

# INFORMATION UNLIMITED

A CULTURE OF INNOVATION

Better Security with IEC 62443

Automate Command Sequences

The IIoT in F&B Production



INVESTMENT | METHODOLOGY | CURIOSITY | PARTNERSHIP  
CUSTOMER ORIENTATION | SETTING STANDARDS | INDEPENDENCE





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## PREFACE



Dear readers,

This edition of our *IU* is dedicated to the topic of ‘a culture of innovation’. Some of you may say, “Innovation! Again ...”. And I agree, this term is greatly overused.

However, we’re talking about a significant quality of our corporate culture and I have not yet found a better term. We are constantly improving and renewing our products and processes and there are simply many genuine innovations involved. This is because renewal – and this is what we mean by innovation – ensures the steady improvement in performance that you expect from zenon and from us. It is not a matter of reinventing the wheel, but primarily about openness in thinking and communication.

We have tried to live this ‘culture of innovation’ since the beginning, when we first developed zenon. Our minds are full of new ideas, and we can hardly wait for the planning phase of the next version. Suggestions for improvement come-up everywhere – when talking to customers, at trade fairs, at workshops, programming and testing, or chatting during a break. Keeping an open ear for inspiring ideas enables us to share the prospect of zenon becoming even more ergonomic and productive in the coming years.

A handwritten signature in blue ink, consisting of stylized initials and a surname.

THOMAS PUNZENBERGER, CEO



GÜNTER HASLAUER,  
DEVELOPMENT MANAGER,  
COPA-DATA

**SPOTLIGHT**

A GOOD CLIMATE FOR NEW IDEAS:

# MAINTAINING A CULTURE OF INNOVATION

PHOTOGRAPHY: [WWW.31PLUS.AT](http://WWW.31PLUS.AT)  
PHOTO LOCATION: PANZERHALLE SALZBURG

*“Innovation” and “innovative” are some of the most favored words of companies when they describe themselves or their products. The fact that these terms are used too often – or almost reflexively – doesn’t mean that they are always empty and meaningless. In the right environment, innovation is fundamental. It primarily describes an attitude and, in the best case, determines the corporate culture. There are good reasons why we approach “innovative” with reservation, but a “culture of innovation” with enthusiasm and endurance.*

From the origin of the word, innovation means “renewal”. Often, invention and innovation are seen as synonymous, but they are not synonyms, only sisters in spirit. An invention describes a completely new development. In contrast, innovation changes existing things and can be the trigger for invention. Innovations are prized in the natural sciences just as they are in the arts and in economics.

### FROM RENEWAL TO A CULTURE OF INNOVATION

Joseph Schumpeter introduced the term “innovation” to economics in 1911. According to his “Theory of Economic Development”, innovation is the implementation of a new technical or organizational feature in the production process. In the more than one hundred years since its introduction, there has been no success in finding a generally-accepted definition of the term. However, all current definitions focus on the renewal of an object or process. Innovation may also refer to a cause or effect of corporate change. Innovation must be discovered, introduced, used, applied and institutionalized. It builds upon knowledge that leads to change.

Innovations are usually praised as a benefit for consumers. This is true. But not always. Not every change is welcomed by customers. Sometimes, it is not even in their interest. Innovation cannot, therefore, automatically be posited as a customer benefit. However, from the perspective of living corporate culture, innovation always looks to add value for the customer.

### WHO BENEFITS FROM THE CULTURE OF INNOVATION?

Many people gain something from a well-implemented culture of innovation – not least the innovative company itself. The steady renewal of the company and its products ensures that it remains on the pulse, takes technical developments into account punctually and recognizes trends early. Because a culture of innovation always includes open communication and a willingness to experiment, so others may also benefit from an exchange of ideas, suggestions and experiences.

This is how processes, algorithms and developments are driven; how they grow, gain their own form and sometimes even lead to inventions. This is how companies remain young at heart and flexible. However, for customers this also means that they have to appreciate the culture of innovation in order to benefit. For example, anyone who always insists on the same version of software cannot experience how a product develops further. Anyone who limits their discussions with their supplier to a minimum

cannot discover how the supplier is developing and also has no influence on the direction they take.

### HOW DO YOU PROMOTE INNOVATION?

A fresh spirit of innovation does not just appear. It is the result of consistent work. A culture of innovation has many roots: knowledge, communication, participation, attentiveness, flexible thinking and the readiness to question your own structures and dogmas. And curiosity of course. In a company this means that even when employing new staff thought is given to how they will support the culture of innovation. But this is just the start. What is primarily important is the freedom of the employee to be able to think beyond borders, and a tolerant culture of discussion. Only in a culture that is accepting of dead ends, wrong ways and errors can new ideas bloom. One who makes mistakes is at least doing something.

Internal competitions can, of course, also promote developments. But it is more effective and efficient to create a culture of innovation that involves everyone in the company almost automatically.

Consistent innovation management is a good aid. This could look as follows:

- **Phase 1: impulses**  
Trends are detected and observed, new technologies are identified, user wishes are recorded.
- **Phase 2: evaluation**  
Evaluate trend relevance for your own products, the company and for the industry that you supply.
- **Phase 3: transfer**  
New aspects that have been recognized are accepted, developed, amended and made ready for production.

The phases do, of course, overlap and can happen concurrently.

### WHY INNOVATION NEEDS EXPERIENCE

Innovation is often associated with young companies. A mistake with far-reaching consequences. Young, yes – but young in thinking and curiosity. It is, of course, young companies that often bring fresh impulses and innovative procedures. However, on a long-term basis, you need more than the fresh vision of rookies.

It is, for example, important to know what already exists and to understand the methods that have already been tried. This is how to avoid the fruitless and expensive reproduction of mistakes that have already been made. However, most of all, you build on what already exists and can drive long-term development again and again.

ZENAJDA HASANOVIC, DEVELOPER,  
COPA-DATA



For example, COPA-DATA makes this possible with zenon, thanks to its backwards compatibility, which productively uses projects from previous versions and expands them. This means that customers, depending on the need and situation, can use both the most up-to-date features and their own tried-and-tested versions that have worked for them, even in mixed operations.

Experience makes it possible to develop in a focused manner for years, and to intelligently research rather than stabbing in the dark and only discovering things by chance. However, this also means that a culture of innovation needs time.

### HOW DO YOU KEEP A CULTURE OF INNOVATION ALIVE?

COPA-DATA decided at the time it was formed that it would focus on promoting a culture of innovation. It's no wonder that there were already features in the first version of zenon that now contribute to the ergonomics of the software. The path here may have changed, the focus might have moved, but some components have served the culture of innovation at our company for a long time.

- **Investment:** COPA-DATA puts many resources into research and development, and reinvests a considerable amount of its annual revenue into this area.
- **Methodology:** The developers work using agile methods and also have time to take on research tasks.
- **Curiosity:** A "why not?" attitude and a view beyond one's own limits is promoted. Ideas and constructive criticism are always welcome.
- **Partnership:** Open communication, an exchange of knowledge and partnerships with other companies and research institutes are day-to-day activities. Cooperation concerns large companies just as much as start-ups.
- **Customer orientation:** What good is the best invention if the market doesn't need it? The requirements and wishes of our customers are a fixed component of the culture of innovation at COPA-DATA.
- **Setting standards:** COPA-DATA also invests money and manpower into collaboration with committees for standards and standardization. This is a particularly fruitful exchange. The knowledge and experience of many companies is incorporated into standards and everyone benefits from the know-how of others.

- **Independence:** As a family-run company, COPA-DATA has the freedom to autonomously make decisions in relation to how the company develops – independent of external financiers or stock markets, but in close cooperation with customers and partners.

A culture of innovation cannot be exemplified by marketing statements. Instead, it comes from consistent product development, a readiness to try something new, listening to intentions and communicating openly. For example, compare zenon 7.50 to 7.00 or 6.50 to 6.22.

A culture of innovation cannot be depicted in quarterly sales figures or driven to profitability through strict requirements. It reflects a fundamental attitude of a company: the joy of developing oneself and getting better. The knowledge that perfection is hardly possible but nevertheless worth striving for. And the pleasure of making the journey together.

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## GUEST CONTRIBUTION

### Digital Transformation Through IT

# IIoT: From Hype to Innovation

Industry 4.0 and the Industrial Internet of Things (IIoT) are now subject to a lifecycle similar to that observed during the emergence of cloud computing. Due to many new and disruptive business models, more and more industrial companies and large companies see themselves forced to innovate. They must also drive this form of digital transformation in their organization, in order to remain competitive. Similar to the use of cloud computing, the question of whether such technologies and approaches should be used is no longer asked. Now it's just a question of when. In virtually every large German industrial corporation an "Industry 4.0 Team" is already in place – often also called a "task force" – which eagerly tries to both improve processes and to implement truly new, innovative business models.

However, digital transformation in both Industry 4.0 and IIoT, are primarily associated with IT issues, even though IT can only be seen as an enabler here. This is no wonder, because both of these hyped-up topics originated and were driven by IT-orientated environments from the start. Of course, this development is not just attributable to the marketing or push of the IT "market criers", but also to the significant advancements in IT. These include the development of cheap and powerful single-board computers, such as the Raspberry Pi, extended address areas in the network of the Internet (with Ipv6) and the emergence of powerful IoT platforms based on cloud computing. As with cloud computing, the IIoT has also led to a democratization of the industry, because the loss of the previous need for significant investment means that medium-sized companies – sometimes even small companies – are now in a position to implement the technology in a cost-effective manner.

#### **INNOVATION THROUGH A HOLISTIC APPROACH**

Nevertheless, the true potential of digital transformation through IIoT is not about the effective use of a range of technological innovations. It is rather a matter of two fundamental changes that should, or must, significantly push industrial companies to benefit from the associated advantages: first, the convergence of OT and IT and second, a new way of dealing with IT and software that is massively different from the current conventional practices. Objectively, it must be said that both were possible before Industry 4.0 and IIoT and already implemented by some companies. However, the wider public needed an occasion, such as introducing or publicizing an issue like digital transformation. This is confirmed by the fact that many companies, that have only recently started working with projects in the Industry 4.0 environment, quickly discover that they must take a good look at Industry 3.0 tasks first.

#### **CONVERGENCE BETWEEN OT AND IT**

OT stands for Operational Technology and when talking of a team, generally the automation department of a company is meant. On the other side, and this can be described quite stereotypically, there is the classic IT department, i.e. the people who ensure that all IT infrastructures used at the company work accordingly. Which interfaces or cooperation strategies do these departments generally use? The answer is relatively simple and at the same time disappointing: very few. There are frequently intense conflicts between both groups when working on projects or joint plans, because they have different, sometimes even contradictory objectives. In the OT team, the motto

JÜRGEN MAYRBÄURL,  
SOLUTION ARCHITECT FOR IOT  
(INTERNET OF THINGS) - EMEA,  
MICROSOFT CORPORATION



“Never change a winning team” prevails. Something that works well should not be “touched” if possible, ideally for an average product lifecycle of ten to fifteen years, which is generally quite common for machines in the manufacturing industry. This thinking clashes with modern IT, which is currently characterized by trends such as continuous delivery. Continuous delivery means constantly making changes, such as functional or security improvements, to the productive system, without following a prescribed time plan. An idea that is completely absurd and impossible for most employees from the OT team. This example shows where the cultural differences between OT and IT are at the moment. It is only companies that can create a convergence between OT and IT as soon as possible, by means of a thriving innovation culture, that are successful in the short to medium term when implementing Industry 4.0 projects. The current “conflict” between these two business areas must be transformed into a “cooperation”. In some cases, the dissolution or merging of these structures can be the more promising approach.

### **USING ESTABLISHED IT THINKING THROUGHOUT THE COMPANY**

The second necessary change in the company is directly related to the first one, but is not limited to the two departments of OT and IT. A significant factor in the digital transformation in industry is the digitalization of all of a company’s processes and thus the adoption of approaches and methods from information technology. Examples of this are the continuous development of processes and the software used for this, as well as the possibility to incorporate new functionality by means of software enhancements. The car manufacturer Tesla, which added autonomous driving to its cars by means of a software update, provides my favorite example of this. Not a single Tesla customer had to drive to the workshop for this. The complete process was carried out in a fully automated manner. Transferred to traditional machine building, this would mean that in the future an innovative manufacturer would only have to provide basic functionality with their machines and could later provide enhancements to their customers as software updates. They can therefore be much more competitive as a comparably conservative manufacturer that only offers a fixed feature set for a period of many years.

The issue of security, especially IT security, plays a significant role in this context, because old patterns of thought become particularly clear here. In manufacturing companies, machines that are not networked in any way are often used and generally constitute a closed system. Connecting or networking assets with services that run in the public Internet is in no way possible. Security concerns are often explained as the reason for this “head in the sand” behavior. In addition, obsolete operating systems, no longer

supported by the manufacturer, such as Windows XP, are frequently used to control the machine. When asked how required firmware updates are carried out on this machine, the answer is usually by means of a USB stick in the machine directly. In such cases, it appears as though communication about state-of-the-art IT knowledge has failed completely. Both working with obsolete operating systems and using USB sticks in a production environment are the worst faux pas in a production environment, and should be avoided by modern manufacturing companies at all costs.

When German industrial companies invoked digital transformation in the industry some years ago with their Industry 4.0 initiative, they were probably not aware of the resources required for this. However, experiences gained from the implementation of successful projects in recent years have clearly shown that new, modern approaches – which very often come from the environment of modern IT – are necessary. Only then is innovation, which can lead to a massive increase in productivity, as well as the implementation of new, modern business models, feasible.

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### **ABOUT THE AUTHOR:**

Jürgen Mayrbäurl works as Solution Architect for IoT (Internet of Things) at Microsoft Corporation, focusing on building IoT solutions with large enterprises to transform their business models and improve their production processes. He has more than 15 years of experience as Software Architect for Enterprise solutions and has successfully supported Independent Software Vendors creating and deploying new business models. For more details, see his LinkedIn profile at <https://at.linkedin.com/in/juergenmayrbaeurl>

# Questions as a Driver of Innovation

TEXT: SEBASTIAN BÄSKEN,  
PUBLIC RELATIONS CONSULTANT

The inventor and entrepreneur Thomas Alva Edison (1847–1931) carried out countless trials with his employees and partners. Many failed. Yet, despite these failures, he invented groundbreaking things and had many “lightbulb” moments in his life – in the truest sense of the expression! He is reported to have succinctly stated: “Experience is the sum of all our errors”. It is clear that, for Edison, deep tenacity and a willingness to experiment without paradigms were just as essential for successful further development as application-orientated research – and this is true for the team at COPA-DATA as well.

