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Spotlight:

A CLIMATE OF CRISIS?

EARTH

⚠ CO₂ 412 ppm   ⚠ Drought 41%   ⚠ Hurricanes 78

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ZENON SERVICE GRID**
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A digital substation out
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**BIG DATA IN THE
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As important as chemistry
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PREFACE

Dear readers,

What does sustainability mean to us and how can we better meet the challenges of the climate crisis? We chose this topic for the new edition of IU before the pandemic. It is a sign of the times that the topic is now more relevant than ever.

In recent months, our lives and social priorities have changed dramatically. Even if, for example, the currently approved federal aid packages set priorities for "green" solutions, economic survival is – for many – more important than saving the environment. So we have suddenly slipped from the climate crisis into a climate of crisis.

Regardless of the type of crisis, whether climate change or pandemic-induced economic downturn, our goal to actively and positively shape the future continues to drive us at COPA-DATA. This calls on the same personal qualities as in the past: a spirit of innovation, creativity, perseverance, solidarity and an optimistic outlook on the future.

How can we use technology and digitalization to meet the challenges of today and tomorrow? How can we best help our myriad zenon users in the manufacturing and energy sectors to achieve their goals through digitalization? These are important questions, and they are integral to our DNA as a software manufacturer. Our answer is to provide a solid, reliable software platform that enables users to connect industrial automation with the IoT in flexible and agile solutions. On that note, you'll find more exciting insights and news about upgrades to the zenon Software Platform in this edition.

Be inspired!

Thomas Punzenberger

THOMAS PUNZENBERGER, CEO

SUSTAINABLE BUSINESS

A CLIMATE OF CRISIS?

The coronavirus crisis has lifted a veil on the vulnerable side of our networked economy. Facing the effects of climate change, we were already in the midst of an era marked by enormous socio-ecological transformation. But after months of shutdowns, can we afford the luxury of sustainability? What is clear is that if we do not bring about some radical changes, the problems will catch up with us in a few years' time. Market dynamics are already making their presence felt and companies would do well to act in good time on planned digitalization projects so they can remain stable in the face of climate change.
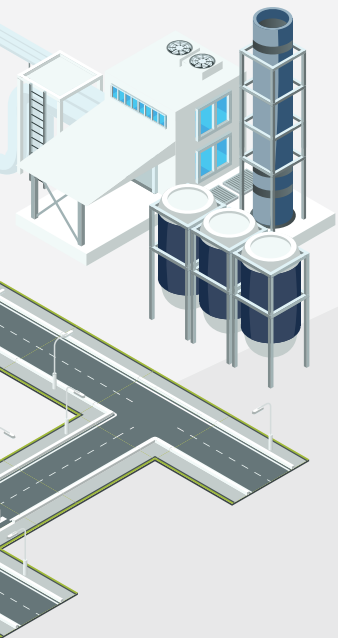
What future do we want to leave behind?

THE UTOPIA OF DIGITALIZATION AND HOW TO SOLVE THE CLIMATE CRISIS IN THE CONTEXT OF COVID-19

Have you ever heard of the "rebound effect"? In energy economics, this term describes the impacts caused by the failure to realize the potential for savings generated by increased efficiency. [1]

The rebound effect is a rather strange phenomenon: we do as much as possible to conserve energy, water and other commodities but, in the end, it does not change much in terms of our footprint, or carbon footprint. Our energy usage behaviors are mostly to blame for this, but production methods also play a role.

Studies have shown, for example, that drivers who, by their own assessment, purchased an "environmentally friendly" car drove 1.6 times more kilometers than with their conventional car one year after the purchase, thus offsetting any positive impact from the eco-friendly car [2]. A further example of a poorly considered product lifecycle would be when the production of the electric car and the manufacture or disposal of its batteries destroy any improvements to its environmental footprint, or when the majority of its charging current comes from coal-fired power plants. Something similar is anticipated as a result of the current #covid19 crisis: global CO_2 emissions were reduced for a few months only to return to above pre-pandemic rates as the economy picked up again.

REBOUND EFFECTS IN THE CONTEXT OF DIGITALIZATION

Looking at digitalization, opinions vary widely about the extent to which rebound effects will occur in Industry 4.0 – and, in this stronger merging of the physical and virtual world in the production of services, what form they will take.

Let's start with the positive impacts: digitalization improves efficiency and reduces costs along the entire value chain, primarily thanks to real-time monitoring via sensors, software and communication channels. Modeling is carried out by evaluating data in real time using artificial intelligence and the cloud, and these models can then be used again decentrally via edge computing. In addition, any action required can be communicated accurately to personnel and equipment in real time via digitalization (esp. via social media). Overall, these effects are found to have a high potential for energy and commodity efficiencies.

Nevertheless, there are rebound effects in the area of digitalization. Only recently has attention turned to the enormous amount of energy consumed by data centers and the servers and end user devices used to provide digital services. An estimated 9,000 terawatt hours – that's 9,000 billion kilowatt hours – will flow into digitalization by 2030. That is as much electricity as the European Union and China consume together today [3] – and it clearly torpedoes the EU's goal of becoming climate neutral by 2050.

TECHNICAL INNOVATIONS HAVE BROUGHT US PROSPERITY – WHAT IS DIGITALIZATION DOING TO US?

A wide range of technical innovations have dramatically changed and accelerated people's lives over the past hundred years. We live today predominantly under democratic, social and constitutional conditions, and broad portions of humankind are doing better today than ever before.

The next decades will be shaped by transformations fueled by digitalization. Today, we can only guess at the

(1) Binswanger, M. (2001): Technological progress and sustainable development: what about the rebound effect? Ecological Economics 36 (1), pp. 119-132.
(2) Santarius, T. (2012): Der Rebound-Effekt: Über die unerwünschten Folgen der erwünschten Energieeffizienz, [The Rebound Effect: The undesired consequences of energy efficiency.] Wuppertal Institut für Klima, Umwelt, Energie GmbH
epub.wupperinst.org/frontdoor/deliver/index/docId/4219/file/ImpW5.pdf, accessed on 24 Aug 2020 (only available in German)
(3) Richard, P., Limbacher, E.-L., Engelhardt, T. (2017): www.dena.de/fileadmin/dena/Dokumente/Pdf/9232_dena-Metastudie_Analyse_IT-Einsatz_ Energieverbraeuche_Digitalisierung.pdf, accessed on 24 Aug 2020 (only available in German)

rebound effects that these digital innovations will have. This has to change if we don't want to continually outpace our planet's capacities.

DIGITALIZATION AND THE SOLUTION TO THE CLIMATE CRISIS

Instead of acting and taking concerted countermeasures, business leaders are still talking about growth. By this, they mean profit-oriented growth.

I am convinced that – in order to solve the climate crisis and other threats like Covid-19 – this understanding of growth is an obstacle. We need qualitative growth and that is not possible where endlessness prevails. Endlessness cannot be applied to non-renewable resources, space requirements, etc. (we only have one planet!). Yet, today, the effects of digitalization are hardly linked to green economic growth (or a green economy, which takes into account our planet's capacities). (4)

In a world where digitalization can help to solve the climate crisis, a change must occur in the weighting of capital against the human brain. People and their contributions to society must be prioritized over money. Digitalization becomes important because it helps people do their jobs well.

In my utopia, digitalization alters our understanding of ownership and utilization. Here's one example: I have to get from point A to point B, but I don't buy a car. Instead, I purchase a transport service with all the modes of transportation (short rail, bus, regional and long-distance trains, bicycles, rental cars, e-scooters, etc.). A company provides transportation, electricity and maintenance, in the sense of "transportation as a service". For such public systems, which are all intelligently connected to one another, we need more digitalization to make them a reality.

This networking accelerates the development of the platform economy, in which the relationship between customer and service provider is experienced directly. Services are used only when you need them ("pay per use"). Middlemen and brokers are needed less and less. Individual services without ownership mean that service providers have to deal with the entire lifecycle of the service and product, i.e. from purchase to re-use. This brings us to the sustainable circular economy.

One example of an economic tool is taxes on energy. Energy prices are the key to ensuring that the use of information technology develops only in environmentally responsible ways. Part of the automation gains that digitalization provides could be redistributed to energy and resources through taxes. (5) Leading economic researchers argue in favor of using

the current #covid19-created economic crisis to risk this new start and, for example, to make loans to large struggling companies conditional on compliance with more sustainable corporate practices. In fact, that would make a lot of sense. Otherwise, we will have a hard time explaining to future generations the EUR 1.8 trillion approved in July to stimulate the European economy.

If, as a society, we do not want to be brought to our knees by the development of digitalization (which is perceived by some as threatening) or other changes triggered by crises such as Covid-19, then it is in our own best interest to become more thoughtful again as beings and seek to be more mindful and aware. This will strengthen our resilience as societies. We must exchange limitless growth business models for re-usability, or at least keep the growth drivers balanced and low (for example, for every tree cut down another should grow in its place). The innovative spirit and resources needed to meet tomorrow's challenges will not, in all probability, be the same as today's.

PROF. (FH) DR. HABIL. CHRISTINE VALLASTER

Christine Vallaster has headed the Marketing & Relationship Management department in the business school at the University of Applied Sciences in Salzburg (Austria) since 2015. Her research and activities focus on strategy development and implementation along with responsibility, circular economy and corporate branding.

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www.mymarketingworld.at

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Climate change for pragmatic minds

GOOD FOR THE ENVIRONMENT. BUT IS IT GOOD FOR INDUSTRY?

ROBERT KOREC,
PR & COMMUNICATIONS CONSULTANT

In 2015, the international community set itself the ambitious goal of limiting the global temperature increase to well below two degrees Celsius. Then the coronavirus pandemic hit... Given the current context, does it make any sense for companies to focus on decarbonizing individual production facilities? Is it even possible for climate protection strategies and business objectives to now go hand in hand?

CLIMATIC DISRUPTIONS

The global economy is on the cusp of undergoing a drastic, climate-induced transformation that will span the coming decades. The idea that our economy is subject to constant structural change is nothing new. Digitalization – in particular – has been a key issue over the past few years. It has confronted companies with the question: are you agile enough to emerge stronger from digital disruption?

The current pandemic and its consequences have clearly shown how quickly massive changes can impact individual companies – and that there is only so much forward planning one can do for such scenarios. At the same time, we have also clearly seen just how fast it is possible to successfully respond to challenges - and to drive digitalization forward - when there is the will to do so.

HOW DOES CLIMATE CHANGE AFFECT ME?

For individual companies, business-related matters are the primary concern. However, the consequences of climate change cannot be ignored over the medium or long term. The energy sector is bearing the brunt of the impact. However, the food and beverage industry is also experiencing significant upheaval from droughts, temperatures and precipitations that deviate greatly from typical seasonal norms, resulting in crop failures and thus also in supply bottlenecks and price fluctuations in the downstream processing industry.

However, supply difficulties can also affect other sectors. The disproportionate temperature increase in some regions is worsening people's living conditions – significantly in some cases. This, in turn, restricts companies' abilities to employ suitable workers on a long-term basis. Production facilities located in countries that are particularly exposed to natural disasters such as floods, fires or hurricanes must deal with this additional risk, while their customers are struggling with increasing uncertainty over supplies.

The efficiency of thermal power plants will decline due to rising ambient temperatures. A shortage of cooling water and higher water temperatures could result in operating restrictions or even temporary shutdowns.

THE INDIRECT CONSEQUENCES OF CLIMATE CHANGE

In addition to the direct effects that can be traced back to the natural and physical impact of climate change, companies are also confronted with indirect consequences brought on by the response of legislators and the market, such as emissions trading, punitive tariffs, rising energy prices and fluctuating production costs.

State subsidies for fossil fuels are being cut in favor of subsidies for switching to climate-friendly energy sources. In contrast to the coronavirus crisis, it is easier to predict the direction in which we are headed in terms of climate change.

REPUTATIONS AT RISK

In the wake of the Fridays for Future protest movements, environmental policy actions have been brought to the attention of the wider public. Companies are named and shamed in publicity campaigns, facing pressures that can threaten their very existence. These factors have also influenced the behavior of consumers who are increasingly looking for products with climate-friendly manufacturing processes when shopping. Against this backdrop, corporate managers are increasingly expected to include upstream supply chains in their carbon footprint and to ensure that their suppliers promote climate-friendly production. Digitalization can help in this regard, allowing production processes to be switched to "just in time" or "just in sequence" strategies in order to minimize storage costs and energy consumption.

HOW CAN I PREPARE MY COMPANY?

What risks does climate change hold for your company? When is the right time to invest? How much needs to be invested? To prevent your company from experiencing negative consequences, it is important to analyze your current position – for example, using traditional techniques such as SWOT analysis. This analysis is used to consider the opportunities and threats facing a business in relation to its strengths and weaknesses. In a similar way, the vulnerability assessment was developed specifically to demonstrate the direct effects of climate change on states, industries and companies. Vulnerabilities are compared with resilience and the ability to adapt, which allows companies to plan not only to survive crises but also to achieve long-term success in the market.

PLANNING IS KEY – INCLUDING IN HR MANAGEMENT

The transition toward decarbonization also affects HR planning – new professional qualifications will be needed in order to achieve a successful transition. An integrated approach calls for a Chief Sustainability Officer who will take all the necessary steps in close cooperation with the CFO. When it comes to recruiting the best minds, meaningful work is increasingly seen as a priority for applicants, especially among younger generations. Leaning toward more sustainable production processes can work in a company's favor if it wishes to attract high-potential employees.

AGILE, FLEXIBLE, SCALABLE

Climate models are based on assumptions. However, projections around our future climate are subject to

EFFECTS OF CLIMATE CHANGE ON INDUSTRY

– Consequences of global warming: reduced efficiency of thermal power plants, threats to energy transmission and supply bottlenecks due to interruptions in the supply chain in extreme weather conditions, as well as calorific power plant shutdowns

– Government/regulatory interventions: rising energy and raw material costs due to carbon pricing, emissions trading and customs duties. In return: subsidies and incentives to switch to climate-neutral production processes

– Loss of vs. boost in reputation due to changes in consumer behavior

– Cost of investing in transformation processes

– Energy-efficiency savings

BORGAR AAMAAS

Borgar Aamaas is a Senior Researcher at the CICERO Centre for International Climate Research in Oslo, Norway. He has ten years of experience as a climate researcher and has a PhD in meteorology. In 2013, he was a contributing author to the IPCC Fifth Assessment Report. His research spans disciplines and includes work on emissions, climate mitigation and the impacts of climate change, as well as giving advice to businesses and government.

cicero.oslo.no/en

substantial uncertainty. It is also difficult to assess the future direction of political and regulatory measures. This means that industrial production facilities in particular must remain flexible and scalable in different directions so they are able to quickly implement changes to business models.

CONCLUSION

Some companies and/or industries have survived the current crisis better than others. Some will also benefit from the upheavals caused by – and the fight against – climate change, while many others will lose out. The companies that are able to recognize opportunities and risks at the right time and react with suitable strategies and measures will find themselves among the winners.

Active supply-chain and energy management requires transparency in in-house production processes. That is why companies should use the reorientation opportunities offered by digitalization to start their transition to climate-friendly production processes, with the overarching aim of being as flexible and scalable as possible. Unlike the coronavirus crisis, we cannot hope that laboratories will develop a preventive vaccine that will hold off the symptoms of climate change. Rather, each and every company is responsible for taking the necessary steps in its own sphere of influence to secure its own positive economic development in the bigger picture of sustainable global change.

Three questions for the climate researcher Borgar Aamaas

Become part of the climate solution

What can industry leaders expect in terms of climate change in the coming years?
Climate change is now on everyone's lips, including in the business sectors that cause the most emissions. A leader in the financial sector told me recently that he has seen more change in the last year than the previous 20 years combined. Industry leaders who don't pay attention to this green shift may lose out in the long term.

How can the energy sector and industry best prepare?
Businesses should focus on both climate mitigation and climate change adaptation. The companies seen as the problem today could become part of the climate solution tomorrow. Extreme weather caused by climate change is already disrupting different sectors, from damaging company infrastructure to halting supply chains.

What can other countries learn from Norway's experiences in climate protection?
Norway is both a green leader and a laggard. We are world-leading on electrifying cars, and ferries and trucks are next in line. Our electricity is already green. Local and national government work together to reduce emissions and impact. However, many countries have done a much better job in reducing greenhouse gas emissions.

Sustainable opportunities

MANY COMPANIES ALREADY SEE SUSTAINABLE PRODUCTION PROCESSES AS AN IMPORTANT SOURCE OF COMPETITIVE ADVANTAGE.

SEBASTIAN BÄSKEN,
MARKETING COMMUNICATIONS MANAGER

Let's assume for a moment that climate change is real and that it's bringing about an economic change. In what ways will we have to adapt our products and services? Will we be faced with new challenges such as adopting ecological production processes, promoting reusability and managing CO_2 throughout the entire product lifecycle?

CO$_2$ CATEGORIES FOR COMPANIES

Generally, we can divide companies into five categories based on their CO$_2$ consumption in the course of delivering their products and services. Companies may maintain business relationships with other companies in each category, including with those in the same category.

Companies in category A directly produce raw materials, which, when used, lead to the emission of greenhouse gases, in particular CO$_2$. These companies are part of the coal, oil and gas industries.

Category B includes companies whose products use these raw materials and therefore emit CO$_2$. This category consists of operators of conventional power plants as well as manufacturers of automobiles, ships, aircraft and heating systems.

Category C companies largely still depend on products from companies in categories A and B. This means that they also emit greenhouse gases on a large scale. Examples include logistics companies, manufacturers of construction materials and many large agricultural holdings.

Category D includes all service companies that depend directly on the products and services from categories B and C – and, therefore, have dependencies on category A. Retailers or tour operators, for example, cannot operate without logistics services. Software providers require a lot of IT equipment and energy. And when did you last see a large sports facility built without any cement?

The last category, E – which is currently very small – comprises companies that are already CO$_2$ neutral or can even boast a negative carbon footprint. These companies include forestry businesses and providers in the renewable energy sector. In some areas, category E companies still depend on services from categories A to D. However, they still manage to offset those CO$_2$ emissions and offer a sustainable alternative for the entire system.

CHANGING THE PLAY OF FORCES

Of course, this is only a rough outline of the five categories. However, it helps to clarify the basic problem and identify courses of action. If the companies in categories B and C transformed their energy supply and production processes in such a way as to become CO$_2$ neutral or even carbon negative, this would be a powerful driving economic force for change. On the one hand, category A companies would lose a great deal of importance and turnover because there would be less demand for their raw materials. On the other hand, the products of category E companies would gain in importance. The numerous companies in category D could build on these new products and services, thereby automatically increasing their CO$_2$ neutrality. So why isn't it happening? This transformation poses economic and technological complications for many companies.

ECONOMIC HURDLES PRESENTED BY CO$_2$ NEUTRALITY

High market demand and competitive prices are two crucial factors when it comes to producing sustainable products and services. For this to work, the value of sustainable solutions needs to be aligned with the value of solutions which harm the environment. More often than not, this requires a political intervention, with laws, subsidies or taxes paving the way for sustainable solutions.

There are consumers who attach importance to sustainable products, but they are still in the minority. In order to achieve global climate objectives, the mass market must switch to sustainable products and services that offer tangible benefits to consumers. For the most part, this is regulated by price: if sustainable alternatives are the same price or even cheaper than polluting goods and services, they will prevail in the market. In Japan, for example, domestic flights are not as useful as the excellent network of high-speed trains. In other words, the advantages of the mode of transport that is more environmentally friendly outweighs those of the more polluting mode (of course, the electricity for the former should ideally come from renewable energy sources).

TECHNOLOGICAL HURDLES PRESENTED BY CO$_2$ NEUTRALITY

Overall, it could be possible to convert technological equipment to ensure more climate-friendly production processes. But, as mentioned above, this has not yet proven to be economically viable for most companies. If this were to be regulated politically, in terms of sustainable market regulations, engineers would need to adopt a more holistic approach when developing technical innovations.

In this context, it is worth taking a look at the Cradle to Cradle (C2C) approach, where nutrient cycles are created in the industrialized world that eliminate the output of waste. The waste from one use is reintroduced as the raw material for a subsequent use. Likewise, to prevent the negative effects caused by the greenhouse effect of fossil fuels or the future problems posed by nuclear storage, only renewable energy sources should be used. In addition, industrial systems would require much more complex structures than those to date; what's needed is something more akin to those of natural recycling processes. Nature promotes almost infinite diversity, creating innumerable new forms of utilization to maintain nutrient cycles and to prevent unusable waste.

