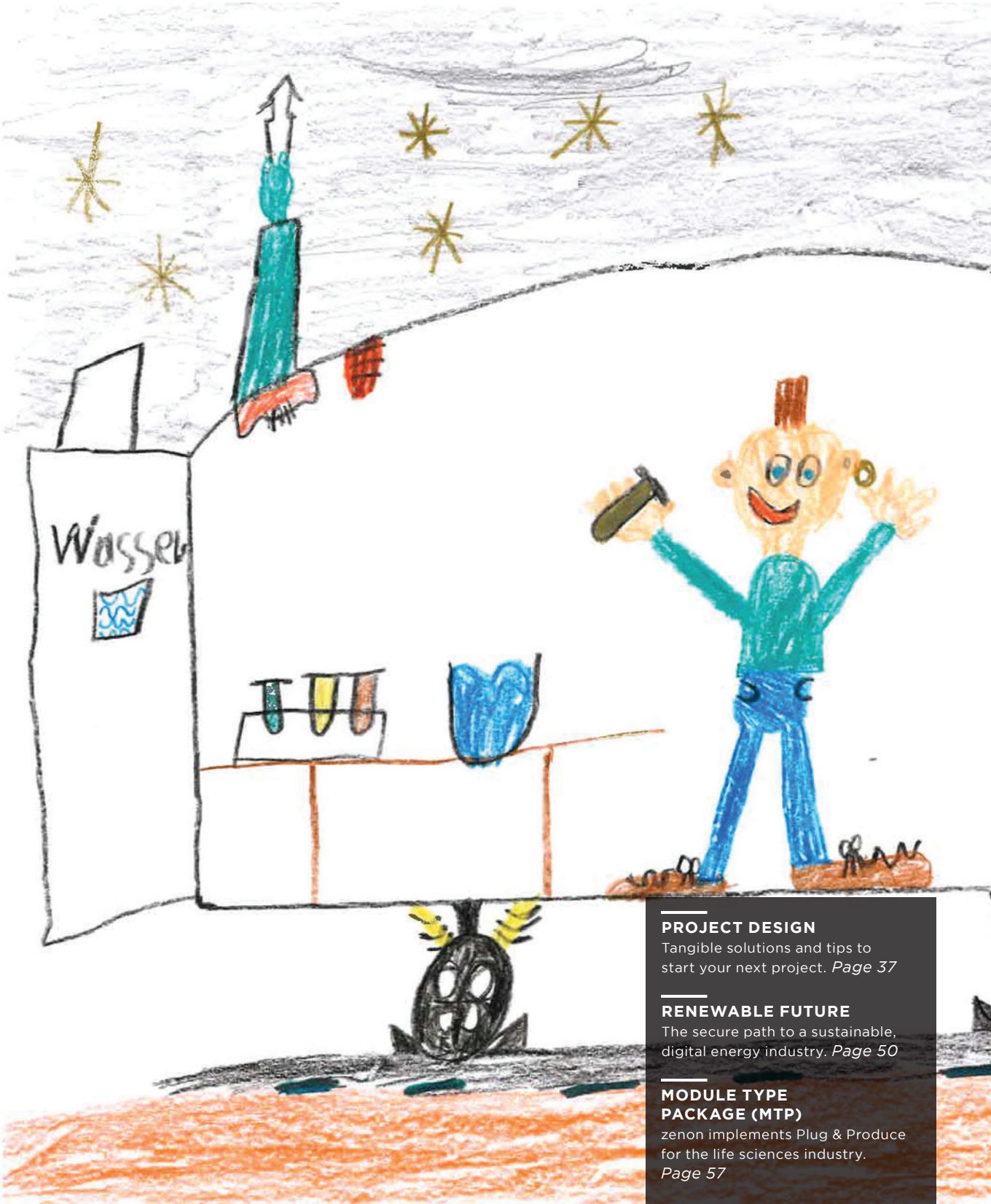
IU

INFORMATION UNLIMITED

Spotlight:
FUTURE SKILL SETS



PROJECT DESIGN
Tangible solutions and tips to start your next project. *Page 37*

RENEWABLE FUTURE
The secure path to a sustainable, digital energy industry. *Page 50*

MODULE TYPE PACKAGE (MTP)
zenon implements Plug & Produce for the life sciences industry. *Page 57*

ISSUE #38 2022 | THE COPA-DATA MAGAZINE

IU
INFORMATION UNLIMITED

THE COPA-DATA MAGAZINE

ISSUE #38 / MARCH 2022

PRESIDENT AND PUBLISHER:
Thomas Punzenberger
Ing. Punzenberger COPA-DATA GmbH
Karolingerstrasse 7b; 5020 Salzburg, Austria
Commercial Register Number: FN56922i
T +43 (0)662 43 10 02-0
F +43 (0)662 43 10 02-33
www.copadata.com

EDITOR-IN-CHIEF: Robert Korec
PROJECT MANAGEMENT: Christina Andexer
EDITORIAL TEAM: Eva Oberauer-Dum, Esther Rutter
ART DIRECTOR: Kathrin Machmer
COPY-EDITING: Supertext Deutschland GmbH, Berlin

AUTHORS/CONTRIBUTORS: Emilia Axinia, David Cerdeira, Parth Desai, Philippe Dutkiewicz (guest author), Gero Gruber, Stefan Hufnagl, Alexandra Hughes, Bernhard Korten, Daniel Kusenda, Markus Kremser, Michael Legat, Gerald Lochner, Reinhard Mayr, Giuseppe Menin, Herbert Oberauer, Dr. Daniela Ortiz (guest author), Anita Perchermeier, Sebastian Pfaller (guest author), Sabrina Pfandlsteiner, Thomas Punzenberger, Josef Ries, Sofia Ribeiro de Sousa, Chris Rogl, Roland Saller, Philipp Schmidt, Phillip Werr, Lewis Williams, Bernd Wimmer, Wolfgang Wösner

PRINT OFFICE: Offset 5020 Druckerei & Verlag Ges.m.b.H., Bayernstrasse 27, 5072 Siezenheim, Austria
LETTERSHOP: BK Service GmbH - Dialog Marketing Agentur, Neualmerstrasse 37, 5400 Hallein, Austria
Print Run: 5,800 copies

COPYRIGHT: © Ing. Punzenberger COPA-DATA GmbH. All rights reserved. The magazine and all the articles and images it contains are protected by copyright. Any use or duplication is not permitted without prior permission from the editorial team. The technical data contained herein has been provided solely for informational purposes and is not legally binding. zenon®, zenon Analyzer®, zenon Supervisor®, zenon Operator®, zenon Logic® and straton® are trademarks registered by Ing. Punzenberger COPA-DATA GmbH. All other brands or product names may be the trademarks of their representative owners and have not been specifically earmarked. We thank all contributors for their friendly support and the pictures they provided. Subject to change - technical, print or otherwise.

linkedin.com/company/copa-data-headquarters
facebook.com/COPADATAHeadquarters
twitter.com/copadata
xing.com/companies/copa-data
youtube.com/copadatavideos

MIX
Papier aus verantwortungsvollen Quellen
FSC® C106019
FSC www.fsc.org

CONTENTS

5 Preface
6 **SPOTLIGHT: FUTURE SKILL SETS?**
8 Future mindsets are more important than skill sets
11 Sustainability calls for competency
14 I can't be afraid of things that I don't yet know
20 Future Skill Sets: How does COPA-DATA rate?
24 **PRODUCTS & SERVICES**
26 How IT and OT are converging
30 A meeting of minds?
34 Laying the foundation for state-of-the-art HMI design
37 Plan, configure and benefit: it pays to do the basics
41 A new way to manage updates and patches
44 **INDUSTRIES & SOLUTIONS**
46 FnB: Transformation. What else?
50 Energy: The proven path
54 Automotive: "Maestro to the pit"
57 Life Sciences & Pharmaceutical:
Modular plants in life sciences: dream or reality?
62 **AROUND THE WORLD**
64 Who is Who
66 Home Smart Home
72 Partner Community World Café

Jakob, 8 years old: I'm going to be a researcher in a lab on Mars. The laboratory is a trolley on rails and has a special fireplace with filter. In the laboratory, water is produced for Mars. A water tank produces water that is mixed with chemicals.

CONTACT /
FREE SUBSCRIPTION:

IU@COPADATA.COM
WWW.COPADATA.COM/IU

PREFACE

We want to support our users in mastering their biggest challenges.

Indisputably, one of the greatest challenges of the coming decades will be energy transition and the goal of global net zero emissions. Simply providing the technology won't be enough; we also need to develop the sustainability mindset in everyone involved. Read our spotlight feature to discover many smart impulses from inspiring authors and interview partners on the topics of future skills, mindset and sustainability.

Mastering challenges often means implementing digitalization projects quickly and efficiently. In our series "Efficient project planning" (page 34) along with guidelines for forward-looking project planning (page 37), you will find helpful tips. With the application sets in zenon, we offer ready-to-use project templates to make life much easier for our users. Groundbreaking? Why not try it out right away and decide for yourself? You can find download links on page 39.

There are also many exciting possibilities with modular production using MTP. Industry experts speak of impressive results – such as reducing time-to-market by up to 50%, lowering production costs by up to 40% and increasing flexibility by up to 80%. What technology is behind this hyped topic? And how do you implement modular production with zenon? Read our article on page 57.

"Home Sweet Home" is a particularly charming story. Our colleague Wolfgang Wösner created an impressively practical smart home application for his parents using zenon (read more on page 66).

The extraordinary illustrations in this issue might already have caught your eye. We have asked numerous young artists to express their ideas about their profession in 30 years' time, giving exciting insights into the world of work of tomorrow from the perspective of our children today. Many thanks to all these creative minds!

I hope you enjoy reading and discovering all the topics in this exciting issue.

Be inspired!

Thomas Punzenberger

THOMAS PUNZENBERGER, CEO

ISABEL, 14 YEARS OLD:
A cityscape from the year 2150, i.e. in 130 years.
I don't find it so exciting what will be in 30 years,
my imagination demanded a hundred years more.

SPOTLIGHT

FUTURE SKILL SETS

The global economy is on the verge of tremendous structural change as a result of climate change and the steps taken to combat it. A shortage of skilled workers, accelerated by digitalization, is worsening. Pressure is bound to increase, especially in manufacturing and the IT industry. Many national roadmaps call for significant reductions in greenhouse gases within just a few years in order to achieve the goal of "zero emissions by 2050". Companies must take steps now to realign their operations to meet these challenges. To successfully navigate the transformation process, employees with the right technical know-how and soft skills are needed. These skills need to be systematically promoted and developed. In contrast to the COVID-19 pandemic, which caught the world largely unprepared, companies now have the opportunity to weigh the potentially conflicting goals of climate neutrality and growth and to actively shape the future.

NORA, 6 YEARS OLD:
That's me as an underwater world researcher. My helmet can translate all animal languages so that I can communicate with the fish underwater.

FUTURE MINDSETS ARE MORE IMPORTANT THAN SKILL SETS

These days the discussion about sustainability can no longer be avoided. But what skill sets do companies need to become sustainable? Too heavy a focus on skills is not always a good thing.

PHILIPPE DUTKIEWICZ,
HR CAMPUS AG

Interest in the issue of sustainability has been consistently high for several years and continues to grow. Google Trends provides a clear picture of the "sustainability development goals". Fun fact: interest in the issue always drops sharply at Christmas and during the summer holidays. Despite the continued interest, real answers have been postponed in many countries. There is no other explanation why the average car in Switzerland still emits 120 g CO_2/km or why 75 percent of Swiss buildings are still heated with oil or natural gas. At least, in Switzerland, electricity is clean in terms of CO_2 emissions. Despite the energy revolution, the situation in Germany is even more absurd. Almost 40 percent of electricity is still generated from coal or natural gas, and it is still considered fine to drive on the autobahn at 200 km/h and burn 20 liters per kilometer. Going green might be cool, but let the neighbors worry about that! This is true not only for Switzerland and Germany but throughout Europe – except perhaps in Denmark, but more on that later. What has always been missing in sustainability is a real incentive.

COVID-19 AS INCENTIVE FOR DIGITALIZATION

The situation around sustainability is similar that of another issue – digitalization. In an example from HR, countless companies operated with expensive, inefficient processes and a high level of variation, but nobody really cared because the costs were hidden somewhere in overheads. Then COVID-19 arrived, and companies worried that they couldn't simply send employees home, but they had to. Suddenly, digital investments began to pay off. For those that hadn't already digitalized, processes were digitalized in knee-jerk responses and nobody asked whether employees in HR and beyond had the necessary skills. The consequences had to be accepted: high project costs, less than optimal purchase decisions, excessive demands and more. Yet none of that should have been necessary because it had been clear for a long time that something needed to be done.

It is even more difficult to guess what the trigger or incentive will be when it comes to sustainability. It probably won't be one single incentive like COVID-19, but different ones, depending on the industry. Nevertheless, the incentives will come. There are a lot of examples we can list, e.g. a ban on the sale of combustion engines, oil heating systems or plastic packaging, or massive price increases. It is already clear that these incentive events will be powerful and turn entire sectors of industry on their head. So we have to ask ourselves: what can we do now to prepare for it? It would be arrogant to try to answer for the company as a whole. However, from an HR perspective the answer is relatively clear: bet on the right employees and prepare them. Make sure that they have the proper mindset and skill set. Note that mindset describes a person's way of thinking, their beliefs and attitudes (e.g. openness to new things) while skill set describes an employee's competency profile (e.g. specialist knowledge of internal combustion engines).

MINDSET VERSUS SKILL SET

It is very difficult to answer which skill set exactly will be required in which industry and company. If I were the CEO of VW, the most important question for me would be how to hire to the best software developers in the world as quickly as possible. Yesterday, so to speak. But the nice thing for the CEO is that you can learn skills or, in some cases, buy them almost like goods. This is a little more difficult with mindset. In Switzerland, for example, a nursing initiative was underway last

summer to improve the work situation of nurses in hospitals. This is actually very welcome. But it is almost sad to read the mindset in which half the industry is trapped. A sentence from the initiative text reads: "Federal government and cantons [...] must ensure that a sufficient number of qualified nursing professionals is available for the increasing demand and that the people working in nursing are deployed according to their training and their skills." This calls for resource planning through to a mindset in which employees are planned and deployed like production material. This attitude is omnipresent in Switzerland. With this mindset, it is unlikely that anything will improve for these employees. During the COVID-19 pandemic, this whole system of rigid resource planning and strict hierarchies completely collapsed in many areas. With a different mindset – the sharing of employees across hospitals, self-organization, appreciation of employees and much more – one could at least have cushioned certain effects.

Focusing too much on skills in order to make a company sustainable is, therefore, not necessarily productive. Martin Winterkorn, former CEO of VW, could have hired countless electrical engineers when in charge. But with a management mindset that boasted of "gasoline in the blood", those engineers would have had absolutely no chance against Tesla. That has changed with Herbert Diess, the new CEO. He is also a mechanical engineer in terms of skill set. But in terms of mindset, he is a rebuilder and not a hurdle to change. He's someone who wants to move away from the combustion engine. Shareholders can only be happy about this (+55 percent in five years), even if there is still a long way to go to catch up with Tesla. At BMW, a different wind is blowing from the very top. People still rely on platforms that are designed for all types of drives. Shareholders can be less happy about that (+9 percent in five years), even if Oliver Zipse, the current CEO of BMW, is actually a trained computer scientist and should, therefore, have the right skill set.

HOLIDAY IN DENMARK

Now, back to Denmark again. The culture or mindset in this country seems to be making a real difference. Denmark has come through the pandemic quite lightly, especially in terms of the low death rate. A study by the Bertelsmann Foundation that compared countries' hospital structures during COVID-19 supports this fact: "It should be emphasized that the definition of specialization in the Danish health system is not static, but adapts to technological change, and the knowledge acquired by the staff." We are familiar with the results. Denmark was able to quickly expand capacities and later quickly return to regular operations, which helped to quickly reduce the "operational backlog". Denmark is also pushing ahead when it comes to climate change and is even making it a business model. Gigantic wind farms are being built in the North Sea for 28 billion to satisfy the hunger for energy from the country's neighbors to the south. Perhaps we say this with our tongue in cheek, but it might not be so far-fetched – one way to prepare your employees for change would be to send them to Denmark on holiday!

PHILIPPE DUTKIEWICZ

is a member of the executive board of HR Campus AG, a Swiss provider of human capital management services. With more than 1000 customers and 200 employees, the company is one of the largest providers in Switzerland. It offers services ranging from HR strategy consulting and the introduction of IT-based solutions to comprehensive HR services and business process outsourcing.

www.hr-campus.ch

KYRA MARIE, 10 YEARS OLD:
I work in a market garden where robots and humans work together. The robots help the people, they take care of simpler things like caring for the flowers, watering flowers, setting and picking.

SUSTAINABILITY CALLS FOR COMPETENCY

Businesses increasingly understand that innovative ideas for addressing pressing social and environmental issues are key to their own long-term commercial success and legitimacy. The prerequisites for developing and implementing these ideas include dynamic capabilities that are based on systemic thinking and a collaborative mindset. This can be well illustrated by the example of sustainable mobility.

DR. DANIELA ORTIZ
FHWIEN DER WKW, UNIVERSITY OF APPLIED SCIENCES FOR MANAGEMENT & COMMUNICATION

Sustainability is no longer a niche issue – and it hasn't been for some time. Companies are increasingly aware of this. The reason? Greater numbers of consumers are paying attention to sustainability criteria. Political and legal conditions are changing. Examples include the European Green Deal, which, amongst other things, expands reporting requirements in the area of non-financial indicators. The issues of reputation and securing skilled workers are also increasingly seen in the context of social and ecological responsibility. People increasingly want to work for companies that make a credible contribution to meeting global challenges. In addition to these and other drivers, cost and efficiency must also be taken into consideration. In short, those who underestimate or ignore the issue of sustainability will put at risk their own survival and legitimacy over the long term.

Businesses of all sizes must convincingly build sustainability into their corporate culture and strategy. Anyone who has already put this into practice knows that sustainability can often turn out to be a driver for innovation in products, processes and business models. But how do you separate the wheat from the chaff? How do companies that have established sustainability as a driver for innovation differ from those that try to approach sustainability with isolated solutions that are disconnected from their core business – and that might potentially be described as greenwashing? Research and practice show that one possible approach involves a set of dynamic capabilities that companies must continually develop and promote. Systems thinking and collaborative competencies are essential building blocks for these capabilities. This is well illustrated by the example of sustainable, low-carbon mobility – because the solutions called for cannot be reduced to developing e-vehicles. Central to sustainable solutions are intelligent concepts for whole systems that give equal billing to political, economic, environmental and social aspects. Also, collaborations are needed in order to make the implementation of such concepts possible in the first place. Currently, ideas on how more holistic solutions can be designed in concrete terms are being developed in a range of companies. The roadmap for climate neutrality presented by the Volkswagen Group in April 2021 provides one illustrative example[1].

SYSTEMS THINKING PROVIDES THE FOUNDATION FOR HOLISTIC INNOVATION

Functions dedicated to sustainability management help companies to deal with the complex impacts of their business processes, e.g. activities in the value chain, on ecological and social systems. Companies that take a systematic approach to sustainability broaden their view of the interdependencies and interactions of the challenges to which they contribute. As a result, these companies understand the role they can play. They also typically have a better understanding of the effects of feedback loops and unintended consequences of possible solutions. This includes, for example, problems associated with the supply of raw materials needed to produce batteries for electronic vehicles. Volkswagen has, for example, recognized the need for change in terms of sustainable mobility and has developed feasible innovations. In the recently presented roadmap, everything from the design to the use and recycling of e-vehicles was considered. In addition to the green use phase and recycling of batteries, the climate neutrality of the heavily criticized production of these vehicles was discussed, including related supply chains[2]. Volkswagen also sees another approach to solving the challenges of individual, motorized mobility in the continuing shift to alternative business models. Instead of the traditional model of manufacturing and selling individual vehicles, the future lies in "Mobility as a Service" – car sharing, ride pooling and so forth. Based on new technologies, apps and algorithms, this paves the way for sustainable, user-friendly services[3].