A curious question lies at the start of every invention or innovation. The world usually offers several answers to the same question. However, in automation there is an important indicator as to which solution is the correct one: it has to work. Ideally it is robust over a long period of time, ready for amendments in the future and as simple as possible. This ideal is the repeated focus of COPA-DATA developers in numerous research projects.

There are now just under 50 people at two sites engaged in the development of our software products. This represents a major investment in permanent innovation. Our developers meet daily to discuss the smallest details in order to continue the tasks they have been assigned. There are also several research projects currently being carried out in conjunction with institutes and companies around the world.



SIMON KRANZER, RESEARCH ASSOCIATE,  
INFORMATION TECHNOLOGY & SYSTEMS MANAGEMENT,  
SALZBURG UNIVERSITY OF APPLIED SCIENCES

An efficient and ergonomic solution always starts with a problem. “At COPA-DATA we understand research as the opportunity to use many paths to reach the same destination,” says Reinhard Mayr, Product Manager at COPA-DATA. “Errors are initially part of this. As a result of those errors we get to understand the more laborious answers, and can exclude them and develop short cuts through to ergonomic solutions.”

### A BIRD’S EYE VIEW OF AUTOMATION

zenon is used in a variety of industries and solves problems in many plants. Diversity is the trump card here. It means that solutions originally developed for automation in the energy sector can be used in applications outside of that industry and vice versa. Each research project thus benefits the product as a whole. According to Reinhard Mayr, “Product management is akin to playing several games of chess simultaneously. The program parts, or chess pieces, all have to win on multiple boards, i.e. they must deliver in different industries. At our company, the winning strategies from each ‘board’ are incorporated together so we can apply them in many different environments. Whatever board we are playing on, the objective is always the same: to find the optimum software solution for an automation problem.” In practice, this means rapid implementation of standard features across the zenon Product Family, which are then available to all users.

The research projects in which COPA-DATA has participated over several years are also diverse. Some run at the technology level, others focus more on people and their behavior in order to improve ergonomics. In others, zenon, with its comprehensive protocols and connectivity, serves as an instrument for research.

Innovation does not fall into one’s lap. However, it starts relatively simply: with the right question. Or as Edison expressed it: “Genius is one per cent inspiration, ninety-nine percent perspiration.”

As an example, we will now give you an insight into three recent successful research projects in which COPA-DATA has been involved.

### SIMUPROD – SIMULATION OF SMART PRODUCTION FACILITIES (2012-2015)

#### INITIAL SITUATION:

Goods are now produced under increasingly complex conditions. Even process development for industrial management is under greater time and cost pressure. Large companies in highly-automated industries currently use methods to simplify and improve industrial development and manufacturing processes. Using costly simulation software for digital production they develop ever more efficient strategies when planning, commissioning and maintaining production facilities.

#### RESEARCH QUESTION:

How can, with the help of model-based simulations, small and medium-sized enterprises (SMEs) use similar strategies and make their production facilities smarter on a lasting basis?

#### PROCEDURE:

For around three years, the Salzburg University of Applied Sciences, together with COPA-DATA, and funding from

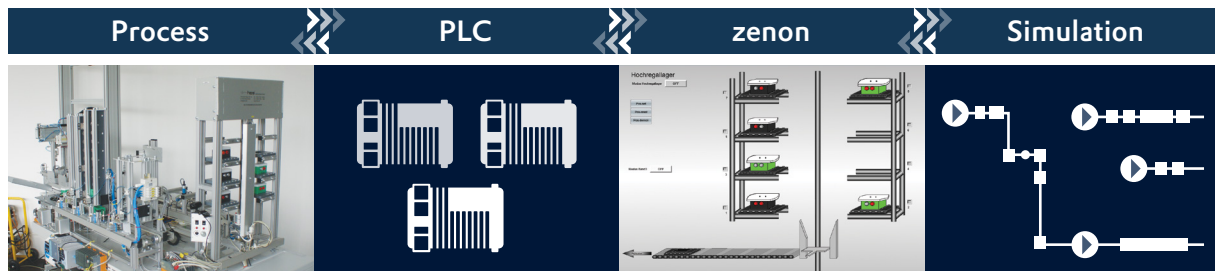


Figure 1: The miniature manufacturing plant, controlled by zenon as the SCADA system, created the necessary data with its PLCs. This was then exchanged with the simulation software.



Figure 2: The portable tank model provided real-time values from various sensors to zenon and worked similarly to a real production facility.

the Austrian Research Promotion Agency (Österreichische Forschungsförderungsgesellschaft, FFG), have been researching the simulation of smart production facilities. With SimuProd, the researchers have focused on the topics of data integration, virtual commissioning and simulation-supported maintenance. Initially, corresponding production data needed to be created and gathered (see Figure 1). To this end, a miniature production facility and a cleverly-devised tank model supplied data in the laboratory (see Figure 2). Using zenon as HMI/SCADA software, the data was read, recorded in full and prepared for the subsequent mathematical process. In order to guarantee compatibility with existing simulation tools used in the market, corresponding programs were also linked to data from zenon. In addition to the data supplied by zenon, the team of researchers also integrated ERP systems, whose interaction with the SCADA system could make production planning easier. A zenon wizard developed in the research project and comprehensive training helped with operation. In addition, there was a joint framework to assist potential SME customers in selecting appropriate simulation software.

#### RESULT:

The data simulated in SimuProd can also be collected from real production equipment and evaluated. The information gained is valuable in order to plan both equipment

enhancements and new facilities with greater accuracy and efficiency. Even operators of smaller facilities can thus get data about expected interactions between different equipment and systems, without having to intervene in ongoing operations.

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## IMP – INTELLIGENT MAINTENANCE PLANNER (2014–2016)

#### INITIAL SITUATION:

Many machines and equipment are still subject to set maintenance intervals. They are therefore rarely serviced at the optimum time – if at all. In addition, there is often little or no information about the actual execution of maintenance: which part should be changed and how? Which resources were last required? The consequence is usually increased maintenance costs.

#### RESEARCH QUESTION:

How can existing data be used for error-free maintenance in intelligent maintenance cycles, thus actively supporting the success of the company?

#### PROCEDURE:

In this FFG reference project, the Salzburg University of Applied Sciences, the research company PROFACTOR and COPA-DATA developed a self-learning tool for the intelligent planning of equipment and machine maintenance. This tool uses zenon to gain information from various sources, interprets this and triggers the necessary steps. In doing so, it learns from each new service and makes predictions increasingly more precise.

There are five clear steps in each maintenance process (see Figure 3):

#### 1. Identification:

The need for maintenance is detected by the system. First, on the basis of specifications. Then, increasingly, by means of condition monitoring using the evaluation of machine and operational data, as well as feedback from previous maintenance.

#### 2. Planning:

The tool creates specific maintenance instructions and defines the optimum time, as well as the required resources. The plans include target times which increase in accuracy with each service.

**3. Time planning and dispatch:**

Using its database and linked shift schedules, the best-qualified employees to carry out a task are chosen and automatically informed. For time control, production and maintenance tasks are considered and optimized together.

**4. Guided performance:**

During operation, the technician is given detailed information by means of augmented reality. The component to be replaced and its position in the machine is displayed and technical instructions are shown. In the event of deviations, feedback is given to the planning component.

**5. Learning:**

The quality of the maintenance carried out is assessed. Newly-gathered data and experiences are incorporated and used as a basis for the next maintenance process.

**RESULT:**

Companies can optimize the running times of their machines, plan the necessary maintenance cycles more precisely and use existing resources better.

The study provides insight into ergonomic HMI design and the integration of new technologies such as social media, interaction technology and recognition technology. From this, it was clearly evident that HMIs will have to cover more tasks in the future; more than merely observing and operating a machine. HMIs will also be a platform for cooperative decisions, gathering knowledge and solving problems in a team.

**RESEARCH QUESTION:**

How can future HMI operators influence the optimum use of systems by means of user-generated operating aids and how can the specialist knowledge of a few experts in a company be reliably shared and forwarded in a targeted manner?

**PROCEDURE:**

Under IAO management, operators of complex production equipment throughout many industries, machine manufacturers, as well as software and technology companies such as COPA-DATA, found themselves together in the “HMI 4.0” group project. We provided know-how and zenon, as a successfully deployed HMI software in the market. Initially, the participants worked out concepts for how, in the era of Industry 4.0, user-generated operational aids can be implemented in the HMIs of the future. Findings from the topics of gamified design, psychology, perception and learning were included. The focus was first on the usability and efficiency of the operational aids, and second on the topic of general cost-effectiveness, incorporating systems and motivational incentives for employees. In the second step, the workshop participants implemented their solutions in actual prototypes for specific applications. zenon served as the basis for the development of interactive and motivational HMI operating aids.

**HMI 4.0 JOINT PROJECT (SINCE 2015-ONGOING)**

**INITIAL SITUATION:**

In a previous trend study, the Fraunhofer Institute for Labor Economics and Organization (IAO) identified and examined the most important action areas for successful human-machine interaction for production in the future.

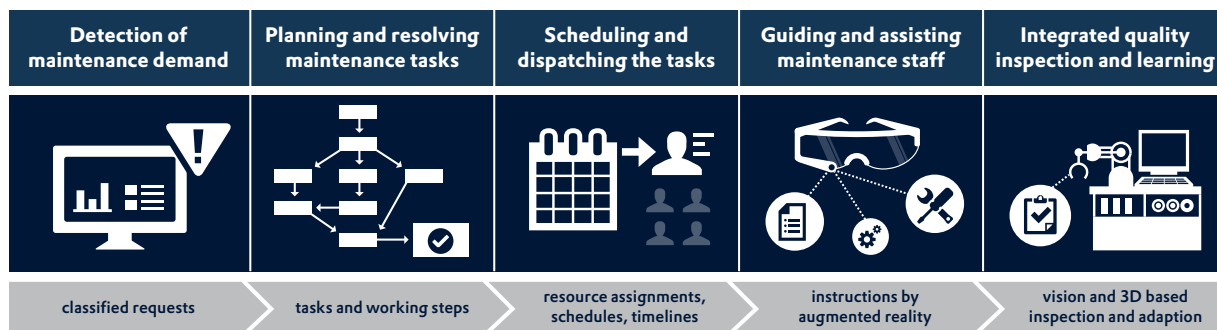


Figure 3: The five steps of a maintenance process in IMP.



Figure 4: Example of a user-generated operating aid within a zenon HMI application to solve a specific problem.

#### RESULT:

Because the project has not yet been completed, we can only report interim results. The different perspectives of the project participants ensure a comprehensive consideration for meaningful options of HMI design and performance. People and their specialist knowledge remain extremely important in the smart factory of tomorrow. The approach of implementing user-generated operating aids in HMIs for enhanced knowledge transfer in manufacturing companies is appearing as a pioneering route (see Figure 4). Actions to be carried out in error situations in automated processes can thus be more efficient and independent from any one particular person. The challenges are, in particular, in the instructive checking of user aids and motivating specialists to really share their existing knowledge. Ideally, the knowledge generated should also be available in the company's higher-level systems.

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Get an overview of COPA-DATA's involvement in a variety of research projects that contribute to the further development of our products.

<http://kaywa.me/38KIN>





REINHARD MAYR,  
PRODUCT MANAGER,  
COPA-DATA



# PRODUCTS & SERVICES

# IEC 62443 Brings Increased Security to Automation

**New technologies open innovative ways of increasing creativity and productivity. At the same time, each improvement also entails new security challenges. It is precisely in manufacturing companies where it is not easy to reconcile the requirements of automation and IT security. The new IEC 62443 standard creates the basis for comprehensive security.**

Modern automation equipment nowadays consists of highly-standardized hardware and software components. The different resources are networked using HMI/SCADA systems such as the zenon Product Family. This networking is increasingly overcoming conventional limits in the automation world – most of all that of the networks – and builds new bridges between critical infrastructures and the World Wide Web. However, a rise in networking automatically increases IT security risks in all networked equipment.

In order to make it possible for the operators of such equipment to implement modern security concepts, it is absolutely necessary that they trust the products used. These products must offer technologies and functions that enable implementation of the planned security strategies. It is not just the finished products, but the manufacturing processes and quality assurance methods of the respective manufacturer that play a significant role for the introduction of new security concepts.

A previous disadvantage of certification for products and services in the automation industry was that they could not be certified in relation to their “IT security”. Until recently, there were no internationally-recognized standards for this particular environment. This situation has fundamentally changed since the publishing of the IEC 62443 set of standards.

In product management at COPA-DATA, we have been intensively looking at the topic of software security and QA strategies for software development for over ten years. Now, IEC 62443, provides a standard that caters specifically to the requirements and problems of the automation industry. We see the main advantage of the standard in that, for the first time, it unites all perspectives – that of the component supplier, the system integrator and the equipment operator – into one regulation. It is clear that it is only when all three parties are able to work together effectively can implementation of modern security concepts be realized.

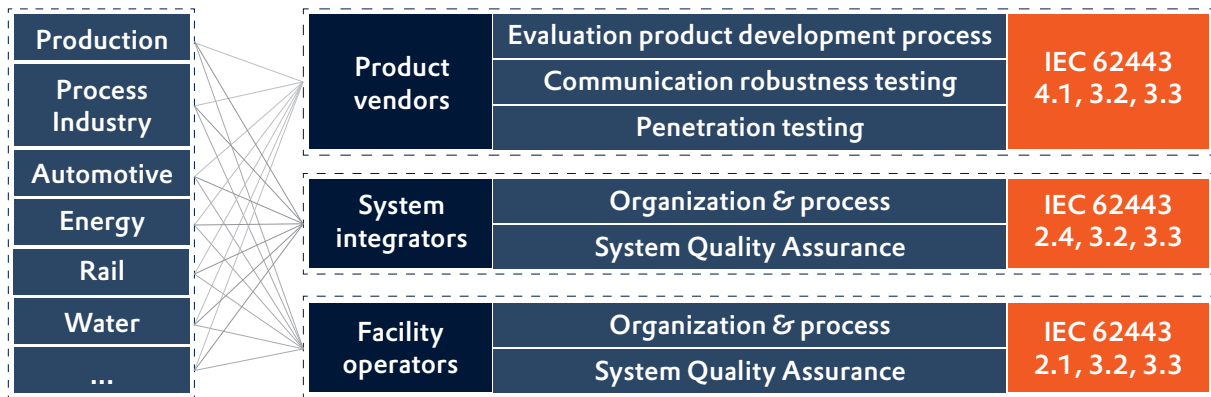


Figure 1: Overview of IEC 62443.

Even in the phase before all aspects of the standard had been fully defined, we decided to adopt its requirements into our products. At the end of 2014, we found a suitable partner, TÜV SÜD, who have since supported us with implementation. From the start, our declared objective was to certify COPA-DATA and our products in accordance with IEC 62443.