BETTER USE OF RESOURCES

A few examples of such cycles can already be found today in the recycling and upcycling of certain components of manufactured products. For example, many sportswear manufacturers rely increasingly on biological production

Consistently applying C2C principles as early as the product-design stage can trigger a circular economy. This requires a willingness to cooperate with specialized partner companies.

methods, upcycle plastics collected from oceans or offer repair services to preserve the originally purchased products.

Products manufactured according to the C2C design principle are developed for circular recycling from the very beginning. Such products are composed of recyclable packaging and printed material, compostable textiles, building materials that are almost infinitely reusable or with biodegradable materials replacing toxic substances. Let's take cement production as an example, which is currently said to be responsible for around 8 percent of man-made CO_2 emissions. Optimizing the technology behind the production processes would not only reduce the energy consumption – ideally, it would even actively reduce the amount of CO_2 released during production.

Let's break down the steps required, according to C2C principles, to electrify all vehicles throughout the world. Both the energy for manufacturing and subsequent charging current would preferably come from renewable energy sources. Production expenses would have to cover sophisticated and diverse ways of reusing each individual vehicle component even after its useful life. In Leipzig, for example, BMW is networking more than 500 discarded

batteries from its i3 fleet to form an energy storage system that can stabilize network utilization when drawing from volatile renewable energy sources. Following this, the discarded battery components will be recycled. No manufacturer can start such complex cycles on their own: the key is cooperation with other companies – especially from category E.

REGIONAL ORIGINS AND DIGITAL SUSTAINABILITY

The global spread of a medically unmanageable virus has focused the whole world's attention on digital and geographical realities. Without a digital strategy and the adaptation of processes, even more companies would have fallen due to the crisis than those that unfortunately did so. The extent to which these new digital business models are sustainable depends significantly on collaboration with category E companies, because the energy consumption of digital services can be very high.

At the beginning of 2020, Microsoft announced that it will be carbon negative by 2030 and that it will even remove all the carbon it has emitted since it was founded in 1975 by 2050. The tech company is pursuing an aggressive

Category A	Category B	Category C	Category D	Category E
Coal, oil, and gas industries, …	**Conventional power plants, automotive industry, heating-system manufacturers**	**Logistics companies, manufacturers of construction materials, industrial agriculture**	**Service providers, trading companies, tour operators, …**	**Forestry businesses, providers of renewable energy sources, …**
production of raw materials, which, when used, lead to the CO_2 emission	CO_2 emissions: Combustion of category-A products	CO_2 emissions due to dependence on products of category A and B	CO_2 emissions due to dependence on categories A, B, and C	CO_2 neutral/carbon negative. Dependent in some areas on categories A to D

More regional company cooperations, primarily with companies in category E, can sustainably advance the prevailing power play in favor of reduced CO2 emissions.

program containing seven principles based on scientific findings. Moreover, it is setting up a climate innovation fund to accelerate the development of carbon reduction, capture and removal technologies – thereby utilizing and supporting category E companies.

Another major element for sustainable business includes shortening the extensive supply chains required for manufacturing goods. Although globalization enables the use of raw materials from all over the world, these can often be sourced much closer to home, saving thousands of supply-chain kilometers and a great deal of resource consumption.

Ironically, the most consistent aspect of the coronavirus crisis was uncertainty. The global economic network collapsed within days due to national strategies. This was followed by regional or zonal regulations at a municipal level. Then local restrictions were eased again to regional or even multinational levels. And then we went back to regional restrictions due to new infections. And on it goes, back and forth, depending on the threat profile of the virus spread.

Measures such as closing borders, shutting down well-established supply chains and reducing the labor force brought international procurement channels to a standstill. Regional supply chains proved to be a blessing for many manufacturing companies. Streamlined structures provide a high degree of flexibility and adaptability: a helpful remedy for the uncertainties and changing requirements caused by the pandemic.

During the crisis, the best business strategies consisted either of forming part of the critical infrastructure, running a purely digital business or relying heavily on regional supply chains, which were much less affected by international restrictions. These approaches can be sustainable if the use of resources is minimized or established as a cycle.

GLOBAL COOPERATION AND JOINT ACTION

It's clear that no company in the world has set itself the deliberate goal of accelerating global warming. It happens to be a negative effect of producing useful and in-demand goods and services – a bit like blaming a light bulb for generating heat when its actual purpose is to produce light. Similarly, it's highly unlikely that companies were prepared to combat the effects of the coronavirus pandemic. Nevertheless, some companies have emerged from the crisis in good shape, with outlooks ranging from relatively stable to downright successful.

Willingness to cooperate, promoting innovation and adopting cycles based on the optimistic C2C concept are approaches that can hopefully save mankind from destroying the perfect conditions offered by our planet for our species – the Anthropocene. Hopefully, they will also contribute to rendering pandemics less destructive than they are at present. To this end, we need more businesses to cooperate – in particular at a regional level and with category E companies – to create environmentally friendly products and services and to utilize sustainable business practices for the good of humanity.

SUSTAINABLE BUSINESS PROCESSES WITH ZENON

HOW ZENON CONTRIBUTES TO RESOURCE-SAVING OPERATIONS

Changing to CO_2-neutral production processes and the accompanying modifications to equipment are usually associated with high costs and much effort. Yet, in fact, protecting the climate and reducing resource consumption go hand in hand with an improvement in operating results. The zenon Software Platform offers potential for improving overall equipment effectiveness and, consequently, environmental protection.

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ANDREAS GASTEIGER,
PRODUCT MARKETING MANAGER

The annual Earth Overshoot Day marks the day on which humans use up as much natural resources as the planet can sustainably generate in a year. In 2019, Overshoot Day fell on July 29 – earlier in the year than ever before. The responsible use of resources is a strategic challenge in view of the global situation, with the energy industry sector taking center stage. However, all companies should consider adopting sustainable operating processes not only as a result of social pressure, but also in the interest of their own profitability.

ADJUSTABLE ENERGY CONSUMPTION?

One of the first things that people think of when they hear "environmental protection" and "sustainability" is the responsible and efficient use of energy. Yes, recording your energy consumption and the resulting costs in a transparent manner (e.g. with zenon) is indispensable in the era of Industry 4.0. However, there are effective measures that can help you to go even further, such as installing smart grids – power grids that support energy efficiency – and cost-efficient system operation using bidirectional communication. In such cases, zenon uses a variety of tools, including project configuration, visualization and reporting, to optimize energy consumption and energy storage, allowing renewable energies to be used to the fullest extent.

However, to reduce energy consumption over the long term, the average output value during operation must

also be kept as low as possible and load peaks must be avoided. zenon automates the energy supply according to live data and creates a forecast for the remaining observation period using various trend calculations. Based on these results, zenon can recommend switching operations or even perform them automatically. This enables on-site staff to react in a timely manner and activate or deactivate energy generators and consumers, as needed.

NETWORKING INSTEAD OF COMMUNICATION ISLANDS

"Batch size 1" has transformed from being just another hot topic to a promising and sustainable production concept for the long term. However, in addition to requiring special production facilities, this model inevitably results in production processes that are more complex from a technical standpoint, as well as creating additional potential sources of error and higher costs. zenon solves these technical, organizational and economic challenges by creating visualization and control projects in a fully automated manner.

The horizontal integration of the value chain is another approach used to render production processes more sustainable. This approach, however, requires corresponding software that provides connection opportunities for programmable logic controllers (PLC), for example. zenon links isolated communication islands

together to form an ideally synchronized overall system concept that offers machine operators full transparency of the entire process across all locations.

TRANSPARENT SUPPLY CHAINS

Upstream supply chains must also be included in this process if horizontal integration is to have an impact on resource efficiency. This is the only way for companies to improve their overall carbon footprint. The same principle applies to networking with external suppliers and to adapting the internal supply chain: manufacturers require data-driven technologies to ensure smooth cooperation. Bottlenecks in supply chains prevent demand-oriented production and underutilized facilities are inefficient. It requires far more energy to stop and restart production lines again, whereas improved production planning prevents excess production. Everything that has to be thrown away has a negative impact on the environment. With just a few simple tips and tricks, zenon optimizes the material and information flow, allows for "just in time" and "made to order" production sequences and also minimizes energy consumption – not to mention storage costs.

A further measure for those committed to sustainability is to implement a predictive maintenance concept, whereby zenon calculates downtime in advance based on existing data. This approach also counteracts the effects of unnecessary machine downtime and creates sustainable cost savings.

NEED A FINANCIAL REASON TO BECOME CO$_2$ NEUTRAL?

As the old adage goes, a bird in the hand is worth two in the bush, and we all know it's better to be safe than sorry. But the road to prosperity requires a few expenses and investments from time to time. This is the only way to remain successful in the long term – and equipped for future challenges. And while we're on the subject of the future: climate change is a real threat! It's not enough for politicians and the public to begin holding companies to account. It is in the best interest of companies themselves to take measures to protect our planet.

Anyone thinking "I don't want to make the world better, I want to make money" should take a moment to look at the bigger picture. After all, the responsible use of resources and a more sustainable business model is a good news story which will improve the way the public perceives your company. A good reputation leads to more – or certainly more loyal – customers, which is an important prerequisite for long-term economic success.

Combating climate change and its consequences won't be a walk in the park. But times of suffering and hardship can bring about the best and longest-lasting changes. zenon is here to support companies on the road to CO$_2$-neutral production from the very first step out of your comfort zone. The first step is often the step that has the greatest impact and, in this case, it's also a step that leaves a smaller carbon footprint!

Empowering companies to be crisis-proof with zenon

DIGITAL CRISIS PREVENTION

How can we use our experiences of the coronavirus crisis to set the course for the challenges brought on by the climate crisis? Digitalization plays a pivotal role in adapting to new environmental conditions and remaining resilient in troubling times.

COPA-DATA has previous experience of dealing with some of the challenges we are currently facing. Some of our zenon customers operate in regions where they are confronted with natural disasters, blackouts or political instability. Knowledge of how to deal with such issues has been incorporated into the development of zenon and will also boost agility with regard to climate change. How can zenon help you to maintain the operation of infrastructure systems and to react safely and quickly in case of unforeseen events?

NOT TIED TO LOCATIONS

For security reasons, many production facilities operate their machines directly on site. But this can become difficult or even impossible when a natural disaster or pandemic hits. Fortunately, many types of equipment monitoring and optimization tasks can also be performed remotely. zenon offers flexible options for monitoring, evaluating and controlling equipment. Especially in the event of a disaster, work instructions must be communicated quickly. More often than not, companies still rely on paper-based emergency plans that include hardly any scope for digital development. The zenon Smart Checklist is a proven method for transmitting modified work instructions in production facilities without any delay. Replacing paper lists and memos, it can be edited directly on machines or PCs and also on mobile devices. Users can update the list regardless of their location, without access to a standard PC, and in complete compliance with internal security rules.

zenon also offers flexibility from an engineering perspective: the zenon Editor can be accessed by multiple users and enables several project developers to collaborate on projects while working at different locations. This means that projects can be implemented even if travel restrictions, stay-at-home advice or environmental restrictions make it impossible to work together on site. With the Hot Reload function, customers can transfer changes to zenon Runtime during operation and upload them without restarting, thereby helping to reduce

the need for on-site maintenance work. The integrated redundancy in the network ensures maximum reliability.

The pandemic has highlighted how important it is for companies to be able to quickly convert their production activities. Extreme weather conditions can also lead to supply chain failures. In the course of adapting to climate change, agile, modular and flexible production of different end products will gain in importance. zenon supports the quick retooling of machines and equipment. This includes routine retooling processes, short-term adjustments and modular manufacturing concepts. With zenon's Recipe Administration, any number of parameter sets can be edited and saved, making it easy to implement a production change quickly.

QUICK, SECURE, EFFICIENT

Redundancy is a key factor in ensuring the reliability of critical infrastructures. zenon ensures seamless redundancy and maximum data consistency so that no data is lost and uninterrupted operation is provided.

Increasing efficiency is desirable due to increasingly expensive resources and environmental considerations. The economic disruption arising from the pandemic has shifted even sharper focus onto production costs. In order to make reliable decisions quickly, machines, equipment and locations must be comparable on the basis of solid data, across locations and hierarchies. To this end, an energy data management system (EDMS) based on zenon enables customers to identify areas for improvement. With reports on consumption, key figures in real time and the correlation with production quantities, zenon helps customers to see optimization potential. Customers can also achieve savings through automated engineering. Applying best practices, projects can be created and distributed automatically in zenon. This enables companies to more efficiently invest resources in their sustainability and digitalization projects and thereby gain an edge over competitors.
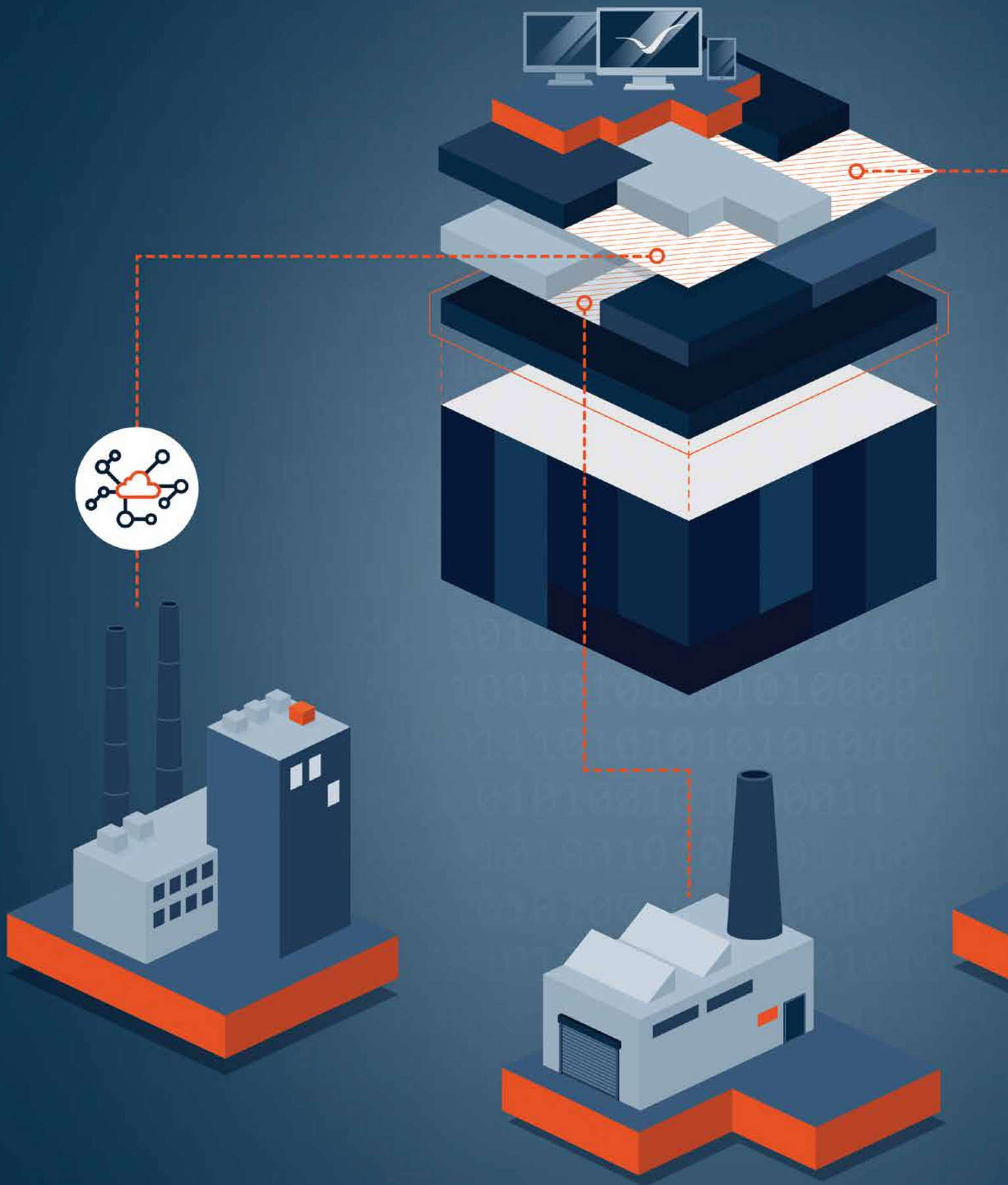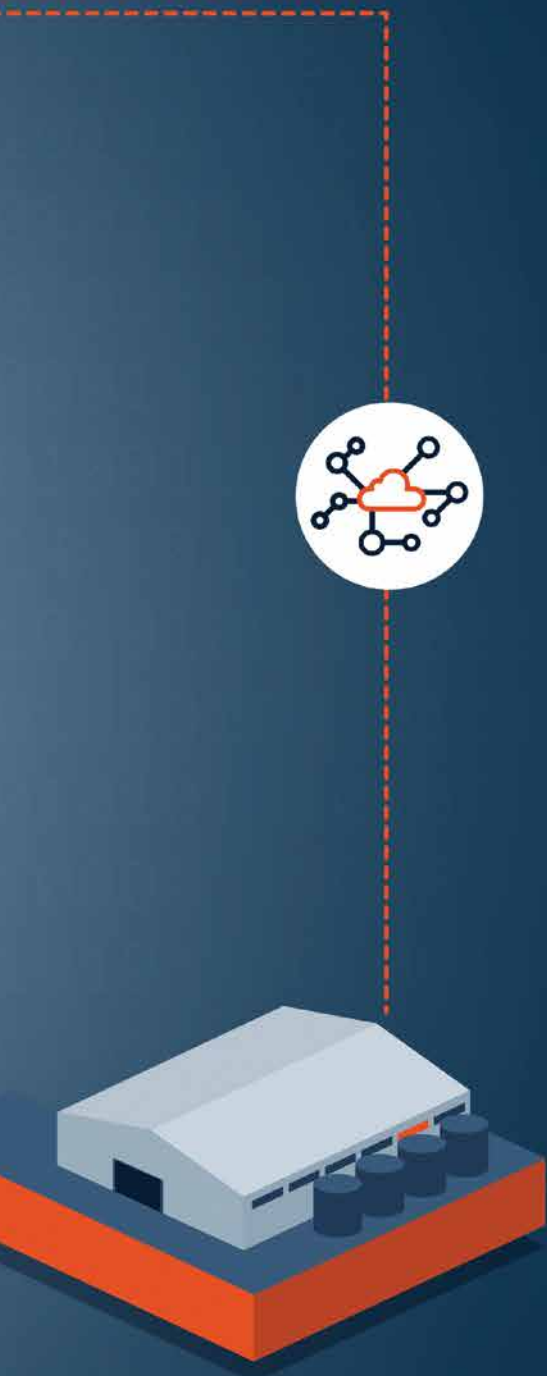
PRODUCTS & SERVICES

ZENON 8.20 AND ZENON ANALYZER 3.40

NEW FUNCTIONS DESIGNED TO MAKE LIFE A LITTLE SIMPLER

More than ever, we all want to be flexible, independent and efficient. The main focus of this year's zenon and zenon Analyzer releases was, therefore, on promoting these properties. As well as routine improvements and the long-awaited introduction of Smart Objects, there are also a number of other innovations.

SAVING TIME AND RESOURCES WITH CONTAINERS

zenon version 8.20 enables our customers to use zenon with Docker for the first time. Docker is a container technology which isolates services and processes from each other. All the applications and functionalities that are required in order to run a process come in a handy package that can be launched from its own file system.

A container is, to some extent, a small virtual machine. The major advantage is that multiple installations can now run on one operating system rather than requiring a separate operating system in each case. This boosts performance and enables almost limitless scalability. Above all, it saves on hardware costs, since multiple Runtimes can run on one server. The zenon Runtime data is stored on the host system and is kept secure if Docker

crashes. This technology is not only suitable for large corporations with extensive system landscapes – it is also a simple solution for small and medium-sized enterprises looking to store their entire infrastructure centrally. We will initially be offering zenon on Docker for Windows operating systems.