Competency in making and dealing with change enables companies to build sustainability into their strategic processes and, as a result, to recognize the need for change, to generate feasible innovative and transformative ideas, and to implement these in line with corporate strategy.

[1]Germis, C. (April 29, 2021). "VW will mindestens ein Elektromodell im Jahr auf den Markt bringen." [VW plans to bring at least one electric model to market every year.] https://www.faz.net/aktuell/wirtschaft/auto-verkehr/vw-will-mindestens-ein-elektromodell-im-jahr-auf-den-markt-bringen-17317405.html

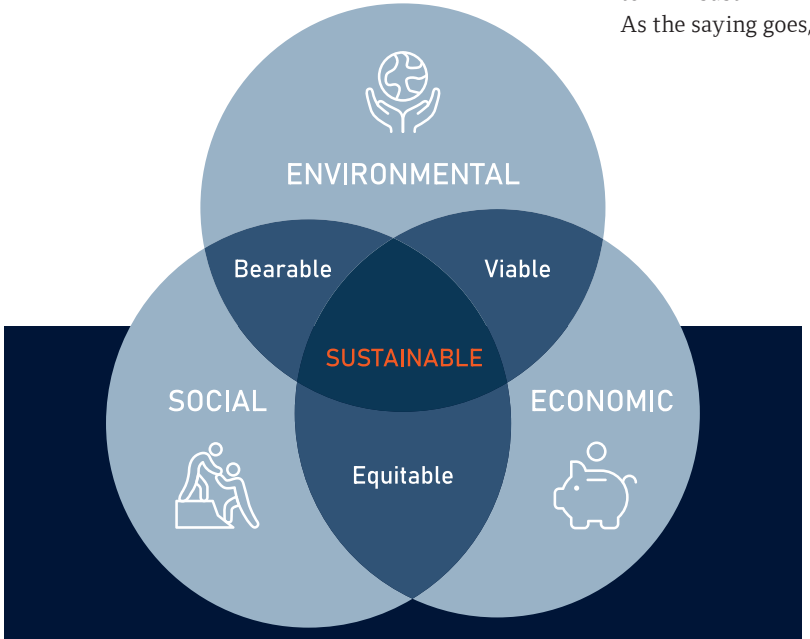
[2]Germis, C. (April 29, 2021). "VW will mindestens ein Elektromodell im Jahr auf den Markt bringen." [VW plans to bring at least one electric model to market every year.] https://www.faz.net/aktuell/wirtschaft/auto-verkehr/vw-will-mindestens-ein-elektromodell-im-jahr-auf-den-markt-bringen-17317405.html

[3]Sustainable mobility concepts: no traffic jams, less environmental pollution – How can that be? (August 21, 2020). Volkswagen Group Ireland Limited. https://www.volkswagen.ie/en/electric-cars/switching-to-e-mobility/sustainability-mobility-concepts.html

COLLABORATING TO LEVERAGE POTENTIAL

Profound, holistic changes cannot be achieved in our networked world by working alone. In order to implement system-relevant, sustainable innovations, companies rely in most cases on collaboration (active, selective and voluntary partnerships[4]). In addition to sharing knowledge internally or incorporating third-party expertise, the effective bundling of human and financial resources to achieve sustainability objectives can yield win-win situations. Collaborations also heighten the impact and visibility of measures. Plus, they can foster the discovery of new market opportunities[5]. The shape of a collaboration varies depending on its objectives. With regard to sustainable mobility, partnerships with energy companies that provide electricity from renewable energy sources are becoming increasingly popular. Joint projects with start-ups and other innovators often open up fertile ground for changing entire systems, such as promoting a more sustainable value chain. Looking at the example of Volkswagen, it is also clear that multi-stakeholder platforms are important. As part of the Responsible Lithium Partnership, the company has launched an initiative together with other companies. The initiative is coordinated by the German Society for International Collaboration and advocates for sustainable lithium mining in Chile[6].

However, change usually doesn't happen overnight – we need to learn to take on and apply systems thinking and a collaborative mindset. It is necessary to continually promote these skills so that businesses can adapt to the shift toward sustainability and, potentially, even help shape it. As the saying goes, the early bird catches the worm.



RESEARCH PROJECT: CHANGE FOR CORPORATE SUSTAINABILITY

The aim of the City of Vienna Competence Team "Change for Corporate Sustainability" is to support Austrian companies in their strategic shift towards sustainability. The Competence Team works with partners to research how they can develop the dynamic capabilities needed for a sustainability transformation. The project was launched in March 2021 with the support of the City of Vienna (MA 23 – Economics, Labor and Statistics). It is based at the Institute for Business Ethics and Sustainable Strategy (IBES) at FHWien der WKW. The Competence Team is led by Dr. Daniela Ortiz Avram.
The project will run from March 1, 2021 to February 29, 2024.

DR. DANIELA ORTIZ AVRAM

Daniela Ortiz has been leading the City of Vienna Competence Team "Change for Corporate Sustainability" at FHWien der WKW since March 2021. Her main research interests are strategic CSR, sustainability management and business ethics. In addition to her academic work, she is involved in advanced training programs for managers and is invited regularly as an expert in sustainability management in scientific and private-sector contexts. She is also a juror for the TRIGOS Prize, an award for responsible business practices.

[4]Busch, A. M., Ortiz, D., Löffler, C., & Scholz, M. (October 2020). Nachhaltigkeitsmanagement in österreichischen KMU. [Sustainability Management in Austrian SMEs.] https://ibes.fh-wien.ac.at/wp-content/uploads/2020/10/Studie_Nachhaltigkeitsmanagement-in-oesterreichischen-KMU.pdf
[5]Massachusetts Institute of Technology. (January 13, 2015). Joining Forces: Collaboration and Leadership for Sustainability. MIT Sloan Management Review. https://sloanreview.mit.edu/projects/joining-forces/
[6]Volkswagen Konzern, BASF, Daimler AG und Fairphone starten Partnerschaft für nachhaltigen Lithiumabbau in Chile. [Daimler AG and Fairphone launch partnership for sustainable lithium mining in Chile.] (June 8, 2021). Volkswagen Newsroom. https://www.volkswagen-newsroom.com/de/pressemitteilungen/volkswagen-konzern-basf-daimler-ag-und-fairphone-starten-partnerschaft-fuer-nachhaltigen-lithiumabbau-in-chile-7245

I CAN'T BE AFRAID OF THINGS THAT I DON'T YET KNOW

The shortage of skilled workers, which began with digitalization, will increase during the coming energy revolution. The changes that are coming will affect people's qualifications and their day-to-day work and will happen very quickly. How do employees deal with these changes and what experiences from the pandemic can they apply to future crises?

PHOTOGRAPHY: CHRIS ROGL

Interviewer Robert Korec: Digital disruption, the COVID-19 pandemic, climate change... Markus, as a young person, how do you deal with this highly uncertain future?
Markus: I believe that a certain level of general education is a good basis on which to build – for example, dual training in an apprenticeship with a high school diploma. Next, it is important to continue to learn and educate yourself throughout your life, whether through courses or whatever you want to study afterwards. As a result of digitalization, we are living in a time of constant change. You have to see change as an opportunity and take advantage of new training opportunities. It is important to keep up with changes and continue your training in order to meet new requirements. There is a wide range of courses, technical colleges and universities where you can learn new professions and train to acquire additional qualifications.

Do you believe that your generation is more open to change and that part of your outlook is to recognize that the profession you trained for originally is not the one you will be doing in ten years?
Markus: Society has become more open, as have career choices for women and men. Typically, there used to be male and female jobs. Today, men are accepted as kindergarten teachers and women are sought after as software developers. Changing careers is much more acceptable today and there is a wider range of options than in the past. Today, it's almost expected and it's normal for people to change careers when they're 30.

Herbert, out of everyone in this group, you have worked the longest at COPA-DATA. When you look back on the past few years and your professional life, how have the requirements of your job changed?
Herbert: I was already employed before COPA-DATA. I had worked after completing school and then I studied part-time. From the start, what I liked about COPA-DATA was the flexibility and professional development opportunities available to employees. It has always been possible to switch from support to sales or marketing. Many colleagues have taken advantage of these opportunities. Flexibility is reflected in the culture at COPA-DATA. It makes us agile for future change. Whenever you move to a new team, you have to work on your own skills and develop them further. Standing still is not an option.

Sabrina, you work on the People Growth team. You help colleagues develop the skills that will make COPA-DATA fit for the future. How do you approach this challenge? How do you motivate your colleagues to try something new and expand their horizons?
Sabrina: Giving employees a chance to develop within the company and take on other jobs and activities is in line with expectations these days for society and the workplace. At COPA-DATA, you'll find not only the opportunity to do similar jobs but also something entirely different. This is valuable in the job market and it enhances the company's image. It makes COPA-DATA an attractive employer. That makes it easier for us to find well-qualified new employees. And we have another advantage: if new skills are needed in an area not currently covered by vocational training, we can quickly identify the skills already available in-house. We can help our colleagues to develop their skills. This is how we remain competitive as a company because we don't just have to recruit from outside.

What is your approach when it comes to training apprentices and People Growth? How far into the future are you looking? How do you decide on the content for training?

Michael: We are currently offering apprenticeships in application developer coding as part of our program. This apprenticeship has only existed since 2018. Much of the learning content taught at school can be applied in practice, such as coding small applications and tools. This is how we can bring new technologies closer to our young talents like Markus. In addition, zenon is continually adding new content and features, which means we always need new experts for the modules. To offset the shortage of skilled workers purely by recruiting and hiring graduates or poaching people calls for a big investment. The apprenticeship training program gives us the opportunity to attract young, unbiased and motivated people who are enthusiastic about our product and interested in infusing new energy. We train experts who will be well equipped for future challenges.

Does this mean that internal training can reskill workers to successfully promote the digitalization and greening of the economy?

Sabrina: We get a lot of feedback from colleagues when we hold workshops. This generates topics for the future. And that's where we begin to adapt and further develop our learning and qualifications. Bringing people with similar interests together is an important step in advancing future topics.

Anita, in your daily work you deal with solutions for customers that focus on end users. In doing so, you have to take into account the skills of people who are at the end of their working lives, as well as serving the skills and user habits of younger and future generations. What changes have you observed and how do you manage this balancing act?

Anita: I think the issue of uncertainty plays a major role here. Unpredictability has arisen as a result of digitalization. We have recognized that learning never stops and we should always be open to developing further. You can also see it from the other side. We ask ourselves: how can we best help people absorb new information as easily as possible, so that they can do their jobs as easily as possible? There is a small shift taking place. The generation that grew up with automation and that doesn't come from the IT sector has completely different software needs. They use different terms than IT specialists do and have little idea how IT works. The younger generation deals with new technology in a completely different and natural way. They learn it from an early age and have developed problem-solving strategies so that when they get stuck they use Google or YouTube to quickly find the answer. The older ones, on the other hand, like to use a printed manual, without which the software would not be complete for them. As a provider of a software platform – whether developer or designer – we have to step out of our world and think about the perspectives of others. Learning never stops – in the sense of deepening and developing existing skills, but also in broadening them. This is the only way we

can take on different perspectives and disciplines. New skills that we acquire sometimes have little to do with our own original discipline. In addition, empathy is a very important quality, as is the willingness to accept uncertainty.

Markus, do you see a difference between the generations in terms of willingness to acquire new technical skills?
Markus: Access used to be much more difficult when you wanted to learn something new – for example, when you wanted to navigate a new program. You used to need a thick book to learn programming. Today, I can find over 20 very good pages with C++ tutorials after a quick search on Google. In this way, knowledge can be built up much more easily and quickly.
Herbert: Yes, it has become much easier. Acquiring knowledge used to be a lot more complex. After spending a lot of time on the problem and looking through books, you might have been lucky enough to speak with an experienced colleague. Nowadays, with the help of the Internet, large amounts of code, for example, can be generated very quickly – although sometimes the deeper knowledge behind it is missing. As long as valid sources were used, that's okay – because nowadays you no longer have to be an expert at everything.

How does the People Growth team take into account these different approaches to learning?
Sabrina: We schedule courses that are needed, but we also rely increasingly on tools that make it easier to share knowledge. When it comes to online offerings, users need to have a certain level of personal learning skills. I find that young people are more confident in this regard. Older generations are more likely to choose face-to-face training, if available, over online training. However, I also have yet to see someone out right reject online training. I think that personal learning skills are already quite high in our company.
Anita: I agree that personal learning skills are essential. In an increasingly uncertain, unpredictable world, I might have to learn new things overnight. So I can't be afraid of things that I don't yet know or can't do yet. I have to, instead, develop the self-confidence and skills to absorb new knowledge quickly.
Sabrina: If I want to acquire knowledge, there is an incredible number of options available to me today. For example, if a course is not offered in Salzburg, I can attend online training offered in Berlin. Or I can participate online instead of flying to a conference in Stockholm – which is a plus for sustainability.

MARKUS KREMSER has been doing an apprenticeship as an application developer at COPA-DATA's HQ for one and a half years. At the moment, he is supporting the development team as a tester. The fact that he can get to know a different team every year is the "cool" thing about his apprenticeship for him.

HERBERT OBERAUER has been with the company since 2007 and, in addition to technical support, has also become acquainted with the world of programming. What he appreciates about COPA-DATA is the togetherness. He is convinced that even in difficult times you can only move forward by teamwork.

With all of these uncertainties, how do you stay grounded in this rapidly changing world?
Anita: You can allow for uncertainties. Personally, teamwork gives me stability. I don't need to know everything. I just have to be able to quickly come up with a strategy about how to gain the knowledge and how I can achieve the goal with the help of and in cooperation with others. It's about achieving a common goal. Everyone on the team has their own skills that they can use to contribute to the effort. So I think the lone wolf approach is becoming more difficult and less common because there are simply so many disciplines and subjects that need to be mastered.

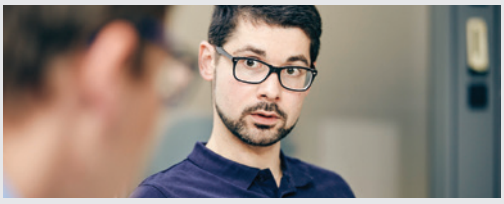
Does this mean that social skills and soft skills are becoming increasingly important alongside technical know-how?
Michael: Soft skills are increasingly important. In the COVID-19 situation, we learned to keep communication going via Microsoft Teams from the home office. Communication with colleagues and line managers is important to strengthen the team. But it is also a challenge, especially when working with young people

who need a lot of support. And, of course, communication is an important cornerstone. A lot needs to be clarified so that everyone is talking about the same thing, especially when it comes to complex technical issues. That's why soft skills are becoming increasingly important.

Sabrina: When it comes to digitalization, self-organization is an important soft skill. For example, a message can arrive via Teams, then someone calls and, at the same time, an important email arrives. Plus, the normal work still has to get done. I have to be able to manage my time very well. In the course of digitalization and globalization, intercultural proficiency is also very important. It's not just about learning about cultural characteristics but about a general openness and tolerance for other people – a developed empathy that I bring with me.

Michael: Due to the COVID-19 pandemic, when travel was limited, many training courses and meetings took place online – which is, of course, positive in connection with climate change. For online approval meetings, additional skills are needed to make them efficient and to avoid misunderstandings. We are still at the beginning of this and additional experience is needed. It takes a steady instinct, especially in cross-border cooperation. There are cultural differences when approaching problems. Handling a development project in Asia requires a different approach than in one's own cultural environment. There are different tolerance thresholds when it comes to deadlines, but there are often fewer inquiries because the questioner is afraid of being seen as incompetent or losing face.

ANITA PERCHERMEIER started in 2014 as a Screen & Interaction Designer at COPA-DATA HQ. Since the beginning of 2019, she has overseen an interdisciplinary engineering team as Project Leader. Together they develop zenon templates, design concepts and provide professional services.



MICHAEL LEGAT started at HQ in 2014 as a Special Solutions Developer. Since fall 2019, he has taken over apprentice training in addition to technical topics. He takes care of the recruitment and structured training of the young application developers.

Do you think that experiences from the pandemic can help us to address climate change?

Mark: I think we can learn from our experiences during the COVID-19 crisis and the lockdowns. There are problems that must be solved. During the pandemic, many more people worked from home and used the car less. Can we sustain that change? We should pay attention to green energy and rely on wind power plants, hydroelectric power and concepts designed to replace fossil fuels.

Are issues of sustainability and climate change also playing a role in the career choices of the younger generation?

Mark: In my circle of friends, sustainability hardly plays any role in our choice of career. Many look to their parents' jobs for guidance. But when it comes to thinking about which company I would like to apply for and where I would like to work, sustainability questions play an increasingly important role. Companies that deal with sustainability are often perceived as future-oriented. On the one hand, this creates trust with regard to job security and, on the other hand, these companies often provide more modern concepts for organizing working time and working from home. And that is very attractive to young people.

Can we use the lessons learned from the pandemic to fight climate change?

Herbert: If we look at our combined response to the COVID-19 crisis, we can see hope about how we can work together to bring about the energy revolution. We still have to lay the foundations together – including in terms of qualifications. The "we" is extremely important here. If everyone had been engaged at the beginning of the COVID-19 crisis, we would have ended the pandemic much faster. The same can be said of climate change. A joint effort is now called for. It often helps to personally take one step back in order to take two steps forward together. If we don't educate and empower people today, it will be much more difficult and expensive to turn things around later. COVID-19 has taught us that digitalization works and that working from home works

too. It will be the same with the energy revolution. The knowledge and experience we have acquired will help us in this regard.

Michael: Many supply chains were disrupted during the pandemic. That was a curse and a blessing at the same time. It created a positive moment for the climate to catch its breath. We have learned to respond to such situations in an agile manner. It showed how important a network of producers and suppliers can be. It protects the climate if goods can be sourced locally and don't need to be shipped halfway around the globe. Even with technology products, we can start to ask ourselves how often they have to be replaced. It would certainly be more sustainable to return to making devices that can be repaired. Many repair and maintenance professions have virtually disappeared. Think of the profession of radio and TV technician – it has been made virtually obsolete through modern LCD flat screens. We might need to relearn these skills.

For the pandemic, vaccine development was like the moon landing was for the space industry. Has there been a similar surge in innovation in digitalization?

Anita: On the one hand, COVID-19 has accelerated and advanced a lot of technological developments, including, for example, the ability to work from home or other developments long predicted as megatrends. Many in our generation enjoy an extremely high standard of living, higher than ever before. However, we have been living absolutely beyond our means for a long time. We all need to step back and be less selfish in order to properly handle crises like COVID-19 or climate change. As a society, we are having a hard time with this. I think we also need to be clear as a society about how much of an obligation the individual has to society if it is to work. I see this as a threat and society needs to change to make a resolution to this possible. Digitalization could bring about a lot of positive things.

SABRINA PFANDLSTEINER has been working for COPA-DATA in the People Growth team since 2021. Prior to COPA-DATA, she was employed at AMS Salzburg (Public Employment Service Salzburg) for four years and had a lot of contact with the topic of the shortage of skilled workers through this job.

ROBERT KOREC joined COPA-DATA's HQ as PR & Communications Consultant in November 2018. His responsibilities include press and public relations as well as editorial responsibility for the customer magazine *Information Unlimited*.

FUTURE SKILL SETS: HOW DOES COPA-DATA RATE?

Issues of sustainability and changing employee skills sets impact every company seeking to position itself for the future. COPA-DATA is no different: these issues are found in many shapes and forms.

MORITZ, 6 YEARS OLD:
I'm in a hospital on the moon. Oxygen is extracted from lunar rocks and bottled. The bottles are available for medical treatment as well as for outdoor use.

At COPA-DATA, we believe in lifelong learning, and today we understand how important it is to run a sustainable business. On the one hand, it is important for us to take a critical look at our own influence on global climate change. For our new office building in Salzburg, we chose to build with the lowest energy construction methods. In addition, we will generate a considerable amount of our electricity from our in-house PV system – managed by zenon, of course. Green electricity will power our more-efficiently-designed power consumption needs. Our vehicle fleet is also gradually going electric. Plus, we are thinking before planning travel to avoid any unnecessary mileage. The perspectives of our employees, management and our strategy are changing. Our know-how is growing and, little by little, this is improving our carbon footprint.