Over the last one and a half years the experts from TÜV SÜD have placed COPA-DATA's complete development and quality assurance processes under the microscope, including holding workshops. Because our processes had already been clearly-documented and well-practiced for many years, only minimal amendments to individual process phases needed to be undertaken. The strength of the standard is primarily shown in that it is possible for us to retain our existing agile project management (scrum development processes). We can thus easily incorporate the requirements of the standard into our "everyday business".

A significant component of such a process is the definition and creation of a defined use case, a realistic situation where zenon is used, which is as industry-neutral as possible and typical to everyday practice. A subsequent validation of this use case is then performed covering the

required tools and methods, such as "threat modeling", for example.

Our objective was to define a use case not only corresponding to the real use of our products and taking the investments in "security features" from recent years into account, but also meeting the requirements of the standard. The following considerations and technologies led to the certification-relevant use case:

- **Redundancy:** Production units need high availability in the event of a security problem. zenon redundancy allows seamless redundancy between the active production servers and ensures that there is no production downtime and data loss.
- **Networking:** zenon is characterized by its networking possibilities. Local units (such as production cells) can be integrated into a global SCADA system at the click of a mouse.
- **Encryption in the network/client authentication:** If an attacker manages to get into the zenon network or if the attack is from inside, simple access and data manipulation are not possible.

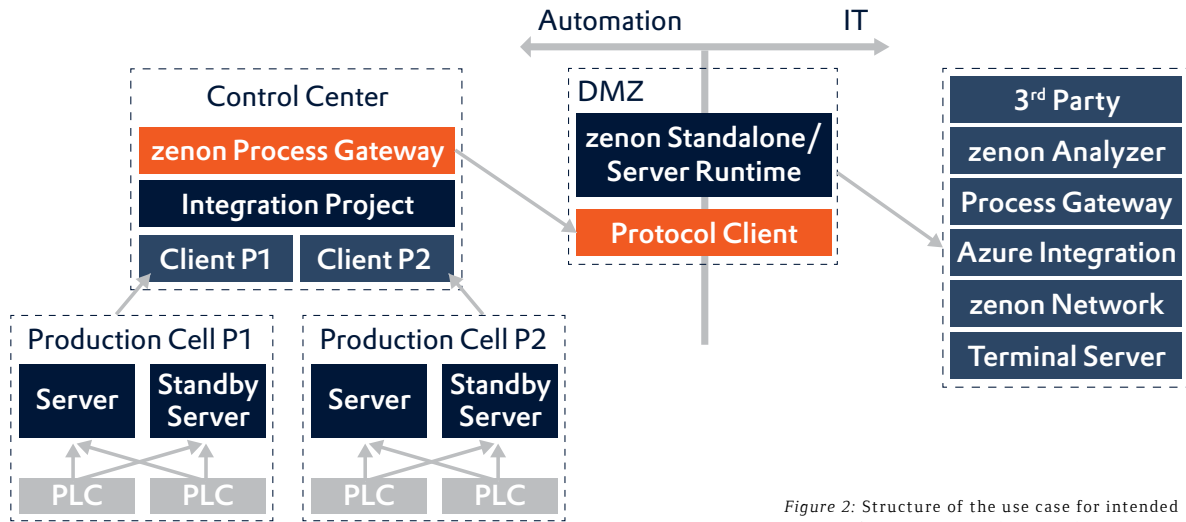


Figure 2: Structure of the use case for intended certification in accordance with IEC 62443.

- **Integration project:** In order to have a single point of entry into the automation network, the zenon integration project offers, together with a process gateway, the perfect possibility to provide global data from all networked subprojects.
- **DMZ/process gateway:** In order to provide data outside of the automation network, the standard prescribes at least one defined DMZ (demilitarized zone). This should, if possible, be connected via a communication protocol that is different to that of the automation network. The zenon process gateway is therefore perfect for connection.
- **Detached engineering/remote engineering:** In order to prevent unauthorized or undocumented changes to the productive system, it is imperative to operate the Runtime systems without an installed Editor system.

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REINHARD MAYR,  
PRODUCT MANAGER

The previous discussions and workshops with TÜV SÜD showed that, thanks to many years of investment in security, we are in an excellent position to meet the requirements of the IEC 62443 standard in full. There is nothing standing in the way of successful certification, which is expected to be in 2017.

# MORE FLEXIBLE ZENON TRAINING COURSES THROUGH E-LEARNING



Online training is not bound to a particular time or place. As a result, it offers COPA-DATA customers, partners and employees, a new opportunity to learn parts of zenon step by step. Our existing range of training courses has been proven effective for many years and makes it possible for zenon specialists to work competently around the world. The new e-learning training courses are more flexible and support mobility in learning. Thus they address the participants better. If needed, the information and content can be called up in the online training sessions immediately.

## **SIMPLE LEARNING AT YOUR OWN PACE**

The new Online zenon Training Courses consist of videos, accompanying texts, and review tests, as well as appropriate embedded educational examples with which to practice. The course participants are presented the subject material in a clear and manageable way – they can now acquire their knowledge of zenon using individual e-learning modules, without having to take into account the learning pace of other participants or the trainer.

## **ONLINE TESTS AND ZENON CERTIFICATION**

As with on-site training, there is also the opportunity to obtain official zenon certification after the e-learning courses, by means of a zenon online test. These tests build on the content of the respective training course – the learning objectives behind both options, online or on-site, are the same. Everyone who meets all the conditions and passes the test at the end receives a certificate.

## **“GREEN LEARNING” – ECOLOGICAL AND ECONOMIC TRANSFER OF KNOWLEDGE**

Learning about zenon online reduces CO2 emissions considerably, because the participants do not need to travel anywhere to take the course. This saves the participant

time and also reduces the (travel) costs entailed with the training – making for more ecological and economical learning.

## **BLENDED LEARNING – E-LEARNING IS NOT A THREAT TO CONVENTIONAL LEARNING**

E-learning is a sensible addition to the conventional methods of passing on knowledge at COPA-DATA. Despite early predictions about the role of e-learning in the 21<sup>st</sup> century, it will never completely replace conventional forms of learning. We are therefore taking the path of targeted blended learning to combine the advantages of on-site training with the benefits of e-learning.

You can find details of the training we offer at:

**[www.copadata.com/training](http://www.copadata.com/training)**.

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MARTIN SEITLINGER,  
DEVELOPMENT OF COMPETENCE

\* The range of new Online zenon Training Courses is continually expanding. First online courses are already available.

HUMAN-MACHINE INTERFACES (HMIs) FOR  
PROCESS AUTOMATION SYSTEMS:

## ZENON MEETS ISA-101.01-2015

Simple and easy-to-operate HMIs are an important basis for seamless operation and quick, correct reactions in the event of errors. The new “ANSI/ISA-101.01-2015 Human Machine Interfaces for Process Automation Systems” standard creates a practical set of regulations and offers important orientation assistance for easily-operable HMIs. It defines the terminology and the models for developing an HMI, as well as the working processes to maintain the HMI during its life span. We put the standard under a magnifying glass and analyzed whether zenon can work in compliancy with it.

The objective of the standard is to provide assistance for the design, creation, operation and maintenance of HMIs, but also to improve the ability of users to diagnose abnormal situations and rectify them correctly. In doing so, all users having direct contact with the HMI are addressed: production managers, operators, maintenance staff, developers, safety specialists and quality control staff.

### ZENON AND ISA-101

With the zenon 7.50 version, users can already design HMIs according to the requirements of the standard.

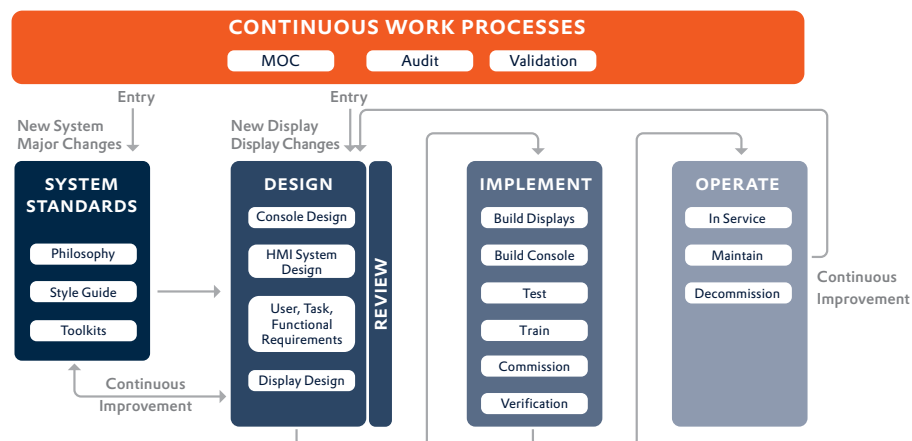


Figure: Working processes throughout the complete lifecycle of an HMI in accordance with ISA-101. Source: AMERICAN NATIONAL STANDARD ANSI/ISA-101.01-2015 Human Machine Interfaces for Process Automation Systems. International Society of Automation. ISBN: 978-1-941546-46-8. Page 19.

If you consider the workflow defined in the standard (see *Figure*), zenon primarily falls under the area of “Design”, with the actual implementation of the HMI GUI. However, zenon can score points in the “System Standards”: although the “HMI Style Guide” does not contain any details about implementation, it must be possible on all target platforms. As a result of its intuitive structure, zenon already allows this at the prototype development stage.

zenon scores further points with its ability to set parameters and the possibility of implementing projects without having to do any of your own programming. In the standard, it is expressly recommended that a reasonable amount of customer-specific programming is already defined in the HMI Style Guide. Due to the difficult maintainability of source code, this should only be used if the related efforts are justified.

With the zenon Editor, users are offered an efficient tool<sup>1</sup> to implement the graphic symbols defined in the HMI Style Guide and other supporting elements. The design created can be tested in zenon Runtime as a simulation or live at the control system.

## HMI DESIGN

Implemented correctly, the HMI design supports the primary tasks of the user, such as monitoring and control of the process. Secondary tasks, derived from the actual tasks, should be minimized.

HMI capabilities:

- Secure and efficient process control.
- An aid to early detection and diagnosis, as well as reaction to abnormal situations.
- Support for the operator in correctly prioritizing their reaction in the event of system errors.
- Errors in a screen are made immediately visible to the operator.

zenon can be simply used to implement a consistent design within the HMI by means of a centralized structure that uses a font list, color table, symbols, screen templates, styles, etc.

## SITUATION AWARENESS

The HMI should not just be visually appealing, it should mostly help users get their bearings quickly and simply within the project. The requirements for the display and navigation are strongly influenced by the user roles for the

primary user (operation) and secondary user (maintenance, development, etc.). zenon makes it easy to define a screen hierarchy from the overview (worldview) screen with a summary of the cross-site equipment on a multiple-monitor workspace through to detailed diagnosis displays in a faceplate in the HMI.

The HMI should promote an understanding of the current system and process status. Abnormal situations are made known through visual and/or acoustic signals with “appropriate conspicuousness”. In zenon, this means, for example, that a visual color display is reinforced dynamically by moving or flashing.

With “Chameleon Technology”, zenon offers a tool to amend the HMI to the limits of the user’s sensory system. Users can thus also compensate for widespread deficits such as color-blindness or environmental conditions (such as different lighting situations).

Further standard features in zenon – such as the display of additional information, external help, unit switching or the increase of operating security through user administration and confirmation of the action (signature) – relieve operators of their everyday tasks and allow them to concentrate on production. In the event of absence from the station, operating personnel can be quickly and easily informed using the Message Control module.

zenon supports users of version 7.50 optimally when implementing projects according to ISA-101.01-2015. They benefit from HMIs that can be operated intuitively and can secure their investment on a long-term basis.

You can find further information on the ISA-101.01-2015 standard at [www.isa.org](http://www.isa.org).

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**GERO GRUBER,**  
TECHNICAL PRODUCT MANAGER

<sup>1</sup> Defined in the standard as an “HMI Toolkit”: an “individual library” that contains screen templates, pop-ups, faceplates, static symbols and dynamic symbols.

# NEW: SMART CHECKLIST MAKES REVIEW PROCESSES EASIER

## Dispense with Paper Lists for Good!

TEXT:

MAGDALENA PRITSCHER, HEAD OF WORKFLOWMANAGEMENT ISA 88,  
COPA-DATA GERMANY

**Despite the digitalization and networking of production processes one pre-digital hangover still appears in day-to-day operations: a handwritten checklist on paper. This need not be the case. With Smart Checklist, zenon offers a new functionality that supports digital workflows in production companies by means of checklists.**

Paper lists are found in various formats across production facilities – be it for quality control, or as production-related papers or operating instructions for set-up or security guidelines. Employees, clipboard and pen in hand, must tediously work through one step after another. To confirm, they will enter the well-known “x” or maybe a checkmark.

Handwritten comments may also be added. Later, these will need to be typed up by somebody in order to send them on to the appropriate Manager by e-mail. This is not only time-consuming but also becomes prone to errors and carries a high risk of data loss. The filing system can easily become chaotic and out of date.

If checklists could be digitalized it would be possible to create more efficient working practices and to avoid illegible entries and piles of paperwork. A digital filing system is also easier to manage, takes up less space and allows for flexible processing of data.

### **DIGITAL CHECKLISTS IN ACCORDANCE WITH ISA-88**

Smart Checklist is based on the zenon Batch Control module. It offers user guidance in accordance with the ISA-88 standard. Further zenon modules complement the checklist for automatic data recording or screen interaction. The integrated user administration allows for more flexibility and also serves to sign off the checklist.

The new zenon Smart Checklist offers further benefits when used on mobile devices. You can be informed of

individual steps taking place on site. Subsequent data processing can flexibly take place on different workstations. In addition to working through the checklist locally via the user, zenon can automatically collect further data and use this to create reports and key performance figures, such as measurement and guidance values.

### **MORE EFFICIENCY, FEWER MISTAKES WITH THE SMART CHECKLIST**

Step by step, the user is led through operations within the checklist – depending on his user role. Nothing can be left out as the user is not able to proceed to the next step before the present step is completed. The order and requirements are defined by the administrator in advance using the graphical list creation tool.

Checklists are available anywhere and ease team or cross-site information exchange. Interactively guided operation of work steps allows for a clear overview and avoids errors, thus leading to improved quality. In addition, zenon can offer the user instructions and suggestions for processing the list. For example, you can collect measured values and display these as a trend curve.

You can also integrate the inspection record when examining triggered messages and alarms. Documents, standards, switching plans, or 3D models support the user as needed and shorten processing time. Automatic collection of information saves a great deal of time; resources are used more efficiently.