CLEAR CATEGORIZATION OF EVENTS

We also wanted to make the Chronological Event List (CEL) more flexible and efficient, and have therefore introduced a new categorization option for this feature. Up to now, zenon has reliably logged every event, but in some cases, this could lead to an information overload and result in processes taking more time. We know time is money and very few of us have money to waste. So, in version 8.20, all possible events have now been assigned to one or more categories. When the user filters this list, they will only see the messages that are relevant to them. This will improve efficiency, particularly when it comes to validating batches in the pharmaceutical industry. And that's not all: in the zenon Editor, users can even edit the assignments themselves and add their own categories. A new entry can, of course, be assigned to multiple categories and will remain available even if the language is switched.

FLEXIBLE ANALYSIS

zenon Analyzer version 3.40 includes a number of innovations which provide the user with even more flexibility, independence and efficiency. Enhancements in the XY trend now allow users to contextualize several variables in one diagram – values such as pressure, density or electricity consumption, for example, can be set in relation to temperature and displayed in the same diagram, enabling new insights into production processes. More time filters in the report result in more informative trends. Fully customizable headers and footers allow users to visualize reports based on their own preferences. In addition, with zenon Analyzer 3.40, the width of headers and footers can be adjusted dynamically and reports are adapted automatically to all formats.

All of these innovations are valuable measures that will help to improve and simplify all aspects of zenon and zenon Analyzer and to maximize their benefits for users. But no matter how helpful these new features are or how proud we are of the new releases, we are always looking ahead to the next challenge. As the creator of automation software that was ahead of its time when it was first launched in 1987 and that continues to set new standards today, we never rest on our laurels. Marie Curie, the pioneering physicist, summed it up perfectly when she said: "One never notices what has been done; one can only see what remains to be done!"

Informative trends, adapted to individual needs and design specifications.

THE HIGHLIGHTS AT A GLANCE

–   Scale zenon with Docker technology to conserve resources

–   User-defined event filtering in the CEL

–   Save valuable engineering time by using Smart Objects

–   More informative trends and more personalized reports

FURTHER HIGHLIGHTS

–   zenon Service Grid *(page 24 onward)*

–   Smart Objects *(page 36 onward)*

ANDREAS GASTEIGER,
PRODUCT MARKETING MANAGER

INTO THE FUTURE WITH ZENON

More than just gazing into a crystal ball

The factory of tomorrow will... How would you end this sentence? Are you thinking of artificial intelligence? Factory halls devoid of people? Networked and self-configuring machine parks? Batch size one? We don't think that there's just one answer to the question, but we're sure that you have a vision of what it should be. However, to build the world of tomorrow, we need the right tools today.

It's clear that we cannot build the solutions of the future using tools from the past. That is why we at COPA-DATA are investing significantly in further modernizing our proven zenon Software Platform. Following our vision "There is always an easier way!" we want zenon to make it even easier for you to reach your goals in the future.

One such development consists of expanding the technical functions of the zenon Software Platform via zenon Service Grid. We are not only adding new features – we are actively merging proven and new technologies, making zenon a tool for the applications of the future. But although we're constantly thinking of future opportunities, we are certainly not neglecting our existing priorities.

ROBUST AND STABLE

In the future, applications in the industrial environment and in the energy industry will continue to be subject to extremely high requirements regarding robust, stable

have always invested a great deal in improving zenon's performance to cope with the rising number of variables and data volumes. The trend is no longer to scale on a single physical PC or virtual machine, but to distribute workloads flexibly across different resources. This creates additional options for handling large data volumes and helps to relieve critical bottlenecks.

AGILE AND EASY TO MAINTAIN

On the one hand, developers are required to create and adapt software applications quickly. On the other hand, these applications must be easy to use and easy to maintain over their entire life cycle. It must also be possible to maintain them even if they have become considerably more complex over the years, or if their original developers are no longer available.

We have always ensured that zenon projects remain easy to maintain and expand in the long term by using configurable applications, project engineering without

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„Thanks to our continuous development efforts, as with Service Grid, our zenon Software Platform is your reliable and future-proof partner in the long term."

PHILLIP WERR,
CHIEF MARKETING AND OPERATIONS OFFICER

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and often continuous, round-the-clock operation. Data acquisition, processing, and storage as well as alarms and system control are domains where you must be able to rely fully on zenon. This has been the case so far and is not about to change, even in a networked, modern world.

MODULAR AND FLEXIBLE

You need an environment that can be expanded and adapted in a modular and flexible fashion, so that applications are tailored to the initial use case but can also be continuously developed. zenon's modular structure and its features such as multi-project administration have so far supported these requirements. In the future, zenon's modular and flexible features will take on new dimensions, with individual tasks being performed in a modular manner within a flexible system architecture. For example, third-party systems can be connected to the cloud via the Service Grid API, while data is acquired and processed on-premise at the machine.

SCALABILITY

For many years, we have been facing volumes of data which are increasing dramatically. That is why we

programming, a central approach to project engineering, and continuous compatibility across versions. Rest assured that this will remain the case in a world where zenon offers a service-oriented and integrated software platform that spans sensors to global networking.

ACCESSIBILITY AND VERTICAL INTEGRATION

IT/OT (Operational Technology) convergence is used to describe the process of integrating a company's automation system with its IT system. For decades, we were used to both areas being separate worlds – technologically, but also in terms of organization and attitude. Our children probably won't understand the difference or why they were once split into two separate fields. Can you explain to a digital native that using the phone, for example, used to be a completely different discipline to writing messages and using the Internet?

Previously, vertical integration with zenon meant connecting production with the ERP system. This was primarily an interface and communication issue. In the future, the zenon platform itself will be capable of vertical integration with individual components

Robustness and stability

Agility and maintainability

Modularity and flexibility

Accessibility and vertical integration

Openness and horizontal integration

Scalability
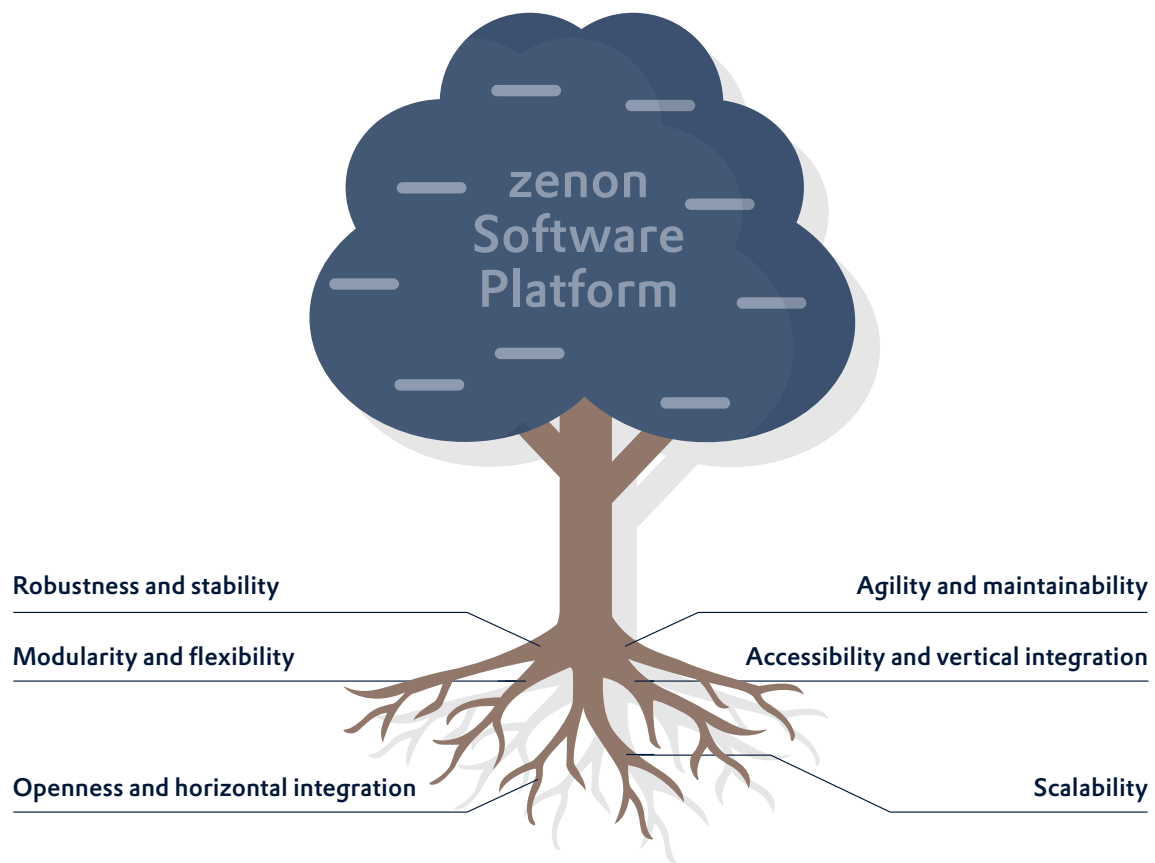
operating directly in the machine and other components in the company-wide data center. At the same time, all components still form part of a well-functioning whole.

OPENNESS AND HORIZONTAL INTEGRATION

It is more convenient for users to map as many disciplines as possible directly within the zenon software platform. Nevertheless, there are always use cases in which zenon acts as a team player in a large ecosystem of different systems and technologies. By using open interfaces and supporting industry standards, we have always ensured that zenon can be perfectly integrated in and expanded with third-party components. We are in constant pursuit of openness: in the future, zenon will no longer be at home only in automation systems, but also in conventional corporate IT systems. At the same time, the platform will help to create technological bridges between the two areas.

Thanks to our continuous development efforts, for example, with Service Grid, our zenon Software Platform is (and will remain) your reliable and future-proof partner in the long term. In this way, zenon can inspire you to realize the full potential of your ideas and design the factory of tomorrow.

PHILLIP WERR
Chief Marketing and
Operations Officer

As a member of the Executive Board, Phillip Werr is responsible for the Marketing and Operations divisions. Before he joined COPA-DATA in the role of Product Marketer in 2010, he ran a production plant as an independent entrepreneur. The ongoing development of customer benefits as well as the topics of business model development, production efficiency, and optimized resource utilization are particularly close to his heart. He holds a degree in Management and Economics from the Free University of Bozen-Bolzano in Italy.

LinkedIn: phillipwerr

PRACTICAL APPLICATIONS FOR THE SERVICE GRID

Make it easy to monitor and control distributed locations

Our customers love zenon as a platform because of its ease of use, scalability, and expansion options. The zenon Service Grid is the perfect addition to the software platform, particularly for distributed applications. Read on to find out how Service Grid can make all kinds of production sites compatible with the Internet of Things.

The Internet of Things (IoT) is on everyone's lips, not least in the industrial sector where the Industrial Internet of Things (IIoT) is becoming increasingly widespread. IoT applications generally communicate via the Internet or mobile connections without using VPN hardware which is expensive, high-maintenance, and susceptible to fault. IoT protocols such as MQTT or AMQP are used to enable encrypted Internet-based/WAN-based communication. These protocols are designed in such a way that they even work properly over interruption-prone 4G or 5G mobile networks with a low bandwidth.

Alongside the protocols, the software components also need to be able to buffer data in the event of network interruptions and then synchronize with the higher-level system when the connection is restored. Furthermore, the fact that the software components are being used in the public network means that any gaps in security need to be closed rapidly. zenon Service Grid provides all of these features as standard within the zenon Software Platform – in the simplest possible way as always.

THE ORIGIN OF THE NAME
zenon Service Grid consists of a system of modular software components or microservices. The microservices communicate with each other, forming a communication network. This is where the name Service Grid comes from – it is a network of services in which each individual service performs a particular task. It is ideal for geographically distributed applications.

THE COMPONENTS OF THE SERVICE GRID
The most important component is the Service Hub, which is made up of two services: the Data Hub, which serves as a data broker, and the Hub Controller, which manages the nodes (i.e. all connected local equipment or services). A node must be authorized in the Hub Controller before it can communicate with the Data Hub via a secure connection. The Data Hub is responsible for bidirectional data transmission between the services of the Service Grid and with local equipment. Local equipment can also be controlled in this way. If an end device gets into the wrong hands, an administrator can block the device's access with immediate effect in just a few clicks.

FOCUS ON SECURITY
Alongside secure communication and device authorization, user administration is an important part of IoT platforms because it enables users or applications to be authenticated and authorized.

Authentication means proving and verifying the identity of a system user. In the Service Grid, this is carried out by the Identity Service using the standard protocol OAuth 2.0. This makes it possible to authenticate web applications, desktop applications, mobile devices, and IoT devices. You can also use the Identity Service as a federation gateway in order to connect additional directory services such as Microsoft Azure Active Directory, Active Directory Domain Services, or Lightweight Directory
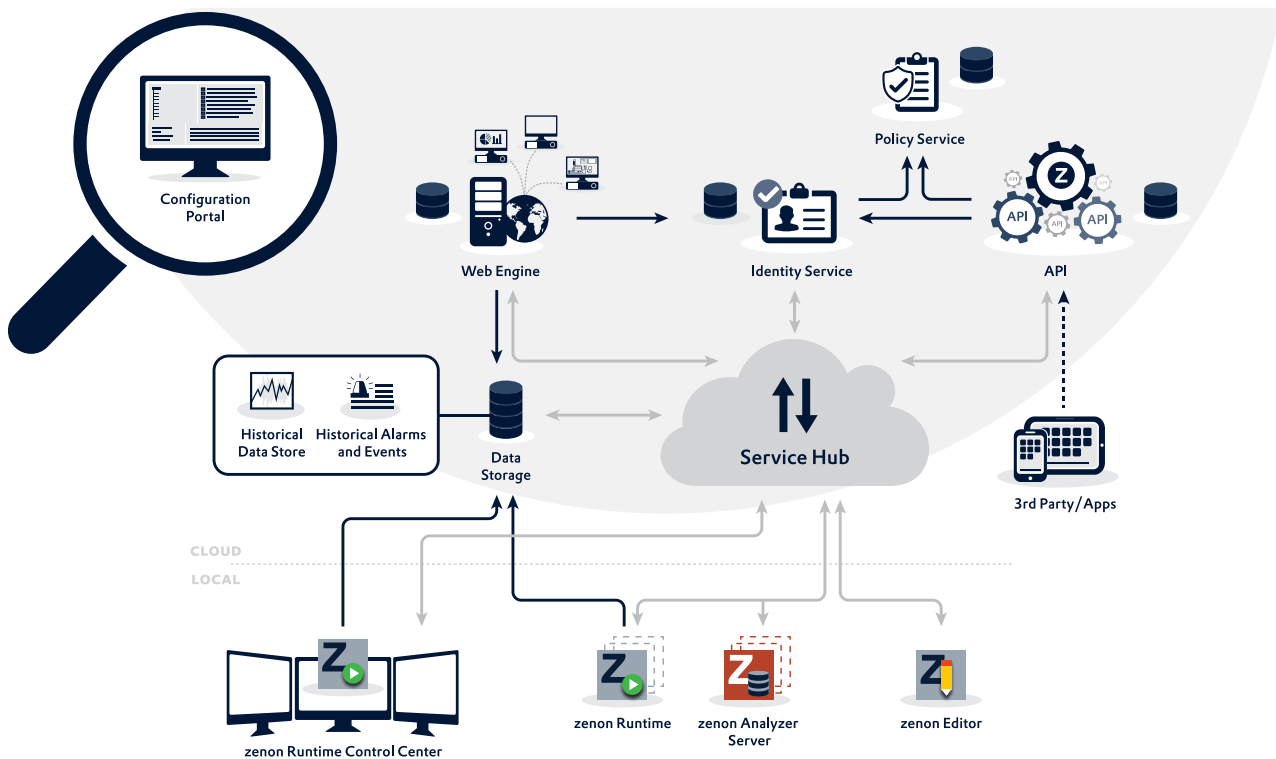
Services of the zenon Service Grid

Access Protocol (LDAP). Single sign-on (SSO) allows you to log in to the system once and then use various components without having to log in again.

Authorization refers to the allocation – and repeated checking – of access rights for services and resources; for example, the right to access historical data via the Service Grid API. The Policy Service is used in the Service Grid for this purpose.

DATA EXCHANGE VIA SECURE INTERFACE

The Service Grid API is a web-based API which grants access to real-time and historical data such as variable values, alarms, and events. In order to request data from the API or to make changes to the data, the client application must log into the Identity Service first if it has not already done so. Once it has logged in successfully, the client application receives an access token. This makes it possible to request data from the API or to make changes to the data as long as the logged-in user has the necessary rights.

The Service Grid API was developed in line with the representational state transfer (REST) method commonly used by programmers. This web service interface

communicates via the HTTPS protocol. This enables you to connect third-party software – such as Grafana – in the zenon Service Grid.

A simpler option is to use the integrated solution with the HTML5 Web Engine, which enables the web-based visualization of process images and dashboards. Alarms, events, and trends, for example, can be displayed on a desktop or on mobile end devices.

The Data Storage stores historical data such as time series data. This data is taken from the Data Storage in order to display trends in the HTML5 Web Engine, for example, or when historical data is called up via the Service Grid API.

COMMUNICATION IN BOTH DIRECTIONS

As of version 8.10, zenon Runtime has the ability to supply real-time and historical data to the Service Hub in the form of variable values, alarms, and events. Whereas in zenon 8.10, communication took place via an add-in in the project, as of version 8.20 it is carried out via an integrated functionality – the Service Grid Ingress Connector. With zenon Supervisor 8.20 and zenon Service Grid 2.0, archived data is published to the Data Storage . The Egress Connector is used in turn to read
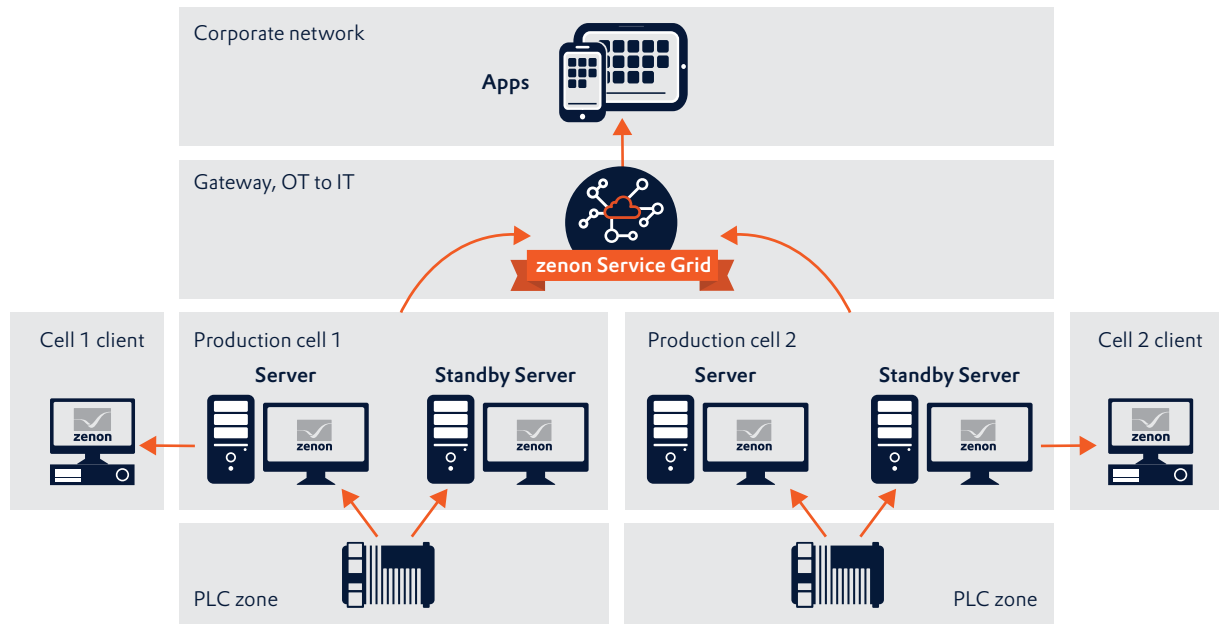
Security gateway with the zenon Service Grid

in data from the Service Grid ; for example, in order to implement a control room application.

HOW TO INSTALL THE SERVICE GRID

The installation process supports all standard operating systems such as Linux and Windows as well as cloud systems. The use of Docker facilitates the provision of the Service Grid by the IT department. Services can be easily transported and installed as files in the form of containers which contain all of the necessary packages. The software is updated by exchanging the container – without any loss of production data, of course.

CONCRETE APPLICATION EXAMPLES

The zenon Service Grid technology is primarily intended for geographically distributed applications via the public network and offers all kinds of possibilities. You can, of course, also create local applications.