BUILDING BRIDGES WITH SOFTWARE

Not only are we focusing internally on our options for transformation and the skills we need, but with our zenon software platform we also support and encourage our industrial customers to learn how to grow sustainably and improve the efficiency of their existing processes.

For Emilian Axinia, Industry Manager for Food & Beverage at COPA-DATA, companies face the challenge, in light of climate change, of implementing major changes in a very short time: "Gradual continuous improvement does not go fast enough in this case. We need to accelerate the transformation process as a whole. A lack of qualified staff for sustainability issues can be mitigated by networks and communication bridges. Remote applications, such as those supported by zenon, make it possible, for example, for one suitably qualified employee to monitor several production sites, centrally and without the need for a qualified employee to be at each location. Sustainability requires the greatest possible transparency in all processes and supply chains. Dimensions such as profitability, environment and social issues have to be visible across the board and accessible to employees in a wide variety of places. Providing this information helps raise awareness. Individuals learn which dimensions are important, can play a role themselves, and are motivated to promote sustainability goals in their area."

NEW USERS, SKILLS AND REQUIREMENTS

COPA-DATA is embracing the challenge of developing future skill sets at the customer level. It's not only a question of how zenon can be used effectively to bring more transparency to production and to identify processes that use too many resources. It's also important to understand how proven automation software can respond to changed user behavior and the skills of a new generation. For Günther Haslauer, Head of Software Engineering at COPA-DATA, the classic desktop PC is becoming less and less important in daily life: "Increasingly, zenon users belong to a generation that grew up using mobile devices, such as smartphones and tablets, since childhood. This fact significantly influences their expectations of machine controls and facility overviews. For user acceptance, you need to have a clearly organized, ergonomically designed, state-of-the-art display. And it's taken for granted that the system operates like a smartphone. As a result, semi-transparent objects in UI design and multi-touch gestures have also found their way into automation."

WELCOMING IN THE NEXT GENERATION

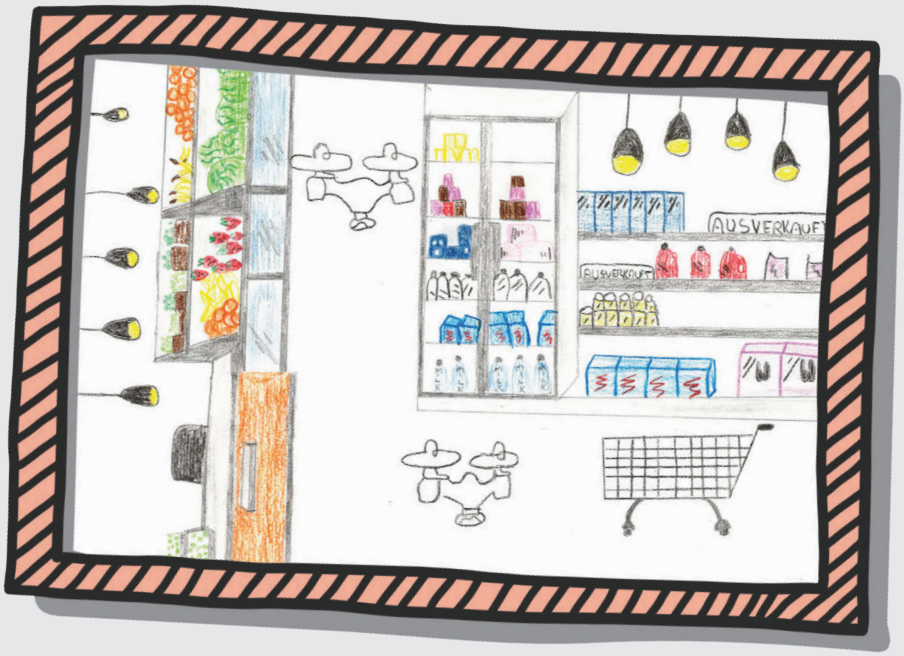
In both recruitment and software development, COPA-DATA relies heavily on training and research institutions. As Head of Information Security and Research Operations, Reinhard Mayr oversees these relationships. He says, "To meet the challenges of the future as a company and together with our employees, COPA-DATA is strengthening our support for training and research. We plan to build on the know-how and spirit of the next generation, who will be hit even harder by climate change than we are today. Only by working together can we develop technologies and solutions to meet the climate goals that are so critical."

One thing is clear to us: businesses can play a key role in the fight against climate change. Sustainability is an important shared global objective that we believe every company should pursue. In the future, it will be more and more important for organizations to act sustainably. Business partners will attach greater importance to it. It will also be more important in recruiting, as applicants will increasingly pick employers committed to sustainability. With zenon, we are making it easier for you to learn the skills of the future and apply them in an impactful way.

Children are the future!

"Look at life trough the eyes of a child."

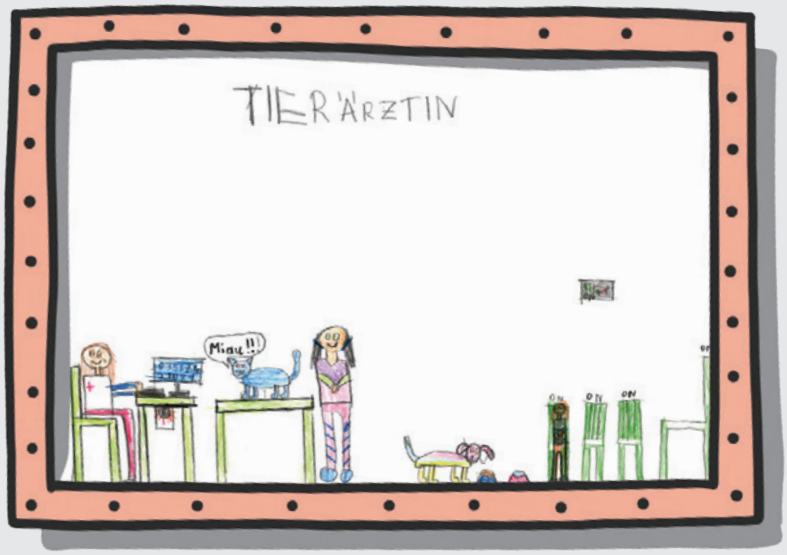
HENRY MATISSE



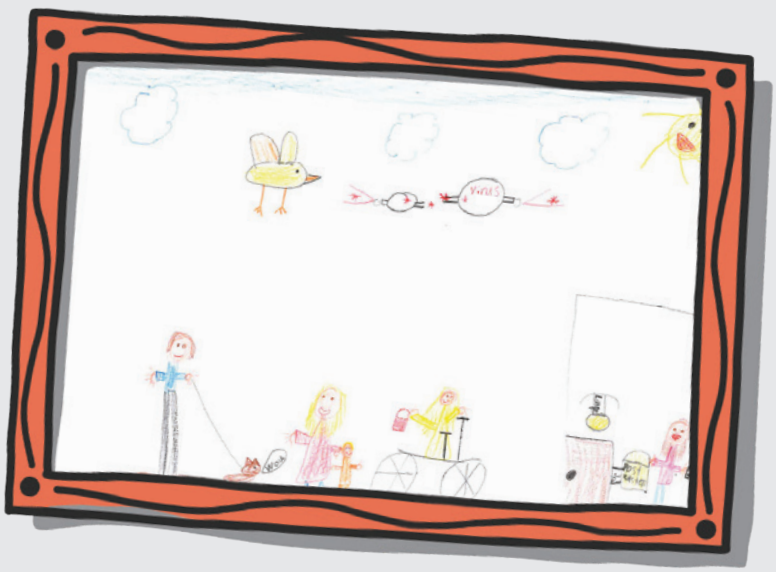
ZOE-KRISTIN, 12 YEARS OLD:
In the supermarket of the future, drones will do the shopping for people.

FELIX, 9 YEARS OLD:
The apple harvest in 2050 will be done by drones.

OLIVIA, 7 YEARS OLD:
In my restaurant, humans and robots work together as a team.



VALERIE, 9 YEARS OLD:
A computer helps the veterinarian understand animal language, and the table is also a printer that prints out a picture of the disease.



ANTONIA, 8 YEARS OLD:
I want to build a giant vacuum cleaner that can suck viruses out of the atmosphere.

PRODUCTS & SERVICES

WHAT'S HAPPENING HERE? AND WHY?

HOW IT AND OT ARE CONVERGING

No doubt you have encountered the term "Industry 4.0" in recent years. Digital transformation seems ubiquitous in industrial manufacturing. All market players are looking to leverage the potential of digitalization and, to do this, are providing "revolutionary" solutions.
But is "revolutionary" really the right term?

Most of you have been following complex issues in the industry for many, many years. Has anything changed significantly in the basic approach to these issues? Ultimately, it's a question of your own perspective. The more closely you were focused on activities in automation technology in the time before digitalization, the more revolutionary approaches such as cloud solutions and machine learning might seem to you. However, if you were previously familiar with the business solutions and infrastructure on which they sit, you probably have a different perspective.

Digitalization has, without doubt, expanded our toolbox. It provides us with the right tools to work on difficult and complex issues and broadens our spectrum of solutions.

This process can be described with one concept: the convergence of IT and OT. You certainly don't hear about this concept as frequently as "digitalization" or "Industry 4.0". However, it deserves more attention, as it describes precisely what is happening in our industry at the moment.

WHAT IS IT-OT CONVERGENCE?

The convergence of IT and OT refers to the process of migrating concepts, mindsets and technologies from IT to operational technology (OT). This convergence impacts industrial production and automation technology, specifically, in relation to digitalization. OT people – and this includes COPA-DATA and its customers – are adapting know-how and concepts from the IT world. However, the convergence isn't relevant in every use case: you would be quite surprised, to say the least, if your bank announced in a glossy brochure that your account data will be transferred via OPC-UA in the future.

IT-OT convergence is producing a lot of new knowledge and new tools to create exciting solutions. However, one question might yet be posed: are there good reasons why IT and OT have led separate existences for so long?

WHERE OT AND IT DIVERGE

At first glance, the OT and IT industries look very similar. Each of you is probably familiar with the situation of having to explain your work to a friend who is not familiar with the industry. From an outsider's perspective, we're all computer geeks! Both the IT and OT professions attract people who are tech-savvy, analytical thinkers focused on creating technology-based solutions.

However, on closer inspection, the general conditions in the world of automation technology differ quite significantly from those in the IT industry. It is precisely these differences that have led over many years to different approaches, technologies and solutions developing in the two worlds. I'd like to highlight some of these differences and look at whether they might now be a thing of the past as OT and IT converge.

FOCUS ON PRODUCT LIFECYCLES

Do you know when your smartphone was last updated? How old is the device, anyway? Presumably, the answer to the first question is "a few days ago" and to the second "some months".

There are many reasons for this short life span and they could fill a separate article. Reasons for favoring shorter product lifecycles include both the financial interests of businesses and technological reasons, such as product development or cyber security. The closer a product is to the end consumer and more widespread its use, the more these factors gain in significance. Your favorite app gets an update every few days, your company's SAP system only once a month, and the SQL database for the production data gets checked by the admin even less frequently.

The high rate at which solutions and technologies are developed and replaced in the IT world stands in clear contrast to lifecycles in the OT world.

CONTINUITY IS KEY

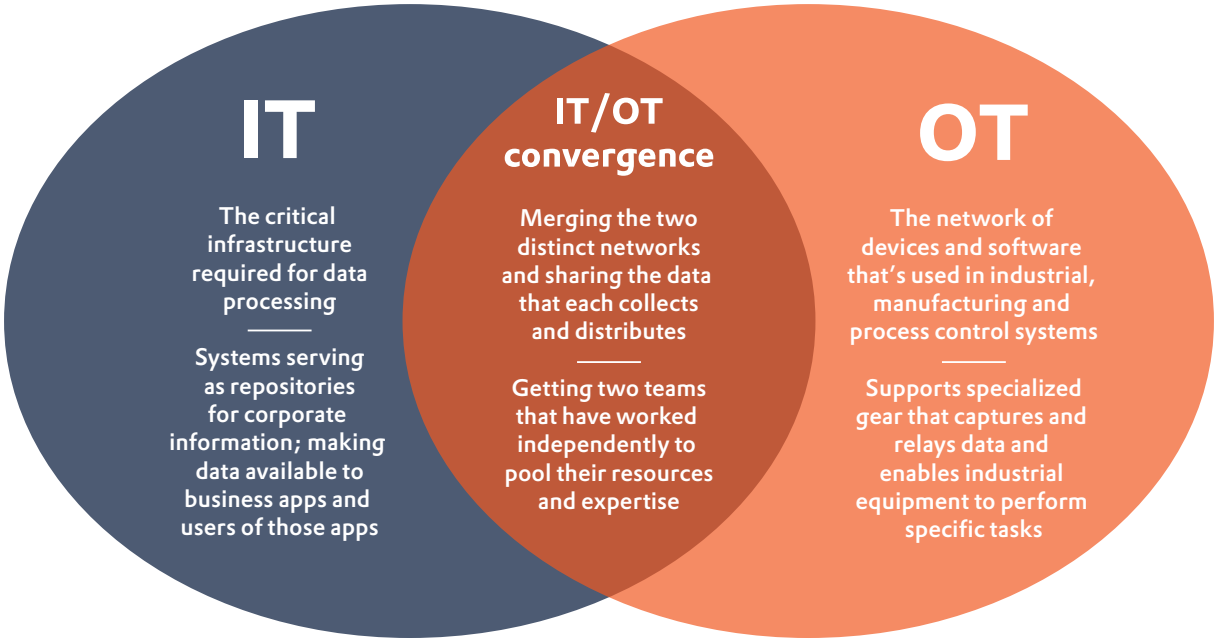
Once an OT system is up and running, it should provide good service for many years, perhaps even decades. Of course, this has a major impact on the technology used, because the lifecycle of the overall system depends largely on the lifecycles of its integral components. As a result, an important criterion for OT components has always been their durability. zenon is a good example of this. Today's zenon Service Engine traces back ultimately to an original version that is many years older – and COPA-DATA still guarantees compatibility. That would be completely unthinkable in the IT industry. Mobile phones from the early 2000s are now found in museums like Germany's Museum of Technology in Berlin.

This is one of the biggest differences between the IT and OT worlds. The different product lifecycles mean that not all IT technologies are suitable for operational technology. If they lack the longevity required, the costs to maintain the solution will be too high.

DIFFERENT LIFECYCLES DON'T HAVE TO BE MUTUALLY EXCLUSIVE

"But my machine gets an update from the manufacturer every year," you might reply as an attentive reader. Yes, attitudes towards this subject have changed in recent years. Industrial systems also have short lifecycles in the sense that they receive regular updates and functional upgrades. Digitalization has achieved a lot in recent years. There are a variety of factors driving this change: in addition to advances in technology and increasing cyber security concerns, business interests also play a role, of course.

Nevertheless, the different product lifecycles will continue to have a part in the process of digitalization.



Where IT meets OT

To mitigate the challenges arising from this, there are some helpful strategies to combine components with wildly different service lives into a single solution:

- Choose an array of durable OT and IT technologies.
- Use state-of-the-art modular methods in software development to create long-term flexible interfaces between components.
- Commit to long-term product planning that takes into account lifecycle requirements from the outset, e.g. connecting to the cloud.

THE UPSIDE OF ACCESSIBILITY

What is the job of a company? There are many answers to this question and many can have an almost esoteric character. Let's make it easy: if a company is a black box, where the things that come out of the black box have the same value as the things that go in, the company wouldn't make any profit, obviously. However, since every process in this black box has a cost – in the absence of a perpetual motion machine – a company has to add value to survive. It simply doesn't work without added value.

In a manufacturing business, it is fairly easy to say where value is added: in the production process. So clearly this process has to be maintained.

It may be an uncomfortable truth for employees in accounts but, ultimately, the added value for their employer will hardly suffer in the short term if the numbers aren't controlled for a few days due to an IT problem. Things are different in production. If the entire system is at a standstill because the smallest machine in the process no longer starts up after a Windows update, value-adding activity in that process line drops to zero.

The high demand for system uptime in production processes has an impact on the components used and their handling. Features such as self-diagnostics in the event of an error, multi-level redundancies, updates during operation and load shedding to protect critical processes have been integral to OT software systems, such as zenon, for many years. It is clear that the technology requirements of an OT solution differ from those in IT.

IT DEPARTMENTS AS SERVICE PROVIDERS

We've considered the technological differences between OT and IT. But there are also differences in the people who roll out, operate and maintain these technologies in companies. If you look closely, you'll find a distinct contrast between the ways of working and the responsibilities in most organizations' OT and IT departments.

IT departments are usually quite large. They typically see themselves as an in-house service provider for a wide range of customers. From the office junior through facilities manager to the C-Suite executives, every employee has contact with IT. The IT department provides support, for example, when "the font is too small" on a browser or a

"login doesn't work" for an SQL database. An IT admin has to be a generalist. They need to be an expert in a wide variety of technologies and be quick to solve minor issues as well as complex problems. As a result, many IT departments handle a high rate of small and varied tasks.

The engineers and computer scientists in the OT world usually have an entirely different daily routine. Instead of applying wide-ranging knowledge in many areas to small problems, work activities in the OT area are usually carried out for a few, much more complex issues. For example, the rollout of a new SCADA system, the expansion of production data acquisition, or the design of the HMI interface. These projects often last months or years and require intense commitment.

The OT engineer is, therefore, given more space to be a specialist, while the IT technician is often expected to be more of a generalist.

HOW CAN WE ALL BENEFIT FROM IT-OT CONVERGENCE?

Although this article has highlighted the differences between IT and OT, I firmly believe that digitalization and the merging of these two worlds is the best thing that could happen to our industry. In recent years, the technology spectrum in automation has expanded significantly. Many are now working with new technologies on solutions that would have been unthinkable ten years ago. It is exactly this change that is energizing the market and creating a range of opportunities. Because ultimately:

"It's not the big that eat the small, but the fast that overtake the slow."
- Eberhard von Kuenheim, BMW AG

Being quick does not mean applying all the new ideas and possibilities in zealous activity. Rather these changes call for a balanced approach between youthful innovation and level-headed experience. In this spirit, I'd like to wish all of us success!

PHILIPP SCHMIDT
Technology Scouting and Prototyping Manager

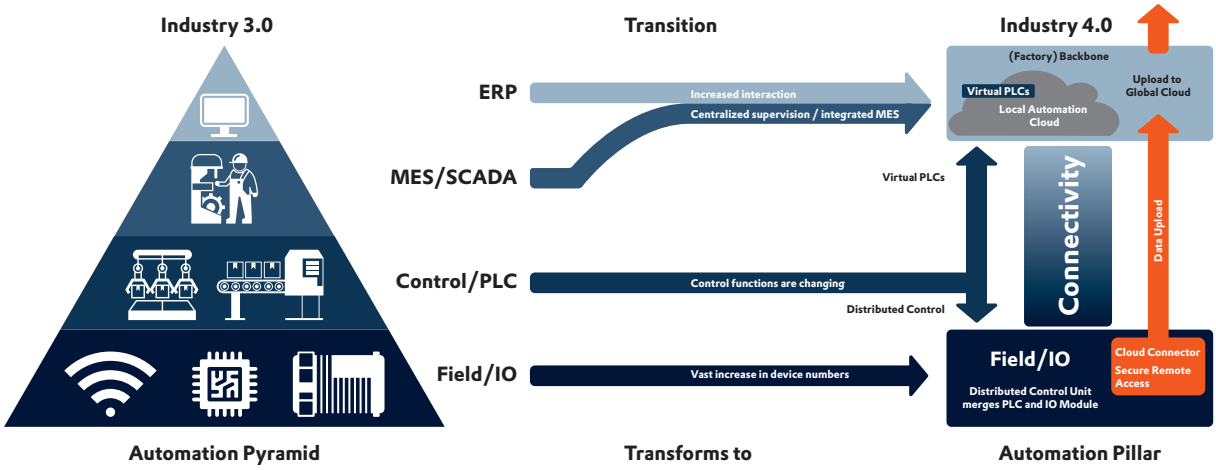
Philipp Schmidt has been working in the field of industrial digitization for more than ten years and has helped shape the innovative change from the very beginning. As part of the product management, he coaches companies in the introduction of new technologies and continues to develop the zenon software platform for the future.

philipp.schmidt@copadata.com

YOUR QUESTIONS ABOUT IT/OT CONVERGENCE ANSWERED

A MEETING OF MINDS?