Excerpt from a report after full processing of a checklist in zenon.

**HOW YOU CAN STAY FLEXIBLE - WHETHER BY LOCATION, LANGUAGE OR SYSTEM**

The user can add comments when monitoring steps, as needed, in available entry fields. This information is stored and is retrievable at any time.

zenon Smart Checklist offers you a high level of flexibility. You can have all data displayed in your chosen language and in country-specific units of measurement.

The individual monitoring steps are stored in zenon and cannot be manipulated. Data is thereby always made available – and with consistent quality. Transferring data to an SQL database or a higher-level ERP system is therefore easy. You can generate reports and inspection records from the data. These are suitable for storing in the system documentation. They are also available as PDF documents, so they can be used for further digital processing.

**HIGHLIGHTS OF THE ZENON SMART CHECKLIST:**

- Digital workflow management
- Integration of checklists with graphical user interface
- Independent of location, language, or data format
- Consistent improvement though quick connection of new workflows
- ISA-88 compliant

Find out more in our Smart Checklist Fact Sheet Scan & Download!

<http://kaywa.me/rD09u>

*“zenon Smart Checklist offers you location-independent interaction between user and process which is highly flexible and supports production processes according to your requirements. Workflows, monitoring processes and other procedures are documented in digital format. This reduces paper loads, increases accuracy in data collection, improves workflows and optimizes productivity.”*

**HEIKE SOMMERFELD,**  
PRODUCT MANAGER, COPA-DATA GERMANY



## FAQs

# Compatibility of zenon

## How Sustainable is your Software Solution?

You are probably familiar with the following situation:

you've been working in a team on a comprehensive project configuration for months.

On the way to the optimum solution, you tried many variations, rejected some, and ultimately found your solution. The result is generally praised and quite respectable. But you ask yourself: "What happens with our perfect project if we want to upgrade to a new version of the software on which it is based?" Start everything over again?

This is seldom the case. You fear that some things will no longer work once you have installed a new version of the software. But how can you secure your tailor-made project on a lasting basis and nevertheless benefit from new functions?

Simple: your software must support you in the process.

You can find out how this works with zenon in the following FAQs.

### What do I need compatibility for?

In zenon, it guarantees that your intellectual property and your solution is saved in a zenon project on a lasting basis. Once developed, you can always benefit from it. You do not need to fear losing a unique solution irretrievably.

### How do I activate compatibility in zenon?

You do not have to activate it at all. Compatibility is automatically integrated by design.

### How flexible is the compatibility of zenon?

Very. It ensures that you do not lose work once it has been created and also allows you to benefit from new functions. To do this, you do not need to create a project from scratch. You simply continue from where you left-off. This is how

the newly-created possibilities let your solution grow, without losing previous results.

### What does compatibility mean with zenon?

We make a distinction between several types of compatibility. The most important are:

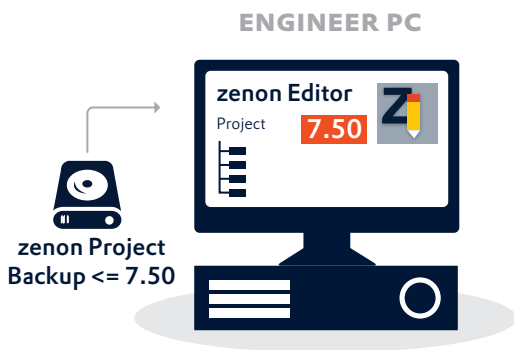
- editor compatibility
- backward compatibility (compatibility between editor and runtime)
- runtime compatibility
- online compatibility (compatibility between runtime client and runtime server)
- runtime data compatibility

**What advantages does editor compatibility provide?**

Editor compatibility means that you can always load a zenon project into the most recent version of zenon Editor, regardless of the version in which the project has been created. You can develop it further in the most recent version and benefit from new functionality in the process. The editor compatibility ensures that your projects also run reliably in the future. With every new version, COPA-DATA enhances the possibilities of zenon. With the editor compatibility, there is no reason to shy away from new versions.

You can find details in our online manual (F1) -> Manual -> Editor -> Compatibility

AN EXAMPLE:



**What does backward compatibility mean?**

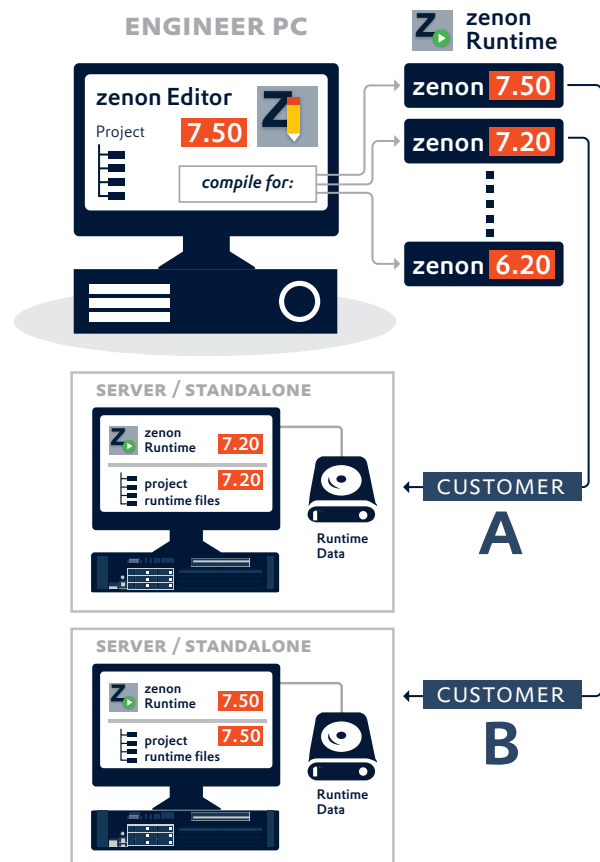
zenon Editor offers the possibility to compile a project for an older version of runtime, back to zenon 6.20 SP4. Using editor compatibility, you can keep your projects up-to-date and continue to operate existing projects that run under a previous version of zenon Runtime. At the same time, you can use the latest version with its capabilities for your new projects.

AN EXAMPLE:

- Customer A has been using the 7.20 version of zenon Runtime.
- Customer B is a new customer who already uses the 7.50 version of zenon Runtime.

The system integrator administers the project that was started with zenon 5.50 in zenon Editor 7.50. For Customer A, he compiles the project for zenon Runtime 7.20. For Customer B, he compiles the project for zenon Runtime 7.50.

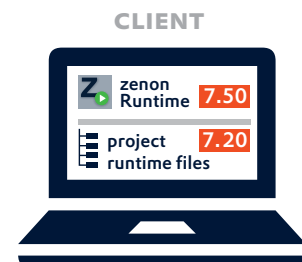
Backward compatibility also ensures that new features in the project for Runtime 7.50 do not present any problems in Runtime 7.20. The new functions are simply not present in Runtime 7.20, or cannot be executed.



**What benefits does runtime compatibility provide?**

Runtime compatibility makes it possible for zenon Runtime to load older versions of zenon. This is of decisive importance when upgrading to new versions and serves to protect your investment on a lasting basis.

AN EXAMPLE:



### How do I benefit from online compatibility?

Online compatibility ensures that a zenon Runtime client with a more recent version can communicate with a zenon Runtime server using an older version. This can also be performed in mixed operation across several projects in different versions of zenon.

Online compatibility is a decisive factor when considering upgrading a system to a new version of zenon with minimum downtime. The equipment can be upgraded to a new version step-by-step during ongoing operation. At the end of the process, there is minimal downtime; it is reduced to just restarting the server. New versions of runtime are required in order to benefit from new features. Due to the simple upgrade scenario, existing projects can also benefit from new features. To do this, the existing project configuration is simply enhanced. You can continue developing a solution, even for projects your customers are already actively using. This is a way to inspire existing customers with new features.

AN EXAMPLE:

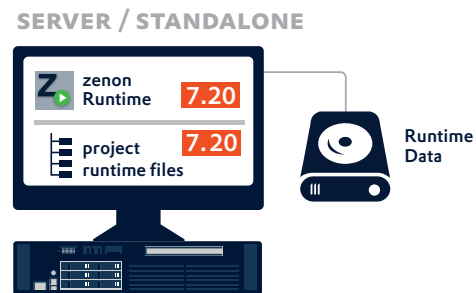


You can find details in our online manual (F1) -> Manual -> Runtime -> Runtime files -> Compatibility of Runtime files

### How does runtime data compatibility support me?

Runtime data compatibility ensures that data created previously remains usable without losing its validity. zenon Runtime creates data whilst it is running, and saves it in the Runtime folder. This includes data from the AML, CEL, Historian, Recipegroup Manager, user administration etc. This runtime data is version-independent and can also be used with a new version of zenon.

AN EXAMPLE:



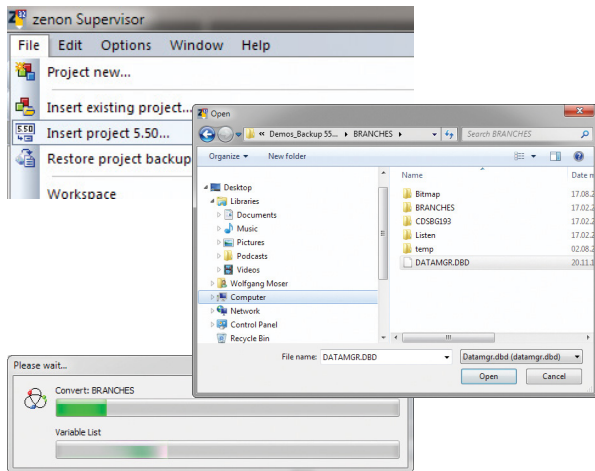
### How can I upgrade my zenon 5.50 project to the current version?

We recommend that you always consult the following references before upgrading:

- Release notes of the target version
- Documentation and online manual (F1) -> Manual -> Project conversion
- Knowledge base on our Support & Services page [www.copadata.com/support](http://www.copadata.com/support). Using the "Advanced Search", click on the "Module" field and filter for "Compatibility" or "Conversion".

Note: always use the 32-bit version of zenon Editor for the conversion of 5.50 projects!

To convert: In the "File" menu in the editor, select the "Add 5.50 project ...". Search in the following dialog and select the DATAMGR.DBD of the 5.50 project. The conversion then starts. After conversion, you can find the converted project in the zenon Editor project manager window.



With the diverse zenon compatibility, you can be assured of easy and secure software upgrades. We see it as our task to provide our partners and customers with a functional ecosystem for industrial automation. That way, you can focus on your core competence, the creation of industrial process solutions.

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**WOLFGANG MOSER,**  
**TECHNICAL CONSULTANT MANAGER**

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Recommendation: after conversion, check the output window for messages, warnings or errors.

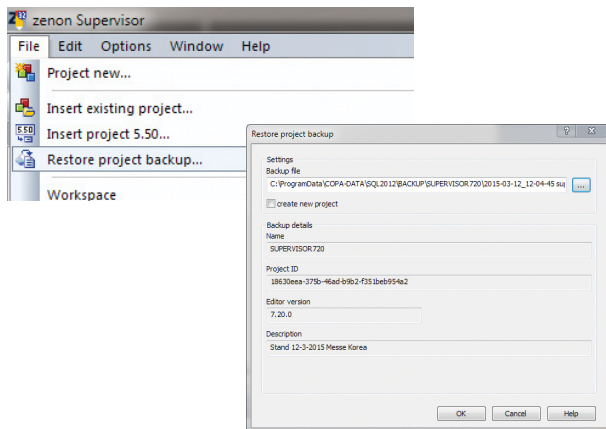
**How can I upgrade my zenon 6.xx project to the current version?**

In this case, we also recommend that you first consult the references given in the previous answer.

Conversion works by simply using the “File” menu and the “Restore project backup” entry. Select the backup of the 6.xx project in the following dialog. You then receive additional information about backup. After conversion, you can find the converted project in the zenon Editor project manager window. The original backup is stored in the backup folder as “before converted to ...” and thus remains available to you.

Customers with a Service Level Agreement (SLA) or a Software Upgrade Service (SUS) benefit from free upgrades for all recorded zenon licenses.

**Find out more!**  
<http://kaywa.me/y2jRD>





MARKUS HELBOK,  
HEAD OF TECHNOLOGY SERVICES,  
COPA-DATA



# INDUSTRIES

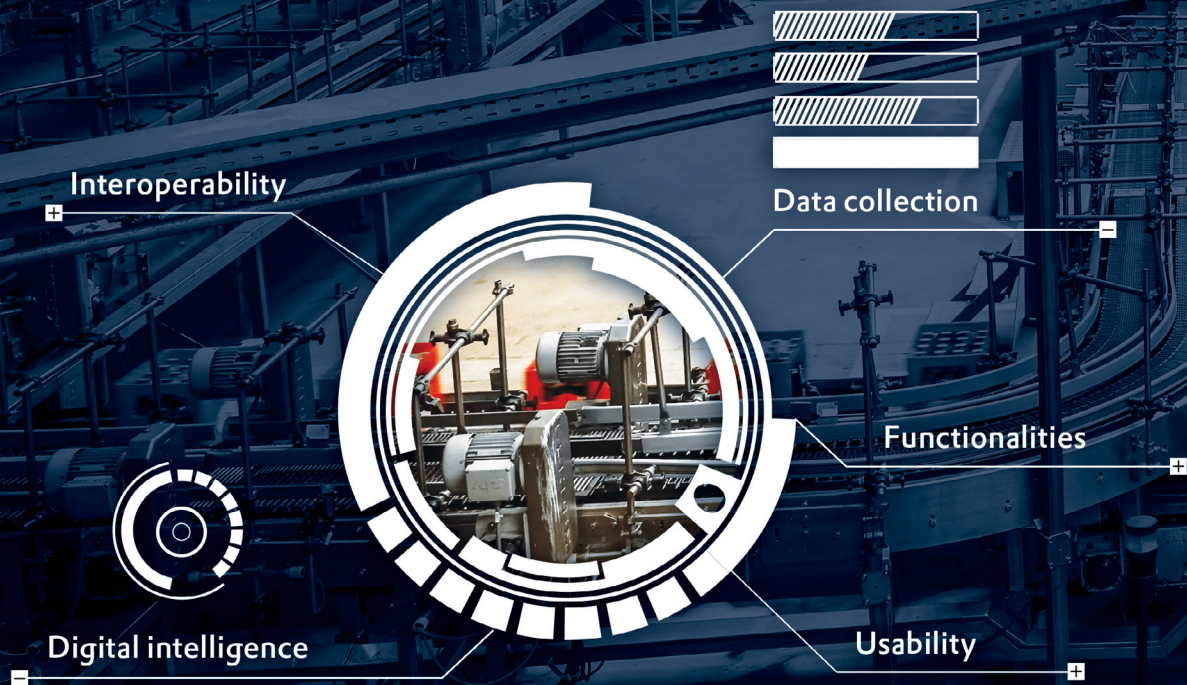
&

# SOLUTIONS

FOOD & BEVERAGE  
ENERGY & INFRASTRUCTURE  
AUTOMOTIVE  
PHARMACEUTICAL

INDUSTRIAL INTERNET OF THINGS (IIOT) FOR  
FOOD & BEVERAGE ENTERPRISES

# MAKING THINGS SMART



**What is the IIoT for you? Just hype or a commercial reality of “smart” gadgets infiltrating all aspects of industry? A paradigm shift or a dream of fully profiting from the newest technologies?**

In the food and beverage industry, you can find all kinds of responses to the topic of IIoT. But what sceptics, moderate supporters and enthusiasts all have in common are the business priorities of their companies. Customer satisfaction, flexible production at high quality, and effectiveness, with reduced consumption of energy – these are critical topics for a company’s existence. They are independent of any hype. For many years, the newest technologies found their place within this performance-oriented environment. Highly competitive teams are now using mature concepts to control their processes. Leading companies are involved in international standardization efforts, motivated by financial targets concerning ROI and TCO.