EXAMPLE 1: A security gateway between the production network (OT) and the company network (IT). Plant data from production is made available to users in the IT network via the HTML5 Web Engine or third-party systems. Access within the IT network does not affect

production as there is no direct data flow between the zenon Supervisor production system and the web-based visualization. The use of web-based technologies reduces administrative work to a minimum, as there is no need to install software on the clients in the IT network.

EXAMPLE 2: Multiple renewable energy locations distributed across a country or even across the globe, which work independently and need to be monitored and controlled centrally – as cost-effectively as possible – from one control room. Real-time and historical values are transmitted to the Sservice Hhub from the local equipment via zenon Ingress Connector . The Data Storage stores all historical data relating to the local equipment. The central control room receives the data via zenon Egress Connector. The proven engineering options – with an integration project for overview purposes and subprojects for each piece of equipment – are, of course, available for use. In addition to the easy configurability of this solution, it also means that no VPN hardware is required. If the connection is interrupted – between the Service Hub and the local equipment, for example – no data is lost as the remaining data is transmitted to the Data Storage once the connection is restored.
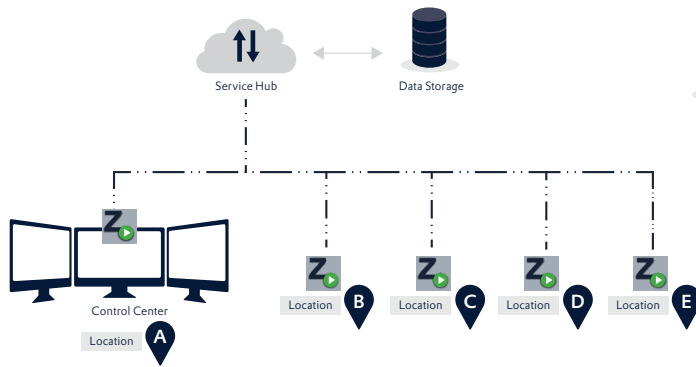
Geographically distributed monitoring of equipment in the field of renewable energies
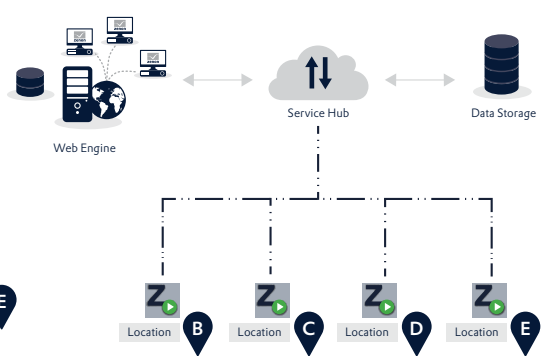
Mobile access for service technicians

EXAMPLE 3: Service technicians can access the equipment on the go via mobile application and can therefore decide spontaneously whether they need to make contact or visit the site in person. This makes maintenance easier and saves money.

These three examples can also be combined and applied to other industries; for example, for a mechanical engineering company that wants to provide additional support for its customers and requires machine data in order to do so.

IDEAL FOR DISTRIBUTED LOCATIONS

In conclusion, the zenon Service Grid is an expansion of the zenon Software Platform for geographically distributed, industrial applications. It is made up of individual services which may or may not be required, depending on the application in question. Every IT department can install and update the Service Grid in a cost-effective manner through the use of containers.

An example showing how to integrate Grafana can be found here: https://github.com/COPA-DATA/grafana-service-grid-api-datasource

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

FAQs

Everything you ever wanted to know about the zenon Service Grid

Now it's easier than ever to use the Internet of Things in industry

The zenon Service Grid is the perfect addition to the software platform, particularly for distributed applications. Here, we'll consider the particular benefits of this software expansion. Why is it ideal for equipment distributed across a country or across the globe? How does it establish the connection between a company's OT and IT networks? How is it installed and what license models are available? The answers to all these questions and more can be found here.

Is the zenon Service Grid intended to replace zenon Runtime, zenon Logic, and the zenon Analyzer?
No. zenon Service Grid expands the platform in the direction of the Internet of Things (IoT). It is not a standalone product. Rather, it is an IoT upgrade for the zenon Software Platform which enables completely new applications. The zenon Service Grid was designed in line with current best practices and state-of-the-art approaches to software development. It uses architecture concepts such as microservices, bringing together several individual software components to form a large, scalable application. The distribution of the components allows you to make efficient use of the existing hardware resources.

What are the key benefits compared to other IoT solutions?
The zenon Service Grid allows you to monitor data from distributed locations in an integrated solution. In conjunction with Service Grid, the zenon Software

Platform makes it possible to transfer data continuously from the fieldbus level to the cloud within one system. The central development environment makes engineering easier and reduces the amount of work required overall. Thanks to the backward compatibility, existing projects can also be easily integrated into the overall system.

How does Service Grid help to protect the OT network?
zenon Service Grid works exclusively with unidirectional connections. All nodes use outgoing connections to communicate with the Service Hub – this includes zenon Runtime. Communication is encrypted via Transport Layer Security (TLS) and the identity of the participants is verified by means of digital certificates.

What kind of applications is the Service Grid best suited to?
The main purpose of zenon Service Grid is to provide a simple connection between geographically distributed

zenon installations – in the case of international production sites, for example, or in the field of power generation. The collected production data can be visualized in a central location, such as a control center, with the aid of zenon Runtime or the HTML Web Engine. The Service Grid can also be used as a security gateway between OT and IT networks in order to transfer data from the field level to third-party systems in the IT landscape. For more information on this subject, please refer to the previous article which contains further concrete examples.

Is the Service Grid intended to replace the zenon network?

No, zenon Service Grid and the zenon network can and should exist in parallel and each should be used appropriately, as the situation demands.

When does it make sense to continue using the zenon network?

The zenon network is used in the context of OT within one plant in order to synchronize runtimes with each other. zenon Service Grid, on the other hand, is generally used in conjunction with WAN connections over large distances in order to process selected data from zenon Runtime or zenon Analyzer in a cloud application or a local data center.

Which systems can be integrated for the purposes of exchanging data?

zenon Service Grid is primarily used to exchange data between the software components of the zenon Software Platform; i.e. between zenon Runtime, zenon Analyzer, zenon Logic, and the HTML Web Engine. In order to guarantee the security of the data and the data exchange process, external systems cannot be integrated with the internal communication layer of the Service Grid. Third-party systems can obtain data for further processing via the REST interface of the Service Grid API.

What kind of data can be exchanged via the Service Grid?

The Service Grid supports various types of data. Process data such as variables, alarms, and events can be exchanged in large volumes. As well as distributing real-time values, the system can also access historical archived values. Furthermore, you can set whether each individual data point should be available as read-only, available for read and write access, or not available at all in the Service Grid. Alarms can be confirmed and linked with comments as well as causes. The Service Grid also has an interface with zenon Analyzer, which can be used to generate and retrieve reports. zenon Analyzer also allows you to use all existing SQL-stored procedures in order to carry out data

analysis. Engineering data can be synchronized between zenon Editor and zenon Analyzer, ensuring that zenon Analyzer metadata is always up to date.

Is zenon Service Grid scalable?

A stable, high-performance system is a necessity, particularly in the case of large distributed systems with numerous plants. For years, zenon Runtime has served as a stable foundation for data acquisition and analysis as well as process control in such environments. zenon Service Grid responds dynamically to high load peaks. A higher-level management system records the utilization of individual services and can implement scaling measures. Through a generic approach with container-based applications, you can scale each service independently within zenon Service Grid. You have a free choice when it comes to the container platform and the management system. However, COPA-DATA recommends using Docker and Kubernetes. Instructions for operation on this platform basis can be found in the help documents.

Why is the REST interface provided in zenon Service Grid?

REST interfaces are widely used and are a popular way of exchanging data between software systems via HTTPS. Further benefits include the fact that they are not dependent on any particular programming languages or platforms, they are optimized for large data volumes, and they enable the connection of mobile applications. REST interfaces are not standardized and are always configured for the specific application in question. They support various data exchange formats, including JSON, XML, or any type of text format.

What does the Service Grid do in the event of a network failure?

zenon allows you to evacuate historical data from zenon Runtime into zenon Service Grid. If the network connection fails, the entries are buffered until communication is reestablished. Following successful synchronization, the local memory is enabled again, thus preventing data loss.

How are user authorizations implemented?

The authentication and authorization mechanism is based on a two-stage concept. In the first stage, the user is authenticated by means of the Identity Service, thereby answering the question "Who am I?". The Policy Service is then used to decide what rights the user has, thus answering the question "What am I allowed to do?". This system makes it possible to implement complex access rights.

Do staff need specialized IT knowledge in order to install and operate zenon Service Grid?

Your IT staff will need some in-depth knowledge; for example, in order to tailor the required parameters of the individual services to the installation platform. This is carried out directly via configuration files during installation. If you want to benefit from advanced functionalities, such as dynamic scaling and failsafe performance, you will need to use technologies such as Docker and Kubernetes. Specialized knowledge and experience are required in this case, as the IT staff will be responsible for operating and maintaining the installation over the long term, including taking care of troubleshooting and software updates.

Does Service Grid only run in a particular cloud environment?

zenon Service Grid is platform-independent and cloud-independent. You can choose any cloud provider or opt for operation within a private data center.

Why are new technologies such as Docker used?

It is particularly advantageous to use new technologies in the case of web applications in the cloud environment. Application requirements such as scalability, platform independence, and easy installation can be achieved more easily and efficiently with these technologies.

Where are the installation packages and how do I install zenon Service Grid?

The process varies depending on the type of installation. A Windows setup program is available for classic installation, which should be carried out on the server hardware and server operating system. For installation in a cloud environment or a local data center, Docker images are available in the COPA-DATA registry. These images should be installed on an existing Kubernetes cluster.

How are the individual components of the Service Grid updated?

In the case of classic installation, the individual components are updated with the ISO installation package. If the Service Grid is operated with Kubernetes, you can easily update the components by using the latest Docker images. In both cases, only the binary files of the components are updated. The configuration of the Service Grid installation remains the same. This means that you can continue using the system immediately after the update.

Do I need an SLA for the Service Grid?

You will need a valid service level agreement (SLA) in order to purchase and operate zenon Service Grid. This will give you access to the latest security updates and functional enhancements at all times. Improvements are implemented in zenon Service Grid on an ongoing basis and are provided via the COPA-DATA registry.

What license models are available?

You can purchase zenon Service Grid as a monthly subscription with billing on an annual basis. The Service Hub, Data Storage, Identity Service, and Egress Connector components are included. The Ingress Connector can also be licensed, if necessary. In this case, the price is dictated by the number of variables in the existing zenon Runtime. The connection between the Web Engine and the Service Grid can be configured either as a read-only connection or a read-and-write connection, whereby licensing is based on the number of users. Any further components connected via the API Gateway can have either a read-only or a read-and-write connection. Furthermore, a connection from zenon Analyzer to zenon Service Grid can be licensed in order to output reports via the Web Engine or the API Gateway.

How does the release cycle for the Service Grid compare to zenon Supervisor and zenon Analyzer?

We have been systematically developing and refining the zenon Software Platform over the last few years. With the next version – zenon 10 – all components of the zenon Software Platform will be released simultaneously for the first time, including zenon Service Grid. An annual release cycle is regarded as appropriate in the OT world, but it is not fast enough for cloud scenarios. COPA-DATA will, therefore, offer zenon Service Grid in two different versions. The version with long-term support will be released annually with the other components of the zenon Software Platform. To enable timely updates and enhancements, there will also be three further releases; one at the end of each quarter. You are free to choose the option that best suits your needs.

THE NEW ZENON HELP NAVIGATOR

With a little help from my friend

The zenon Help Navigator is a new feature in version 8.20. It ensures that you can find the content you want quickly. The Help Navigator also provides a preview of the relevant sections and an advanced search function. This allows you to navigate safely through the forest of documents and pinpoint the information you need.

JOSEF RIES
TECHNICAL EDITOR

Proven systems are rarely developed further once defined requirements have been met without any problems. It's a different story with zenon Help. True to the motto "Good is good, but better carries it", we have developed the new zenon Help Navigator so that you can find solutions to problems quickly and easily. The new tool offers a tutorial to guide users, and makes it easier to do day-to-day project planning as well as troubleshoot issues.

BETTER USABILITY WITH NEW DESIGN

The Help Navigator interface has been completely redesigned, although the proven tree structure has been retained. This gives you a quick overview and shows you where you are in the documentation. If you want to use the entire screen, the tree structure can be hidden.

Both the user interface and familiar functionalities have been updated. The new design is geared even more closely to the needs of users, as the results from the text search are displayed in context. A preview in a separate screen also makes it easier for you to find the content you want.

NEW AND IMPROVED FEATURES

With infinite scroll you can now easily jump from one section to the next. This makes it easier to read and provides a quick overview of the context for the relevant topic. This is particularly useful for more complex help topics, in case

you want to quickly look up a few steps. Another new feature allows you to change the language directly in Help at the push of a button. The required information can thus be made available easily, even when employees who speak different languages are working on the same system.

In addition, you can bookmark frequently used help topics in the zenon Help Navigator so that you can find these again quickly and without searching.

DIRECT LINK TO THE GLOSSARY AND FEEDBACK OPTION

Property names listed in Help are linked directly to the glossary, so you can get concise definitions of names and terms. The links are indicated by property names highlighted in blue and are followed by an easily identifiable ⓘ icon. You can also print out the information by clicking on the corresponding icon.

You can even easily add your own expertise to the documentation. If there is a need for additional information in a Help topic, you can use the feedback icon to generate an email with an identification number matching the topic ID. The message is sent automatically to the COPA-DATA documentation team, which can make upgrades or changes.

SAVE TIME AND MONEY!

If you press the Help button, the corresponding section will open as before. The same applies to opening Help via a property.

The search terms used are saved during the session and are available as suggestions in your next search. You can also search for specific terms throughout the documentation.

The new zenon Help Navigator makes it easy to find the content you want and helps you to find the answers to your questions. The new features help you to save time, and therefore money, and make room for other tasks.

TIPS FOR EFFICIENT SEARCHES:

– Choose search terms or phrases that are as clear and concise as possible, e.g. "buttons to acknowledge" instead of "button".

– Enclose a term in quotation marks to search for it. Limit the search.

– Use filters, e.g. if you are only interested in results from a manual.

– In the "Search results" area, click on the section with the desired result to open it in the main screen of the zenon Help Navigator. Unlimited scrolling and the familiar tree view, which shows the context of the section, are now available in this screen.

– To view further results in the main screen, click in the section of the screen where the search term is still visible and then click Enter.

BENEFITS OF THE ZENON HELP NAVIGATOR

– New look with improved usability

– Infinite scroll for easier operation

– More efficient search function with preview of results

– Switch the language of the user interface directly in Help

– Bookmarks for easy retrieval

– Display of information from the glossary

Example of a Smart Object Template with the motor symbol and its released properties.

HOW TO MANAGE PROJECTS CENTRALLY WITH ZENON

The first part of this series focused on the fundamental philosophy of zenon.
It looked at the concepts based on this philosophy and discussed topics such as
how to manage elements centrally. We will now use a practical example to show
you how centralized management can be optimized with the aid of data types,
symbols, links and – with the new zenon version 8.20 – Smart Objects and
Smart Object Templates.

Let's imagine you want to visualize three motors of the same type – used for conveyor belts in a production facility – in your zenon project. These motors are switched on and off via an HMI and supply the system with information about the operating status, speed and temperature. To map the motors in zenon, you will need variables, functions and one or more screens. This is where zenon data types and symbols come into play, since they offer numerous possibilities when it comes to engineering.

WHAT ARE DATA TYPES?

Data types allow you to centrally define the properties of variables – for example, measuring ranges or limit values. In this example, you create multiple simple data types: "MotorTemperature" (BYTE), "MotorState" (BOOL), "MotorSpeed" (UINT). For "MotorTemperature", you enter "°C" as the measuring unit and create a limit value for "critical" at 80°C and "overheating" at 100°C. You then create a structure data type called "Motor" with the structure elements "Temperature", "Speed" and "State", which are each based on the simple data types you've just created. Make sure that "Link data type" is selected under "Structure options" so that changes made to the data type later will automatically apply to the structure elements.

The next step is to create the variables for the three motors with the names "Motor_Band1" (..2, ..3); each of these is based on the "Motor" data type. A total of nine variables have now been created and activated automatically with your specifications.

USING SYMBOLS SENSIBLY

A centrally defined symbol is used for the graphical visualization of the motor. In this case, it is a good idea to use a button with labeling and value displays for temperature and speed. These are to be linked to the corresponding variables from the "Motor_Band1" structure data type.

Drag the symbol you have just created into a screen where it can be used directly for "Motor_Band1". For "Motor_Band2", drag the symbol into the screen again and replace the variables and functions via a linking rule in the dialog that opens automatically. Alternatively, you can open this dialog under the linking rule in the property window. In this example, it is sufficient to use "*1*" as the source and "2" as the target for the replacement function. You can check the result of this linking rule immediately using the Preview button.

CUSTOMIZING SYMBOL PROPERTIES

Properties such as the color or text of the motor are not taken into account by the linking rule, however. To enable individual customization of these properties directly in the screen and whenever a symbol is used, you can release individual properties of elements within a symbol.

To do this, open the symbol, highlight the element and release the desired property (e.g. Text) using one of the three options below. You must always be guided by how the property is labeled in the property window.

– Drag the property into the area below the the symbol's drawing area
– Open the context menu by right clicking and select Release 'Text'
– Highlight the property and select Release Property in the toolbar

If you select the symbol that is now on the screen, you will see a new node – "$_<Elementname>" – in the tree view in the property window, which contains the property that has just been released. This allows you to overwrite individual definitions locally whenever the symbol is used. At the same time, it reduces complexity for the engineer, as only the properties that are relevant to them are displayed.

If you want to switch the motor on and off directly from this symbol, you need to create two buttons and two Write set value functions with the names "Motor_Band1.Start" and ".Stop" on the "Motor_Band1.State" variable. Saving

the symbol automatically updates all points of use in the screen. If you now open the linking rule dialog again for "Motor_Band2", you will see in the target column that the Start and Stop functions both have a "(?)" at the end. This means that these functions do not exist in the project. As the user of this symbol, you therefore need to know which variables and functions the symbol expects, create them in the project and adjust the function parameters.

THERE MUST BE AN EASIER WAY!

The new zenon version 8.20 makes life easier in a number of ways. You can now create Smart Objects and Smart Object Templates which, alongside displaying symbols and screens graphically, also bring together data types, reaction matrices, functions, interlocks, files and other elements.

The zenon Editor features a separate area for the Smart Object Templates. In the area on the left-hand side, create a new template called "Band" (belt). A tree will now appear on the right-hand side of the window showing the available zenon modules. Here, you should create the same objects as described above, except that "Band1" can be omitted from the names in all cases.

In the symbol, you should release the released property "Label" for the Smart Object Template as well by highlighting the property in the symbol editor and releasing it again by clicking on the button in the toolbar. Now switch back to the project tree, select the Smart Objects node and create a new Smart Object based on the template you have just created. In the list, you will see the Smart Object and, below this, the symbol you have defined. If you drag this symbol into a screen and then open the linking rule dialog again, the correct rule will already be implemented for the replacement and all targets will be found in the preview.

Thus, when you create a Smart Object, all engineered variables, functions, etc., are automatically created in the project and adapted at all points of use.

HOW TO EXPAND SMART OBJECT TEMPLATES FOR NUMEROUS PURPOSES

If you also need motors in other assembly groups in your facility, you can add the Smart Object Template as a reference in other Smart Object Templates and use it as often as you like. And if you want to add a detail view with trend curves to the motor later on, for example, you can easily do so with Smart Object Templates as well. Simply create a new screen and engineer one trend element for "Motor.Speed" and another for "Motor.Temperature" along with a button with the Close Frame function. As soon as you save the Smart Object Template, all Smart Objects in the project will be updated and the necessary functions and screens will be created. The new functionality will be available throughout the entire project instantly.

DISCOVER THE BENEFITS OF THE NEW ZENON VERSION 8.20 NOW

The concept of linking, as explained above in relation to symbols, is also available in the Screen Switch function. With Smart Objects, linking is automatically adapted when the Screen Switch function is created so that the correct variables are always linked in the detail screen.