In many companies and for many decades, the worlds of operational technology (OT) and information technology (IT) enjoyed entirely different orbits. OT was the preserve of the shopfloor and the engineering staff. IT was the preserve of the computer geeks, stationed between the office and the server room. That's how it was for a long time – and never the twain shall meet. Just recently, however, the orbits of these two astral bodies have started to converge. What's caused the shift? And how do we smooth the convergence to ensure there are no messy collisions?



The transition from Industry 3.0 to Industry 4.0 and its implications

WHAT IS IT/OT CONVERGENCE?

IT/OT convergence is the integration of IT systems with operational technology.

As TechTarget explains, "Modern organizations grapple with two worlds. There is the traditional physical world composed of machines, electromechanical devices, manufacturing systems and other industrial equipment. Then there is the more recent digital world using servers, storage, networking and other devices used to run applications and process data. Advances in technologies such as the internet of things (IoT) and big data analytics are systematically allowing the digital information world to see, understand and influence the physical operational world. When implemented properly, IT/OT convergence can merge business processes, insights and controls into a single uniform environment."

WHAT ARE THE DIFFERENCES THAT HAVE TYPICALLY CHARACTERIZED IT AND OT?

IT and OT fulfill very different tasks and have come to be characterized by different philosophies and approaches. IT is focused largely on the interaction between people and applications. Accuracy and data delivery measured in fractions of milliseconds usually play no role here; human processes can usually tolerate delays. The confidentiality of data usually takes a higher priority than data integrity.

OT, on the other hand, is focused on the interaction between machines as well as between people and machines. These event-oriented interactions between conditions and process systems can require control loops of 10 milliseconds.

Of course, there are exceptions. In financial services, for example, the performance requirements are similar to those of OT. Financial data is often time-critical; differences of

fractions of a second can deliver competitive edge in trading. And data loss is a no-go. Plus, hardware – such as ATMs – are required to run reliably for years.

WHY HAVE IT AND OT BEEN LARGELY SEPARATE UNTIL NOW?

Most OT systems were considered stand-alone solutions. They weren't designed to be managed remotely. The two worlds have often run on separate infrastructure. It was common to operate separate OT and IT networks. This made cross-network interactions difficult.

An "air gap" between the IT and OT worlds was often considered desirable from a security point of view. The implications of changing the conditions of a large-scale production operation or shutting down a power grid were too great to warrant creating potential vulnerabilities via interfaces with IT systems.

Further, reliability is vital in the OT world – in a way that it isn't in IT. You don't want to hear "the network was down, so the emergency stop failed" when the operational safety of an energy grid or a production line is at stake. The cost of building secure, reliable, redundant systems with the necessary fail-safes means that lifetime expectations are higher for OT technology; it must be usable over the long term. In the world of IT, technology is traditionally much more disposable.

WHAT HAS CHANGED TO PROMPT OT/IT CONVERGENCE?

At a time when it was not considered desirable to connect machines to the Internet, it didn't matter that much of the control system on the shopfloor was running on an old version of Windows that was no longer supported. Today, that is no longer the case. The plethora of connected devices means that industrial networks are much more vulnerable and the highest cyber security standards should be in place. If older operating systems can't be allowed to run, inevitably there is a closer link between IT and OT.

From a technology standpoint, the rise of connected devices, the ubiquity of cloud computing and the fall in the cost of IT – whether sensors and other components or data storage and processing – have all contributed to the convergence. These changes opened up new possibilities for improved decision making based on real-time data, changing expectations in how colleagues in different sites and operational units can collaborate as well as greater potential for data gathering.

WHAT ARE THE POTENTIAL BENEFITS AND RISKS OF IT/OT CONVERGENCE?

Ultimately, the goal of IT/OT convergence is to optimize processes. For example, the cost of shopfloor operations might be reduced by optimizing operational processes using data analytics. In addition improved sharing of real-time information from the shopfloor can provide greater transparency for supply chain partners and customers, or for strategic decision making.

The need for data, however, can open up a whole can of worms. Machines that have been operating on a stand-alone basis in OT suddenly have to become part of a network. New software for data analytics has to be purchased. The different software systems have to be harmonized.

With greater convergence, it makes sense to take a global approach to the IT/OT landscape – even if only from an efficiency point of view. IT departments are becoming more involved in what have traditionally been OT purchasing decisions. State-of-the-art IT is finding its way into increasing numbers of OT networks. And you'll find an increasing understanding of OT in IT departments – and vice versa.

There are clear business benefits arising from this approach. And it's worth remembering that no department or job becomes redundant simply because the two disciplines converge.

HOW IS IT/OT CONVERGENCE AFFECTING THE AUTOMATION SOFTWARE MARKET?

The market is currently being shaped by a few major players and some specialized SMEs, particularly in Europe. However, in recent years, corporate consolidations have reduced competition.

Currently, there are three types of providers on the market:

- Conventional providers who come from OT and are developing quality solutions that reach higher into the automation pyramid.
- IT software providers such as SAP or Microsoft who develop solutions from the other direction, e.g. from cloud solution to OT hardware.
- New entrants who are using state-of-the-art technologies and architectures to develop entirely new products and services, e.g. dashboards, analytical tools and mobile apps.

WHAT DOES THE CLOUD HAVE TO DO WITH IT/OT CONVERGENCE?

As part of the transition from Industry 3.0 to Industry 4.0 – and as part of a wider trend in IT – software systems are being integrated and virtualized, and are running in local or central cloud architectures.

This transition and the growth of the cloud provider landscape makes cloud compatibility an absolute requirement for OT technologies, whether in the form of interfaces or cloud support. It's really about creating cloud-compatible solutions or cloud-native software. This type of software can be run in either public or

private cloud systems and provides access centrally or locally.

Cloud-native solutions typically run on the Linux operating system; it offers advantages in terms of maintenance and cost. The user interface (UI) is mostly web-based. The communication protocols have been developed from the start to communicate over public internet infrastructure, although these protocols can also be used locally.

WHAT OTHER FACTORS ARE HAVING AN IMPACT?

IT/OT convergence isn't happening in a vacuum, of course. Other big changes are also having an impact. For example, demographic changes: many professionals from the "baby boomer" generation will be taking their well-earned retirement in the next few years and Gen Z is entering the workforce. As baby boomers retire, years of experience is being lost and vacancies are hard to fill due to the shortage of workers.

Alongside this, Gen Z is the first generation to fully grow up in a digital world. When it comes to ease of use, this generation expects the same operability from IT and OT software as it does from their devices for personal use.

Let me give you an example. One of the exercises I use when teaching students UI technology at a university of applied sciences tasks students with designing a desktop app for Microsoft Windows or MacOS. It's designed to provide students with the practical skills to go with the theories taught in class. I've been giving this assignment for many years and have never really had to explain the difference between desktop, web or mobile apps. Previously, the information alone – that a desktop app is needed – provided students with enough context to design an app with the desired behavior. This all changed about four years ago. In the new generation coming through virtually no one – perhaps only a few students – understood this difference. For Gen Z , who grew up primarily with mobile and web apps, it wasn't on their radar.

WHERE CAN I FIND MORE INFORMATION?

COPA-DATA is planning a series of articles to provide readers with different perspectives on IT/OT convergence. To date, our initial findings show that:

- IT departments are increasingly involved in the decision-making process for OT-related software. This is leading to a more holistic view of the IT landscape.
- In the OT arena, large sums of money have been invested in equipment over the years. This equipment must be integrated and ready for the future, i.e. retrofitted upgrades.
- To optimize processes, the current situation must first be documented. For this, systems must collect and compile data – and make it available to users in a useful format.
- State-of-the-art software products can be rolled out rapidly, e.g. container technologies, web visualization, NoSQL database systems.
- Software systems with increased connectivity so that they can intervene directly in production must be protected against cyber risk.
- New applications are emerging and new providers are entering the market. This makes open interfaces more important than ever.

In the months to come, we'll be sharing more details about these findings, as well as how the zenon development process is responding and staying ahead – so stay tuned for updates from a range of my colleagues!

If you have a story or two that you'd like to share about how IT/OT convergence is currently being experienced or planned for in your organization, we'd love to hear from you. Please send your stories to pm@copadata.com.

GERALD LOCHNER
Head of Product Management

Gerald Lochner has been part of the COPA-DATA team in Salzburg, Austria since September 2014. The former software developer is responsible for product management for the zenon Software Platform and is passionate about making sure that it is fit for the future.

gerald.lochner@copadata.com

The new COPA-DATA Melting Blog

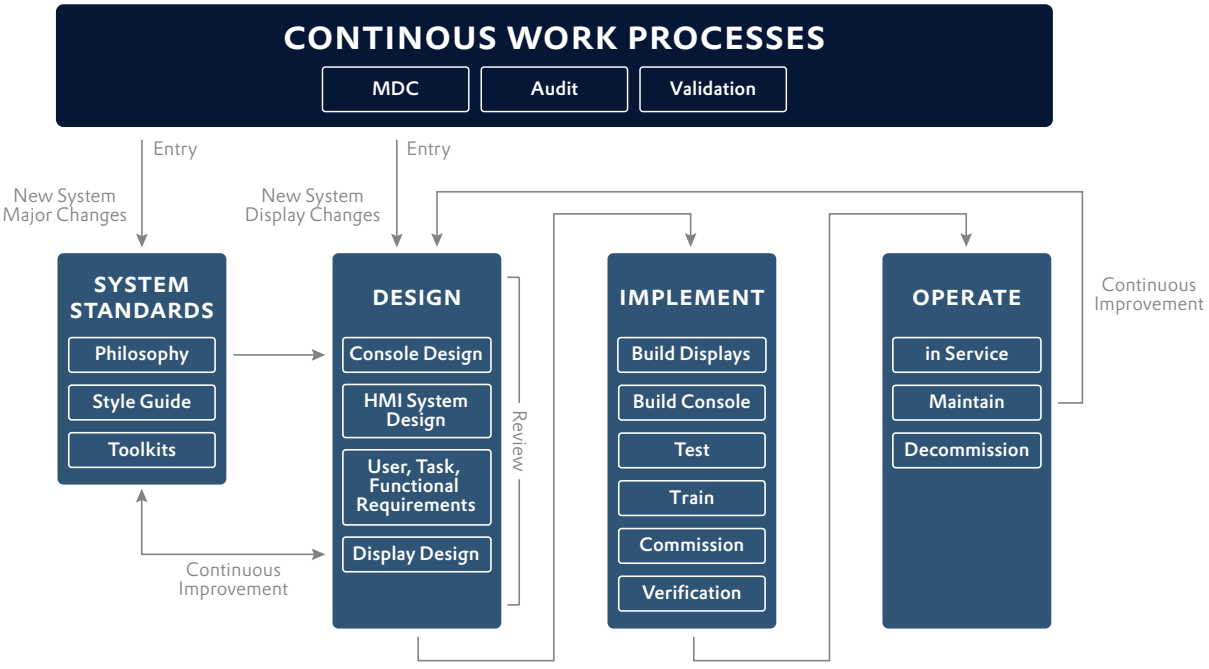
What's trending in the world of digitalization and automation? The COPA-DATA blog about the fusion of OT and IT with zenon.

blog.copadata.com

SERIES: EFFICIENT ENGINEERING WITH ZENON – PART 4

LAYING THE FOUNDATION FOR STATE-OF-THE-ART HMI DESIGN

In the third part of this series, you learned how to work with symbols and images by using Replace links and indexes as well as Faceplates and Limit Values. We will now show you how to prepare a user-oriented, state-of-the-art HMI design.



The continuous work process according to the HMI standard ISA-101

Think back to the example of the operator in front of a machine: they have to carry out a number of different tasks and meet targets. The nature of these tasks and targets can vary widely, depending on the user role. For example, a production manager needs different information than a service engineer requires. An HMI must, therefore, meet these different information needs.

WHY DESIGN AND USABILITY ARE CRITICAL FOR AN HMI

An HMI not only has to look good. Its information has to be laid out clearly to make it easy to identify abnormal states and to assist the operator. An HMI should also help to reduce error rates and to restart faster after a production stoppage. Ultimately, with good HMI design you can improve productivity and ensure there are fewer interruptions to production.

FOCUSING ON USERS

The requirements for display and navigation functionalities depend heavily on user roles. Primarily, there are the shopfloor or operational users. In addition, there are the secondary users who take care of maintenance, development and so forth. How do we come to understand the needs of these different user groups?

Personas are a proven means of defining user groups. As user models, personas represent the motivations, goals and needs of a target group. Personas can help you to correctly implement a target-group-oriented HMI from the start. Personas represent fictitious users but they are based on findings from, for example, interviews or testing with real users of the product.

Personas are intended to help you in your daily work by forming a shared understanding of all the players on the team. With each feature, you can ask: for which persona is this relevant? Plus, you can help prevent users from accidentally mutating into many-armed contortionists.

In addition, by properly developing personas, you generate the basic data for zenon User Administration.

A QUESTION OF STRUCTURE

While an HMI should be visually appealing, it should – above all – help users to maintain an overview and navigate projects quickly and easily. To this end, the zenon software platform makes it easy to create a hierarchy of screens from the overview screen. This provides a facility-wide summary on a multi-monitor workstation, as well as detailed diagnostic displays, for example, using a Faceplate defined in the HMI.

To achieve this, divide the screen or screens into different areas:

- the user's primary desktop
- navigation area(s)
- areas always visible with condition information, display of recent alarms, etc.
- pop-ups allowed to overlay other areas, if necessary
- other areas on request

Based on these specifications, you can use (zenon) frames to define these areas in zenon, and later fill them with different content as consistently arranged areas.

CONTINUOUS LEARNING IS CALLED FOR

Even at this early stage, it is important to actively approach future users in order to verify any assumptions made. In line with our motto, "setting parameters instead of programming", you can create a simple prototype at this stage and use a "click dummy" to test the HMI with users and refine it, as necessary. Particularly when designing the information architecture and navigation hierarchy, it is best to work together with real users from your defined target groups, for example, with the help of card sorting.

BE PREPARED FOR ANY SITUATION

Alongside standard operations, you also need to take into account, for example, activities such as retooling or troubleshooting on a machine. All the work steps and activities carried out by user groups must be captured so that you can provide them with the right display and ensure that they can complete tasks efficiently and without error.

The aim of good HMI design is to support users' primary tasks, such as monitoring and controlling the process. Efforts involved in secondary tasks that detract from the task at hand, such as navigating between images, should be minimized for users.

An HMI must perform the following tasks:

- Provide secure and efficient process control
- Serve as a tool for early detection and diagnostics, as well as responding to abnormal situations
- Support operators in responding properly in the event of system errors
- Display errors immediately on screen or in screen elements for system operators (situational awareness)

WHAT IS SITUATIONAL AWARENESS?

HMIs are designed to provide information about and make operators aware of current system and process conditions. Abnormal situations are indicated by visual and/or audible signals designed to alert operators. You don't want to overwhelm users with too many inputs all at once. For example, flashing lights, which provide a very strong stimulus that draws a lot of attention, should only be used very sparingly and for really critical information.

Tip: Establish a definition of conditions and their criteria prior to configuration. You can then use this definition as a reference when setting limit values or creating reaction matrix (see part 3 of the series).

Example of condition levels:

- Level 0: Diagnostics
- Level 1: Normal
- Level 2: Awareness
- Level 3: Increased awareness
- Level 4: High risk
- Level 5: Critical situation

TWO BIRDS WITH ONE STONE

Based on the defined condition, you can also categorize alarm messages in zenon with the help of alarm classes and add further information, e.g. color, graphic file, function, etc. You also assign this definition to limit values or a reaction matrix, in order to classify the alarm.

In addition, you can use alarm classes, for example, to filter the readout for the Alarm Message List or to suppress diagnostic messages.

MANY MORE PATHS

zenon also provides you with a range of options for using screen elements to visualize the current system condition, for example, as a list or table.

- Screen elements support dynamic color change for font or background color when a limit value is being exceeded.
- Screen elements support blinking functionality for either the whole element or only the display text.
- Elements can be displayed only when required.
- With the help of Combined Element, you can switch texts, symbols or graphic files based on the current condition; a formula editor is optionally available for more complex evaluations.
- With the help of limit values, functions can also be run automatically, for example, to automatically display the detail screen for an alarm.
- Acoustic signals can be enabled with the features "Play Audio File" or "Continuous Tone Start/Stop".

WHY CONTINUOUS IMPROVEMENT IS ESSENTIAL

Looking at continuous work processes from the perspective of the HMI standard ISA-101[1], this article has focused mainly on the fundamentals of HMI design and the designated review stages. Of course, a project is not finished after this initial phase. There are opportunities to optimize the HMI during implementation and operation. User feedback ideally flows back into the HMI design in a process of continuous improvement.

SUMMARY

By clearly planning the user groups, information architecture and navigation hierarchy, as well as condition and alarm definitions, you can lay a solid foundation for an efficient and intuitive HMI. This not only supports operators in their daily work, but also saves time and money for project engineers.

In the next part of the series, you will learn about system standards and HMI system design, as well as how to design an HMI that is both graphically attractive and easily configurable.

GERO GRUBER
Product Manager

As Product Manager and Product Owner for the zenon software platform, Gero Gruber particularly focuses on the user interface, the interaction design for the platform as a whole and the graphic visualization in the zenon runtime.

gero.gruber@copadata.com

[1]AMERICAN NATIONAL STANDARD ANSI/ISA-101.01-2015 - Human Machine Interfaces for Process Automation Systems

LOOKING FOR IDEAS FOR YOUR NEXT PROJECT DESIGN?

PLAN, CONFIGURE AND BENEFIT: IT PAYS TO DO THE BASICS

It's important to give real thought during the project creation stage – particularly if you are a newbie to configuration – to operations and the needs of the personnel groups involved, in order to identify potential obstacles in advance. The following article looks at a few potential questions, presents approaches to solving problems and recommends some proven best practices.

Creating projects is a separate topic, for which a wealth of experience is undeniably a benefit. However, not everyone starts out as a zenon professional and, as is well known, starting out is never a cakewalk. We gather knowledge over time, usually not without making at least a few minor missteps. With the help of a few tips and suggestions, however, it is easy to avoid some common beginner's mistakes.

COPA-DATA offers you a wide range of support options for getting started with the zenon configuration environment and for implementing your requirements. In this article, several practices and information resources are presented that can provide answers to many questions. These are not necessarily innovations but are intended, rather, to provide a brief overview of our offerings with an emphasis on the topics that are less commonly known.

AVOIDING ERRORS AND DISRUPTIONS

Various factors are constantly at play when systems are running – hardware, software and employee skills, to name a few. Changes made in one area can have an impact in other areas. These dependencies and interactions can be used to improve existing processes in a range of areas.

While options for avoiding problems can be introduced in advance or when systems are already running, in the event of a disruption during operation you only have one option – to fix the problem. Every error avoided saves you time and unnecessary costs.

If hardware is taken for granted in these considerations, the areas of software and skills remain, in which you can actively intervene. In both cases, there is a high potential for optimization and enhancements to improve the efficiency of the equipment.

SOFTWARE

The section below focuses on project creation, although of course we can only mention a few project engineering tips here. Further observations on this topic form the basis for implementation during configuration. One of the first questions should be about the planned project rollout: are you planning for a local stand-alone project, or is it possible that your solution will be adopted later in other countries? This first step determines whether more or less configuration is called for, as well as the scope of localization work required for a future rollout.

SUGGESTIONS FOR CREATING A PROJECT

– Choose the project language(s): In general, the practical solution is to use the relevant country language. This is especially true for projects that will only be used locally. However, if an international rollout is planned or if users come from a variety of language groups, it can make sense to configure the system in English when creating a project.

Tip: To be consistent, use the language selected for the comments in the code samples.

- Generalize projects: This refers to the use of color palettes, symbols, styles and substitution, to name just a few. A structured project design makes it easier to make changes and enhancements at a later time.

Tip: Define your settings in a global project to use them for all the related sub-projects.