Such a picture explains the recent statement of an automation professional: “We put all our efforts in the last decades to building a robust infrastructure which works. We already have everything necessary for production; we know where to tune or repair. Why do we need this IoT hype?”

On the other hand, a culture of continuous improvement encourages people to look at their enterprise with different eyes. Replacement costs of damaged hardware are sometimes difficult to justify. Plants are struggling to harmoniously integrate production equipment from different suppliers. Limited openness of software solutions sets constraints on enterprise system architectures. Flexibility and scalability can seem to be a luxury even in modern plants. The unexpected costs of small changes can endanger improvement initiatives prematurely. Performant machines deserve better usability for their HMIs. The development of industrial standards needs more active involvement from manufacturing enterprises. In automation and IT, there is still much potential to better profit from technology. When we consider the potential of IIoT through the prism of continuous improvement, surfing the IIoT wave gets interesting ...

### **IOT IS TRENDING**

Starting IIoT projects in the food and beverage industry is possible only if we consider the entire picture. In comparison, non-industrial IoT didn’t encounter so many prerequisites when conquering the domestic market. Technological development did much more than make industrial functionalities affordable for the home

consumer. IoT introduced the idea of the “thing” as a simple denomination for “smart” components connected within a network – be it Internet or another kind. We can easily find many examples of “smart things” around us: temperature sensors, watches, phones, TV sets, the entire kitchen, home or garden. More sensors, more software intelligence and an Internet connection bring amazing applications into our lives. A large amount of precious data made available over the Internet enables suppliers to offer innovative services. Free of any constraints, the IoT shows every day in surprising examples what interoperability means.

The IoT established a set of “smart” attributes, applicable to any “thing”: extended functionalities beyond the classical expectations, increased sensory capabilities, distributed digital intelligence, an ergonomic user interface (often on mobile devices), and connectivity for integration within wider architectures, including Cloud solutions. The technology is already available at a cost-performance ratio which is very enticing for industrial users.

### **A SIMPLE IIOT EXPERIMENT OF YOUR ENTERPRISE**

The unlimited applications of consumer IoT are today inspiring the early adopters in industry. However, the question of how to start implementing IIoT can be overwhelming. There is no need to turn everything upside-down. This means uncalculated risks and costs. Any production team can try an exciting experiment: looking at their enterprise from the IIoT perspective, in two steps. This experimental approach can lead to discovering new applications and use cases which support the company’s business objectives.

#### **1. CHOOSE AN INDUSTRIAL “THING”**

One straight-forward way of structuring the different “things” of a food and beverage plant is to use established standards. ISA-95 or ISA-88 describe hierarchically an enterprise in a physical model: enterprise, site, area, process cell, unit, equipment module, and control module. Feel free to choose the objects of your analysis at any level of this model, in a bottom-up or top-down approach. Depending on your business-driven priorities, you can focus on several “things”. For example: pumps, measurement devices, packaging machines or production lines.

## 2. DESCRIBE IIOT REQUIREMENTS

With any given “thing” in focus, simply review it against the IoT-like, “smart” attributes:

- **Functionalities:** from the basic to the extended ones
- **Data collection:** sensor or measurement capabilities
- **Digital intelligence:** embedded algorithms, calculations, business intelligence
- **Interoperability:** integration within plant automation and IT architecture
- **Usability:** the ergonomics of the user-interface

A paradigm shift is not easy. Requirements which were, for a long time, options are today expected as normal or even mandatory. Various “smart” attributes may already be in place. With creativity and teamwork, the IIoT evaluation and requirements can offer a valuable result. Let’s explore a few “IIoT wishes” using some “things” as examples.

Pumps could have improved local intelligence and sensors to adapt to their tasks and reduce energy consumption. A bus communication can make the integration with different systems simple – an extension over classical process control, towards asset management, deeper process monitoring or predictive maintenance.

Sensors and measurement devices could take the “initiative” to subscribe with their own identity into central software applications immediately after installation. Compact embedded logic takes care of smooth calibration and diagnostics. The sensor calculates local user-defined indicators which are then “readable” over smartphones.

There is one expectation for all machines in a packaging line, independent of their supplier: further integration with line management or other systems in terms of data models and protocols. OMAC PackML and Weihenstephan

Standards help interoperability and the enterprise’s focus on effectiveness and low energy consumption. HMI software assures a wide integration within the enterprise IT infrastructure, e.g. central user management. With ergonomic software, operators are able to quickly learn to manage complex or even multiple machines.

What should a “smart” production line look like? Which new applications and use cases can be enabled by IIoT? Intelligent sensors guarantee process and quality control at any level of detail. Process cells, units or devices are part of the hierarchical supervision of efficiency and consumption. Large amounts of process data allow for predictive maintenance. Performance indicators and reports are available in real time, wherever demanded. Intuitive software user interfaces adapt automatically to the individual needs of production staff. Less centralized, the automation and IT architectures integrate digital intelligence where needed. Secure information flows to deliver an optimized supply chain, eliminating waste.

## CONCLUSION

Now it’s your turn. Your evaluation from an IIoT perspective based on “smart” attributes can go much further than our examples. Feel free when redefining your own requirements and expectations, from sensors through to cloud. IIoT is a paradigm shift and a great opportunity to create, step-by-step, your “smart” enterprise.

EMILIAN AXINIA,  
INDUSTRY MANAGER FOOD & BEVERAGE

**zenon offers you a smart system architecture for your IIoT applications. Find out more in our video.**  
Scan & Play!

The image is a video thumbnail for 'Smart system architecture'. It features a dark blue background with a central play button icon. Surrounding the play button are various white icons representing different aspects of an IIoT system, such as a cloud, a smartphone, a laptop, a server rack, a gear, and a network signal. The word 'CLOUD' is written in white above the play button. In the bottom left corner, there is a red box with white text that reads: 'If you like, with zenon you can run a part of your architecture in virtual environments or in the CLOUD.' Below this text is the COPADATA logo, which consists of a checkmark icon and the word 'COPADATA'. In the bottom right corner, there is a large QR code.

<http://kaywa.me/pu9fD>

I would love to learn about your IIoT experiences. Please send me an e-mail to:  
**EmilianA@copadata.com.**

## Save costs and avoid errors with the Command Sequencer in the zenon Energy Edition

# AUTOMATE COMMAND SEQUENCES

The zenon energy world has been waiting for this module! The zenon Command Sequencer was conceived for local control in substations and network control centers.

Flexibly-created command sequences, tested in a protected environment, contribute to reducing the operator's workload.

Independent of the communication components applied, the Command Sequencer can be used to compile command inputs in a graphic editor, in the form of a stacked program. After checking and testing, the module then carries out this sequence of switching actions automatically. This is particularly useful for repetitions of the same command sequences or for very long or complicated sets of switching operations.

What may appear unusual for integrators is that they need not program the command sequence in a device specifically envisaged for this (such as a bay controller, front-end processor, RTU or PLC); they configure it in the HMI/SCADA server directly. The reason for putting the command sequences in their own devices is usually because they can rely on their availability. With the zenon Command Sequencer, this is no longer necessary. zenon redundancy mechanisms increase availability to virtually 100 percent. Also, precautions were taken to stop a command sequence if there are problems during execution. The module thus constantly checks the interlocking conditions. Even if interlocking conditions change during the running of a command sequence, the module stops execution of the sequence.

A major advantage of the zenon version in comparison to the device version: users can create the command sequence in simulation mode and, best of all, test it in detail. But what about the issue of process simulation in zenon? Does the person configuring the project have to consider how to develop the simulation code? No, the zenon Energy Edition offers a tool and algorithms that guarantee the interaction of command variables and response variables even in simulation mode, removing the need for engineers to program any simulation code themselves.

They can create and adapt command sequences at any time. This offers considerably more flexibility than a rigidly-programmed PLC solution and is particularly relevant for a distribution network where topology evolves. Here, dispatchers can amend the command sequences

themselves, in a protected environment – at any time. As soon as the command sequence has been tested in detail, it can be approved. The user management guarantees that only one person in charge can grant approval.

### THE BENEFITS OF THE ZENON COMMAND SEQUENCER:

- Automate recurring switching actions
- Configure complex command sequences ergonomically and start them at the click of a mouse
- No PLC programming required for command sequences
- Create and test command sequences in simulation mode
- Teaching: record the command sequence during operation in the single-line diagram
- Save time and costs, avoid errors

JÜRGEN RESCH,  
INDUSTRY MANAGER ENERGY & INFRASTRUCTURE

**Video:**  
**Configure, test and execute command sequences easily with the zenon Command Sequencer**  
Scan & Play!



<http://kaywa.me/a4FYG>

WE SAMPLED LABORATORY AIR

# zenon at the AIT Austrian Institute of Technology



SOURCE: © AIT/KRISCHANZ.ZEILLNER

TEXT:

JULIA ANGERER, PUBLIC RELATIONS MANAGER  
SEBASTIAN BÄSKEN, PUBLIC RELATIONS CONSULTANT

zenon is used in more than 90 countries around the world with over 100,000 installations in use – from the Energy and Food & Beverage sectors, through Automotive to the Pharma industry, from system integrators through machine builders to end customers, as HMI, SCADA, reporting, energy data management or even as a DCS system. The range of possible applications seems almost unending in the age of Industry 4.0. But what is our software doing in the laboratory at Austria's largest, independent, non-university research center, the Austrian Institute of Technology, known as AIT for short? We took a look inside, asked, and were amazed.

At AIT's ENERGYbase premises in Vienna, we met Thomas Strasser and Christian Seidl, two researchers from the AIT Energy Department. It's easy to tell from the electricity distribution network outside the building that it's the real deal here when it comes to energy technology. We received a friendly welcome and were led through the giant gates of the SmartEST laboratory; "SmartEST" stands for "Smart Electricity Systems and Technologies". We were impressed. An area of 400 m<sup>2</sup> revealed itself to us as one of the most modern validation, research and simulation laboratories in Europe. The laboratory is filled to the ceiling with different hardware: from inverters, through voltage regulators and storage systems, to charging stations for electric cars. The environment is rather sterile, almost like in a clean room. A spirit of invention is in the air. As we curiously scan the room, the first of many questions arise.

Thomas Strasser tells us that he and his colleagues work in the field of "Electric Energy Systems" which is also dedicated to the issues of smart grids. In practice, they analyze the interactions between electrical components and the electricity grid under realistic conditions. In doing so, they collect and document their findings about how smart grids work. These smart electricity grids are planned to ensure the supply quality, even with a high proportion of decentralized generation equipment with a fluctuating feed-in. Their focus is on photovoltaic (PV) systems and storage inverters, as well as the integration of these into electrical grids. Information and communication technology is also becoming increasingly important in their work.



Two researchers who have committed themselves to the important energy questions of our future: Thomas Strasser (left) and Christian Seidl in the SmartEST laboratory of the Energy Departments at the AIT in Vienna.

several climate chambers for carrying out tests at full power under extreme temperature and humidity conditions that are available to the researchers. It is primarily hardware products that are tested here, such as the grid connection of inverters that are used to feed photovoltaics into the grid. Such components cannot be tested in ongoing operation, which is why tests under realistic conditions are essential in order to be able to respond to complex questions relating to supply quality, capacity planning and protection strategies. Many noteworthy manufacturers place their trust in the

*"It is very important in our processes that we use real, commercial software such as zenon, which is also used in the field. This way we can guarantee that the interactions between different components tested under simulation conditions correspond to the respective application in practice."*

**CHRISTIAN SEIDL**, JUNIOR RESEARCH ENGINEER, ENERGY DEPARTMENT,  
AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

## **ON THE TRAIL OF THE PERFECT ELECTRICITY GRID**

The laboratory offers several testing and research workspaces, such as a 1 MW system – of which there are only a few in the world, as we find out later – and several 32 kV stands for pure photovoltaic power inverters and for home storage systems. The low-voltage network infrastructure of the laboratory is used for both the certification process as well as for research and test purposes. There are even

expertise of the AIT research team and have their products tested in the SmartEST laboratory before they are used in the field.

Only now are we aware that, for the range of tasks that the laboratory covers, significantly more equipment would normally be present than is visible to us. But we are looking in vain for photovoltaic equipment, transformer stations or a control room. As if the men could read our thoughts, Christian Seidl points out a small computer in

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## OUR INTERVIEWEES:



### DI DR. THOMAS STRASSER

Thomas Strasser holds a PhD degree in Mechanical Engineering with focus on automation and control theory and a Master degree in Industrial Engineering with focus on robotics and automation from Vienna University of Technology. As Senior Scientist at the AIT Austrian Institute of Technology (Energy Department - Electric Energy Systems), he is responsible for the strategic development of the research topic smart grid automation, the coordination and management of national and international research projects as well as mentoring and advising of junior scientists.



### CHRISTIAN SEITL M.SC.

Christian Seidl finished the Higher Technical School Ottakring for Computer Engineering and studied Electrical Engineering and Information Technology (BSc) and Automation Technology (MSc) at the Technical University of Vienna. In his diploma thesis "Development and Implementation of a Battery Emulator for Power Hardware-in-the-Loop Simulations" at the AIT Austrian Institute of Technology he focused on Power Hardware-in-the-Loop (PHIL) simulations of storage applications at the AIT SmartEST laboratory. Since 2015 he has worked as Junior Research Engineer at the AIT in the field of lab automation and control, smart grids and PHIL simulations.