This part of the series has explained how you can use the zenon philosophy to create and reuse reusable components with the help of data types, symbols, linking and – with the new version – Smart Objects. The next part of the series will explain the concept of linking in more detail.

GERO GRUBER
Product Manager

As Product Manager and Product Owner for the zenon Software Platform, I am particularly interested in the user interface and the interaction design of the whole platform, as well as the graphical visualization in zenon Runtime.

LOGGING: UNDERVALUED AND OFTEN FORGOTTEN

How zenon provides security for digital factories

In security situations or military contexts, it has always been standard practice to deploy guards or send out patrols. In other disciplines, however, security can be woefully neglected. In the manufacturing sector, for example, logging should form the basis of all IT security strategies. Yet it is simply forgotten about in many situations. Read on to find out how zenon can help you to implement this important security process – even consolidating inhomogeneous components in a central logging management system.

In the age of the Internet of Things, machines, equipment, measuring devices and other production units are being digitalized and networked in companies' IT infrastructures. But the task of establishing a central log management system for these diverse components is often put on the back burner. This is partly down to the heterogeneous system landscapes used in the industrial sector, as well as a lack of know-how regarding the log information available for the systems in question. Furthermore, not all of the automation components used have the appropriate technical interfaces or configuration options.

Despite these challenges, however, modern automation systems such as zenon offer solution strategies for logging. It is important that all operational systems are incorporated into a central log strategy in order to achieve overarching security objectives. All relevant standards – such as ISO 27001 or IEC 62443 – stipulate this as an integral requirement.

NUMEROUS DATA SOURCES ALREADY AVAILABLE

As the person responsible for IT security, the first thing you need to think about is the range of possible data sources. Typically, an HMI/SCADA system such as zenon will provide information which can be useful for logging, as we outline below.

EVENT LISTS/OPERATING LOGS:

These logs are generally available in all automation solutions and contain security-related information alongside process data. This includes, for example, user logins and logouts and entries detailing when a new client logs into the server. In the latest zenon versions, this information can also be filtered.

ALARM MESSAGE LISTS:

Alarms can provide specific information about critical system states. These can relate to the actual production process, but can also be used to monitor the IT components. In zenon, for example, hardware utilization – for example, the CPU load or the memory requirement for the application – can be monitored in a targeted manner. This means that atypical occurrences relating to the operating states – for example, a case of data theft at night when production is at a standstill – can be easily specified and identified using the central logging system.

COMMUNICATION STATISTICS:

zenon offers lots of ways to monitor network communication and that of individual zenon drivers. With the variables from the system drivers and the communication details available for each driver, you can maintain a detailed overview of all communication. For
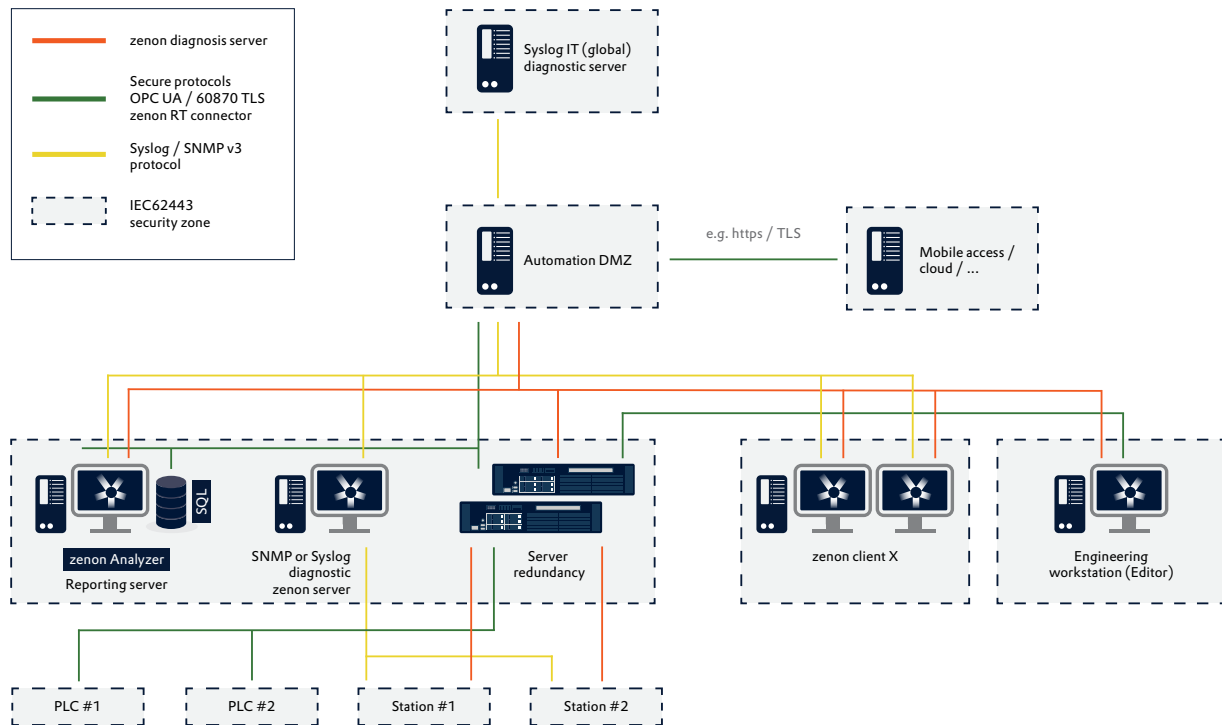
DMZ between corporate network and control network including Syslog integration

example, the Chronological Event List (CEL) records the active network participants, connection attempts and the number of data packages in standard operation. In the event of an atypical occurrence, the user and the central security logging system can be informed via the Alarm Message List (AML) or CEL modules.

APPLICATION LOG FILES:

Almost every automation solution contains a logging system (usually local) which is generally only used for error diagnosis. These log files are often extensive and should be analyzed carefully before being integrated into a central log management system. This data source is generally useful when carrying out a forensic analysis of an incident, but it is less suitable for recording the incident in real time. zenon also offers a logging system of this kind, for which you can individually configure the level of detail required. You should keep logging at a low level in normal operation in order to minimize the load on the production system. If a security breach is suspected, based on the data sources described above, the logging depth can be increased. You can then carry out a forensic analysis based on this more extensive information.

HOW TO PROCEED

At the start of a project of this nature, you should identify the available data sources and define the critical system states. There will often be a broad range of data available that can be used for this purpose. In some cases, however, this information must be added if it is not already available in the application.

If you do not want to make fundamental changes to the existing zenon application, zenon Multi-Project Administration makes it possible to integrate separate logging or monitoring projects across the network. Additional logging tasks can be added to the central logging project at the industrial level. In this way, for example, you can integrate an SNMP client in zenon which receives the SNMP traps from IT devices – network cards or routers, for instance – and checks their ping status and feeds this information into the logging system. Such a strategy enables the central maintenance of the logging instance and consolidates all of the information on one interface.

INTEGRATED LOGGING WITH ZENON

What is the easiest way for you, as an integrator or system operator, to transfer this information to the central IT

system? Which interfaces that are also used in IT environments are available? zenon offers two technologies for this purpose, each of which uses a separate Process Gateway. This means you can easily integrate any information from a zenon application into a central logging system on the basis of variables.

SNMP SERVER

The Simple Network Management Protocol is a standard network protocol for monitoring and controlling network components – for example, routers, servers, switches, printers, etc. – from a central station. The protocol regulates the communication between the monitored devices and the monitoring station. SNMP describes the structure of the data packets that can be sent as well as the communication process. The protocol can incorporate any network-compatible device into the monitoring system. As a result of its simplicity, modularity and diversity, SNMP has developed into a standard that is supported by most management programs and end devices.

SYSLOG

The latest zenon version – 8.20 – also offers Syslog integration. Syslog is a global standard for transferring log messages within an IP computer network. The protocol has a very simple structure. The Syslog client sends a short text message of fewer than 1024 bytes to the Syslog recipient. The messages are currently transferred with a UDP-based protocol within zenon. This makes it easy to integrate all kinds of log sources in a centralized directory.

All good IT security concepts are based on effective logging – not only in traditional IT environments, but in digital factories as well. zenon offers numerous options to help you implement this strategy and maximize security in the digital factory environment.

In the field of IT, logging refers to the practice of recording security-related processes in the system. This includes user logins and logouts, the creation of new workstations or access rights, saving processes, instances of data access, and error messages and states. In a nutshell, logging means recording who does what in the system and when. The processes are normally recorded in a log file which authorized users can access in order to carry out analysis.

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

Reinhard Mayr has been part of the team for almost 20 years. During the last decade he has been responsible for product management. In his current role he is responsible for all data and information security associated with topics for the organization, and he continues to coordinate research-related activities together with universities and independent research partners.

reinhardm@copadata.com

MARK CLEMENS
Technical Product Manager, Technical Consulting

Since 2002, Mark Clemens has been part of the COPA-DATA HQ Technical Consulting team. As Technical Product Manager and Product Owner, Mark brings his expertise to cyber security aspects of zenon. He is a member of the IEC TC57 WG15, actively participating in the maintenance of the IEC 62351 standards series.

markc@copadata.com

INDUSTRIES
&
SOLUTIONS

FOOD & BEVERAGE

ENERGY & INFRASTRUCTURE

AUTOMOTIVE

PHARMACEUTICAL

Never touch a running system – or can you?

Outdated IT infrastructures and software can turn out to be a major security risk for industrial companies. In many cases, simply updating to the latest software version isn't a viable option. COPA-DATA's Italian partner Treesse Progetti demonstrates how you can make a virtue of necessity with its project to modernize a traditional brewery with new software based on the zenon Software Platform.

Breweries are facing a number of different challenges these days – the need to increase flexibility, cut consumption of resources, and enhance efficiency are just a few of them. Among all these challenges, there is one that should definitely not be underestimated: the need to minimize the risk of production downtime due to outdated computer systems and control software.

A LONG SERVICE LIFE MAKES ECONOMIC SENSE

"Never touch a running system" is a motto that everyone is probably familiar with. You can see why it is tempting to live and work by this principle. Once a system has been installed, any teething problems have been resolved and the staff have been trained, everything runs like clockwork. And making any kind of change means extra work and extra risk, as production will generally have to be stopped while the modifications are made. Every minute of downtime costs money. Errors may creep in as a result of the changes, which means the system needs to be tested following the upgrade. And depending on the type of change, employees may need to undergo further training. Given all of these factors, it makes sense to continue using existing systems for as long as possible before updating them.

A long service life is definitely desirable. But it would be a mistake to stick too doggedly to the "never touch a running system" rule because, as IT systems get older, the risk of system failure increases and it can become difficult to source spare parts. The same goes for software. If, for example, you are using old operating systems that are no longer subject to maintenance, the risk of successful cyber attacks increases.

Many companies are aware of these risks and ensure that hardware and software are replaced in good time to minimize risk. This isn't necessarily just about spending money to maintain the status quo; a "tech refresh" can actually improve existing equipment. For example, using up-to-date software can enable automatic production log creation, thus reducing the workload for employees. Modern user interfaces (HMIs) reduce the risk of incorrect operation, while modern hardware and software enable comprehensive recording and analysis of process data, making it easier to identify and address weak points in processes. When added together, all of these benefits deliver significantly enhanced efficiency, which means that the investment costs are offset in a short space of time.

A TECH REFRESH

The process of replacing control software and IT components is known as a tech refresh. COPA-DATA partner and systems integrator Treesse Progetti, based in Treviso, Italy, is a tech refresh specialist. The company has recently been working on a project for a traditional Italian brewery, where the zenon software platform and its Batch Control module play a starring role. The existing system for monitoring and controlling pressure tanks, transfers to the bottling lines and cleaning in place (CIP) had become outdated and needed replacing. The brewery's quality requirements of the new solution were clear:
– Maximum reliability
– Simple operation
– Complete process traceability

The brewery's main reason for replacing the existing system was to minimize the risk of production downtime. The top priority, therefore, was to ensure high reliability. The new system must guarantee stable and fault-free operation for years to come.

However, tech refresh projects are not "just" about improving reliability. The also aim to make the new system better than the old one wherever possible. In this case, it included implementing a modern operating concept that is tailored more effectively to users' needs, thus making interaction easier and preventing operating errors. Complete documentation of all processes – transfers in this case – rounds off the system and provides real added value. For every bottled batch, the system indicates the line the beer was bottled on, which valves it passed through, which tank it was stored in and how long it was stored for.

For Treesse Progetti, zenon is the perfect platform to satisfy these requirements. The company has fitted zenon in breweries before and achieved good results. This time, however, there was an additional requirement. For Mirco Baldisseri, Technical Manager at Treesse Progetti, it quickly became clear that the transfers would have to be controlled in line with the ISA-88 standard to enable transparency, maintainability and straightforward operation.

ISA-88 AND ZENON BATCH CONTROL

ISA-88 is a long-established standard for software solutions in batch-based production. Among other things, it describes a model for process control in which processes are mapped by means of recipes made up of operations and phases. The phases correspond to individual process steps and map the equipment's capabilities – for example, stirring or heating. While these phases are preset by the system, recipes can be freely designed by the user. Phases can be put together in any order (or used in parallel) to map and control the desired process.

The philosophy of the ISA-88 standard is a perfect match for the zenon philosophy of setting parameters instead of programming. It is therefore no coincidence that the influence of ISA-88 can be seen in zenon. In fact, the Batch Control module is based on this standard. The module boasts a simple user interface and seamless integration with the platform. And, as of version 8.10,
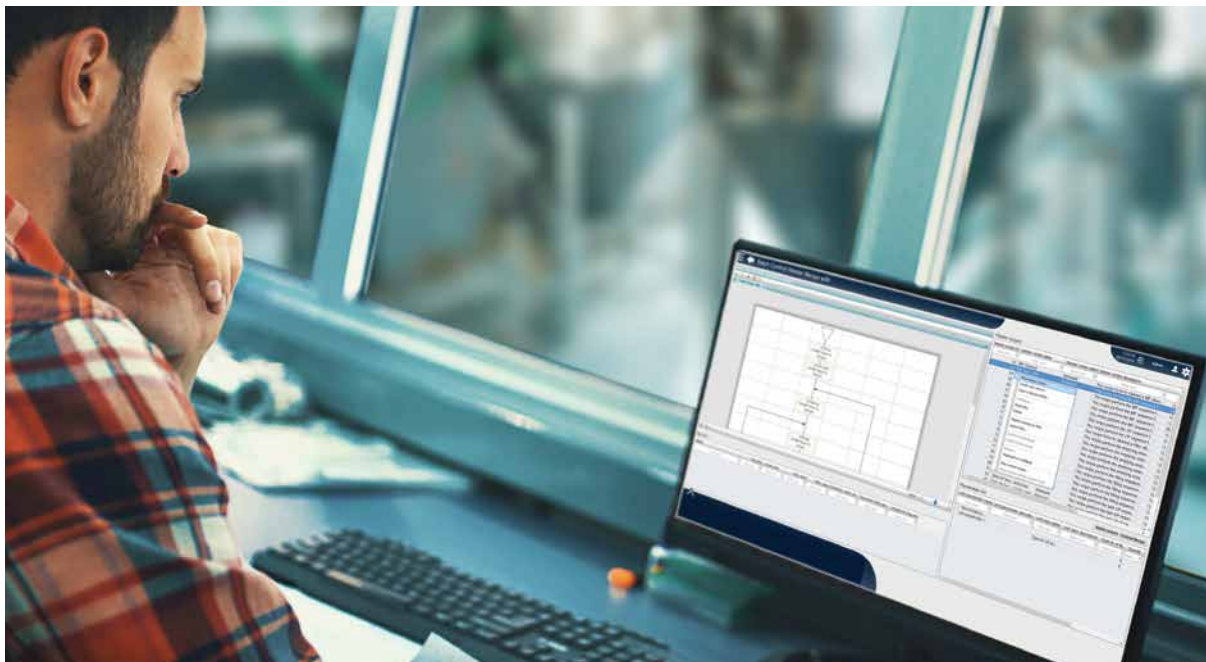
The transfers are controlled with zenon Batch Control. The batch recipe editor provides a user-friendly interface.

a new feature provides even more flexibility. Finished recipes can be assigned to any piece of equipment (see FAQ in IU 34). This is a concept that is seen repeatedly in zenon: an element is configured once and can then be used multiple times. In the case of Batch Control specifically, this means that, in a factory with multiple production lines, only one recipe per product needs to be maintained. The recipe does not stipulate which line is to be used for production, making recipe management much simpler.

THE PROJECT

For Mirco Baldisseri, the need to ensure flexibility and compliance with the standard meant that zenon and Batch Control were the ideal tools for the tech refresh project. "This software solution is compliant with ISA-88, FDA 21 CFR Part 11 and ISA-95. Nothing is left to chance; every action is recorded and presented in a simple and logical manner."

The application involves controlling twelve storage tanks and the transfers from these tanks to the five bottling lines, as well as the CIP equipment. zenon Batch Control is used for all transfers and the status models of the tanks. The use of "abstract recipes" and unit classes ensures

maximum efficiency in this regard. And this efficiency isn't just limited to recipe creation: Treesse Progetti also benefited from the new features when it came to configuring the units. Rather than creating each unit from scratch and adding to them individually as required, the company was able to configure all of the tanks centrally. Every change was then transferred automatically to all 12 tanks – making engineering much easier.

Batch Control is a very important part of the application, but it is not the whole story. The Treesse Progetti developers have succeeded in creating a harmonious overall concept which, as well as fulfilling the functional requirements, also includes an appealing and straightforward user interface. At the heart of this interface is the zenon Worldview, which provides an overview of the equipment in its entirety. From here, the user can zoom in on a particular area of the equipment to see in greater detail. It is also possible to navigate via the hierarchical equipment model. In this case, too, the user can always use the zenon Worldview to get their bearings, so there is no chance of "getting lost".

The key parameters for recipe execution are integrated directly in the tanks' graphical display. This means the

The overview window with Worldview technology ensures that the user can keep track of the equipment at all times.

ABOUT TREESSE PROGETTI

After more than 30 years on the market, Treesse Progetti is one of the leading suppliers in automation engineering in the industrial process field. The company, headquartered in Trevis, Italy, offers customized products and services. Over the years, the company has specialized in the food & beverage industry.

www.treesseprogetti.it

ALEXANDER FRÖHLICH
Food & Beverage Industry Specialist

Alexander Fröhlich has been part of the COPA-DATA team in Salzburg since 2011. Under his supervision as Technical Product Manager, the Batch Control module has undergone multiple stages of development with the aim of meeting customers' needs more effectively. Since 2019, he has been supporting the Industry Management team by focusing on applications in the F&B industry.

alexander.froehlich@copadata.com

operator can always see straight away whether a recipe is active on a particular tank and which step is currently in progress. If the operator needs more detailed information, they can open the desired recipe with a single click and monitor all of the execution parameters.

The application also includes a reporting solution, which enables all bottled batches to be traced across all equipment parts. The data presented in any given report will always relate to a particular batch recipe.

CONCLUSION

The solution developed by Treesse Progetti has breathed new life into the existing equipment in the brewery. Modern technologies such as zenon Batch Control, based on the ISA-88 standard, bring the overall system in line with a state-of-the-art facility, resulting in greater reliability, user acceptance, traceability and enhanced efficiency. Following the successful implementation of the first project with zenon Batch Control, Mirco Baldisseri has certainly been won over:

"I want to use this solution in all future process equipment projects because I am confident this software will allow me to provide the best results for my customers."

If you would like to find out more about how you can extend 30 with zenon while also improving efficiency, please don't hesitate to get in touch with us.

An out-of-the-box digital substation

zenon Application Sets simplify digitalization projects significantly in the energy and infrastructure industry. Even in early stages of planning for next-generation equipment, the implementation team can draw on extensive concept and solution resources. Best-practice modules provide a foundation and offer direction to help ensure successful implementation. Learn how to implement a digital substation efficiently and in line with established standards using zenon.

DIGITALIZATION ON THE AGENDA

The purpose of digital technology is to improve equipment efficiency, make operational management transparent and increase flexibility to meet varying requirements. A foundation has to be laid to enable the existing systems to interact intelligently with one another and for new elements, such as consumer loads or regenerative generators, to be considered in the decisions for optimum overall operation.