- Use terminology consistently. Give workflows and devices unique and meaningful names that are used by all users. For example, every tank is a container, but not every container is a tank. Decide on one term per concept.

Tip: For large projects, it can be helpful to use a terminology database. This makes it easier to manage and track terms. If possible, also add the corresponding term in the other languages. This will improve the quality of your translations.

- Use naming conventions when naming attachments, images, variables, elements and so forth. All names should follow a defined syntax and thus make them easy to identify. This can also make it easier to understand relationships and it's a major benefit for all filter processes.

Tip: Labeling systems such as KKS (power plant labeling system) and standards such as DIN 6779 can be used to define the syntax, to name two of many examples.

- Use versioning for projects in order to always be able to track changes clearly.

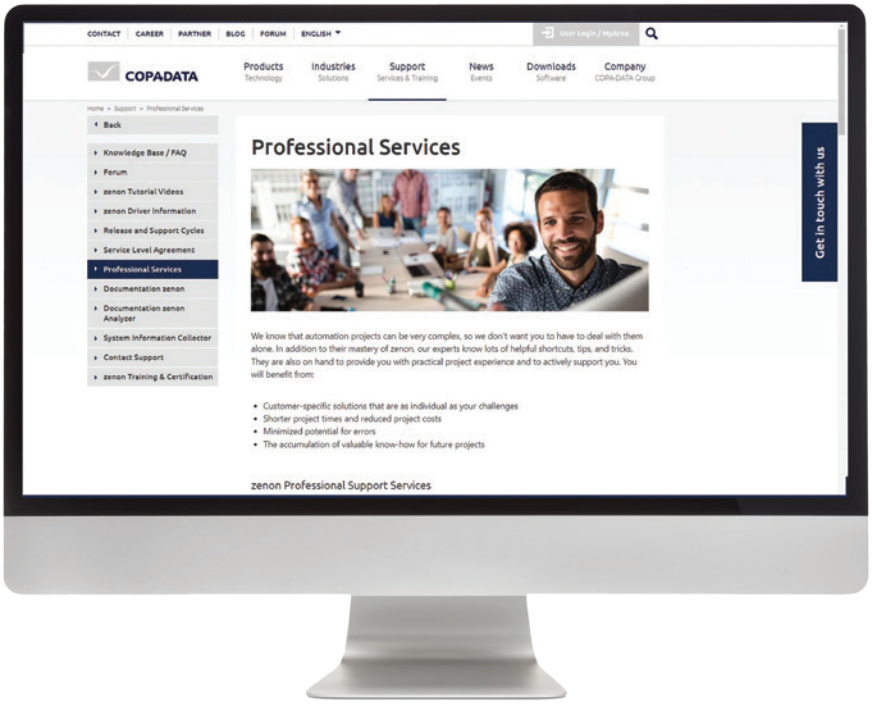
Tip: You can easily compare different versions of a zenon project using the Comparison Tool. Detailed information about the tool can be found in zenon Online Help in the Comparison Tool section.

- Use basic projects with pre-configured content and Smart Objects, which are discussed elsewhere (see below).
- The system users should also be taken into account during configuration. Sample questions include:
- Which group of users is working on the project?
- How can you support them in your work?
- What needs will users likely have?

APPLICATION SETS, BASIC PROJECTS AND SMART OBJECTS

Application sets can help you to streamline your project creation activities because the workflows required are preconfigured and you only need to adjust them to your own conditions. The processes and systems mapped digitally in basic projects are much the same across industries.

For example, bottling equipment is used in the food & beverage industry to fill the selected containers with the beverages produced quickly and traceably. Further



APPLICATION SETS

Application sets are an easy way to deliver a project successfully with zenon. Industry-specific requirements form the basis of preconfigured basic projects from which both beginners and experienced project creators can benefit.

ENERGY & INFRASTRUCTURE: **SOLAR PV SCADA**

ENERGY & INFRASTRUCTURE: **SUBSTATION HMI**

PHARMACEUTICAL: **PHARMA HMI**

downstream in the process, a packaging system is also required.

Of course, customizing a basic project to suit your own needs already requires a certain knowledge of zenon, which is attainable through courses and training.
However, different industries also have different requirements. To meet these needs, we offer industry-specific project templates and we continue to create these for different industries. They are currently available for the core areas of the following industries:

- Energy & Infrastructure
- Automotive
- Food & Beverage
- Life Sciences & Pharmaceuticals
- Process Industry

Alongside tools for creating basic projects, we continue to develop related Smart Objects. These are objects that can contain zenon functionalities such as images, symbols, drivers, and variables in order to map elements such as, for example, a motor. Smart Objects are encapsulated functional units that you can configure for your own applications. You can also import or export Smart Objects – and the version number prevents accidental overwriting of templates currently in use.

Refer to the info box for information about the available application sets. They contain both a basic project and Smart Objects.

SKILLS – EXPAND YOUR HORIZONS

Information is always integrated and interpreted based on one's own world of ideas. COPA-DATA courses and training are available to provide as consistent as possible a level of knowledge in the desired area. We also issue certificates to verify and document the extent of training acquired. If you wish, you can set intervals for further training in order to always be up to date. Training can be held face-to-face or online.
You can find information on the current training opportunities at: www.copadata.com/training

In addition to training courses, zenon Online Help offers you additional opportunities to strengthen your knowledge in previously unfamiliar subject areas. You can also find videos and tutorials with step-by-step instructions on the COPA-DATA YouTube channel.

COPA-DATA TEAMS TO SUPPORT YOUR NEEDS

Perhaps you are faced with a new requirement which won't be easy to implement with internal resources or maybe it involves a larger programming effort? In this case, COPA-DATA's Professional Services Team can provide a solution tailored to your needs, including support for project concept creation, app development, and code reviews, among other things. By using experts, you benefit from our know-how and significantly shorten project development time.
For more information about the services provided by the Professional Services team visit:
www.copadata.com/support

What do you do if a disruption occurs at startup or during operation? COPA-DATA Support can take care of such tasks – but you can also take action directly and troubleshoot the problem yourself.

PROVEN TOOLS FOR PROBLEM SOLVING

A good place to start is the System Information Collector (SIC). This tool is installed as part of the zenon software platform and is always accessible. The application collects relevant technical information about the operating system, product version, configurations, log files, license information and so forth. You can see this data in a user-friendly format and can forward it to support, if necessary.

Tip: SIC logs form the basis for support requests. Information on using the tool can be found in zenon Online Help in the System Information Collector section.

For users with a certain level of knowledge, Wireshark can help when troubleshooting communication problems. This free tool is a professional network analysis tool that uses default settings to improve performance. If you are unfamiliar with the logs generated, contact a support employee after contacting Wireshark.

Data search tools, such as Agent Ransack, are also useful when searching for errors or text messages in a large number of files. This can help you to narrow down a search. Tip: Search for "error" or some other meaningful text.

VALUE ADDED – SERVICE LEVEL AGREEMENTS

A maintenance contract, or service level agreement, can provide additional benefits. For example, you receive free updates for all registered licenses, priority for support requests, discounts in the price of training and guaranteed response times for queries which can shorten the time it takes to resolve problems. Another bonus is the extended period for purchasing licenses and handling bugs.

Information about zenon release and support cycles and extensions for deadlines can be found at:
www.copadata.com/release

SUMMARY

There are a wide range of options for clarifying fundamental issues as early as the project concept development phase. In this way, obstacles and sources of error that have already been identified can be avoided. Forward-looking project planning also has a positive effect on the costs of downstream processes, such as translations. Subsequent project changes are, of course, easily possible in the form of updates, even for systems that are already in operation. User-friendly project versioning can make it easier to keep an overview when you have frequent updates.

Although the focus of our explanations here is on recognizing and avoiding sources of error, project creators, users and COPA-DATA Support also have options for correcting them.

In summary, you can see the greatest benefits from ensuring the configuration and implementation stages are broad-based, as well as providing the proper training and making sure you use the training and help content that we offer. By using application sets, you also gain access to project templates created by experts and based on industry-specific requirements.

This is a great bonus when implementing your project!

JOSEF RIES
Technical Editor

As technical editor, Josef Ries is involved in creating and expanding the online help for the zenon software platform. In addition to managing various engineering teams, he is responsible for zenon Logic documentation.

josef.ries@copadata.com

DAVID CERDEIRA
Senior Support Services Engineer

David Cerdeira started his career in 2012 as an electrical and computer engineer specializing in energy, automation and telecommunications. Since then he has been working in the Customer Services Team at COPA-DATA HQ and has taken on various technical tasks, such as support agent and strategist for testing and troubleshooting. His motto is: "There are no bad questions, only bad answers".

support@copadata.com

HOW CAN YOU BENEFIT FROM AUTOMATED DISTRIBUTION
BY USING ONDESO WITH THE ZENON SOFTWARE PLATFORM?

A NEW WAY TO MANAGE UPDATES AND PATCHES

As an operator of production facilities or critical infrastructure, your highest priority is to keep your equipment up and running. However, this can be put at risk when new components, updates or patches are added. This article looks at how you can automate and easily integrate these components with the ondeso platform.

It is recommended that you use basic systems according to the component manufacturer's specifications, in order to ensure your equipment has stable operating conditions. But it is also important to keep systems up to date during operation, for example, when security updates have to be distributed. Classic IT tools such as the Windows Server Update Service (WSUS) usually do not sufficiently cover OT components and they are not necessarily known for their ease of use. In line with our motto, "there has to be an easier way", COPA-DATA and our partner ondeso are providing new options in this area.

TAKE STOCK OF THE SITUATION

What's the best way to approach an OT infrastructure maintenance project? First, assess the current situation and carry out an infrastructure analysis (see the "Brownfield" article in IU37). The goal is to get a complete overview of all the OT components, including their condition, their purpose and locations. This step often turns out to be very time-consuming because brownfield applications are often not so well documented. At this point, the ondeso platform can come into play and help you. With its integrated functionality for network scans, the platform is designed

to analyze micro-segmented production networks. You can also control the active and passive detection tools to ensure the scans are compatible with the components of the OT network. You should repeat these scans regularly to ensure inventory data is updated and maintained. You have to be able to detect changes promptly so that you can react to new risks – for example, a new device being connected to a system.

AUTOMATIC COMPATIBILITY CHECK

Now that you have a better understanding of your infrastructure, how can you exploit the full potential of the ondeso distribution platform using zenon tools? In principle, there are several scenarios. Some present you with major challenges but they can be optimized in practice. We'll now share some ideas on how you can simplify this complex process.

Software component manufacturers typically provide information with their products about certain minimum requirements. Support and service are often guaranteed only if the existing systems meet these requirements. As an equipment operator, particularly for brownfield applications, you are automatically faced with the following question: can my environments run smoothly with the new components? The ease with which you can now answer this reveals the potential of a zenon-ondeso solution. By sharing information between the two platforms, system operators can, for the first time, carry out an automated compatibility check for existing components at the push of a button.

NEXT UP – THE DISTRIBUTION STEP

Having confirmed compatibility, it's likely you want to distribute one or more zenon components to all the relevant end devices using tools prepared centrally. You can plan the activities centrally and they can be carried out either centrally or locally, for example, by the user. That might sound easy, but the devil is in the detail. Different components have different requirements. There may be multiple components from third-party manufacturers that are required on the target systems. These components can, but do not have to, come from COPA-DATA. In the case of a web-based dashboard, for example, a web server is required. You can manage and configure these complex distribution processes using the ondeso platform, provided they are in the correct order. In addition, you can back up the status quo automatically so that you can return to a defined initial state at any time – useful if an error occurs.

THE IDEA OF COPA-DATA AND ONDESO

After initial system startup, operators face the next major challenge: maintenance and patch management for existing systems. This topic is increasingly becoming the focus of process owners, since almost every week we read about attacks on industrial systems. Patching complex OT

systems in an uncoordinated manner involves a high risk of causing unplanned downtime. COPA-DATA and ondeso have, therefore, independently taken up an idea from IEC 62443, the international series of standards for IT security. Both companies, as manufacturers of components, will in the future actively provide information about patches in a standardized format, particularly patch releases for components from third-party manufacturers. This is intended to make patching processes easier and more reliable.

THERE MUST BE AN EASIER WAY!

In fact, IEC 62443 makes it possible to package this type of information in a standardized XML format such as, for example, the release of a Windows patch for a specific zenon product in a specific version. On the other side stands the ondeso distribution environment. It is able to automatically import this information. Necessary, approved patches – whether from COPA-DATA or a third-party manufacturer – are detected automatically and, if necessary, retrieved automatically, distributed and installed, taking into account maintenance windows.

If you look at the entire process chain required – which covers the professional maintenance of sometimes complex industrial facilities – the potential of integration between the two worlds becomes apparent. The standardized exchange of information allows you to significantly simplify and accelerate these processes. This is in the spirit of IEC 62443 – and is, above all, in line with the COPA-DATA motto “there must be an easier way”.

ondeso

ondeso develops software specially for Industry 4.0 and digitalization environments. The company supports customers from mid- to large-sized companies in the areas of IT operations management and security in production. Facilities operators, as well as machine and equipment manufacturers, have relied on ondeso products for years to provide solutions that can be used across the entire range of production systems and processes. Whether management system, HMI or controller, ondeso manages the lifecycle of industrial PCs and provides tailor-made products at the highest technological and conceptual levels. 100% made in Germany.

SEBASTIAN PFALLER
Head of Product Management bei ondeso

Sebastian Pfaller is responsible for product planning, security, intellectual property and technology partners at ondeso. After training as an IT specialist at a manufacturing company and completing his bachelor‘s degree, he acquired two master‘s degrees in computer science through an exchange program with a year abroad and then started working as a product manager.

REINHARD MAYR
Head of Information Security and Research Operations, Strategic Projects

Reinhard Mayr has been part of the COPA-DATA team for approximately 20 years and has been responsible primarily for product management over the past ten years. In his current role, he is responsible for all matters relating to the company‘s data and information security and coordinates research-related activities together with universities and independent scientific partners

reinhardm@copadata.com

INDUSTRIES & SOLUTIONS

FOOD & BEVERAGE

ENERGY & INFRASTRUCTURE

AUTOMOTIVE

LIFE SCIENCES & PHARMACEUTICAL

CHANGE MANAGEMENT AND SOFTWARE TECHNOLOGY
IN THE FOOD & BEVERAGE INDUSTRY

TRANSFORMATION. WHAT ELSE?

Like it or not, the food & beverage industry is changing in ways that we can feel clearly as consumers. Does this present dramatic challenges or exciting opportunities for manufacturing teams? We consider the experience of leading food & beverage companies to share learning on how to achieve an agile and sustainable business.

INNOVATION. DIGITALIZATION. SUSTAINABILITY

We all live in dynamic times. As consumers, we experience both tasty surprises and frustrating limitations. While you might enjoy creative new drinks today, tomorrow you may miss your favorite restaurant. You may peruse delicious menus online. Or you may eat with less meat, less sugar or choose, whenever possible, regional and organic. These are the new consumer trends that you may follow or, perhaps, even set.

How is change experienced by food & beverage manufacturing teams? As workers, you are probably experiencing a disturbed supply chain – from limited access to ingredients or, perhaps, not reaching your consumers at all. You may not recover the returnable packaging material held up in pandemic-disrupted systems. Perhaps the high work-from-home quota within your team is affecting your ability to produce? And, on top of all these disruptions, climate change has initiated the question of the CO_2 footprint of your operation.

Energy saving initiatives are great, but is their impact on the environment good enough?

The food & beverage industry already incorporates many collective approaches to help cope with change. Standards – such as ISO 22000 or ISO 50001 – guide production teams to improve every day in quality assurance, food safety and consumption optimization. Manufacturing companies, system integrators and machine producers already have a mindset of change. The recent wave of challenges haven't remain unanswered for long. It seems that aiming to overcome today's challenges is natural. But really amazing things are happening when leaders reshape their vision. They see today's opportunities as bigger than ever. Transformation. What else?

Let's look at why our industry is so ripe for transformation.

Innovation can be easily observed on the food shop shelf. Just look at the variety of products, ingredients, recipes, packaging and overall consumer experience. Industrial processes are subject to optimization and disruptive novelty. Entire business models change as new customers are addressed with new products via new delivery channels.

The trend of digitalization brings a strong change energy. Digitalization is itself not a goal of transformation, but the enabler of measurable business benefits. Entire supply chains can grow more fluid by securely integrating people, production and management systems.

Sustainability is the top motivation for transformation in the food & beverage industry. Humanity has a stark and critical mission to act against global warming. Sustainability is an increasingly concrete concept and more widely anchored in the strategy of both big and small manufacturing companies.

The food & beverage industry is embracing a transformative path towards sustainability. Innovation and digitalization can help to drive for sustainability with maximum impact. But what are the real-world experiences of climbing towards these goals? How do you bring your entire team along with you? And how easy is to avoid costly mistakes?

LEADERS AS TEACHERS

The transformation towards innovative, digitalized and, above all, sustainable manufacturing is a never-ending story. "Change" – for many still an abstract concept – is a trail with many milestones and learnings (see Figure 1). You get closer to the mountain peak as you walk and design your journey, step by step. This is our real-life experience working together with leading food & beverage manufacturers. In the following examples, among other success factors, the zenon software platform has been engaged for an easier and more enjoyable transformation trail.

In the frame of continuous improvement in packaging line efficiency, a global manufacturer reflected on the challenges faced by its plant floor team. An obsolete data collection and analytics system had reached the end of its lifetime. The people couldn't implement their newest improvements ideas or profit from increased machine data. Automated data collection, reduced manual input and precise analytics were just a dream.

In the project initiation phase, the first step of a potentially longer journey was designed in harmony with the company strategy and efficiency standards. Its leading European team, the system integrator and COPA-DATA proceeded with a clear goal, resources and timeline. Such a project management setup proved to have great value. First, the pilot project was easily manageable and enjoyed a smooth implementation. Second, the costs were kept at a reasonable level. Third, the results validated the expectations. The zenon software platform helped with a modular approach; enabling the selection of only the necessary software services. The interdisciplinary team and good communication assured the optimum combination of automation and IT technologies.

Close to its end, the pilot project brought one more challenge. Despite the qualitative focus on data-driven OEE improvements, the key people for whom the line efficiency system was designed felt uninvolved and showed low acceptance. The situation was overcome by improving usability based on their valuable input. The flexibility of zenon, in conjunction with the competence of the system integrator, secured the achievement of this key milestone.

The line efficiency solution enjoyed a successful rollout delivered by the European team. Their journey continued vigorously with implementation across the company's European plants. Step by step, the solution grew with new efficiency reports and other functional extensions. zenon is designed for this type of agile implementation. It keeps opportunities open with a future-orientation towards the end user's operational excellence and process innovation vision.

We switch now to another example of a leading worldwide manufacturer.

Despite heterogeneous operation technologies across different continents, it wanted to implement a common global quality system. The main idea was to build on the value of production data. Using automated calculation algorithms, a wide range of quality measurements could be requested in real time, as in an extended HACCP system.

The proof of concept and pilot phases validated the solution feasibility based on the zenon software platform. zenon's high level of connectivity to industrial data sources, its advanced data processing mechanisms and integration convenience were essential. The journey to a

Figure 1: zenon brings value at every step and to the whole of the transformation journey

mature solution continued by achieving key milestones along the way. Among them, the performance of data processing was taken as an early focus. Furthermore, the demand for quick and reliable implementation found its solution in zenon's automated engineering technology. A third key conceptual development was zenon's capability to integrate with various third-party MES implementations.

The close cooperation of global and local manufacturing teams, of COPA-DATA and of local system integrators made the entire journey even smoother. The agile approach of digital transformation enabled team creativity, while perfecting the deployment of the zenon software platform. This way, the global leader remains consistent with its vision of product quality and customer satisfaction across continents.

Our third example shines a light on sustainability. This brewing company aims for a neutral CO_2 footprint. The framework of the ISO 50001 standard and its associated certification is not about setting concrete energy saving goals. Rather, it guides the manufacturing team to build skills that enable it to continuously optimize energy consumption. In an iterative way, just as in the transformation journey, the energy manager and his supporting colleagues create and implement new ideas, check the results and proceed with the next step. The availability of consumption data from the different consumers at the necessary level of granularity is essential. Chosen by the system integrator, zenon came into place to connect various measuring and production equipment. All the data is collected centrally, displayed, processed, archived and further used in energy data management reports. The existing meters and sensors are contextualized within the production landscape and active processes.