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*"We decided to use zenon when choosing software for selected photovoltaic inverter validation processes, because it is a very open system that supports many different communication protocols and is thus easy to connect. An important aspect was communication via IEC 61850, which worked very well."*

**THOMAS STRASSER**, SENIOR SCIENTIST, ENERGY DEPARTMENT,  
AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

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the corner of our meeting room. What at first glance appears very nondescript, quickly unmask itself as a high-performance machine. With this computer, the researchers have developed a real-time emulation system that is in a position to emulate a photovoltaic inverter in real time. A controller regulates the increase in performance; this is also regulated by the system. In a fraction of a second, it is possible to react to signals or trigger power electronic components. We find out that the individual components in the field are increasingly networked and integration into higher-level control systems is becoming the standard. These serve to oversee the grids, for monitoring and reporting, as well as (remote) control of individual components, most of all when these are positioned in distant, difficult-to-access terrain. In these situations, zenon acts as the "missing link".

### ZENON AS A STABLE IEC 61850 CONSTANT IN AN EXPERIMENTAL SETUP

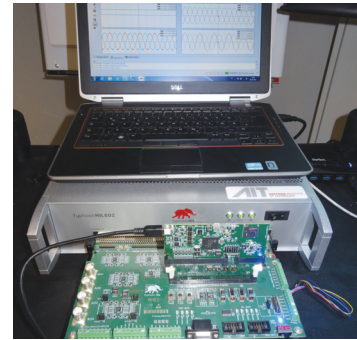
In order to guarantee the networking of various power electronic components, they must be able to communicate with one another and with other devices and systems. Thomas Strasser explains to us that the Modbus communication protocol has established itself as a standard among manufacturers of inverters, because it is relatively simple to implement. However, what many grid operators appear to have forgotten or are not (yet) considering, is the fact that future communication in station automation will largely be implemented using the international IEC 61850 standard. After all, this transfer protocol was specially conceived and developed for such applications. It is a fact that if devices and systems do not speak the same language, seamless communication cannot take place. Even if IEC 61850 currently sounds like a vision of the future, for many, it is now time to carry out research, tests and simulation applications. For this reason, the AIT researchers looked for a control system that already "speaks" IEC 61850 – ideally with a "plug & play" philosophy, at the click of a mouse. Ultimately, they found what they wanted at COPA-DATA. Our zenon software is able to network control system devices and systems from different manufacturers. For this reason, it "speaks" fluent IEC 61850. In order to allow the research team to carry out realistic test processes on the basis of IEC 61850, we equipped AIT with zenon software licenses. The researchers translate Modbus from the inverters to IEC 61850 using Process Gateway, in order to allow communication with zenon. The primary focus of this research and testing is the interaction between communication infrastructure and power grid operation.

Upon asking for more detail, we find out that zenon is also used for a validation application in the laboratory, in order to connect a phasor measurement unit

(PMU). Here too, communication via IEC 61850 plays a role, especially for wide-area communication. The SmartEST laboratory provides a validation platform for this process. The test scenario looks like this: in a low-voltage network, the PMU is to be used as a measurement device that transfers the information to the zenon control system. zenon then uses the measurement data to remotely control the voltage regulation of the photovoltaic converters. A test is carried out to see if this construction works, how the components interact, which dependencies there are and whether, and to what extent, communication problems may influence the process. In this research design, zenon is the independent, stable constant, which is used to research and test different usage scenarios. Up to now there haven't been any notable problems and the tested communication structure is robust, secure and will soon be ready to use in the field.

Impressed by the many insights and information, we took a final walk round the laboratory with the researcher duo. There are exciting test beds to be discovered everywhere, which gave us promising insights into the future of our energy generation, storage and distribution. Proud of the fact that we are helping manufacturers of inverters to optimize their products with zenon, and contributing to smarter electricity grids at research level, we said goodbye with hope for further implementation of zenon in the AIT SmartEST laboratory.

You can find further information on zenon IEC 61850 support at [www.copadata.com/energy](http://www.copadata.com/energy).



What would take up too much space in reality is emulated here in real-time. The conditions are nevertheless realistic and absolutely viable in the field.



## ABOUT THE AIT AUSTRIAN INSTITUTE OF TECHNOLOGY:

With around 1,260 employees, the AIT Austrian Institute of Technology is Austria's largest non-university research institute, focusing on central infrastructure topics of the future. Using applied research and the development of methods, processes and tools, fundamental innovations for next generation technologies in the areas of energy, mobility, health, environment, digital safety & security, as well as innovation systems, are implemented for their customers and partners from industry and administration. You can find further information at [www.ait.ac.at](http://www.ait.ac.at).

**Video: a tour through the AIT SmartEST laboratory**  
Scan & Play!



<http://kaywa.me/x7KME>

## ABOUT THE AIT SMARTEST LABORATORY:

AIT Energy develops innovative solutions for sustainable energy systems that are based on many years of experience in accredited testing and research. The AIT SmartEST laboratory offers a unique research and simulation structure in order to analyze the interaction between components (such as inverters, storage systems, voltage regulators, combined heat and power units, electric vehicle charging stations) and the grid, under real conditions.

ENERGY DATA MANAGEMENT ACCORDING TO ISO 50001

# Enlightened Energy Efficiency at Zumtobel with zenon



The Zumtobel Group, a leading international supplier of innovative lighting solutions for professional indoor and outdoor applications, uses the HMI/SCADA software zenon as a flow measurement solution to improve energy efficiency. The cooperation between the industrial automation software specialist COPA-DATA and the Zumtobel Group has a long history. Back in 2008, zenon became one of Zumtobel's trusted automation solutions because of its flexibility in user interface design and the ease it brings to managing production facilities.

For more than 50 years, the Zumtobel Group has been developing innovative custom lighting solutions for professional lighting applications in offices, hotels, spas, cultural spaces, and industrial and engineering environments. Solutions have to meet exact requirements in terms of ergonomics, efficiency and environmental compatibility while also delivering aesthetic value.

#### **ON THE ROAD TO ENERGY EFFICIENCY**

Several years ago, Zumtobel started a new measurement project. The aim of this project was to profit financially through a sustained program of energy efficiency while simultaneously protecting the environment which was finally achieved by zenon from COPA-DATA. In addition, the project made a valuable contribution to the ISO 50001 certification.

Zumtobel was looking for a clear visualization solution well-suited to facility management. The aim was to measure not only energy data on electric meters, but to collect and save data from the whole facility for later analysis.

The existing electric meters had originally been put in place only for conveying current information. Martin Kronabitter, control engineer and one of the key engineers involved in the zenon integration project, explains: "In the beginning, those electric meters were not meant to save the energy data for later processing. This was simply not required back then."

monitoring task was to collect data. A facility worker went round the building and read out the energy consumption data displayed on each device. Another person manually wrote down all the figures, which were later transferred to an Excel sheet. Each month, the collected data was reviewed."

#### **RELIABLE AND EFFICIENT MANAGEMENT OF ENERGY DATA WITH ZENON**

Before long, it became increasingly important for production facilities to have in-house energy consumption meters which could save all the readings. Barbara Mihatsch and her team decided to implement zenon to make this possible in the Zumtobel facilities. Here, she tells us what it is that, for her, makes zenon so unique: "We are impressed by such a versatile, extensive software solution. We can run individual reports very simply and with 100% reliability. zenon can perfectly support you by displaying different types of data and automatically generating reports. We wanted to have everything done automatically. zenon does this for us. Even SAP data is perfectly accessible in zenon. It provides visualizations at our fingertips. We can access it anytime and anywhere. In addition, the technical support during our training process was well managed."

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*„Thanks to zenon, data is collected accurately and automatically and we can view reports based on our data whenever we want. We see our energy optimization improvements every day in our work. This is a great motivational force for our team.“*

**BARBARA MIHATSCH, PROJECT LEADER, ZUMTOBEL LIGHTING GMBH**

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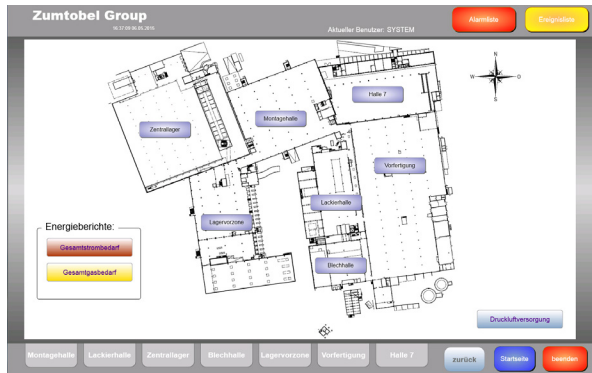
Using electric meters to monitor energy flow was ahead of its time back when the meters were installed. There was no plan to save all the collected energy data in one place for later analysis.

The company had set up electric meters across the site in order to aid the calculation of energy consumption. Staff read out data on demand only from those devices necessary for making calculations. The electric meters were connected to each other. "It was a huge system of connections inside the building, like a network system," explains Barbara Mihatsch, the project leader at Zumtobel. "The primary

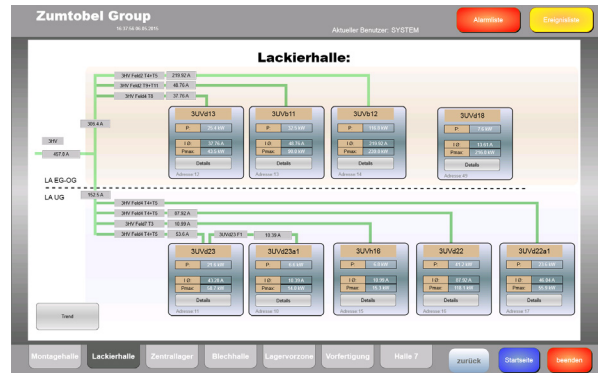
#### **ENERGY DATA MANAGEMENT ACCORDING TO ISO 50001**

After several internal briefings at Zumtobel to assess solution providers that could create a measuring solution, Barbara Mihatsch finally achieved her ambition: an ISO 50001 measurement solution.

She explains her main reasons for having chosen zenon over the other solutions: "zenon has an amazing graphical environment. It is so easy to create a project with zenon. Each element is added using a 'drag and drop' function which makes our work very efficient." The other reasons for



Zumtobel site overview as rendered in the zenon system, including offices, production areas and warehouse.



ISO 50001 measurement concept. The production hall overview.

having chosen zenon over other providers were: simplicity, performance, flexibility and the fact that zenon is an Austrian product.

The days when a person walked around the building and collected energy data on a sheet of paper and then manually entered it into the computer are over. Mihatsch remembers: “There was no one collecting energy consumption data at certain times; for example, on Fridays at 4pm, during holidays or emergency situations. There was no talk about 100% accuracy, because it was impossible. Even if it was possible for the data to be collected on time, it was impossible to be in two or three different places in a building at the same time.”

Mihatsch continues: “Now with zenon, the gathered data is 100% exact. We save a lot of time not doing calculations manually.” In addition, by 2014, zenon had played a decisive role in helping Zumtobel attain ISO 50001 certification.

## ZENON AS THE FOUNDATION OF AN ENERGY MANAGEMENT SYSTEM

The zenon Product Family has proven itself in practice as the centerpiece of an energy management system. Zumtobel profits from its ability to easily integrate with existing systems. zenon offers more than 300 communication protocols. Without the need for programming, data can be collected from various sensors, control systems, machinery and entire facilities.

zenon supports Zumtobel with the automated collection and evaluation of any energy data it requires for decision-making in energy management. “Energy consumption data

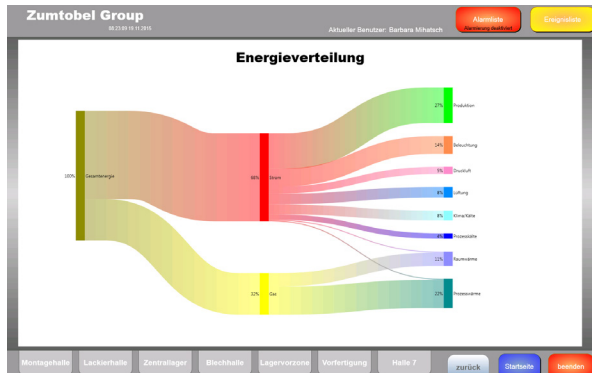
from various sources is pulled together centrally by zenon. Data is clearly displayed. Now we have access to all our energy management reports and performance indicators, as well as historical energy data, in real time.”

The fundamental principles of the ISO 50001:2011 standard clearly show that a functioning energy management policy must consistently measure, collect, process and analyze consumption and production data. The core instrument for this is an Energy Data Management System (EDMS) which manages everything, from energy consumption meters, right up to significant software reports.

Protecting the environment and cutting costs are often seen as contradictory goals. This needn't be the case. With its zenon-based Energy Data Management System, Zumtobel keeps an eye on its resources and energy consumption. In this way, it both protects the environment and cuts costs, while optimizing its productivity.

## BROADENING PROJECT SCOPE: ZENON ANALYZER IN USE

By 2013, following the measurement project, Zumtobel started to reach an optimization of its resources. Martin Kronabitter explains that, “as a result of the zenon integration, his team is even more motivated because of their great satisfaction with zenon. The combination of zenon Supervisor and the later addition of zenon Analyzer ‘makes magic!’” he says. With zenon Analyzer, Zumtobel can be sure that the data it bases its decisions on is correct. The core of each report is high-quality data from the process combined with valid meta data. zenon Supervisor



The Sankey Diagram clearly displays the energy consumption of Zumtobel's painting hall.

captures data from the measurement device and saves it. zenon Analyzer can process and analyze various types of information in real time and display it in any way required. Calculations and reports are achieved in just a few clicks.

Mihatsch sums up the project: "When we began, we were reading out data once a month manually which required a huge effort in terms of human resources. Now data is collected accurately and automatically and we can view reports based on our data whenever we want. We see our energy optimization improvements every day in our work. This is a great motivational force for our team."

## CONTACT:

### Hans-Peter Ziegler

Sales Manager/Authorized Signatory  
COPA-DATA Central Eastern Europe/Middle East  
hans-peter.ziegler@copadata.com

## ZENON AS AN EDMS ACCORDING TO ISO 50001:

- Simple, rapid and flexible project engineering
- Out-of-the-box modules
- Flexibility in user interface design
- Clear display of energy consumption data
- Certified direct connection to SAP ERP
- Dynamic, reliable and easy-to-use reports
- ISO 50001 compliance

# ACG, Innovation for India's Pharmaceutical Powerhouse

FLEXIBLE, SAFE, AND IN CONTROL

India has emerged as a powerhouse of pharmaceutical manufacturing and is now one of the largest providers of generic drugs globally. Enjoying this very important position in the global pharmaceutical market, India's scientists and engineers are shaping the industry and raising standards.