Energy suppliers' innovation teams are running at full speed. It is important to find the proper mix of technology to define the digitally driven infrastructure of tomorrow, while integrating legacy systems too. Using suitable methods, existing inventory must also be gradually refitted to bring it in line with the digital concept.

PLAYING AGAINST TIMEWASTERS AND COMPLEXITY MONSTERS

We are accustomed to the expectations surrounding state-of-the-art automation solutions to continuously increasing. Ambitious demands in the fields of digitalization and the Internet of Things require additional measures to be taken. Overall, the bar has been raised dramatically when it comes to the conceptual and implementation intelligence surrounding the use of new technology in combination with established standards. Typically, systems integrators have collected considerable process knowledge over the years to enable them to meet market requirements. The situation is similar for operators, who have successfully run their systems for decades. However, this wealth of experience is threatened by shifts in the field of technology, as well as by changes to organizational and market structures.

So, it's worth asking: how can we safeguard today's know-how for the long term – to ensure that results already obtained can be easily recreated, if necessary? What prevents us from simply adopting ready-made solution modules?
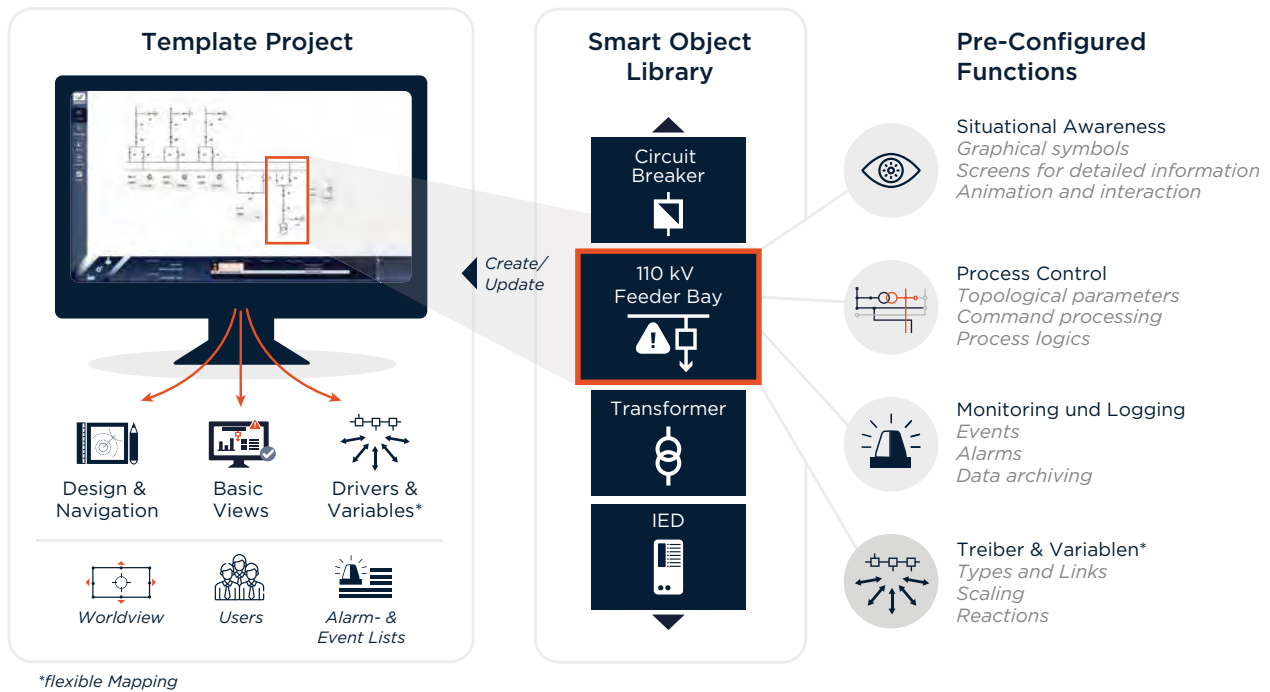
STANDARDIZATION AND REUSE IS THE ORDER OF THE DAY

Often during a new project, you find yourself in a situation where you're developing a great deal of functionality from scratch. After all, the project – if not entirely new – seems to have many unique requirements. New tools are developed and the project design is once again updated to the latest standards. This work takes a lot of time, which probably could have been better invested in more productive activity. The key to replacing what we might call "quasi-productive engineering" is developing standardized and reusable functional units.

So, the two main reasons for standardization in this context are simplifying work and and saving costs. The idea here is to cleverly split up the overall solution and pack it into small units. These units are then placed on a virtual shelf. In the end, a virtual library is created from many such virtual shelves. When you'd like to roll out a new project, you can take these units off the shelf and incorporate them in the project. The units already have preset functions, variables and images. As a result, engineers no longer have to worry about detailed functions. They are already fully integrated and tested.

Built with a consistent design, the units are clearly understandable for users, both in engineering (project engineer) and in the runtime application. Reuse and familiarity thus save time, which cuts costs.

Only by developing application-oriented modular units can such time savings be achieved in the long term. It is

Template Project

Smart Object Library

Circuit Breaker

110 kV Feeder Bay

Transformer

IED

Create/ Update

Design & Navigation

Basic Views

Drivers & Variables*

Worldview

Users

Alarm- & Event Lists

*flexible Mapping

Pre-Configured Functions

Situational Awareness
Graphical symbols
Screens for detailed information
Animation and interaction

Process Control
Topological parameters
Command processing
Process logics

Monitoring und Logging
Events
Alarms
Data archiving

Treiber & Variablen*
Types and Links
Scaling
Reactions

In zenon's Substation HMI Application Set, users can conveniently insert cross-functional process elements in a project at the click of a mouse.

therefore necessary for an expert team to be involved in developing them; for example, a systems integrator. However, COPA-DATA, the provider of the solution platform, is increasingly emphasizing the benefits of a high-availability process engineering solutions library. For this reason, COPA-DATA has decided to create virtual libraries that will help systems integrators and end users to create projects faster and easier.

APPLICATION SETS: OUT-OF-THE-BOX FUNCTIONALITY IN LINE WITH ESTABLISHED STANDARDS

COPA-DATA calls these units "Smart Objects". In software development, an "object" is a unit that helps to subdivide a complex system into manageable parts, encapsulating the the object's internal details and offering a clearly structured interface to the outside world. This applies to Smart Objects: they integrate graphical, functional and communication elements. Essentially, a Smart Object is a mini zenon project that is designed for reuse. It contains functionalities from different modules and combines them. A Smart Object can be used multiple times in a project by instantiating it and inserting it seamlessly into the existing project. The

cross-module approach provides engineers with a process-based view of the project. This avoids the need to think in terms of product modules.

One example: a line branch for a single-line diagram can be predefined as a template using the new Smart Object technology. This can be linked to the functions of all zenon modules that the branch needs to be fully functional in the process. Instantiation can be used to generate one or more branches of this type in the project. In the the project's main view, the single-line diagram, the branch is integrated with its specific arrangement of switches and connections. A zenon function leads to a detailed picture in which the switches refer to the command, which in turn links to a command picture. An alarm panel shows the most important alarms of the connected protective devices. The measured values coming from the relevant current and voltage transformers are also displayed. The Smart Object is a unit that functions independently. All data points are pre-existing and only need to be linked to the real-time variables in the project. All the engineer has to do is select the line branch from the library, place it in the corresponding overview screen, and link it to the variables – the complete branch is configured, down to the smallest detail.

We use the Application Set concept to describe a complete library of Smart Objects for a specific application type and the related basic project, which includes the navigation and standard images such as AML, CEL, along with the corresponding software license and solution documentation.

As a user, there is a clear benefit: you don't have to deal with designing a zenon project from scratch. Neither do you have to create a symbol library nor worry about templates or screen switching functions. Instead, you can hit the ground running with a correctly designed command. Plus, you can skip the design review because you know the colors and fonts match on all the images. The only things you need to configure are the links between the predefined variables for the Smart Object interface and the variables for the drivers that connect the project to the devices (IEDs).

SAME-SAME BUT DIFFERENT – THE STANDARDIZATION BIND

Using preconfigured modules only works as long as they sufficiently meet user requirements. But no customer or project is the same – and requirements vary. Smart Objects generally have to be designed to be adjustable within certain limits. For this purpose, Smart Objects have a mechanism known as "released properties" – parameters that the developer of the Smart Object can deliberately change for subsequent users. This ensures that the object's basic functionality remains preset and protected, but selected parameters of an instance in the project can be flexibly adapted.

SIMPLY USE RELIABLE COMPONENTS AND SCALE THEM AS YOU PLEASE

Smart Objects significantly expand the foundation in zenon for creating an effective template system. Standardized functional units encapsulate all module functions and settings that are required to map any process component. Clearly structured interfaces connect variables to the respective objects and enable users to arrange certain details for the process object.

Based on this approach, a complex process engineering element, such as a line branch in a substation, can be mapped with all of its data, internal logic and visualization as a Smart Object. When you are ready to use it in a project, simply pull it off the "shelf" to create a comprehensive, fully-functional HMI application in just a few steps.

In the Substation HMI Application Set, COPA-DATA will offer a flexible combination of Smart Objects, as well as a basic project with corresponding engineering documentation, as part of a comprehensive commercial package. This enables systems integrators and end users to draw on extensive solution resources to develop and expand substation projects.

The Application Sets are another way COPA-DATA is developing the zenon Software Platform to benefit the zenon user community; helping users to say goodbye to timewasters and address the new challenges in the industry.

JÜRGEN RESCH
Energy Industry Manager

Jürgen Resch has been passionate about power plants and captivated by cables since he was a child. If you want to put his expertise to the test and find out just how switched on he is, simply email:

energy@copadata.com

STEFAN HUFNAGL
Energy Industry Expert

Stefan Hufnagl has been part of the COPA-DATA team since 2013. With several years' experience in the fields of industrial control and drive technology, as well as robotics, he now focuses closely on trends in the energy and infrastructure industry. He uses his expertise mainly to support colleagues in sales-related departments.

stefan.hufnagl@copadata.com

A skyline dominated by skyscrapers marks the border between the sandy desert and the waters of the Arabian Gulf: Dubai. Since the United Arab Emirates gained independence in 1971, Dubai has developed into a globally significant financial, trade and transport hub:

ZENON SUCCESS STORY

DEWA PROTOCOL CONVERTER GATEWAY

Creating a more sustainable electricity supply in Dubai

The Dubai Electricity and Water Authority (DEWA) has provided the Emirate of Dubai with an uninterrupted water and energy supply since it was established in 1992. To continue meeting its objectives, the authority required a flexible and configurable control solution that provides the necessary visibility and compliance.

In 2015, DEWA launched the Dubai Clean Energy Strategy with the goal of generating 75 % of its electricity from clean, renewable sources by 2050.

In line with this goal, the public power company is pursuing the ambitious DEWA 2021 strategy towards sustainability. It currently supplies 2 billion liters of desalinated water and 10,000 MW of electricity generated and distributed using highly automated equipment.

COST SAVINGS AND IMPROVED DATA ACQUISITION

DEWA began by modernizing one of its older Substation Control and Monitoring Systems (SCMs). Installing a PC-based system using the zenon Software Platform from COPA-DATA as an SCMs Gateway to its main control center led to more flexible and reliable operations while providing DEWA with full vendor independence and cost savings.

A RETROFIT FOR SUBSTATIONS

Forward-thinking projects such as a combined desalination and generation plant and the world's largest single-site solar project at the Rashid Al Maktoum Solar Park reflect this shift towards a cleaner energy system. At the same time, much of the existing equipment requires modernization to bring it up to standard.

Some DEWA installations date back to 1959 and require significant upgrading. For example, the data interfaces between the substation bay controller units and the company's main control center needed to be upgraded to comply with IEC 60870-101/104 standards. Legacy equipment supplied as part of the original substation structure was no longer in production. Furthermore, any changes to these proprietary systems had to be completed by the equipment vendor and, therefore, came with high engineering costs.

THE NEED TO REPLACE AN AGING PROPRIETARY SYSTEM

The DEWA engineers responsible for Operation Technology-Telecontrol systems in company's Transmission Power division needed to find a solution that could deliver the performance and compliance required while also offering greater engineering flexibility.

The operational engineers began to scour the market for vendor-independent protocol converter gateway software that would be compatible with the existing IEC-61850 bay controller units (BCUs) in the substations.

Because of zenon Energy Edition's track record in substation control, the DEWA team decided to install and test zenon's process gateway functionality in its laboratory. zenon is used in substation control around the world in a variety of ways, including as an on-site control system, as a control room process visualization and as a gateway to high-level control systems. This proven
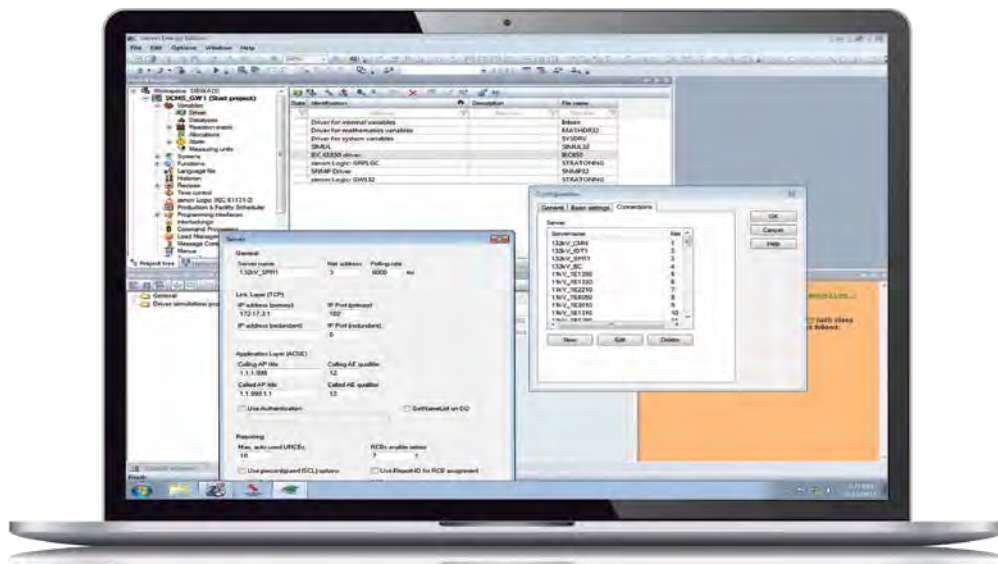
The engineering environment of the zenon Software Platform
is used to create, maintain and expand projects.

pedigree of the zenon Software Platform is convincing. Furthermore, zenon's hardware independence and its ease and efficiency of engineering made zenon a highly attractive option for DEWA.

BETTER ENGINEERING FOR AN IMPROVED COST OF OWNERSHIP

The ability to connect with a wide variety of BCUs, equipment and third-party devices from numerous manufacturers via IEC 61850 is what impressed the DEWA team the most about zenon. This native gateway functionality is bidirectional, allowing it to relay and receive commands as well as forward substation equipment data to the company's control systems.

It can be used for all levels of automation from unmanned, fully automatic operation to on-site operations using ergonomic user interfaces. The software platform also provides seamless redundancy in several different ways, making it easy to guarantee an uninterrupted electricity supply.

All engineering work in zenon can be completed purely by setting parameters. Consistently object-oriented with a wealth of predefined libraries, zenon makes configuring projects a quick and efficient process. Furthermore, zenon addressed two key requirements for DEWA: the need to be hardware independent and the ability to engineer solutions easily in-house.

While the ease of engineering was the preeminent reason for DEWA choosing zenon for the DEWA SCMS Gateway, the software also offers an additional functionality that is highly valued by the DEWA team. In particular, the built-in checks and security functionality helped to prevent errors and enabled the team to produce comprehensive, version-controlled documentation with minimal effort.

The zenon software platform also provides seamless redundancy, making it easy to guarantee an uninterrupted electricity supply. DEWA gained more flexible and reliable operations while benefiting from full vendor independence and massive cost savings.

A SUCCESSFUL FIELD TEST

Even before DEWA's first engineer received zenon training, the DEWA Transmission Power Division's Operation Technology Department installed the software on a PC running Windows 7 Professional. They tested zenon's process gateway functionality in a laboratory and encountered challenges like integration of proprietary add-ons in IEC 61850 complied BCUs from a well-known OEM, which was overcome by a work-around implemented by the DEWA team. DEWA worked closely with the engineers at COPA-DATA headquarters to ensure the necessary compliance with international safety standards. The new solution converts IEC 61850 data to IEC 60870-101 as well as IEC 60870-104 and forwards it to four different DEWA control centers.

Following successful in-house laboratory testing, the DEWA SCMS gateway system built using zenon was implemented at one of DEWA's 132/11kV transmission substations for a one-year field test.

zenon Gateway Testing Setup (TCS LAB)
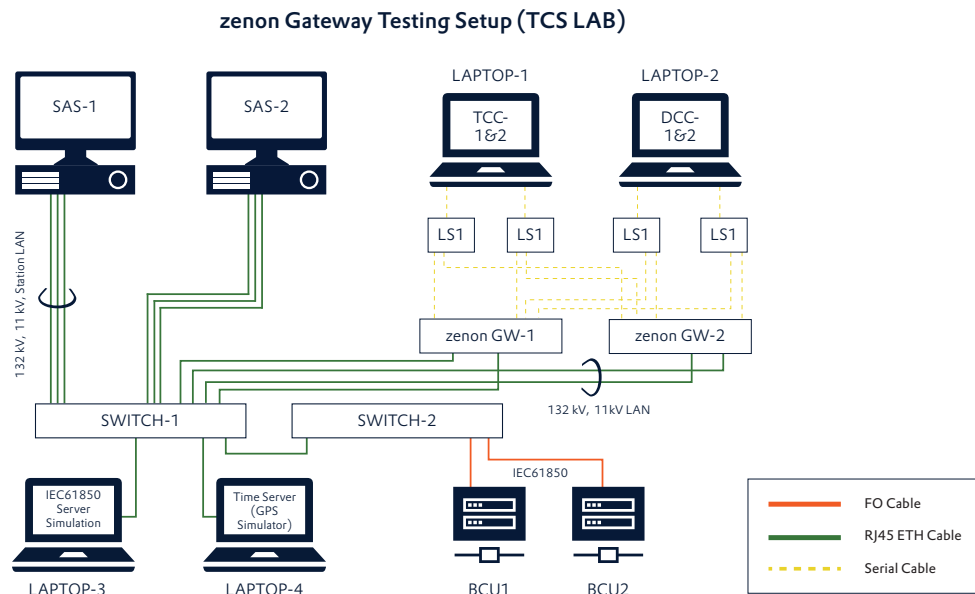
DEWA tested zenon in a laboratory and found its performance was suitable to fulfill all of its requirements.

During the laboratory tests, DEWA engineers discovered that the standard zenon version had no native support for the balanced mode in the IEC 60870-5-101 slave required to correctly handle data from some of their legacy central grid applications. COPA-DATA swiftly added this capability with the help of DEWA. In line with the Austrian automation specialist's quest to ensure the software remains free from custom code so that future version changes remain simple, this addition was incorporated in the following version of zenon. Moreover, a solution was added to DEWA Gateway to prevent detrimental circuit breaker reactions to short-pulse double commands from the controlling station.

CREATING A MORE SUSTAINABLE FUTURE

zenon provides DEWA with the opportunity to modernize the existing communication and control system in the future, which will help to assure the necessary compliance.

It is the highly sought-after engineering independence and flexibility and associated cost savings that zenon delivers that the DEWA engineers appreciate most of all.

Following a full year of faultless operation in the original substation, DEWA SCMS Gateway powered by zenon will now replace the legacy SCMS gateways in many DEWA substations. By installing a PC-based system using the zenon software platform rather than a proprietary protocol converter gateway, DEWA has gained full control over all required engineering, making it independent of hardware vendors. DEWA has saved 87 % of investment costs.

HIGHLIGHTS:

– Open integration of hardware from various sources

– In-house, vendor-independent adaptability

– Enhanced, bidirectional communication with grid control center

– Improved data quality

– Multi-language functionality so Arabic can be used on the HMI displays

– Support for necessary IEC protocols and standards

– Seamless redundancy

– Cost savings of 85 %

– A more flexible and reliable system with a lower cost of ownership

DEWA

Dubai Electricity and Water Authority (DEWA) is the exclusive provider of electricity and water services in Dubai. DEWA was formed in 1992 following the merger of the Dubai Electricity Company and the Dubai Water Department which had been operating as an independent entity since 1959. DEWA's 9,700 employees successfully manage the generation, transmission and distribution of electricity and water across the emirate. DEWA serves a large customer base across the emirate and provides over 600 thousand customers with electricity and water.