In our example, there are many other key development milestones which followed: extensive use of process variables (e.g. temperature, operating states), consumption peak detection, data exchange with further systems of the plant, wide involvement of users, creative diversification of energy reports, correlation of OEE and consumption. Every step builds on previous experience and brings clear benefits and learnings. This is how an ISO 50001-certified manufacturing team acts. The zenon software platform simply reduces the cost of flexibility and maximizes the freedom of action. The journey towards optimum sustainability continues to be smooth and enjoyable.

YOUR SOFTWARE FOR TRANSFORMATION

As our examples show, transformation is a journey animated by an inspiring vision anchored in business strategy. One key secret of a smooth path is how the manufacturing teams frame the agile implementation. While too large a step may be costly, difficult to manage and, perhaps, even end up deviating from the path, too small a step might show unconvincing benefit or slow down the journey.

The software technology used for these solutions also represents another secret to a successful transformation journey.

Looking to Figure 1, when it comes to designing every milestone with an outcome (e.g. return on investment), the zenon software platform grants maximum flexibility through modular services and concepts. Simply choose the software components you need. Make sure the benefits you target are visible for all stakeholders. And prepare every next step with their full support. In each phase, you must stay flexible to build project teams with the proper competences, aligned goals and timelines.

zenon democratizes digitalization technologies. This means learning curves are improved and progress is accelerated. You gain the freedom to reduce organizational and technical barriers. Plus, you can combine zenon with any hardware or other systems, on premise or over cloud. Your teams will feel empowered to find the best paths towards your shared vision.

The Plan-Do-Check-Act framework, as outlined in ISO standards, is a natural companion on your entire transformation journey. At every step, people learn the value of production data and how to use digitalization and innovation to achieve sustainability. You feel always ready for what comes next.

Whether you are striving for production flexibility and quality, for digitalized processes or for sustainability goals, placing the zenon software platform at the core of your manufacturing operation helps you to stay on track with ease.

zenon gives you an extensible, flexible and open digital infrastructure. Therefore, the total cost of ownership (TCO) remains low and continues to drive benefits over many years. Your profit from the newest OT/IT technologies can increase continuously, with every zenon version. Plus, at your side throughout your transformation journey are the skilled, international COPA-DATA team and an experienced Partner Community.

Transformation is already a reality for all of us – both as consumers and manufacturers of food & beverages. With the right approach and technology, transformation towards sustainability is even easier than we think.

Together, we are shaping a better future. Share your journey with us at fnb@copadata.com.

Curious to learn more about the customer examples mentioned here? Watch also the videos on our Melting Blog!

EMILIAN AXINIA
Industry Manager Food & Beverage COPA-DATA Headquarters

Emilian Axinia, M.Sc. Computer Engineering and Executive MBA, has accumulated over 25 years of experience in engineering and automation projects in the food and beverage industry. He led industrial projects for the global company Ecolab before managing his own company as a distributor of innovative automation technology in Romania. Since May 2007, Emilian Axinia has been part of COPA-DATA's team in Salzburg, Austria. His focus as Industry Manager is to develop the business in the food & beverage industry by addressing the challenges faced by today's manufacturing companies, for instance supporting their agile transformation journeys with software technology.

emiliana@copadata.com
LinkedIn: emilianaxinia

RENEWABLE FUTURE –
NEW SKILLS FOR THE DIGITAL ENERGY INDUSTRY

THE PROVEN PATH

"You don't just convert a critical system over a weekend!" explains energy and systems engineer Phil, describing his general approach. However, Phil is finding that his foundation of existing principles and knowledge is gradually being eroded as the increasing dynamics of energy grids, the energy revolution and the increasing expectations for operational efficiency, process transparency and openness develop.

Following his studies, Phil began his professional career at a regional energy supplier in the mid-1990s. He supported many projects and became a technical manager for secondary and control technology. Phil's employer was responsible for supplying electrical power to tens of thousands of households and numerous businesses, as well as public institutions.

Any unplanned interruption had major consequences. So his work and that of his colleagues always involved conscientious preparation and careful implementation. Everything took time. If something worked, the engineering team were not quick to touch it again. However, over time, the general conditions have changed noticeably, especially in the last few years. Today, virtually all businesses want an all-encompassing digitalization program. What is the value of Phil's wealth of "analog" experience in this new environment? What strategy can he use to safely guide himself, his team and, ultimately, the company he is advising into a digital future?

DIGITALIZATION IS IMPORTANT – BUT EXPERIENCE ALSO COUNTS

The demand for more flexible energy grids is not new to Phil. For years, the switch to decentralized supply networks has been trailed under the phrase "Smart Grid". In the long term, renewable energy sources such as photovoltaics or wind power should be able to replace conventional energy sources such as coal or nuclear energy. Naturally, because of the volatility of renewable energy supply, this leads to new challenges – the monitoring and control of more dynamic networks requires completely new approaches and holistic solutions.

What was initially a low-key topic has quickly heated up and became a mainstay for speakers at conferences. Phil has heard a lot of new buzzwords and acronyms, such as digital substations, WAMPACs, smart meters or DERMS. And when the climate debate reached a crescendo in the mid-2010s – keyword "Paris Agreement" – the pressure to innovate in energy automation increased once again. It was crystal clear to Phil that digital technologies had an important contribution to make in overcoming the challenges ahead.

Nevertheless, he remained skeptical: rolling out new systems and technologies requires deliberate planning and careful implementation. Security of supply is still the most important measure of any solution. Highly specialized protection technology remains the foundation of every power plant or substation application. They have gained significantly in digital function in recent years; protection devices can now be used much more flexibly and networked with one another based on modern standards. Instead of setting to work with a screwdriver and voltmeter as in the past, ergonomic software tools are now used on laptops – even remotely.

USING DIGITAL TECHNOLOGY WHERE IT MAKES SENSE

The digitalization of the world of work and practically all areas of everyday life is advancing at a rapid pace. From combating climate change to optimizing one's own physical fitness to online dating, digital offers are being used extensively with the promise of guiding us into a better future. Even toothbrushes now clean more thoroughly – thanks to artificial intelligence. Digital tools, gadgets or apps are installed, updated and uninstalled every minute of the day.

While digital solutions are nice to have in everyday life, Phil knows that completely different rules apply in an industrial environment. Every system decision has far-reaching consequences. A solution in the energy sector must run reliably for many years. In addition to an open attitude towards new technologies and solutions, engineers like Phil always have a critical understanding of the requirements of industry. Importantly, as well as building up know-how and developing approaches that use new technologies, such as cloud and container-based architectures, advanced analytics, or large-scale networking in the context of IoT, Phil's knowledge of the existing systems and processes is critical within the innovation process.

CREATING A DIGITAL FOUNDATION FOR THE ENERGY INDUSTRY

Regardless of who Phil is talking to, one approach currently provides an important measure of modernization and digitization – at least with regard to protection technology and station control technology in substations: the IEC 61850 series of standards.

This standard starts with the design of a system and provides a comprehensive data model that precisely describes all components and interfaces – in machine-readable as well as human-readable form. Thanks to this open type of information display, assistance programs can effectively support various engineering tasks. For example, parts of the system can be generated fully automatically and based on templates. In addition, the IEC 61850 standard defines a series of communication protocols for using the respective devices and systems to exchange data and signals. This represents an immense gain in flexibility, especially on the time-critical process level. Where previously safety-critical signal connections were implemented using hard-wired copper lines, these signals can now be exchanged with IEC 61850 via a fully digital process bus. Both type and number, as well as sender and receiver, can be configured dynamically. The connection no longer runs via a kilometer-long bundle

of copper cables, as it used to, but is implemented via a robust network or fiber optic cable. This transforms a previously rigid system into a cyber-physical system that can be adapted to changing conditions.

It was definitely where we were headed, Phil was sure. Although, given the significant changes that came with it, he felt a little uncertain. After all, the systems not only had to prove themselves on presentation slides but also in the rigors of daily use. All of his teams and colleagues would have to buy into the plan and engage with new tools and processes. The openness of the IEC 61850 standard makes it possible to break up outdated structures and process projects much more economically in the long term but, at the same time, one has to leave behind the safety of familiar technologies and manufacturers.

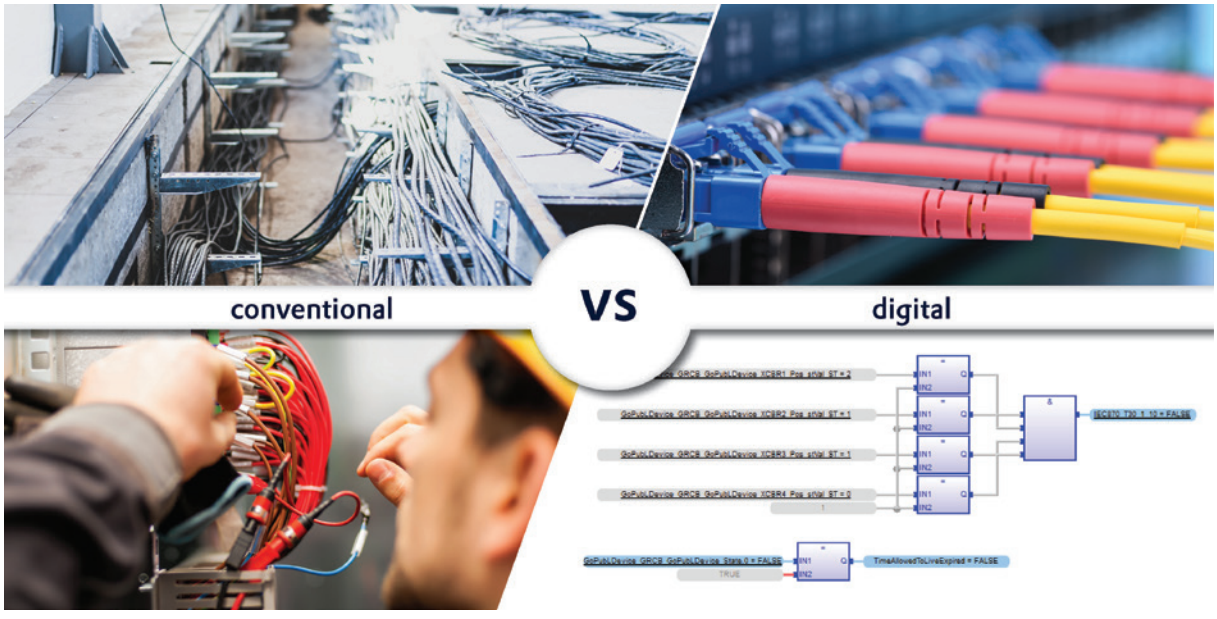
INTELLIGENTLY COMBINING EXPERIENCE AND TECHNOLOGY

Digital technologies hold considerable potential for energy companies. However, these cannot simply be called up spontaneously. Rather, they have to be made usable as part of a strategic process. The goals of this process should be defined as clearly as possible, in order to benefit from the relevant technology effectively and sustainably.

For the engineers on Phil's team, this change naturally holds many challenges. Not only do the new concepts and methods have to be understood, but their suitability for industrial use also has to be proven. Fine-tuned, systematic tests have to demonstrate that a solution architecture is capable of withstanding the many requirements of decades of plant operation with all its regular and unscheduled events.

In addition, the engineers working with Phil have long known that the comprehensive networking of man and machine would create various attack surfaces for cyber attacks. This is a danger that can no longer be ignored. Developers must, therefore, ensure that the risks are minimized right from the start and the proper solutions used.

One latent aspect in many digitalization projects is that of opening up. International standards such as IEC 61850 aim, for example, to ensure that solution architectures can be merged across manufacturers. The protective devices might come from manufacturer "A", the HMI from manufacturer "B", and test equipment from manufacturer "C". This gives Phil's company the chance to break away from certain manufacturer limitations. In principle, he can freely choose the most suitable component for the respective task in the system. Finally, independent integration partners can also be engaged to develop and commission the solution. This offers considerable optimization potential for a project, but also requires a high level of experience in order to benefit sustainably from the freedoms gained. The job of Phil's team is, therefore, to design new solutions and to ensure they can be used reliably. Even in the digital age, their creativity, foresight and talent for improvisation remain invaluable as important human strengths.



For digitalization based on IEC 61850, cost-intensive cabling is replaced by flexible network communications. Signal connections between devices are configured using smart software tools.

The transformation of the energy industry presents numerous challenges and opportunities. Many companies use the performance and the flexibility of the zenon software platform for the realization of digital and sustainable energy solutions.

CHALLENGE ACCEPTED

Phil was determined to face the upcoming challenges openly and to add to his experience. For his team and his company, Phil's commitment and active approach to new things would prove to be invaluable. Projects were being prepared to modernize plants. Existing solutions were getting on in years and these were no longer maintainable within reason. Too many limitations were arising. And more standardization and transparency was required. All information had to be monitored reliably and used for advanced analytics. Technologies and solutions based on IEC 61850 would play an important role in this. Additional sensors should provide status data on a large scale. Cyber-security had become a top priority. And, as is so often the case, significant parts of the project were still unclear. They would only become clear along the way. Phil had heard of a suitable software platform already. It was very well established and was used internationally by many energy suppliers. Very flexible. Independent. Easy to use – hopefully. He knew that feeling all too well: the growing mixture of impending effort, curiosity and confidence. So the time had come – now he began to see the way.

TELL US ABOUT YOUR EXPERIENCE

How do you experience these changes in your environment? Are you facing challenges similar to those faced by Phil and his team? Where are you on your journey into the digital future? Share your experience with us! Scan QR-Code here for the questionnaire:

STEFAN HUFNAGL
Industry Expert Energy

Industrial automation is the main focus of Stefan's professional career. After several years of work as an application engineer, he has also worked in innovation and product management. Stefan has been part of the COPA-DATA team since 2013. As a member of the Energy Industry Team, he deals intensively and openly with trends and challenges in this industry.

stefan.hufnagl@copadata.com

IMPLEMENTING ZENON ON A CROSS-TECHNOLOGY BASIS

"MAESTRO TO THE PIT"

When the call rings out behind the curtains at an international opera house, the conductor steps up to the stand and cues the musicians. In the central control system of an automotive production system, the zenon software platform can take on this role of conductor.

Opera and automotive manufacturing have a surprising amount in common! Everything has to be carefully coordinated and designed. Just as the instrument groups, choir and soloists come in at the right moment, cued by a signal from the conductor, every production step must be carefully timed and guided.

A wide variety of instruments are found in an orchestra. Just as there are different instruments and technologies that vary in methodology, production resources or the degree of automation in vehicle production and in the manufacture of vehicle components.

The configurable, flexible software platform zenon can act as a conductor and interdisciplinary bridge between domains and technologies, such as car body construction, surfaces, assembly, components, building automation, energy and utility supply. On the one hand, zenon can cover basic functions across technologies and, on the other, the platform can integrate technology-specific requirements. This creates synergies when engineering the solution and in operation.

PROTECTING YOUR INVESTMENT WITH A SYSTEM-INDEPENDENT SOLUTION

Investing in an end-to-end system is a decision with lasting impact. Future security is therefore an important criterion when choosing a system. zenon has taken on this challenge more than 300 direct drivers for communication between the central control system (CCS) and the PLC level allow the controller to be changed easily by simply replacing the driver, without having to reconnect zenon variables.

Thanks to zenon's hardware independence, a wide selection of industrial panels, IPCs, PCs and mobile devices are available.

The interfaces for high-level languages, add-ins, controls and the soft PLC zenon Logic ensure that zenon is very flexible for individual extensions.

Plus, the user interface of zenon Engineering Studio enables simple administration after a short training period. Programming skills are not required.

In automotive manufacturing, zenon has proven itself over 20 years under a wide range of conditions. When continuously developing zenon, we focus on requests and requirements based on practices in industry in interdisciplinary applications.

SYNERGIES FROM AN INTERDISCIPLINARY APPLICATION

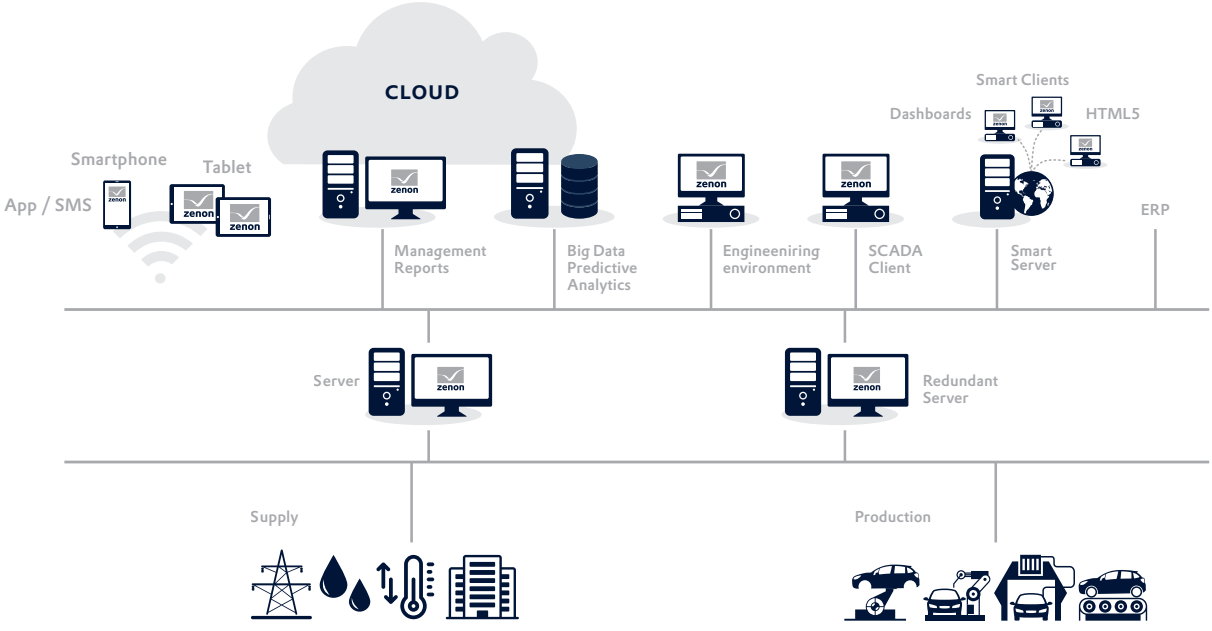
The cross-technology software platform zenon can provide a range of synergies. With comprehensive standardization of software components and interfaces, zenon ensures important production data is transparent. One example is higher-level production control with zenon, which makes the best possible use of the available systems and transport routes. The energy requirements for production can also be taken into account. Configurable reports provide you with the information you need to make further improvements.

The interdisciplinary approach to the modularization of software adds significantly to time and cost savings. Process experts can define the modules, which shortens engineering and setup times. During production operations, these standard modules ensure the system runs smoothly and, thanks to standardized functions, improve maintenance and troubleshooting in case of a problem. When changing or expanding a module, only that capsule's functions have to be altered.

FLEXIBILITY WITH BUILDING AUTOMATION

The requirements for building an automation control system are largely equivalent to those of a central system that monitors functions in production. For building automation to enable production halls, storage areas and offices to be flexibly occupied and operated efficiently, it requires a control system with a large number of interfaces to a wide variety of controls and controllers. Using such a system, problems in the process can be quickly identified and eliminated and requirements for access protection and personal safety can be met.

The control technology should monitor and manage power to ensure production remains stable. It should integrate the relevant data from the feed-in (including on-site producers, such as emergency power compressors or combined heat and power units) to sub-distribution and consumers. Using the corresponding stored algorithms, this results in an intelligent energy management system that allows as much energy as possible to be obtained from the energy supplier at the lowest possible contractually fixed price. Importantly, the potential for savings helps to prevent expensive peak loads, which can be reduced through targeted interventions. Either the load is reduced for switchable consumers, or energy is fed in from on-site generation or is supplied from reserves. For this reason, it is necessary to accurately forecast the average power



Interdisciplinary data access increases transparency

requirement for a measurement period. This can help you to identify issues in a timely manner and take steps to control any impending spikes or overage fees and remain within the specified reference power limit.

