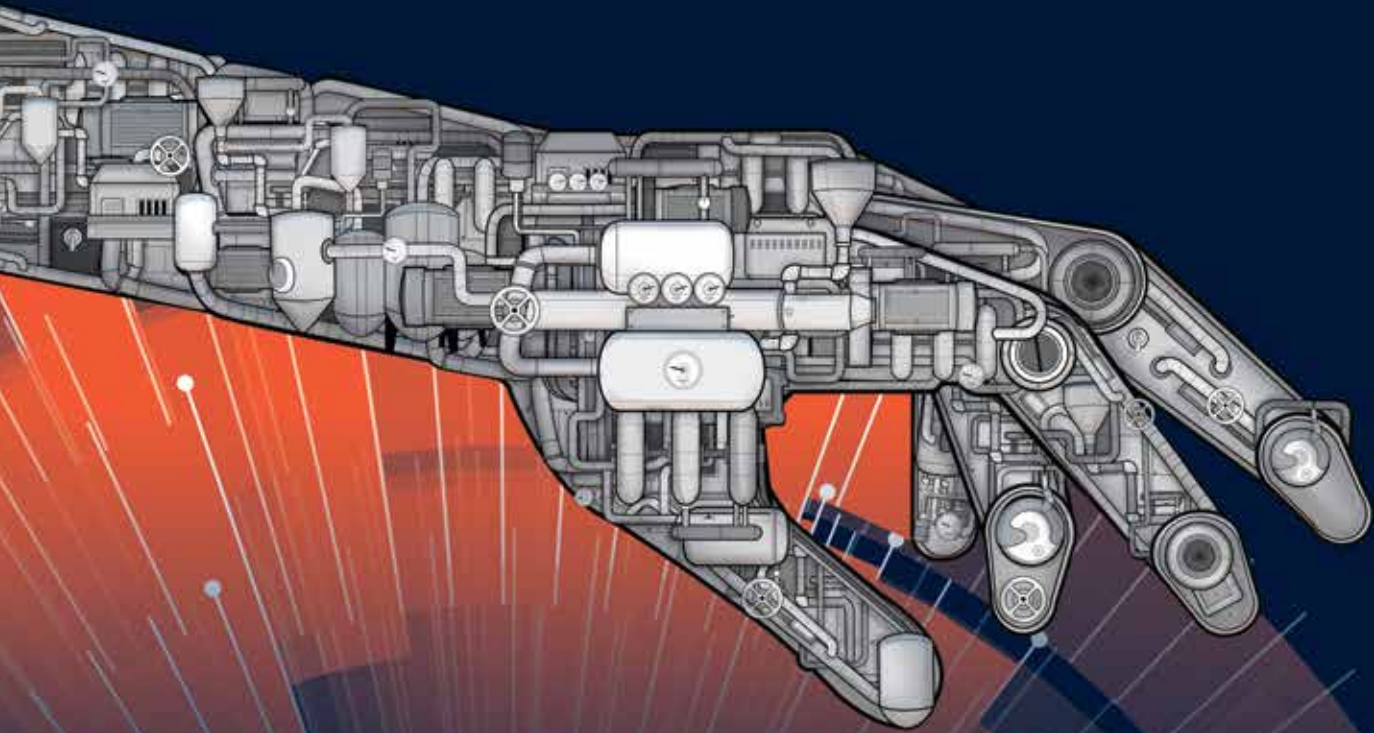
copadata.com/iu

The center of all COPA-DATA platforms, the hub of all information and communication channels, the foundation of exciting communication. From here, all routes take me to my destination.

copadata.com

Better visualization?
At Your Fingertips.

http://kaywa.me/FA6bT

The pedometer showed 10,897 meters. Andrew frowned. Eight hours, eleven kilometers, only by walking from one machine to the next. He was so tired of this job. But then, things started moving: New monitors were set up, software was installed, and Andrew was sent off for training. There he met zenon.

A new software, fair enough. But would it actually change anything? Finally, the moment came when Andrew was attending to an alarm at one machine while another alarm was raised at the other end of

the facility. But this time, there was no sprinting, no panting, only a look at the display, a quick switch to investigate the alarm, flagging it as ,ok to do later', and continue to concentrate on more important work.

"That's what I'm talking about", he nodded at his pedometer at the end of his shift: 1,803 meters. Again, he had saved 9 kilometers. Again, he had saved his energy for higher-priority tasks. And he still felt fit. So that's how ergonomics worked. And that's how relieving it felt.

The Future is Ergonomics.
Ergonomics is zenon.

COPADATA
do it your way

www.the-future-is-ergonomics.com