Data storage
on request

Manage data as needed with
Recipegroup Manager

The digitalization and modernization of processes often involves converting information on paper to digital format. With the zenon Software Platform, this data can be securely managed and clearly presented to support equipment operators in their tasks. In this way, the zenon Recipegroup Manager (RGM) saves and manages a variety of information in one place.

The zenon RGM module is deployed successfully in many industries and covers a range of requirements in the food and beverage and pharmaceutical industries. Recipegroup Manager is also being increasingly used to meet specific project requirements in the automotive industry.

RECIPEGROUP MANAGER IN AUTOMOTIVE MANUFACTURING

The use of recipes in the automotive sector often resembles "conventional" recipe management. Recipegroup Manager defines recipes as a collection of variables, the values of which, like data records, are stored centrally in a database. These recipes can be viewed, similarly to data records, in a database. The related values are stored in these data records. The controller affiliation for the variables in a recipe is irrelevant, so recipes can manage values for different controls or systems. The variables are only transferred on request. This means that the values are written to the recipe or read from the recipe based on an operator action or a defined event. The recipes in the RGM are organized using what are known as recipe groups. All recipes in a recipe group contain identical variables and therefore have the same structure. However, individual recipes from a recipe group have recipe-specific values. The functions of the zenon module vary: recipes can be read or written, values saved in the recipe can be compared with online values, and the data can be exported and imported. Recipe version management or user administration can be integrated to meet additional requirements.

DATA MEMORY IMAGE WITH ZENON

Recipe management is often used when storing controller values offline. The zenon module is used, in this case, to provide a snapshot function for selected values from controllers. After specific settings have been configured in the PLC with the associated programming environment during equipment commissioning, it may be desirable for these parameters to later be changed by the user without expert software. RGM comes into play to manage the information in this way without the need to program software. The zenon project for these systems would be expanded to include Recipegroup Manager. The configuration data from the controller is mapped with zenon variables. These variables are organized in a recipe group. With the zenon function "Read recipe values", the variable values are recorded at the push of a button. Now these values can be processed further with zenon. For example, they can be saved in a recipe data record. When storing data, the recipe data record can be provided with a version number, if necessary. The information stored in this way – regardless of the controller – will be available again later. If the settings need to be modified due to changes in the system, this can be done using the zenon user interface. One way to do this is to use a recipe group screen in which the recipe tags can be edited in a list. Alternatively, there is also the option of mirroring the recipe values to "graphical recipe variables". With these variables, the recipe values are displayed in normal operating screens, and the familiar look and feel is retained. Entries in the graphical recipe variables are transferred to the recipe when the zenon RGM function is launched.

MORE TRANSPARENCY WITH THE COMPARE FUNCTION

By saving the settings with Recipegroup Manager, the stored values can be restored quickly and easily in the event of data loss at the controller (e.g. due to controller replacement). The zenon module even offers a compare option: the saved values from the recipe and the current values from the PLC are compared with each other, and the differences are displayed on the zenon screen. This highlights the differences between online and offline values. The zenon module also increases safety when testing different settings. A "restore" function to quickly revert to the parameters configured originally is possible and the changes made are clearly indicated by this compare function.

CASE STUDY WITH CONVEYOR TECHNOLOGY

The manufacturing information recorded using this method can be passed on with the zenon module, similar to a gateway. The following case involves conveyor technology: at certain points in the route (for example, switches), the vehicle data transported over it must be recorded and saved for long-term tracking. To do this, the reading points' data record is mapped to recipes. The online values are written to the recipe and saved on command. Storage takes place exclusively based on the event. This eliminates the additional, redundant data that would result from cyclical storage. The recipes are then exported as a complete data record for further processing to archival or logistics systems. A recipe is saved as an XML or text file and the file name can be generated automatically. Thanks to the transparent structure of the export files, nothing stands in the way of further processing this information.

INTUITIVE USER INTERFACE TO MANAGE EQUIPMENT INFORMATION

Recipegroup Manager is also suitable for use in machine data management. A large amount of data is required to configure and operate machines and equipment, and this data is often stored at different locations. For example, a copy of the electrical diagram might be found in paper form in a control cabinet. The setting parameters selected

Focus on important equipment parameters.

during commissioning are in the acceptance report. Network addresses and position designations can be found in plant plans, while specific tool settings are managed in datasheets. However, with zenon Recipegroup Manager, all this information can be stored centrally and presented in a structured manner. This increases ease of use and makes it simple to find the information you need.

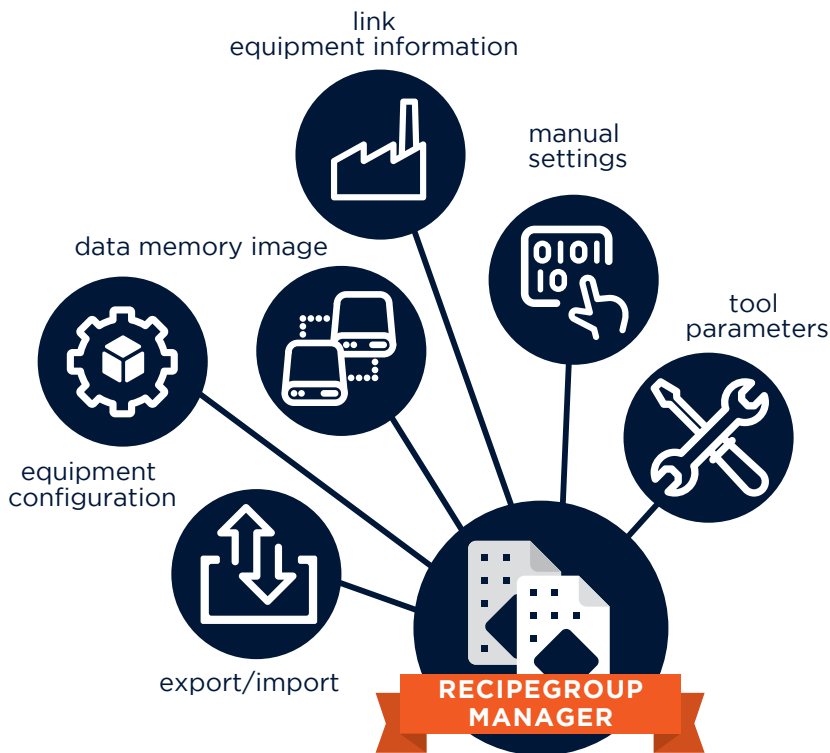## KNOWLEDGE DATABASE WITH REPORTING FUNCTIONS

Machine data management with zenon can be used like a knowledge database. It functions as a kind of online encyclopedia for the maintenance engineer. By using different data types for the recipe variables, all information related to the systems can be saved. For example, the link addresses (path and file name) to the PDF versions of the system documentation or the electrical diagram can be stored in string variables. The zenon HTML screen is used to display these PDF documents. The screen switching

function navigates to this screen, where the address/URL from the string variables can now be used. The content of the PDF is now displayed embedded in the zenon project. If necessary, this data record can be exported again. Depending on the application, a transparent XML or text file can be created for this. zenon reporting also enables the graphical preparation of a report that can be saved as a PDF file or sent by email.

When changing tools on a machine, the settings are transferred quickly and reliably via the related recipe. Equipment configurations can be managed and optimized at a central point. Corresponding reports enable the output and, if necessary, the electronic transmission of all parameters as a digital document.

A TRAIL GUIDE FOR YOUR DATA RECORDS

The zenon equipment model can be linked to allow for navigation within data records and recipes. Different production structures can be mapped using the equipment

Wide range of applications in automotive production.

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.

model. For example, you can store a model according to the location, the cost center or the technology and then link it to the data records. In this way, users can find the way to their data records with the model of the location in the same way a hiker might use a trail map. Users navigate through the structure following the same "route" as if they were going to the equipment. The equipment model records, with cost centers, all the relevant information, pre-filtered for the respective manager.

ZENON: BRINGING PRODUCTION DATA INTO ORDER

Even sophisticated equipment and production processes must be controlled easily and safely. With Recipegroup Manager, parameters for products, tools or control parameters can be managed centrally. Equipment, or even complete lines, can be quickly, easily and safely converted to reflect necessary adjustments. Ease of use and maximum security form the foundation of Recipegroup Manager. All production-relevant default values are clearly arranged in a list and can be transferred to the controller by means of an operator action or automatically. The integrated versioning and status management allows users to make a recipe's entire lifecycle available. As a result, zenon RGM provides efficiency and security for production.

A journey through a Digital Pharmaceutical Plant

"Big Data is becoming as important as chemistry or biology for us," said Merck Group CEO Stefan Oschmann in a video interview[1].

Such a strong statement from one of the most important global pharmaceutical companies indicates the role that digitalization will be playing in the life sciences sector in the near future. This is exactly what was discussed at length at the ISPE Pharma 4.0 conference held in Manchester over November 19-21, 2019.

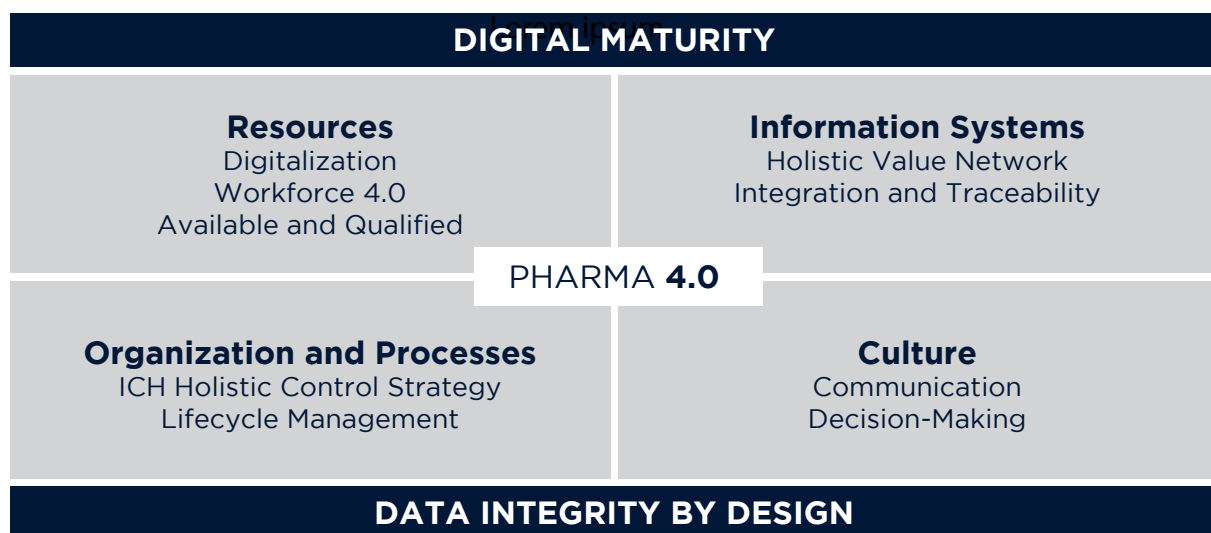(1) https://www.cnbc.com/video/2017/01/18/big-data-becoming-as-important-as-chemistry-for-us-pharma-ceo.html

Figure 1: ISPE Pharma 4.0 Special Interest Group (SIG) operating model. Source ISPE [2]

The last ISPE Europe conference in Manchester was an interesting opportunity to dig into the Pharma 4.0 framework developed by ISPE[2]. This operational model, which starts from the valorization of human resources, includes information systems, organization and processes and culture (as illustrated in *Figure 1*).

The different speakers offered technological insights, ongoing studies and real use cases. In the many speeches, reference was often made to the concept of the "Digital Plant". It became obvious that, to date, there is no clear definition of what constitutes a digital plant. Some associate a digital plant with the introduction of the electronic batch record, others with the IoT and more still with the addition of an MES system. There were several mentions of work undertaken by BioPhorum towards a Digital Plant Maturity Model (DPMM)[3] that offers an interesting picture of the current situation surrounding digital systems in life sciences manufacturing.

DIGITAL PLANT MATURITY MODEL (DPMM)

With a clear focus on the life sciences industry, the DPMM describes the mature stages of a life sciences manufacturing plant, beginning from the traditional "paper-based" facility and extending all the way up to the fully automated and integrated "adaptive" plant of the future.

This is a useful instrument that uses a five-level classification to evaluate a plant's level of digital maturity. This way, steps that need to be taken to increase a plant's integration can also be identified.

The DPMM diagram in *Figure 2* has been intentionally developed to cover not only what is possible today, but also to hypothesize a possible advanced (level 5) adaptive plant

with the clear awareness that it is still beyond the level of current IT and manufacturing technological capabilities.

Let's now analyze this by focusing our attention, for the sake of brevity, on the field of pharmaceutical manufacturing.

A level 1 plant is characterized by the extensive use of manual operations at different levels. For example, all manufacturing activities are managed following paper-based procedures, while the processing parameters in the plants and machines are set manually. Therefore, while plant operations might be controlled by PLCs and DCS systems, there are no HMI systems with recipe management or integrated audit trail functions. Under these circumstances, meeting the regulatory requirements for data integrity can often be very complicated.

In a level 2 plant, automated production systems integrate user management, recipe management and an audit trail, and are able to generate an end-of-batch report. Nevertheless, each machine is an island. There is no data integration between operation (OT) and higher IT levels (e.g. MES, ERP) or horizontal integration, for example, between machines on a line. The operator has to move among the different machines and log in to select recipes and processing parameters. To supervise the operation of that line, the operator must have good knowledge of the process. The operating procedures and batch records are usually paper-based. Operating data that is essential for data integrity, such as audit trails or deviations from critical GMP parameters, remains at the machine level. This configuration complicates the management of GMP data storage and backup activities.

At level 3, data finally begins to flow more smoothly because the machines in the manufacturing line are

(2) https://ispe.org/initiatives/pharma-4.0
(3) https://www.biophorum.com/how-does-your-digital-plant-maturity-compare

LEVEL 1 PRE–DIGITAL PLANT	LEVEL 2 DIGITAL SILOS	LEVEL 3 CONNECTED PLANT	LEVEL 4 PREDICTIVE PLANT	LEVEL 5 ADAPTIVE PLANT
Primarily paper-based processes. Predominately manual processing. Low level of automation. Basic PLC controls. Applications are standalone with minimal or no integration.	"Islands of automation". Some manual processes. Batch records may be semi-electronic or "paper on glass". Local batch-recipe system interfaces with PLCs. Site-specific systems; limited integration across functional silos. Analytics on demand requiring manual effort: "why did it happen?" Plants operate independently with little real-time supply chain visibility.	Vertical integration. ERP, LES, MES and automation layer are fully integrated to support digitalized business processes. Full electronic batch record with review by exception. Industry standards such as ISA-88 (recipe) and ISA-95 (material, equipment and personnel) have been adopted. Standard application platform adopted across plant network. Analytics are semi-automated: "where else can it happen?" Islands of real-time process analytics.	Enterprise integration: internal integration of plant to value chain. Integration of product development and manufacturing (PLM). Advanced production technologies start to be used. End-to-end supply chain visibility with limited external collaboration (suppliers/CMOs). "Enterprise Recipe Management" (ERM) process in place. Online/at-line quality testing with real-time release. Proactive analytics across plant and internal value chain: "what can happen and when?" Integrated real-time process analytics. Simulation used for process modeling and improvements.	Full end-to-end value-chain integration from suppliers to patients. Modular, mobile and collaborative manufacturing environment Advanced production technologies used as standard. Plug & Play everything: from a single instrument to production scale or CMO. Zero system downtime (even for upgrades) and continuous evolution. In-line, real-time, continuous, closed loop process verification and control with automated real-time quality release. Self-aware, continuously adaptive "autonomous" plant with exception conditions handled by remote experts Advanced simulation used across value chain for modeling, testing and improvement of manufacturing and supporting business processes. Trusted information insights are freely and securely available. Pervasive use of adaptive analytics and self/machine learning across value chain.

Figure 2: Digital Plant Maturity Model (DPMM) – definition of levels. Source BioPhorum IT [3]

managed by a line management system. The operator is able to manage and send recipes to the different machines, carry out operations and preliminary checks, start a production batch and supervise the operation of the line in a guided manner from a single workstation. The line management system acquires production data from the machines and sends any deviations from critical GMP parameters to an MES system in real time. The audit trail is centralized at a single point and can be sent to the plant's electronic batch record (EBR) system. The batch release phase is facilitated thanks to the "Review By Exception" (RBE).

Even isolated machines or other technical services such as production of water for injection (WFI) can be integrated through automation integration layer platforms, which can directly connect control systems and acquire critical GMP parameters, pre-process them and manage deviations by integrating all of this at higher IT levels.

From level 3, data integrity compliance is easily and effectively fulfilled. At level 4, we can finally focus on process optimization in terms of quality, efficiency and sustainability. Thanks to the extensive acquisition and archiving of production data, we can now, for example, take advantage of current machine learning and big data analytics techniques to predict quality problems and anticipate potential deviations.

Up to this point, we find real applications in the life sciences sector. When we look beyond this to level 5, we enter the world of ambitions for the future. As can be seen from *Figure 2*, in the adaptive plant, digitalization extends horizontally from the supplier to the final patient. The new machines are integrated with the plant systems as plug-and-play solutions. The production processes are able to self-regulate. It is true that the path to level 5 is a long one and, at present, current technologies are not yet mature enough.

CURRENT STATE OF MANUFACTURING PLANTS

An initial analysis undertaken inside the biotech industry, which is likely representative of the entire life sciences sector, shows that many production sites are still at level 1 (pre-digital) but most plants are level 2 (digital silos). Some of these facilities are approaching or have reached level 3 (connected plant). Only a few highly advanced sites have reached level 4 (predictive plant). Meanwhile, level 5 (adaptive plant) is still a dream for the biopharmaceutical industry and cannot yet be achieved with today's technology.

This assessment has also been confirmed by a survey undertaken by the NNIT consultancy and presented at the conference in Manchester. The survey showed that it remains true that MES systems are not very widely used in life sciences. For example, just 21 % of respondents working in API (active pharmaceutical ingredient) manufacturing

have implemented an MES. Only 36 % of packaging area in secondary manufacturing have integrated an MES system. The majority of respondents are thinking of a more modular and scalable approach to MES functionality as a result of a progressive pervasiveness of IoT in their companies.

We can, therefore, consider level 3 as a point of reference or a first objective to be achieved for the majority of production sites. For manufacturing, this becomes a question of adopting HW/SW technologies and solutions that have been available and consolidated for some time now.

THE PATH TOWARDS A MORE CONNECTED FACILITY

Which solutions could be adopted immediately to increase a pharmaceutical plant's level of maturity without replacing existing assets? Sticking with manufacturing, for the sake of the simplicity, let's look at a couple of examples.
Let's imagine we are at level 1. Our manufacturing assets are reliable and performing. They have significant economic value. However, they do not have the essential functionality for data integrity regulatory compliance. The adoption of a user interface that implements user access control, time synchronization, an audit trail, recipe management, data acquisition of critical GMP parameters and vertical data integration with higher IT levels is an excellent remedial intervention for data integrity that would preserve past investment and prepare for the next steps of digitalization.

Let's consider a level 2 company. Even though the machines are isolated (digital silos), it has an adequate level of compliance in terms of data integrity. The adoption of a management system for the line, such as a line management system or a line execution system, can simplify the setup of new batches (cleaning and changeover procedures via a digital device and recipe management throughout the line). The line execution system offers the operator a single control point for the line and it will generate a centralized audit trail, acquire and archive critical GMP parameters, and will promptly recognize any deviations. The electronic line report will, therefore, be available and can be vertically integrated into company workflows.

For all systems that are not included in a line in the level 2 company, a vertical data integration layer can be implemented. This is typically referred to as an IoT automation integration platform. Thanks to its high degree of connectivity, the platform will maintain bidirectional data exchange between the different devices. The platform will also acquire and store critical GMP parameters, allow centralized management of GMP deviations and will manage and send groups of settings (recipes) to the equipment. It can acquire data entered by operators through mobile devices (paper on glass). Thanks to its archiving capability, the platform will store the information needed to produce a batch record.