CERTIFIED IT SECURITY WITH ZENON

The zenon software platform provides comprehensive protection against unwanted data loss and unauthorized access. With the integrated security options, zenon can be easily integrated in existing security concepts.

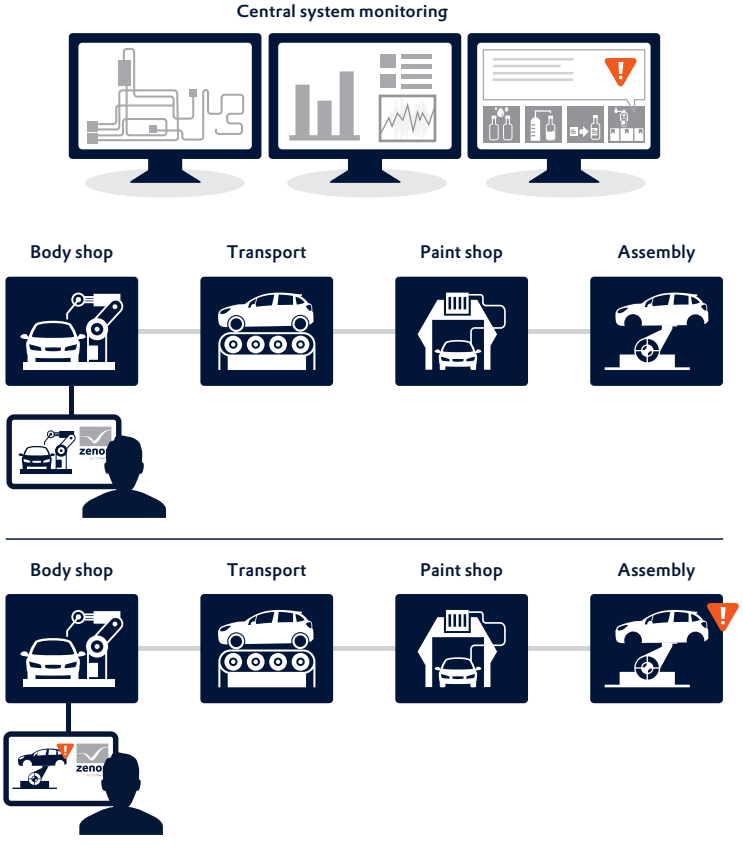
TÜV Süd, the German Association for Technical Inspection, has certified COPA-DATA for its "Security by Design" approach in developing products that comply with IEC 62443-4-1. The IEC 62443 international series of standards defines the security measures for industrial automation systems. Part 4-1 of the standard specifies the requirements for the manufacturer's development process.

zenon is also certified in accordance with the IEC 61850 international standard, which governs the communication between various components in automated electricity and transformer stations. The current test bed for Edition 2 checks new features and add-ons against this standard.

BENEFITS WITH ALL TECHNOLOGIES

The interdisciplinary use of zenon can further promote production capacities. Work orders can be moved flexibly between equipment or production sites. The synchronized production flow is combined with the concept of flexible workstations.

Flexible building automation with integrated energy data processing supports business operations across the properties at the production sites. zenon thus provides a stable platform to meet a range of needs – thanks to its extensive functionality and simple and secure integration with new or existing systems.



Reliable data distribution for seamless control of the production process

BERND WIMMER
Automotive Industry Manager

Bernd Wimmer has been Automotive Industry Manager at COPA-DATA Germany since 2002. Previously, he worked as a central control technology specialist for TaurusMediaTechnik GmbH. He lives with his wife, two children and their cat in beautiful Bavaria.

bernd.wimmer@copadata.de

MODULAR PLANTS IN LIFE SCIENCES: DREAM OR REALITY?

The battle against COVID-19 and the development of treatments using monoclonal antibodies pose considerable challenges to the biotech sector in both R&D and production. One concern is the flexibility of system reconfiguration and the fast interchange between the various modules that make up the system. The MTP standard proposed by NAMUR defines an interesting approach to interoperability and modularity. How can it help in our response?

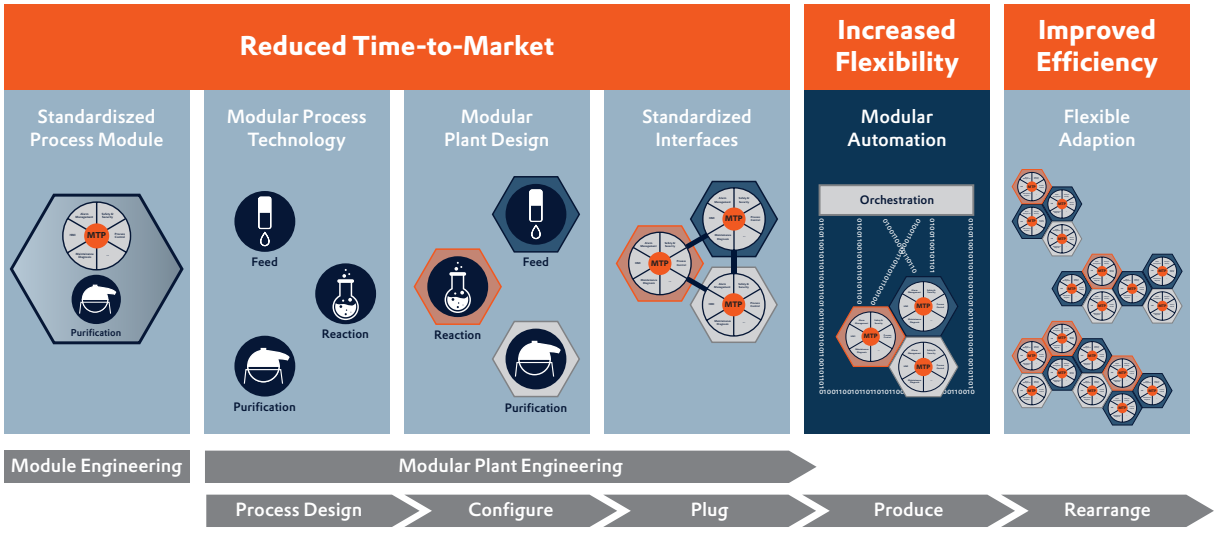


Figure 1: Concept for Modular Plant Engineering – Source: NAMUR, ProcessNet, ZVEI[1]

Public awareness regarding the complexity of pharmaceutical production has never been so widespread. The effort of life science companies working at breakneck speed to develop safe and effective treatments to respond to the COVID-19 pandemic has been well-documented.

As we know, biotechnology is the frontier for the development of new drugs. This is why the biotech sector is experiencing a period of strong expansion. However, to support this expansion – which involves the entire value chain from R&D laboratories to clinical trials and large-scale production – we need to think about innovative production methods.

The main challenges involve the reduction of batch change times where cleaning and disinfection are essential; flexibility in equipment configuration; and the ability to simply swap modules from different suppliers without complex reconfiguration and revalidation.

Companies are rethinking production areas according to the ballroom concept, where it is possible to move modules freely from one part of production to another. There is a move away from fixed stainless-steel plants to single-use technologies that do not require CIP/SIP systems.

Of course, another fundamental aspect concerns the process control systems. Today, the process industry is based on classic DCS architectures that constrain the choice of suppliers for both end customers and process module manufacturers, limiting flexibility and reconfigurability.

Ideally, biotech companies should have a set of process modules that perform a specific function, like a filter, a pump or more complex devices such as a single-use bioreactor or a granulator. This would allow companies to reconfigure the plant by simply connecting several modules together to make one product, before replacing some with others to make something different or to increase production capacity.

However, this requires a common communication language; a common descriptive model of the various devices; a guided procedure to make configuration changes in the system while maintaining the validation status; and software systems capable of orchestrating the various modules in order to produce the expected material.

Innovations of this kind pose considerable challenges, especially for equipment vendors and software technology providers.

NAMUR MTP

To address this challenge, NAMUR, an international association of user companies in the process industry for automation technology, and the German association ZVEI, are supporting this plug-and-play approach by defining the Module Type Package (MTP) concept (VDI/VDE/NAMUR 2658)[1]. This model allows for more flexibility by enabling the quick assembly and disassembly of systems from different vendors in an architecture.

The basic requirement for consistent modularization in production is a uniform description of the information about the individual modules. Which data objects are present? Which services are to be executed?

According to MTP terminology, a module like a bioreactor or a filter skid is known as a Process Equipment Assembly (PEA).

Each PEA presents its properties, such as the services it can offer (for example, a reactor will offer a filling or stirring service), configuration parameters, alarms and the HMI pages for monitoring. All of this information is described in an XML file with a format defined by MTP.

[1]www.vdi.de/en/home/vdi-standards/details/vdivdenamur-2658-blatt-1-automation-engineering-of-modular-systems-in-the-process-industry-general-concept-and-interfaces

All PEAs provide information in a standardized format no matter what control system they use. This facilitates integration with a superordinate Process Orchestration Layer (POL), as you can see in figure 2.

By importing the various modules and interconnecting them via process orchestration, the POL layer is now able to represent and monitor all modules and create batch recipes according to the ISA 88 standard using the services offered by the various modules or PEAs.

Once production has finished, it is possible to reconfigure the modules to produce another batch through a different sequence.

OPC UA, a widely accepted standard, was chosen for the communication layer between the PEA and POL levels. Figure 1 summarizes the various steps of modular plant engineering, as described by NAMUR.

ZENON & MTP

At COPA-DATA we believe strongly in the concept of modular engineering and the use of communication standards that guarantee openness and interoperability. It has been part of our DNA since our foundation. We believe that MTP can be a design method that leads to true interoperability between different suppliers, enhancing the speed of reconfiguration and overall cost reduction for the end customer.

This is what we achieved in the energy sector more than 10 years ago. In substation automation, thanks to the native integration of the IEC 61850 standard in zenon, our partners – including Siemens, ABB, Ducati Energia and SEL – have realized a large number of flexible digital substation projects using devices from different suppliers that have IEC 61850 compliance in common.

To contribute to the development of open and interoperable standards such as MTP, we participate in the working groups of both ISPE Pharma 4.0 Plug & Produce[2] and Biophorum[3]. We have also developed a suite of MTP tools within the zenon software platform to support both machine builders and life science companies.

HOW ZENON SUPPORTS EQUIPMENT BUILDERS

How can a manufacturer provide an MTP-ready Process Equipment Assembly?

First, with each machine, the manufacturer must deliver a file describing its functionality and features using the semantics defined by MTP. The equipment must then be able to communicate with the POL level

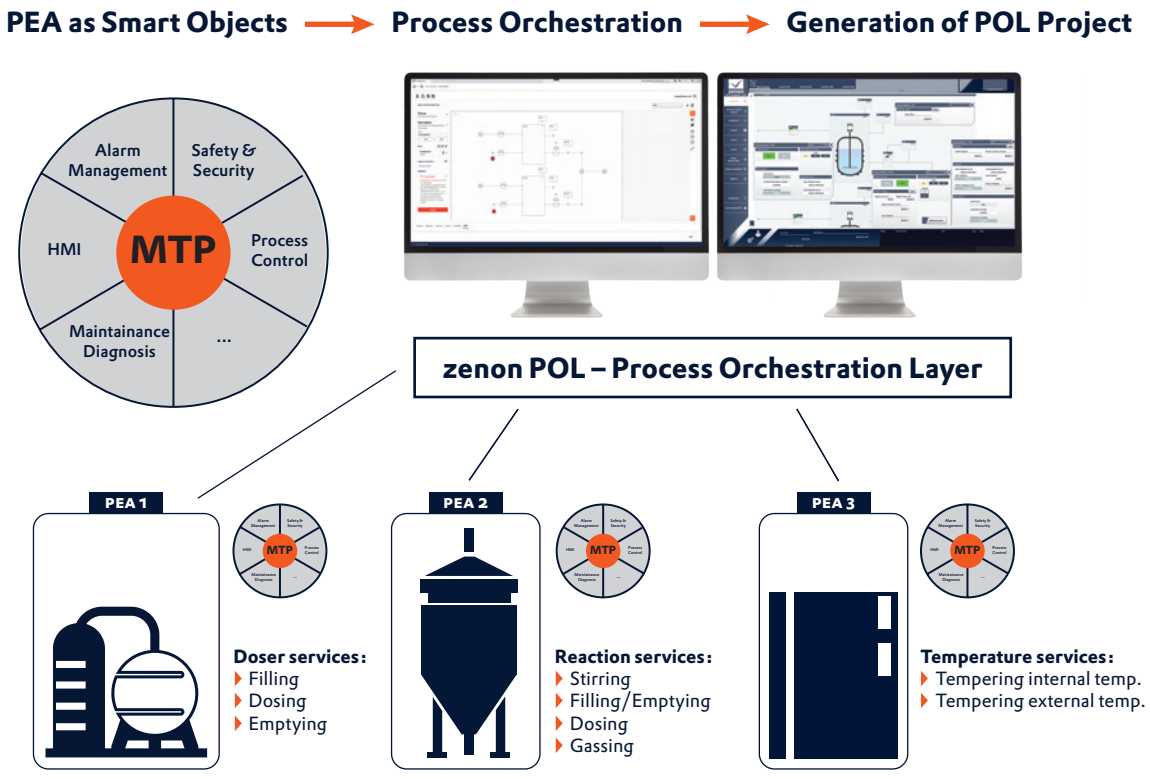


Figure 2: zenon POL orchestrating 3 PEAs

[2]ispe.org/initiatives/pharma-4.0
[3]www.biophorum.com

as an OPC UA server. For this purpose, zenon provides the MTP Editor tool to produce an MTP file according to the specification. The zenon Service Engine includes different modules, including the Process Gateway with OPC UA server functionality. And zenon Logic provides an integrated soft-PLC engine according to IEC 61131. In this way, you can use zenon to build your process module in line with MTP, see figure 3.

HOW ZENON SUPPORTS LIFE SCIENCE COMPANIES

Let us now move on to the needs of the end user at a pharmaceutical company. In this scenario, the process engineer has to configure a preparation line for a product using some of the PEAs available to them.

Having received MTP files from the manufacturers describing the properties of the physical modules, the first thing to do is to validate the conformity and the versions of the various MTP files. Next, the MTP files are simply imported as Smart Object templates into the zenon software platform. Now, the process engineer can see the various MTP PEAs as Smart Object templates within the zenon Engineering Studio. Each has its own variables, graphical representations, alarms and services available as phases according to the ISA 88 standard.

At this point, using the device management tool, it is possible to associate the various physical modules with the appropriate MTP file and the corresponding Smart Object template in zenon. It is possible to integrate several modules (e.g. several filtration skids) using the same description file. And, thus, the engineer has now integrated the PEAs.

The next step is the automatic implementation of the POL project. zenon will use a template project and the various PEAs, seen as Smart Object instances. zenon will automatically realize the project as designed in the orchestration phase. It will supervise the installation and control of the PEAs. From this project, the user can then create and execute their own batch recipe in compliance with ISA 88 by selecting the services offered by the various PEAs.

Users can control the modules manually, check the operating parameters from the automatically generated PI&D diagram, receive any alarms, generate audit trails and store critical process parameters. In short, a true, open and flexible Distributed Control System (DCS) can be created in a guided way without the need for any special programming knowledge using modules from different manufacturers. All this is achieved easily thanks to the MTP Suite integrated in zenon software platform, see figure 4.

HOW TO INTEGRATE EXISTING SKID?

So far, so good. However, there are SKIDS in the company which work well but unfortunately are not MTP ready. How can these modules be integrated? Using the zenon MTP gateway module, it is possible to integrate modules with legacy automation systems, providing them with OPC connectivity and a corresponding MTP file describing their characteristics. With zenon, existing assets are given a new lease of life and can be upgraded to the MTP standard.

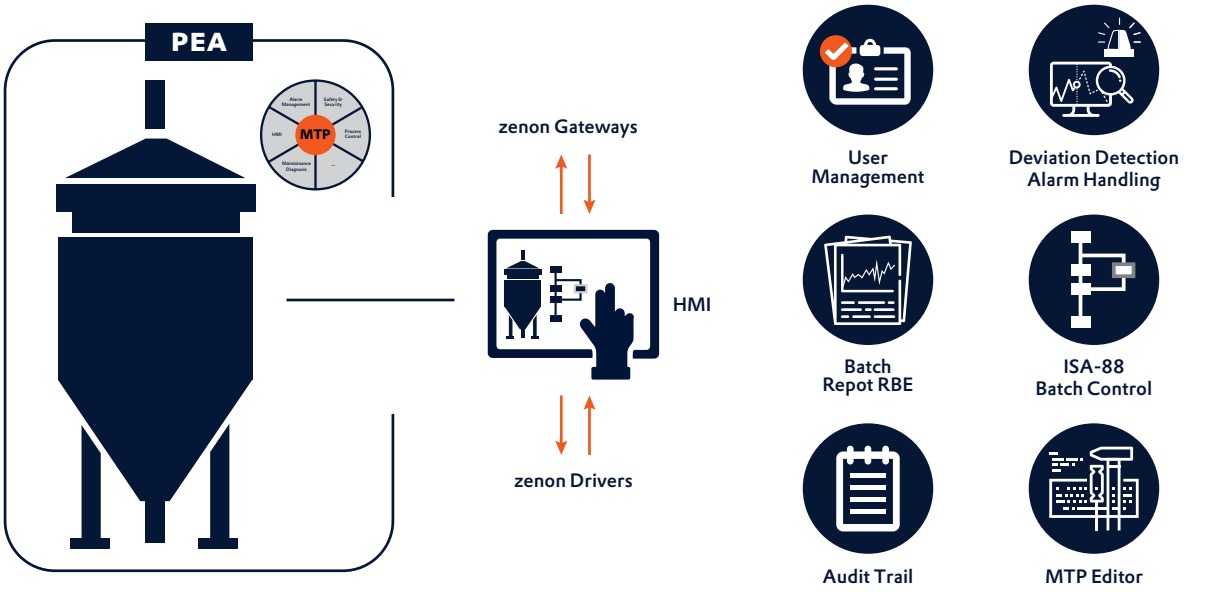


Figure 3: zenon PEA software suite for equipment producers

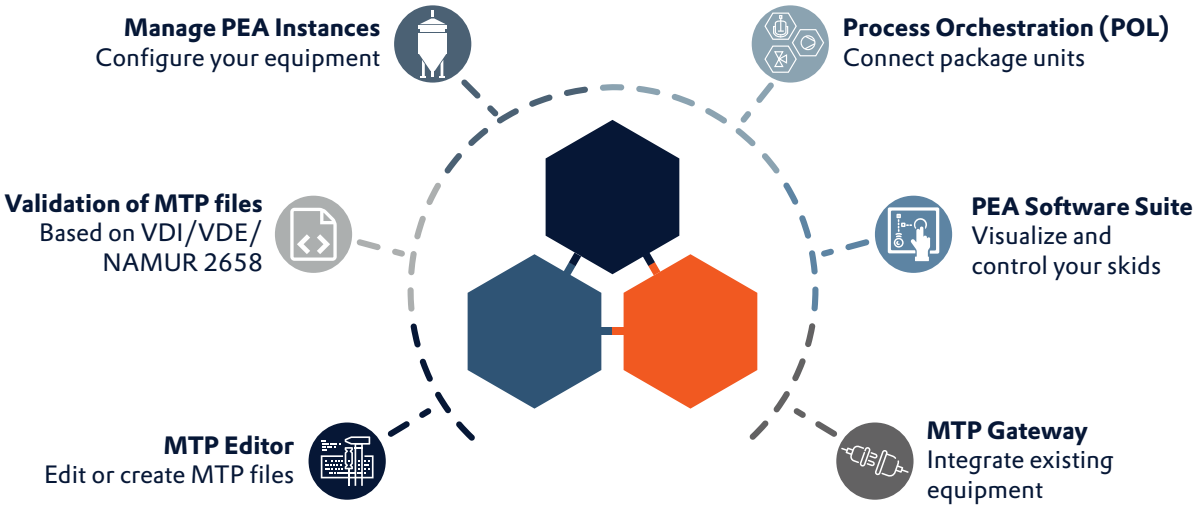


Figure 4: zenon MTP Suite

MTP SUCCESS STORY AT MERCK

So far, so good. But will it be feasible in practice? In fact, it's already been achieved. At the zenonIZE21 event, through a demonstration by Christof Franzke, the Senior Technical Consultant at COPA-DATA Germany, participants had the opportunity to learn about the strategy of Dr. Andreas Bamberg, Executive Director at Merck. He used just this modular engineering to develop 50 different POLs with zenon at the Merck plant in Darmstadt. The project started in 2019 and has already delivered impressive results. To find out more, please review the recordings of Andreas Bamberg's and Christof Franzke's speeches using the QR codes below.