Figure 1: ACG Worldwide, ACG Pharma Technologies, Satara facility.

Even with a constant drive for success, pharmaceutical producers cannot go it alone. The agile flexibility of OEMs specializing in the pharmaceutical industries has harnessed their decades of experience and leveraged “blue sky thinking” to introduce the latest technologies. Collectively, this is their competitive edge: high-end process solutions to advantage India’s pharmaceutical manufacturing.

In this article, I would like to introduce you to one of the pillars of this sector. Since the 1960s, ACG Worldwide has had its finger on the pulse of global pharmaceutical manufacturing. Originally producing hard capsules used in final drug manufacturing, ACG realized there was a huge international potential for its product. It heavily invested in upgrading its plants and processes to become a world-

Having accomplished this, ACG is now being recognized globally for its capsule filling, solid dose and packaging equipment. ACG enlarged its scope of talent quickly; moving further upstream in the manufacturing process in response to industry demands for its expertise of solutions in chemical process technologies. This is how ACG Pharma Technologies was born. It now produces a wide range of fluid-bed solutions for granulation, drying, and pellet coating. This transition into fluid-bed process equipment also required a transition in automation technology. The previous technology was more suited to the requirements of discrete control, but this new process environment needed automation especially designed to meet the needs of process control.

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*“The zenon software and the batch control software products from COPA-DATA have proven to be the perfect platform for our new configurable X-ONE COMMAND control system. The new X-ONE COMMAND control system from APT fulfills all the requirements of batch control machines in the pharma industry by following the GAMP 5 guidelines, the modular S-88 standards as well as the GMP and the FDA 21 CFR Part 11 requirements in a master product development lifecycle. With X-ONE COMMAND and zenon Batch Control, including its MES or ERP interfaces, our pharma customers receive a high-quality control platform for any new batch control machine equipment. It is also the perfect way to upgrade and qualify any existing batch control machine by following the pharma GMP requirements for control systems.”*

**KLAUS FEUCHTMANN,**

PROJECT LEADER AUTOMATION, XERTECS GMBH, GERMANY

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class provider for the global pharmaceutical industry. The phenomenal success that ACG generated and the knowledge gained during this optimization led to a wealth of expertise which would go on to shape a group of world-class companies dedicated to the pharmaceutical industry.

ACG’s expertise generated opportunities to support and optimize its customers’ production facilities. Valuable knowledge which embraced wider process elements beyond capsule manufacturing evolved a few decades ago when ACG began to develop new machines for the innovation-hungry Indian pharmaceutical producers. ACG led the way: producing machines for filling powders, liquids, pastes, and combinations in capsules, plus equipment for the solid dose stages of tableting, inspection, and soft gel manufacture.

ACG was already well acquainted with COPA-DATA, using zenon as standard on some of its machines’ equipment automation. During this collaboration, an understanding developed between ACG and COPA-DATA India – and more specifically with ACG Pharma Technologies – where we were privileged to be involved in the concept discussion for the new process fluid-bed systems for drying, spray granulation and spray coating.

It was natural to evolve in this way, building on ACG’s successfully proven automation technology. zenon provided the desired flexibility, especially with GAMP 5 adherence and FDA 21 CFR Part 11 compliance; a global product on the global stage of international regulations and industry best practice.



Figure 2: In the flesh, ACG Pharma Technologies steel work construction of fluid-bed systems.

To secure global expertise in this new field, ACG partnered with Xertecs GmbH, which operates internationally from its European and US offices. Xertecs specializes in the implementation of technology, processes and services for the pharmaceutical industry. Specifically, for ACG Pharma Technologies, Xertecs's direct experience of excellence in fluid-bed systems, and their adroitness in key international regulations and certifications, provided a powerful partnership – combining the highest levels of innovation with maximum flexibility.

ACG's fluid-bed solutions needed process control at a machine level, in a self-contained system. The initial sketches described the following requirements:

- Process control
- Scalable technology
- Part 11 compliance, audit trail, alarm management, user administration, Historian, reporting
- Integration to higher level system, ERP, MES, SQL

- GAMP 5 guideline best practices, software category 4 (configurable system)
- Process modifications by the end customer, not automation engineers
- Flexible and agile processes
- Reduce risk exposure as far as possible
- Efficient validation

For the team at COPA-DATA, these requirements echoed the initial use cases we developed for zenon's Batch module, the backbone on which the module was designed. The zenon Batch Control module is scalable – from entire plant control with multiple concurrent batches and Historian, through to single use on individual production lines or, as in this case, individual machines. It integrates seamlessly into the zenon environment, where zenon supports Part 11 compliance and GAMP 5 adherence, to create a very flexible end product for ACG.

A solution resulted that combines the process knowledge and control in an environment that allows for new process

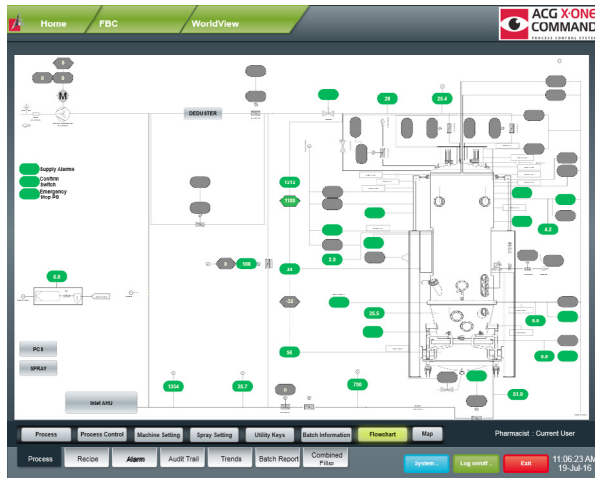


Figure 3: ACG X-ONE COMMAND system: Process overview.



Figure 4: ACG X-ONE COMMAND system: Batch recipe.

recipes to be created without the need for an automation engineer to be involved: a living example of “you innovate and we take care of the compliance”. Adhering to the GAMP 5 guidelines positively impacts the validation necessary to qualify equipment for its intended purpose: reducing effort, time and cost at the end customer’s site. zenon’s connectivity allows for a smooth integration into a facility’s supply chain, MES, ERP and user management system, and is flexible to accommodate the end customers’ QMS.

In pharmaceutical production equipment, the user interface is a critical element. This is the window where the end customer sees the benefits of the machine solution, and where the regulatory data is controlled and generated. The system needs to comply with international regulations (e.g. FDA Part 11), it needs to be robust with very long uptimes, and have a variety of functional roles depending on who uses it. The automation solution needs to integrate

seamlessly into each customer’s unique production and quality system, as this is the junction between the effective equipment technology and the customer’s operational procedures. The connectivity and functionality of zenon create a robust and competent control environment to fulfil the process needs, the flexibility of configuration allows for a smooth interface into the wider production systems, and all this is achieved under the watchful eye of the strict regulations and industry best practices.

The principles of Batch Control defined in the ISA-88 standard has some very desirable features, especially in the regulated industries of pharmaceutical production. Batch Control separates the direct physical control of the equipment in the PLC logic, with its real-world variables and many control elements, from the process control arena, with its process control loops and process parameters.

*“The batch control module from COPA-DATA has given us a perfect base on which to provide a value solution to our customers for recipe management. Various permutations and combinations of process parameters at different process stages are simple to achieve with the help of pre-validated modules. In this way, zenon supports flawless configuration in our project development. We greatly appreciate zenon – and the efforts of COPA-DATA and Maestro Technologies, who have supported us in adopting this technology and integrating it in our projects.”*

**SUDHIR KALKAR, GM TECHNICAL, ACG PHARMA TECHNOLOGIES, INDIA**




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## ABOUT ACG PHARMA TECHNOLOGIES:

ACG Pharma Technologies is a member of ACG Worldwide. With over fifty years of industry experience, ACG Worldwide is an integrated processing, manufacturing and packaging solutions provider for the global pharmaceutical industry. The Group synergistically integrates businesses right from granulation and tablet coating equipment to hard capsules and capsule-filling machines; barrier packaging films to blister packing and cartoning machines; tablet compression systems to tablet tooling; vision inspection systems to end-of-line packaging solutions. With the backing of a dedicated R&D facility - SciTech Center - in Mumbai, India, ACG has been committed towards continuous investment in innovative products and technologies that serve the pharmaceutical industry. Recognized as 'Best Vendor' by OPPI, ACG has also bagged awards for several innovative products from IIP & Pharmexcil. ACG serves customers in more than 100 countries and has its subsidiaries in Brazil, China, Indonesia, the US and the UK. Find out more at [www.acg-world.com](http://www.acg-world.com) or [www.acg-pharmatechnologies.com](http://www.acg-pharmatechnologies.com).

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Learn, how you too, can enhance your batch production with zenon Batch Control. Fact Sheet, videos and more at your fingertips!

<http://kaywa.me/UsZ7T>



Effectively, the zenon Batch Control module lifts the process control out of the intricate world of automation engineering. It allows process engineers the vision to see the fluid and chemical chains, and have a tool at their fingertips to put this into action. They don't need to know anything about automation or individual variables. They simply drag and drop pre-validated phases to define the process, then zenon effectively executes the process control. A process environment, for process engineers: design the automation once and reuse it for many different products.

ACG's vision is to be globally recognized for pioneering new technology and nurturing talent to attain successful products and services in a demanding complex industry. It is a pleasure to have zenon operating within this sphere of expert knowledge, and to be a part of making the "blue sky thinking" a reality at ACG.

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**ROBERT HARRISON,**  
INDUSTRY MANAGER PHARMACEUTICAL

HARRO HÖFLIGER  
INVESTS IN USER-FRIENDLINESS

# Visibly Better



reddot award 2016  
winner interface design

What does a human-machine interface need to do in order for operators, service staff and maintenance staff to be able to work efficiently and productively? Harro Höfliger has created a modern user interface for all types of machines on the basis of zenon from COPA-DATA. It is characterized by intuitive design which allows for quick learning and by functional operation, thanks to familiar Multi-Touch gestures.



Capsules, tablets, inhalation products, liquid products, aseptic products, diagnosis products, batteries, machines for product assembly and packaging – Harro Höfliger Verpackungsmaschinen GmbH, a company founded in 1975, now offers a broad range of machine types for the production and packaging of pharmaceutical goods, medicine, consumer goods, cosmetics and chemical technology. The large number of machines means that complexity also increases – the complexity of machines

and thus also the complexity of operation. “A station, i.e. a functional component of a machine, previously only had a few parameters. Now, individual stations have up to twenty screens, each with 20 parameters that can be set”, explains Fabian Elsässer, HMI/SCADA Systems Group Leader at Harro Höfliger Verpackungsmaschinen GmbH. “Only ergonomically-designed user interfaces allow the user to overcome this complexity.”



user interface. Harro Höfliger has created a standard library of widgets for the different machines. The widgets perform certain functions or display certain parameters and data (such as counter values for example). Users can create their individual home screen from the widgets that are relevant to their task.

as they need. Thanks to the online language switching integrated into zenon, the country-specific language selection is very easy.

*“zenon is an HMI/SCADA solution that offers an extremely large range of functions out of the box, and also has the flexibility, thanks to the programming interface, to design the application in such a precise way that a company's complete customer requirements can be fully met.”*

**FABIAN ELSÄSSER**, GROUP LEADER OF HMI/SCADA SYSTEMS, HARRO HÖFLIGER  
VERPACKUNGSMASCHINEN GMBH

A smartly-created, abstract and modular machine display makes it possible for the user to navigate using the centrally-placed machine screen and to change parameter settings or make corrections at the individual stations of the machine. In doing so, the machine screen is shown in an abstract form with the individual stations as navigation elements. A machine can consist of up to 100 stations. To be able to keep an overview, the users can use the Worldview control in the station overview. This zoom and navigation tool allows a clear display of large and complex process screens – regardless of the display size. Users can focus on individual stations, zoom and navigate in these.

#### **CLEVER MENU STRUCTURE FOR EFFICIENT AND SECURE WORK**

The main menu now consists of six menu items: Management, Stations, Diagnosis, Statistics, Service and Help. Recipe administration, lot and batch management, audit trails and alarm administration are under the “Management” item. The user administration is also integrated there, so that users only execute the tasks and operate the functions that are saved in their user profile. In the “Stations” menu item, the user can select, set parameters for, and configure individual stations of a machine. “Diagnosis” delivers error messages from the controllers, and provides assistance with troubleshooting and error detection. The “Statistics” menu item provides counter screens, lists, production counters, error counters, extended trends, production statistics etc. In order to be able to work with ease, the user can state whether they are left handed or right handed and position the menu bars on the left-hand side or right-hand side

**Video:**  
**Gain an insight into the award-winning Harro Höfliger HMI based on zenon**

Scan & Play!



<http://kaywa.me/yi1FE>

#### **CONTACT:**

**Frank Hägele**  
Sales Director  
COPA-DATA Germany  
[info@copadata.de](mailto:info@copadata.de)

AROUND THE WORLD



STEFAN HUFNAGL,  
PRODUCT MANAGER INTEGRATED SOLUTION,  
COPA-DATA



**AROUND**  
**THE**  
**WORLD**



# ISV-4-INDUSTRY:

## The Software Alliance for the Smart Factory

Industry 4.0 and the Internet of Things will change the way we manufacture and work together. However, it is still not clear to many decision makers what is the best path to the smart factory. We have therefore joined up with three other Austrian software manufacturers to support future-orientated companies with the development of innovative solutions. The isv-4-industry software alliance was a success story from the start, and has been awarded the “Country Partner of the Year Award” in Austria in its first year.

Even now, there are surprisingly few manufacturing companies that consider the topic of Industry 4.0 to be very important or that are already prepared for it. The benefit is often too unclear, and there are no clear, practical examples. Johannes Petrowisch, Global Partner & Business Development Manager at COPA-DATA says: “Industry 4.0 means a paradigm shift; it makes the holistic approach of a company essential. An important basis for this is solutions throughout domains. The isv-4-industry alliance embodies this thinking – and closes the gap between theory and practice.”

### **FOUR FOR ALL**

The isv-4-industry software alliance – isv stands for independent software vendors – consists of four independent, globally-active software manufacturers from Austria that possess expert knowledge of data networking and data provision. COPA-DATA contributes zenon, HMI/SCADA software that can be used throughout many industries. The Firestart BPM Suite comes from PROLOGICS, and is a complete solution for process management including workflow automation and process analysis. augmensys adds, with UBIK, modern software for augmented reality

into the mix. And icomedias provides its solution, HYBRID.FORMS, for the automated processing of forms. Jürgen Kneidinger, CEO of augmensys says: "For many, Industry 4.0 is still an increasingly-used but meaningless term. The isv-4-industry alliance shows that there is another way and now creates measurable benefit through the application-related networking of products."