Thus, we would have reached level 3 manufacturing through vertical data integration infrastructure, using standardized, modular and scalable software solutions. We have adopted a software platform configurable as CAT.4 according to GAMP5 and we have laid the foundations for continuing our journey towards level 4.

Would you like to find out how to reach digital plant maturity level 4? Or would you like to know more about the solutions mentioned above? Connect with us and keep up with the next issues of Information Unlimited.

GIUSEPPE MENIN
Pharmaceutical 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

Stefan Robl

HEAD OF MARKETING

COPA-DATA HEADQUARTERS

AT COPA-DATA SINCE: 2011
RESPONSIBILITIES:
Together with a great team and numerous terrific colleagues, it's my goal to ensure that zenon and COPA-DATA become even more well known worldwide and to make our customers' daily work easier. Collaborating with my colleagues in the different international offices makes my days extremely exciting and varied. A key interest for me is further developing our digital touchpoints.
I GET MY INSPIRATION FROM...
currently mainly from my young son. His joy of discovery and openness are astonishing for me and inspire me to explore the same qualities in my own life as much as I can.
IT IS MY DREAM...
to be able to say I didn't miss anything important in life and that I have made the world a little nicer for some people. I would also like to have the perfect playlist on hand for every situation – the soundtrack for my life, so to speak.

You can reach me on:
stefan.robl@copadata.com

Reinfried Kößlbacher

AREA SALES MANAGER FOR CZ-SK-HU

COPA-DATA CEE/ME

AT COPA-DATA SINCE: 2017
RESPONSIBILITIES:
Since fall 2019, I have been responsible for zenon sales and for the growth of the Czech, Slovak and Hungarian markets. In addition to the automotive industry, these markets have particularly great potential in the food and beverage industry. International brewery groups such as Molson Coors or Asahi Group have their headquarters for the CEE region in the Czech Republic. Sales in the food and beverage industry in the three countries are around EUR 20 billion. I am very much looking forward to leveraging this potential together with the team and establishing zenon here in the long term.
I GET MY INSPIRATION FROM...
my family and my large circle of friends, at festivals and from activities together in nature, for example, year-round in the Lungau mountains in the southern portion of the state of Salzburg. In the summer, I get energized by sailing on the Wallersee come rain or shine!
IT IS MY DREAM...
to live life actively, to remain curious, to try everything and to be able to look back on my life with a satisfied smile on my face. One of my dreams has already come true: I always wanted to have a big family. Now my wife and I have four grown-up children who are confident in life and of whom I am very proud.

You can reach me on:
reinfried.koesslbacher@copadata.com

Alexander Fröhlich

FOOD AND BEVERAGE INDUSTRY SPECIALIST

COPA-DATA HEADQUARTERS

AT COPA-DATA SINCE: 2011
RESPONSIBILITIES:
I keep up with the market by attending trade shows, conferences and customer events. According to market requirements, I create concepts for application packages based on our software platform. In addition, I develop and customize demo projects designed to make it easier for our customers to work with zenon.
I GET MY INSPIRATION FROM...
our partners and end customers. It is always fascinating to see what ingenious applications they have come up with based on our software platform.
IT IS MY DREAM...
for automation to make everyone's life a little bit better and for COPA-DATA to contribute to this goal.

You can reach me on:
alexander.froehlich@copadata.com

WHO IS WHO

Lisa Wüst

**INTERNAL SALES REPRESENTATIVE /
BRANCH MANAGER**

COPA-DATA GERMANY (LUDWIGSHAFEN)

AT COPA-DATA SINCE: 2017
RESPONSIBILITIES:
In Internal Sales, I am the communication go-to and back-up for our sales managers all across Germany. I support route planning, send information to customers and am the point of contact for our partners and new prospects. I am also responsible for quotes and account management for certain customers. As the branch manager, I am the first point of contact for all matters concerning the office.
I GET MY INSPIRATION FROM...
my family and all the wonderful places I have been able to travel to.
IT IS MY DREAM...
to travel! Ideally around the world. There are so many fascinating places, beaches and cultures. I want to discover them all for myself!

You can reach me on:
lisa.wuest@copadata.de

Aaron Cowdry

TECHNICAL CONSULTANT

COPA-DATA UK

AT COPA-DATA SINCE: 2017
RESPONSIBILITIES:
As a member of the Technical Consulting team at COPA-DATA UK, I support our customers – helping them to use COPA-DATA products and zenon training services. I am also involved in creating proofs of concept for customers and demos for our sales team.
I GET MY INSPIRATION FROM...
my family and friends! They give me motivation and inspiration to continuously better myself and overcome the challenges along the way.
IT IS MY DREAM...
to travel and see as many interesting places as I can.

You can reach me on:
aaron.cowdry@copadata.co.uk

Anthony Ralay

DEVELOPER

COPA-DATA FRANCE

AT COPA-DATA SINCE: 2002
RESPONSIBILITIES:
As a software engineer, I develop the straton software at COPA-DATA France. I work mainly on the straton runtime and drivers and operate on different platforms, including Windows and Linux. I'm also part of the IT team at COPA-DATA France. In this department, I'm mainly responsible for our straton license database.
I GET MY INSPIRATION FROM...
my family and my friends who I spend a lot of time enjoying life with. I'm also a big fan of music – both as a listener and as a DJ.
IT IS MY DREAM...
to travel the world, discovering and exploring new places and new cultures.

You can reach me on:
anthony.ralay@copadata.com

Girls shaping the future with tech

The imagiLabs team is striving to be the global leader in equipping and empowering young women with the skills and confidence needed to shape the future with technology: from left to right: Beatrice Ionascu (CTO), Dora Palfi (CEO) and Paula Dozsa (Lead Hardware Engineer)

As part of the European Youth Awards, COPA-DATA is supporting the Swedish start-up imagiLabs in fostering interest in software development among young women. Sweden has been a model country for decades in its efforts to promote gender equality. In the current Global Gender Gap Report published by the World Economic Forum, Sweden once again leads the world in gender pay parity. These are ideal conditions for imagiLabs founders Dora Palfi and Beatrice Ionascu, who aim to inspire young women to pursue careers in programming through their start-up.

NOT FOR GIRLS?

Despite the country's ranking, women are still under-represented in the IT sector in Sweden. When Dora Palfi decided to study computer science at the university, she was confronted with comments such as, "the life of a programmer isn't for girls." She was told that programming involves "working for hours in front of a keyboard without any human interaction." However, her experience does not match up with the stereotype of the computer nerd that's still a frequent feature of sitcoms and films even today. Dora Palfi says, "programmers have to be able to share their thoughts and skills with others. They have to find creative solutions. We are trying to pass this message on to young women to encourage them into the industry."

> *"I was told that programmers' lives involves working for hours in front of a keyboard without any human interaction."*
>
> **DORA PALFI,**
> CEO OF IMAGILABS.

A PLAYFUL APPROACH

With imagiCharm, imagiLabs has developed a colorful accessory that can be programmed and personalized from a smartphone. It has 64 LED lights that can be programmed to virtually any color. So imagiCharm can take on new designs and shapes every day, express emotions and display messages. In the smartphone app included, young women learn how to change the images using the Python programming language. It's a fun way of creating your own designs and sharing them with friends. The imagiLabs app also offers basic tutorials to help write the code. It's a bit like playing with Lego bricks. Users can also add comments and search for or try out other codes in an online community.

SPONSORED BY COPA-DATA, AWARDED BY EYA

It's a brilliant idea with a great deal of potential. COPA-DATA is also convinced of this and is supporting the project as a mentor. At the eighth European Youth Awards (EYA) festival held at the end of November, imagiLabs was recognized as one of ten winning projects. More than 600 participants gathered for the final event in Graz. The participants all represented digital projects designed to address and solve problems in their immediate surroundings. At the EYA festival, they received peer-to-peer feedback to further improve their solutions and help bring them to society and to market.

The winning projects are prime examples of how digital technology can be used intelligently and for the benefit of people and society. The EYA projects also highlight the many possibilities technology offers to enable social cohesion, climate protection and sustainable development.

These ideas are some of the key values that motivated Dora Palfi and Beatrice Ionascu to found imagiLabs. They are convinced that girls and women can make valuable and innovative contributions to the design and implementation of technology solutions. This contrasts completely with the well-known obstacles to choosing the profession, including, for example, family influence, lack of
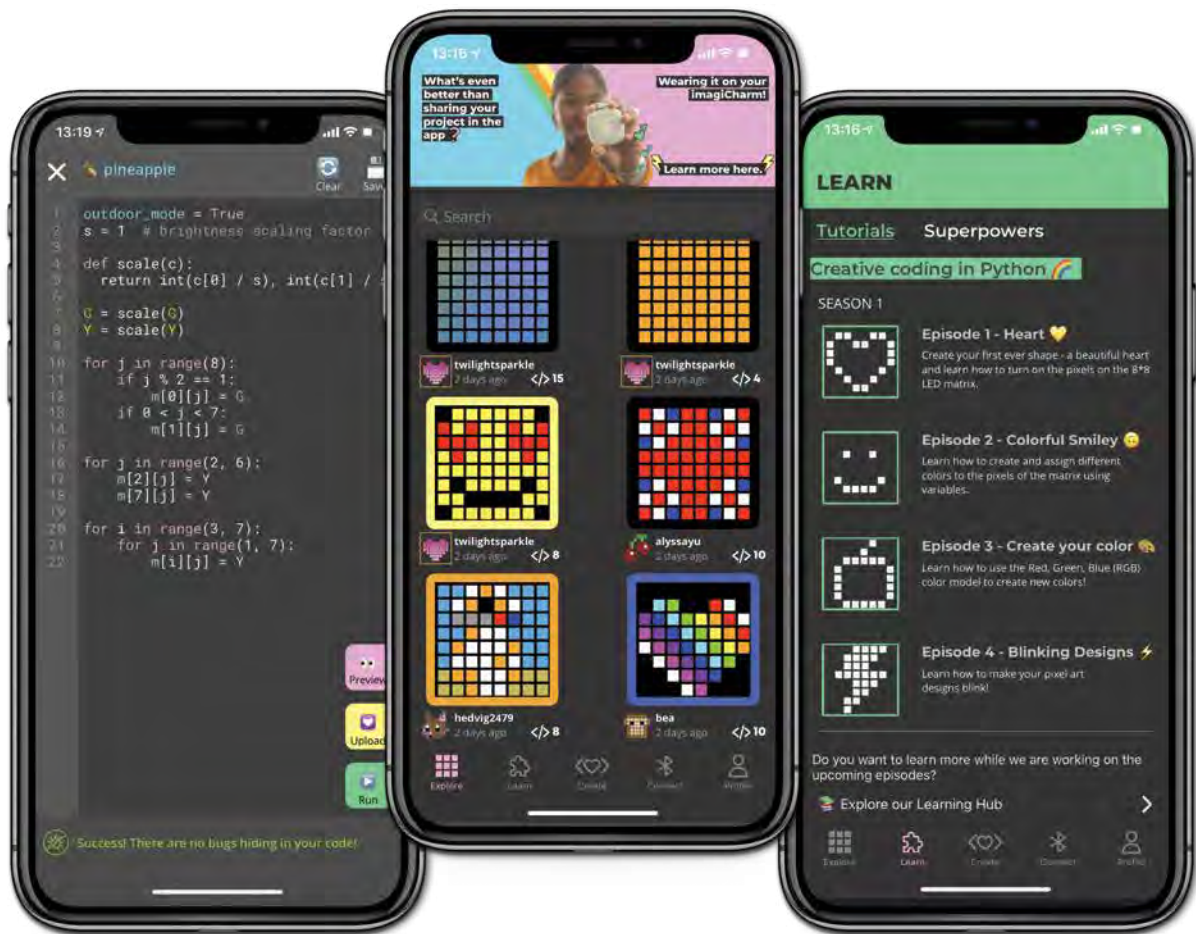

IMAGILABS

imagiLabs was founded in 2017 by Dora Palfi and Beatrice Ionascu with the aim of getting young women interested in technology in a playful way. The Swedish start-up emerged from the student club weSTEM (women empowered in STEM) at New York University Abu Dhabi. This was initiated by Dora Palfi as part of a university research project. The core product of imagiLabs, the imagiCharm, is an accessory that can be personalized using an app on a smartphone. Users are taught what they need to know about the Python programming language one step at a time.

https://imagilabs.com

imagiCharm is a colorful accessory that can be programmed using a smartphone app.

professional information and the lack of female role models. The imagiLabs team has developed a playful approach to getting young women inspired for software development as a job.

MORE WOMEN IN IT – EVERYONE WINS

I can speak in favour of this conviction and motivation from my own experience in daily project work, particularly in the research field. In many of these projects, we can integrate young, motivated talented individuals and achieve excellent, innovative results. One example is the "Intelligent Maintenance Planner" project funded by FFG Austria, during the course of which research was conducted into new methods and tools for improving maintenance planning and implementation.

Why is COPA-DATA committed to this issue, and how do our partners and customers benefit from such initiatives? We want to work with women on the team in very technical areas such as software development and customer service. Even if, in our opinion, we have not yet reached gender parity, we appreciate the many positive benefits of gender-diverse teams during the course of our daily work together.

In small agile teams, in particular, the benefits become apparent very quickly. Wherever possible, we form balanced teams that bring together men and women and also experienced colleagues and newbies. The team

members benefit from their colleagues' different views and approaches. For young women, it is a good opportunity to quickly take on management tasks (for example, as a scrum master or product owner) or to further develop their know-how and qualifications.

UNTAPPED POTENTIAL

Getting young women interested in technology makes sense not only for reasons of gender equality, but also in view of the ever-increasing shortage of skilled workers in the context of digitalization. The support that COPA-DATA is providing imagiLabs with should also send a signal to talented individuals of all

"The festival supports young European companies that focus on digital and social innovation, enabling them to network, present their solutions to burning questions and learn from one another."

PETER A. BRUCK ZIEL ,
EYA INITIATOR

genders. Young women, in particular, represent a huge margin of the untapped potential that the ICT industry will urgently need in the coming years. It is our goal, and that of our partner universities, to significantly increase the appeal of the relevant training paths and subsequent career choices.

Currently, less than 15 % of STEM (science, technology, engineering and mathematics) students in Central Europe are female. There is still a long way to go to achieve a gender balance. This makes me all the happier to support imagiLabs on a small part of its journey and together break down at least a few of the barriers for young women in tech.

REINHARD MAYR,
HEAD OF INFORMATION SECURITY AND
RESEARCH OPERATIONS

EUROPEAN YOUTH AWARD (#EYA)

The European Youth Award (EYA) is a Europe-wide competition for young people, social entrepreneurs and start-up founders who are developing digital projects that provide added value for society. It was founded in 2012 by Prof. Peter Bruck, honorary president of the International Center for New Media, Salzburg. The award recognizes young people from Europe, the Middle East and North Africa who are developing innovative solutions to specific problems using IT and mobile technology. The EYA is based on the goals of the Council of Europe, the Europe 2020 strategy and the UN 2030 agenda with its Sustainable Development Goals (SDGs).

https://eu-youthaward.org

PARTNER COMMUNITY WORLD CAFÉ

CERTIFIED PARTNERS LETTING THEIR PROJECTS SHINE WITH ZENON

Actemium Germany	ematric	ENERGOTEST

GERMANY   AUSTRIA   POLAND

ABOUT US:

Actemium is the VINCI Energies brand for industrial process solutions. The brand comprises an agile, adaptable network with over 400 business units. They specialize in various industrial sectors and ensure the implementation of customized solutions. With its innovative solutions for industry, the brand relies on long-term partnerships.

OUR SOLUTIONS WITH ZENON:

We use zenon in the pharmaceutical and beverage industries. It is used as a central SCADA system in complex production lines, in connection with zenon Analyzer as a system for plant data collection (PDC), as a data hub between MES and different production systems, and as a stand-alone application for machine visualization. As a special highlight, zenon's own symbol library enables us to automatically create the SCADA application from Excel or directly from controller data.

OUR CUSTOMER PROMISE:

We aim to be the best partner for advanced technology. We provide our customers with innovative solutions in the fields of electrical, automation and IT engineering. Thanks to our strong network of business units across Germany and top-quality industry-specific competence, we consistently meet our customers' requirements and thereby build on our success.

ABOUT US:

"automation next" describes in two words what we do and how we think. ematric designs, builds and implements automation technology for the world of tomorrow, from the drawing board to running production systems with the CE mark.

OUR SOLUTIONS WITH ZENON:

We have implemented more than 1,000 systems worldwide using zenon in the fields of conveyor technology, process engineering and application technology for the automotive industry. With more than 25 zenon developer licenses, we are active in greenfield projects as well as in integration work at brownfield sites. Customer-specific production control centers in the food and beverage sector with connections to ERP systems and SQL databases are also part of our portfolio, as are control systems for energy and utilities in general industry.

OUR CUSTOMER PROMISE:

We are service providers and we live and breathe our promise to listen, develop concepts, bring in know-how and then implement the customer's request with technical perfection. Through the continuity and reliability of our personnel, we work in partnership with our customers – today and in the future. High-quality partnerships are our goal.

ABOUT US:

We are a modern and well-organized engineering corporation working for companies operating in the energy sector and other industry branches. We design, create and launch control and supervisory systems based on PLC controllers as well as SCADA and HMI systems.

OUR SOLUTIONS WITH ZENON:

Energotest has been a member of the COPA-DATA Partner Community since 2012. The ECONTROLplus system based on zenon software is designed to fulfill high demands requested from systems in the power industry and industrial process control. The system implements the newest solutions for data transmission, archiving and processing, and also for control and security.

OUR CUSTOMER PROMISE:

We assume that the partnership-based approach is key to mutual satisfaction. We create tailor-made applications according to clients' requirements. That is why our specialists assist our clients with everything from designing solutions, through completion to providing maintenance and support services.

PARTNER COMMUNITY WORLD CAFÉ

CERTIFIED PARTNERS LETTING THEIR PROJECTS SHINE WITH ZENON

Graniten

SWEDEN

2019 · BRONZE

ABOUT US:

Graniten Group make turn-key machines ready for 24/7 production. Through world-class innovation, our machine solutions have the fastest changeover time, close-2-zero, on the smallest footprint. Our client base is primarily within the pharmaceutical, healthcare and food industries.

OUR SOLUTIONS WITH ZENON:

Graniten delivers both machine-centric solutions as well as SCADA functionality to its customers within the pharmaceutical sector. The key feature in zenon for us is the built-in support for CFR21 part 11 for electronic records. We also use the redundant server functionality, paper on glass and the OMAC PackML support, as well as the OPC UA interface.

OUR CUSTOMER PROMISE:

We promise turn-key products ranging from technology innovation to full-scale production equipment. We have wide-ranging development, design, testing and production expertise and we always provide smart machine solutions with promised results to meet our customers' specific needs or wishes.

www.graniten.com

MONT-ELE SRL

ITALY

2019 · GOLD

ABOUT US:

For more than 40 years, Mont-Ele has developed electric, electro-mechanic, electronic and automation systems for energy, transport, industry and the environment. It has made it the company mission to offer solutions that help supply energy and power to millions of people every day and all over the world. Mont-Ele offers a full service, including: engineering, construction, commissioning, support and maintenance.

OUR SOLUTIONS WITH ZENON:

Since 2006, we have had a partnership with COPA-DATA that aims to mutually improve opportunities and technical background. Our solution with the zenon Software Platform has focused on Railway Substation and Power Energy systems using the latest zenon technology such as IEC 61850 driver, zenon Logic, SNMP monitoring and Web Server functionalities.

OUR CUSTOMER PROMISE:

Client satifaction is our primary target. We can overcome this challenge with the full support of our partners, by introducing new technologies and continuously training our engineers.

www.mont-ele.it
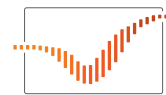
COPA-DATA
Partner Community

FAST FACTS

313 Members Worldwide

5 Gold Partners
41 Silver Partners
221 Bronze Partners
46 Listed Members

48 Countries

COPA-DATA partners are present in 48 countries worldwide

Partner Categories

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

Figures as of September 2020

Entry Year · **Partner Level**

Industry Focus:

Cross-Industry · Pharmaceutical

Automotive · Food & Beverage

Energy & Infrastructure · Educational Insts. & Research Facilities

Optimizing the performance of different production sites.

I can do it.

Cross-site benchmarking and reporting with zenon.

Industrial software that makes your life easier.

zenon
by COPA-DATA