Thanks to the experience gained in these projects, COPA-DATA has decided to extend the support of MTP in zenon. With zenon 11, it will be even easier to realize modular projects in accordance with the MTP standard.

Is modular engineering in biotech just a dream or reality? With the integration of MTP within the zenon software platform, the realization of open and interoperable DCS systems is a proven reality. **Learn more about the zenon MTP Suite: go.copadata.com/mtp**

GIUSEPPE MENIN
Life Sciences & Process Industry Manager

Giuseppe Menin began his career in mechatronics engineering as an automation engineer and software developer. As project manager, he coordinated R&D projects for automating and monitoring manufacturing lines. In 2004, he joined COPA-DATA and is currently covering the role of Pharmaceutical Industry Manager at HQ. As a member of the ISPE Pharma 4.0 Special Interest Group and the Connected Machines working group within GAMP Italy, he is in regular contact with professionals of the life sciences industry.

AROUND THE WORLD

WHO IS WHO

Alexandra Hughes

INDUSTRY SALES MANAGER

COPA-DATA UK

AT COPA-DATA SINCE: 2021
RESPONSIBILITIES:
As an Industry Sales Manager, I look after the Life Sciences and Manufacturing industries by supporting existing customers, helping new customers and managing the COPA-DATA Partner Community here in the UK.
I GET MY INSPIRATION FROM ...
my friends and family. They motivate me to be the best version of myself.
IT IS MY DREAM TO ...
travel and experience as many adventures and cultures as possible. And maybe open an animal sanctuary one day!

You can reach me at:
alexandra.hughes@copadata.co.uk

Daniel Kusenda

QUALITY ASSURANCE ENGINEER

COPA-DATA HEADQUARTERS

AT COPA-DATA SINCE: 2015
RESPONSIBILITIES:
I provide software quality assurance engineering. In my job, I work closely with software developers to perform manual and automated software tests. I prepare test cases and test scenarios for our software and quality assurance on scrum teams to meet specifications and stories. I also carry out testing in different test phases: testing in conjunction with development and integration tests and I support colleagues when they are introducing test cases and test scenarios.
I GET INSPIRATION FROM...
my family and friends, when I'm on a mountain peak, biking outdoors, and at home in my garden.
IT IS MY DREAM TO...
enjoy all of my hobbies.

You can reach me at:
daniel.kusenda@copadata.com

Lewis Williams

INDUSTRY SPECIALIST ENERGY – PRODUCT & APPLICATION

COPA-DATA HEADQUARTERS

AT COPA-DATA SINCE: 2014
RESPONSIBILITIES:
As a member of the industry management team for energy at COPA-DATA, my responsibilities are to ensure that the zenon software platform is equipped with the key features and solutions for various applications within the energy sector. It is necessary to keep up to date with the latest energy trends, in order to conceptualize and specify product improvements and applications.
I GET MY INSPIRATION FROM ...
people who are persistent in their pursuit to improve themelves daily. Learning about new challenges – and potential solutions – facing the world today and hoping to contribute in any way possible to a sustainable future.
IT IS MY DREAM TO ...
continue to enjoy life with my family.

You can reach me at:
lewis.williams@copadata.com

WHO IS WHO

Sofia Sousa

HEAD OF FINANCE AND ADMINISTRATION

COPA-DATA CEE

AT COPA-DATA SINCE: 2019
RESPONSIBILITIES:
I am responsible for the company's bookkeeping and I help in the preparation of our financial statements and reports. My tasks also include the coordination of order processing and licensing. Plus, I take care of recruitment and other HR-related tasks.
I GET MY INSPIRATION FROM...
people I meet, books I read and places I visit. My family and friends are also a daily source of inspiration.
IT IS MY DREAM TO...
continue enjoying life with the people that matter the most for me and to live long enough to witness a world without violence or pollution. Seeing flying cars would also be awesome ;)

You can reach me at:
sofia.sousa@copadata.com

Parth B. Desai

TEAM LEADER

COPA-DATA INDIA

AT COPA-DATA SINCE: 2019
RESPONSIBILITIES:
As a team leader at COPA-DATA India, my responsibility is to set the direction for technical development so that we deliver the best possible results as a team. Alongside my role as a developer, I work mainly on the new interfaces. This includes research, proof of concept and making the new interface production ready.
I GET MY INSPIRATION FROM ...
my family, friends and colleagues. They motivate me every day and the positivity they provide gives me the energy I need when it comes to tackling challenges.
IT IS MY DREAM TO ...
overcome the problems that are stopping me from reaching my full potential. Also, to give my family all the things that they deserve.

You can reach me at:
parth.desai@copadata.com

Roland Saller

AGILE TEAM MANAGER

COPA-DATA HEADQUARTERS

AT COPA-DATA SINCE: 1999
RESPONSIBILITIES:
I am a team manager for software engineering groups. I currently lead three scrum teams, including inbound testers. I am also the scrum master for these three scrum teams.
I GET INSPIRATION FROM...
nature, from my family and friends, and as a volunteer paramedic with the Red Cross.
IT IS MY DREAM...
for my family to remain healthy and for me to interact every day with people who are positive and open-minded about the future

You can reach me at:
rolands@copadata.com

ZENON HOMESTORY

HOME SMART HOME

Wolfgang Wösner, Technical Services Engineer at COPA-DATA, helped his parents build their new home as a smart home that uses zenon to take account of aging-related challenges and needs.

INTERVIEW: ROBERT KOREC PHOTOS: CHRIS ROGL

Wolfgang, your parents turned their dream of building a new home into reality. This resulted in a zenon smart home. What led to this?
Wolfgang Wösner: I was taking evening classes at the HTL college in Salzburg and was looking for a topic for my final project in electrical engineering. I wanted to do something that involved automation. At that point, my parents had just started building their new house. It was the perfect opportunity for me to set up a building automation solution in a new building. First of all, as part of the thesis, we planned the project without zenon. It wouldn't have been much of a challenge with zenon because we'd only have to program the controls. After completing my thesis project, I always planned to roll the whole thing over to zenon. I did this after the house was finished.

Was it hard to convince your parents?
Wolfgang: My father was immediately excited, so I didn't really have to persuade him. My mother was more skeptical about it all.

Frau Wösner: At first, I wasn't 100 percent certain whether or not it made sense to include a visual display. Today, I see how practical it is and all of the benefits.

Was it clear when you started your thesis that your ideas would be implemented in the real world?
Wolfgang: Yes, that was clear from the start.

What features does your smart home include?
Wolfgang: The lighting, blinds and lawn-watering systems are controlled. Initially, we had also planned to add set points for the heating system, which was manufactured by Solarfocus. We installed the controls and planned to change the set points in the individual rooms via zenon. My colleague Markus Wintersteller (see Home Story IU 34) said that this would be nice for an underfloor heating system, but that it was also a relatively sluggish system. You might use set points for two or three months, but then you would no longer need them. So we configured it so that the room temperature

is actually set only once via the valves. This way, it suits the separate circuits.

However, what is new for heating systems – and what is still regulated – is the excess energy from photovoltaic systems. Before the energy is fed back into the network, it can be used for heating a buffer storage tank via modulation using a thyristor controller in a 6kW heating element. So you can optimize energy use completely.

Which areas of the house are controlled by zenon?
Wolfgang: All areas, wherever you frequently need to manage systems: lights, blinds, lawn watering and the alarm system.

You also implemented an alarm system using zenon?
Wolfgang: For the alarm system, I borrowed a little from the system at COPA-DATA. I used motion detectors. This is easy and practical as protection against break-ins when nobody is at home. With zenon, we have implemented one of the most cost-effective and efficient alarm systems that you can imagine. I ordered a piezo buzzer online. It has 100 decibels, which is very loud. Five units cost around eight euros. They are installed in various rooms. They also serve as an acoustic signal for the smoke alarms. The function for acknowledging alarms and smoke detectors also runs in zenon using zenon Message Control.

And what happens when nobody is home?
Wolfgang: We are using a Voice-over-IP server. In the event of a break-in or a fire alarm, a follow-up call is triggered. My father gets a call first. If he doesn't pick up, it goes to me.

So there are a lot of things to make life easier?
Wolfgang: It is important to keep projects like this one as compact as possible so that it does not become too complicated to use. Yet it still provides a lot of features. I've trimmed down the zenon Service Engine so that it looks good. It manages complex tasks but is easy to use. For me, usability is critical.

Can you describe the basic design for us?
Wolfgang: zenon Service Engine runs on an industrial PC from Beckhoff in the plant room in the basement. The web server, i.e. Web Engine, also runs on this. This is connected to a screen in the entrance hall via an HDMI extender so that the HDMI signal and the USB signal (for touch control) are transmitted. In this case, there is only one client and that is the server itself. The solution also runs on a smartphone thanks to zenon Web Engine, with proper encryption and security, of course.

Was it clear to you from the start that you would implement the project with zenon? Or did you consider using a conventional building automation system?
Wolfgang: First, I already had experience with zenon. Second, I installed a controller so, in other words, I couldn't have done it this way with a conventional system. Working with zenon gave me more flexibility than with conventional smart home HMIs. Small modifications are relatively easy to implement, so I didn't have to rely on anyone else.

Did you consider using KNX, a common, open standard for commercial and domestic building automation?
Wolfgang: No, everything is managed via the control system. The signals from the buttons and sensors are transmitted to the inputs for the control system. The controller connects to the outputs which are, in turn, routed through the relays for the various devices. If the system is managed via the visual display, the real button is replaced by a virtual signal. The mechanism is the same, regardless from where you are when operating the system.

Does that mean everything depends on zenon?
Wolfgang: No, it also works without zenon and the control system. If the visual display unit fails, everything will still work, but there are fewer functions. In principle, zenon is used for the display and the controls, such as setting thresholds for maximum "on" time, for example, for the lights. The automation ensures that each light switches itself off after a certain time – about 15 minutes. This also has the benefit of protecting the devices if you forget to turn them off overnight. In zenon it is also possible, for example, to switch off all lights at once using group commands. You can lower all the blinds at the same time. Or change the automatic modes. Of course, a few visual goodies can also be implemented.

Your mother is less tech savvy than your father. How did you finally convince her?
Wolfgang: When I explained to her that she could still use conventional light switches, she was reassured. She was afraid that everything would only work via mobile devices, which of course would be very impractical. My mother has an analog rainwater meter in the garden that she can use to monitor daily rainfall. I've built in a sensor that does this for her. So she doesn't necessarily have to go out to read and empty it. She can also retrieve historical data using zenon. In addition to the amount of rain, the temperature, wind speed and energy consumption are all displayed in trends. She can view this in a trend chart and look at the data for any day. Another of her ideas that I implemented in zenon was for the camera image from

the front door to be displayed automatically on screen when someone rings the doorbell. The visitor is recorded if nobody is at home, although the recording takes place outside of zenon.

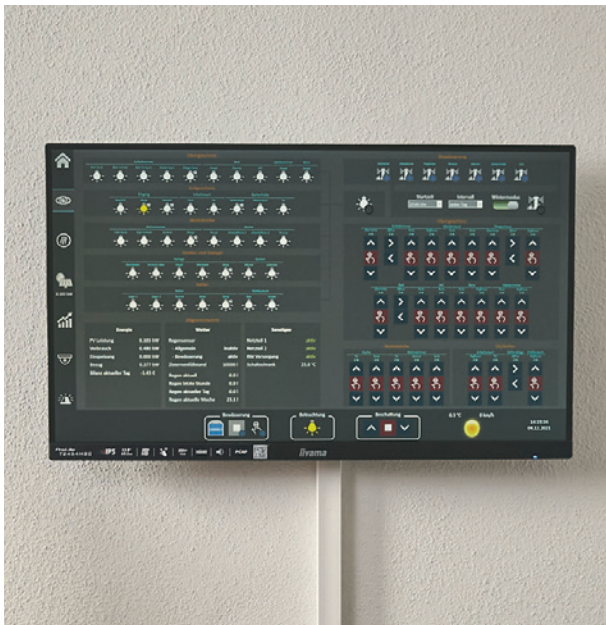
How did you implement the ground-watering system?
Wolfgang: In principle, it depends on two sensors. There is a general rain sensor that outputs a Boolean signal as to whether or not it is raining. This informs automatic modes for seven ground watering circuits. These start, for example, at ten o'clock in the evening or at two in the morning and run cyclically one after the other. Users can adjust the start times and the intervals for the individual circuits in zenon. The second sensor is a very simple cork sensor. The cork sucks in moisture and triggers a micro-switch. When it is dry, the system knows that it is time to water the lawn again.

The sunshades are also controlled via zenon?
Wolfgang: Yes, exactly. There are four light sensors on the roof that are aligned with the cardinal points. There is also a temperature sensor and a sensor for the wind speed. If the automatic mode is switched on, when the sun rises in the morning and a hot summer day is expected, the shades on that side of the house are lowered. As the sunshine traverses the building, the blinds go up again. This is also good prevention against break-ins because the movement makes it look like someone is at home. To this end, when my parents are on vacation, they can also put the lighting on a random automatic moden.

You have been living in the house for several years now. Which features are particularly useful in everyday life?
Herr Wösner: I like to check the trend charts for recorded weather data. I also use my smartphone to check how much electricity the photovoltaic system is producing.
Frau Wösner: I use this feature quite often because, when production is high, I can run appliances such as the washing machine. This helps me to use electricity as efficiently as possible. I now regularly use my smartphone to control the shades and to switch lights on and off.

Let's talk about the future: you are now both in your 50s. Looking ahead to the decades to come, did you design everything in an age-appropriate manner?
Herr Wösner: We certainly took this issue into consideration when planning the house. A multi-generational house also has to be flexible in terms of design.
Wolfgang: In the zenon project, we made sure that, for example, the buttons are large enough so they can be used easily in old age. The same applies to the font size and the color scheme. Of course, different requirements apply here than I am familiar with from industrial projects. In the future, we could consider voice operation. This is currently not required, but it could be implemented quickly if it were.

Bewässerung
Beleuchtung
Beschattung
0.3 °C
0 km/h
14:18:49
04.11.2021
iiyama


iiyama

PARTNER COMMUNITY WORLD CAFE

CERTIFIED PARTNERS LETTING THEIR PROJECTS SHINE WITH ZENON

F&S PROZESSAUTOMATION GmbH

GERMANY

2018 SILVER

ABOUT US:
For more than 30 years, we have been successfully implementing our solutions and system integrations in the fields of automation technology, control technology and power converters. Our group provides comprehensive, end-to-end solutions – from development and project management to production and service. We also go the extra mile for the security of our customers: our information security management system (ISMS) is certified in accordance with ISO/IEC 27001: 2013.

OUR SOLUTIONS WITH ZENON:
Our focus is on equipment and network automation, as well as on the sectors of branch and network control systems for municipal utilities and industrial sites. From a technical perspective, our solutions are often based on zenon Energy Edition and frequently include add-on modules. When used to support multi-branch network control systems, we have equipped a large number of systems with zenon Energy Edition or its industry derivative SICAM 230 over more than two decades.

OUR CUSTOMER PROMISE:
We do not think in terms of individual departments, rather we think holistically. With our solutions, we provide our customers with a tool designed to help them manage operations, based on a standardized toolkit.

www.fs-group.de

B&W Automatyka

POLAND

2018 BRONZE

ABOUT US:
B&W Automatyka is part of B&W Group. We provide the best solutions for customers in the field of batch production, CIP systems, pigging and transfer systems. We design and build stainless steel tanks and pipework that is automated to our clients, needs. In our team, experienced engineers realize each customer's requirements to create solutions which optimize production processes and save a lot of money.

OUR SOLUTIONS WITH ZENON:
As a member of the COPA-DATA Partner Community in Poland, we use the zenon software platform in our key industries, including food & beverage and pharmaceutical. zenon is ideal for projects where process safety and detailed reporting are necessary. We appreciate its ergonomic and rapid engineering, nice graphics and scalability. Our customers appreciate zenon's network capabilities to create high-availability redundant systems without additional cost.

OUR CUSTOMER PROMISE:
Our clients' satisfaction is our most important focus. The zenon software platform supports us in this. Our customers are successful because we control each part of the implementation process, including project, mechanical work and automation – and because we build long-term relationships with them. Thanks to zenon, our customers can be competitive, and have a clear roadmap to digitalization.

www.b-w.pl

Bouygues Energies & Services

FRANCE

2021 SILVER

ABOUT US:
As a player in the energy, digital and industrial transition, Bouygues Energies & Services provides tailor-made solutions and services for infrastructure, buildings and processes.

OUR SOLUTIONS WITH ZENON:
Bouygues Energies & Services and COPA-DATA have been working together for several years now to facilitate the integration of our customers' energy projects using perfectly integrated protocols such as IEC 61850.

OUR CUSTOMER PROMISE:
We have found in COPA-DATA a solid partner with which to develop optimized solutions dedicated to the needs of our customers in the world of energy. This allows us to acquire the necessary mastery for implementation in France and abroad.

www.bouygues-es.fr

PARTNER COMMUNITY WORLD CAFE

CERTIFIED PARTNERS LETTING THEIR PROJECTS SHINE WITH ZENON

Emrocon

SLOVENIA

2018 | BRONZE

ABOUT US:
Emrocon comprises a group of professionals with vast engineering experience in the fields of computer science, electrical engineering and mechanical engineering. We provide solutions to bridge the gap between industrial companies' key technologies and information systems. We strive for simple, robust and highly efficient systems.

OUR SOLUTIONS WITH ZENON:
In the field of process automation, we use zenon for efficient and ergonomic engineering. Customers receive solutions that deliver reduction of losses, appealing and intuitive desktop visualization, process control, reporting and a reliable client-server network.

OUR CUSTOMER PROMISE:
We follow the latest digital transformation trends to provide our solutions and products in close cooperation with our customers, so that we precisely match their wishes – however unusual or complex.

www.emrocon.com

Digital Factory Vorarlberg

ÖSTERREICH

2017 | GOLD

ABOUT US:
The Digital Factory Vorarlberg is an independent research center that supports companies to develop and implement state-of-the-art digital solutions for manufacturing and logistics. Our focus is on developing cloud-based manufacturing systems for parts production; optimizing processes and systems; using artificial intelligence and machine learning throughout the entire product life cycle; creating simulation models for digital twins; and evaluating, simulating and defending against cyber threats in the OT area.

OUR SOLUTIONS WITH ZENON:
The research center boasts a model factory, where critical processes are developed and tested for agile, digital production, including single-piece production. zenon and Service Grid provide the core network connectivity for machines and enable users to connect to higher-level control and planning functions, reporting tools and dashboards.

OUR CUSTOMER PROMISE:
We combine applied research with industrial practices to help our partners develop tailored solutions to problems in industry and business.

www.vactory.at

COPA-DATA
Partner Community

FAST FACTS

350+ Members Worldwide
8 Gold Partners
44 Silver Partners
200 Bronze Partners
100+ Listed Members

in 60+ Countries

Partner Categories
Systems Integrators, OEMs, Machine Builders, Educational Institutions and Research Facilities

Entry Year | **Partner Level**

Industry Focus:

- Cross-Industry
- Life Sciences & Pharmaceutical
- Automotive
- Food & Beverage
- Energy & Infrastructure
- Educational Insts. & Research Facilities

Validate your MTP files ONLINE!

Plug & Produce with zenon MTP Suite

Manage PEA Instances
Configure your equipment

Process Orchestration (POL)
Connect package units

Validation of MTP files
Based on VDI/VDE/ NAMUR 2658

PEA Software Suite
Visualize and control your skids

MTP Editor
Edit or create MTP files

MTP Gateway
Integrate existing equipment

go.copadata.com/mtp

zenon
by COPA-DATA