All four systems can be used independently from one another in different scenarios and architectures, but are designed to communicate perfectly with one another. This is how completely new, comprehensive solutions for maintenance and servicing can be developed. The most important objective of the isv-4-industry software alliance is to show the actual benefits of the latest technology and to implement it within pre-existing infrastructures. This includes applications for service and maintenance, as well as commissioning, quality management, energy data management and logistics. The holistic approach of the alliance is particularly suited to optimizing pre-existing infrastructure, and to design working processes more quickly and efficiently – in order to reduce costs, improve flexibility and increase competitiveness.

### THIS IS HOW A SMART FACTORY WORKS

The cooperation of isv-4-industry provides companies with innovative ideas and applications – including practical, small advantages in management. Each of the partners can draw on the expertise and services of all four companies and can thus very quickly turn questions into tangible solutions. Christian Ekhart, CEO of icomedias, explains: "In isv-4-industry, we connect the solutions of four providers, each with different approaches in different fields. This combination allows the respective optimum customer benefit – better than any one could achieve alone."

The choice of products and services that can be combined, will differ for each individual requirement. A practical solution for a system-wide application could look like this:

Putting equipment into operation and maintaining it requires a large amount of paper documents. The isv-4-industry solution can noticeably improve this process with digital workflows, interactive forms and augmented reality. The planning and execution of the individual work processes are simplified considerably. Whereas now there are often still qualified personnel with thick paper folders travelling around the globe – in the future, work procedures will be supported with digital, local resources everywhere in the world. This saves not just a great deal of time, but also provides quality benefits.

### AWARD-WINNING

The original networking base of the isv-4-industry alliance is the Microsoft Partner Network, to which all four members belong. Although we only merged into an alliance at the end of 2015, we have already impressed Microsoft with our ideas and applications. So much so, that we received the "Microsoft Country Partner of the Year Award" in Austria in 2016. Robert Hutter, CEO of PROLOGICS says: "Our alliance shows very well how individual technologies, put together correctly, can create considerable added value for the customer. The future belongs to humans and machines, but we are ensuring that humans keep the upper hand."

You can read more about the software alliance at:

[www.isv4industry.com](http://www.isv4industry.com).

**ISV<sup>4</sup>INDUSTRY**  
AUGMENSYS | COPA-DATA | ICOMEDIAS | PROLOGICS



### ISV-4-INDUSTRY IS THE MICROSOFT PARTNER OF THE YEAR

Over 2,500 nominations from 119 countries were considered for the 2016 Microsoft Partner of the Year Awards. A specialist jury selected the winners in 37 categories. The most important criteria are the use of the most recent Microsoft technologies, such as the Microsoft Azure cloud platform, and solving an existing customer problem.

The isv-4-industry software alliance won the "Microsoft Country Partner of the Year Award" in Austria due to its strong orientation towards partnership. Therefore, for the first time in the history of the Microsoft Partner Awards, an alliance is the recipient of an award. The winners and finalists were honored in July 2016 as part of the Microsoft Worldwide Partner Conference (WPC) in Toronto, Canada.

**HANS-PETER ZIEGLER,**  
SALES MANAGER,  
COPA-DATA CEE/ME

## WHO IS WHO



### Bartłomiej Giza

TECHNICAL CONSULTANT  
COPA-DATA POLAND

**AT COPA-DATA SINCE:** 2015

**RESPONSIBILITIES:** I'm mainly focused on supporting customers in Poland and sometimes in Central Eastern Europe and the Middle East with technical issues. Alongside that, I provide training for Polish clients and also help our sales team with technical aspects.

**I GET MY INSPIRATION FROM ...** sports and the time I spend with my family and friends. My favorite sports are cycling, football and basketball. I also love mountain hiking, especially in the beautiful Polish Tatra mountains.

**IF I COULD DO AS I WANTED, I WOULD ...** collect the Crown of Europe (the highest mountain in each country in Europe), Crown of the World (the highest mountain on each continent) and Crown of the Himalayas.

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You can reach me at:  
bartlomiej.giza@copadata.com



### Christian Bauer

TECHNICAL PRODUCT MANAGER  
COPA-DATA HEADQUARTERS

**AT COPA-DATA SINCE:** 2013

**RESPONSIBILITIES:** As a Technical Product Manager, I'm responsible for the zenon API, the integration of VBA/VSTA, WPF elements and wizards, and our Azure interface in zenon. In these areas, I primarily support my colleagues with their tasks and technical questions. In addition, I hold training courses and workshops in relation to these topics, as well as the zenon Basic or zenon Supervisor training.

**I GET MY INSPIRATION FROM ...** my small farm. Being with nature and animals offers the perfect change from everyday office life. If there is time, I like to unwind with sport or enjoy a good movie.

**IF I COULD DO AS I WANTED, I WOULD ...** travel to the most beautiful places on earth with no time limitations, get to know the culture and people, work with them and help them, gaining many impressions and enriching myself with new experiences.

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You can reach me at:  
christian.bauer@copadata.com



### YoungSu Kim

TECHNICAL SALES & GENERAL MANAGER  
COPA-DATA KOREA

**AT COPA-DATA SINCE:** 2010

**RESPONSIBILITIES:** I'm responsible for the domestic sales of zenon in South Korea. Even though Korea is a very small country, there are several big players here. In order to be able to approach such key accounts, I have to not only prepare a sales approach but also have a strong background in technology. When I meet senior research engineers or directors of R&D centers, I don't explain what zenon is. Instead, I listen to what they need and what their wishes are, then I suggest the best solution for their own particular situation.

**I GET MY INSPIRATION FROM ...** my family. My wife gives me her full support and my little girl gives me an immeasurably precious smile every day.

**IF I COULD DO AS I WANTED, I WOULD ...** be a professional baseball player.

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You can reach me at:  
youngsu.kim@copadata.com

## WHO IS WHO



### Lee Sullivan

REGIONAL MANAGER

COPA-DATA UK

**AT COPA-DATA SINCE:** 2016

**RESPONSIBILITIES:** I'm responsible for actively selling zenon in the Southern UK area to new and existing customers, through the effective use of technical knowledge. I'm also in charge of building and maintaining strong customer relationships and growing COPA-DATA's UK revenue and profitability consistent with strategic business goals.

**I GET MY INSPIRATION FROM ...** wanting to die contented. What I mean by this is that I want to live my life to the fullest, being the best husband/father/friend I can, dreaming but realizing as high as I can, changing and adapting as often as possible. I can then die with a smile knowing I tried everything and gave everything.

**IF I COULD DO AS I WANTED,**  
**I WOULD ...** be an entrepreneur and design stuff that would make the little hassles in life easier.

You can reach me at:  
lee.sullivan@copadata.co.uk



### Martin Feustel

SENIOR TECHNICAL CONSULTANT

COPA-DATA GERMANY

**AT COPA-DATA SINCE:** 2012

**RESPONSIBILITIES:** In the role of Senior Technical Consultant I support our sales team, for example with the conception and preparation of proposals. I also advise existing and new customers in regards to any technical questions they may have. Furthermore, I'm responsible for managing our training courses and workshops. My work covers the eastern fringes of Germany – from the Alps to the Baltic Sea.

**I GET MY INSPIRATION FROM ...** going to festivals and concerts, which is the perfect place to spend time with friends and switch off from daily life.

**IF I COULD DO AS I WANTED,**  
**I WOULD ...** take a trip around the world on a motorbike and spend extra time in the places I really liked.

You can reach me at:  
martin.feustel@copadata.de



### Bernhard Gruber

RELEASE MANAGER

COPA-DATA HEADQUARTERS

**AT COPA-DATA SINCE:** 2008

**RESPONSIBILITIES:** I'm in COPA-DATA's Technology Services team. I'm responsible for – and the central point of contact for – the internal coordination of the release process, up to the point of release, for the complete zenon Product Family. Among other things, I pursue the further development of our software setup, including attendant communication with our OEMs. At the same time, I support my colleagues in the team with creating tailor-made solutions.

**I GET MY INSPIRATION FROM ...** virtually everything – be it one of my numerous hobbies, such as brewing beer, photography, cooking, or in conversation with friends and family.

**IF I COULD DO AS I WANTED,**  
**I WOULD ...** initially not be able to decide on what to do at all. My dreams are varied. To name just two of them: opening a cool steak and cocktail restaurant, and running my own vineyard in the south.

You can reach me at:  
bernhardg@copadata.com

# **COPA-DATA PARTNER COMMUNITY**



IN FOCUS:

## EDUCATIONAL INSTITUTIONS AND RESEARCH FACILITIES

Our collaboration with various educational institutions and research facilities around the world is instrumental to our innovation strategy. This long term interaction with universities, schools and research institutes significantly contributes to the innovative development of our products and solutions. Due to the increasing importance of this sector, this type of partner is now being officially welcomed into the COPA-DATA Partner Community.

### NEW “EDUCATIONAL INSTITUTIONS & RESEARCH FACILITIES” PARTNER CATEGORY

COPA-DATA is the technological leader for ergonomic and highly dynamic process solutions. One vital aspect of successfully positioning ourselves in the market has been our long-standing collaboration with education and research institutions and the subsequent innovative product development. Research projects, bachelor or master theses, internships, project work and further joint activities contribute to continually increasing our company's innovative power and further our position as technology leader.

When the COPA-DATA Partner Community was first introduced in 2011, its focus was mostly on system integrators and other business-related organizational types. Now, educational institutions, such as universities, advanced technical colleges, academies and private and public research facilities, are officially included in the partner program. After many discussions with different members of this sector, this partner category was developed according to their requirements and desired benefits, bringing future collaboration into a more formal structure.

Some of the many advantages include:

- The zenon Education Package for pupils and lecturers (incl. self-study material, demo projects, etc.).
- Guest lectures on zenon or other topics at the respective institution.
- Free zenon licenses for use in laboratories, research projects or degree theses.
- The distribution of industry-related research surveys within the COPA-DATA Partner Community.

### ZENON IN EDUCATION AND RESEARCH

#### SALZBURG UNIVERSITY OF APPLIED SCIENCES

Since 2002, a very successful partnership has been in place with the Information Technology & Systems Management study path (ITS) at the Salzburg University of Applied Sciences. zenon is used at the University for all research projects in automation and control technology, such as SimuProd and Smart Campus Puch. Our software is also used in seminars and is a part of research and study projects, and bachelor and master theses. The entire building services and parking management at Salzburg University of Applied Sciences is now controlled by zenon. The University and COPA-DATA also run a cooperation laboratory in Puch where together we support the skills development in young people.

Joining the COPA-DATA Partner Community was a logical step for the Salzburg University of Applied Sciences, which brought greater visibility to our cooperation. Simon Kranzer, research associate at Salzburg University of Applied Sciences, sees the Partner Community as a platform for interaction between commercial partners

*“The cooperation with COPA-DATA encourages progress and innovation. And the unity of research, training and practical experience underwrites our offer of a high-quality education.”*

**SIMON KRANZER**, RESEARCH ASSOCIATE,  
INFORMATION TECHNOLOGY AND SYSTEM  
MANAGEMENT, SALZBURG UNIVERSITY OF  
APPLIED SCIENCES

“Partnerships with education and research institutions are an important instrument for our innovation strategy. Networking with universities provides an impulse for innovations in industry, allows us access to scientific findings and guarantees the training of highly-qualified graduates at further education institutes,” explains George

*“We are pleased to be able to benefit from COPA-DATA’s practical know-how and the many years of proven expertise in the industry. A lively exchange of knowledge is indispensable for our chair. The cooperation promotes not just research, but also the transfer of knowledge within the industry.”*

**XINYU CHEN**, RESEARCH ASSOCIATE,  
CHAIR OF FOOD PACKAGING  
TECHNOLOGY, TUM

and universities. “The students have a wide range of opportunities for networking and thus gain in-depth insights into current technological developments. We can thereby make the world of automation, its application areas and research questions more tangible for them.”



### **TRAINEE AND INNOVATION DEVELOPMENT IN COLLABORATION WITH THE TECHNICAL UNIVERSITY OF MUNICH**

The chair of food packaging technology at the world-renowned TUM (Technical University of Munich) is also a “Registered Partner” of the COPA-DATA Partner Community. The focus of this partnership is close cooperation in sciences and teaching, as well as promoting young researchers and innovation.

Yamanoglu, New Markets & Partner Account Manager at COPA-DATA Germany.

The joint work and regular exchange between science and business has already borne fruit. COPA-DATA has been involved in the “Weihenstephan Standards” (WS) working group since 2008. The Weihenstephan Standards enable a manufacturer-independent connection between HMI/SCADA or MES systems and machines in the filling and packaging industry, as well as the foodstuffs industry. For users, this means that the integration of machines into assembly lines becomes significantly easier. The standardization comprises data content (data points as well as the definition of data points), a physical interface and a set of commands.



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**OFFICIAL MEMBERS OF THE COPA-DATA PARTNER COMMUNITY FROM THE “EDUCATIONAL INSTITUTIONS & RESEARCH FACILITIES” CATEGORY**



Practical Robotics Institute  
Austria (abbr: PRIA)



STRI AB (Sweden)



Salzburg University of Applied  
Sciences (Austria)



Lapplands Gymnasium,  
Välkomnaskolan (Sweden)



HTLuVA St. Pölten  
(Austria)



Kungliga Tekniska Högskolan  
(Sweden)



Automation and Control  
Institute at the Vienna  
University of Technology  
(Austria)



The Chair of  
Food Packaging Technology at  
the Technical University Munich  
(Germany)

You can find all COPA-DATA Partner Community members at [www.copadata.com/find-a-partner](http://www.copadata.com/find-a-partner). Do you want to become a member? Contact us without commitment at [partner@copadata.com](mailto:partner@copadata.com) or talk to your local COPA-DATA Sales Representative.

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JOHANNES PETROWISCH,  
GLOBAL PARTNER & BUSINESS DEVELOPMENT MANAGER

GEORGE YAMANOGLU,  
NEW MARKETS & PARTNER ACCOUNT MANAGER,  
COPA-DATA GERMANY





*A culture of innovation neither emerges overnight, nor automatically. It is the result of consistent work – and a lot of patience. Just like a Soma cube. It can be assembled in 240 different ways. Every combination reaches the goal, one isn't better than the other. But only when all seven parts fit together perfectly can the big picture be seen. Try for yourself!*

