# IU

## Information Unlimited

**Magazine for Automation Industry**
2009 · Issue No. 17

# CHALLENGES

**zenon in substation automation**

**Tipps & Tricks** Efficient Engineering  [part 02]

**Energy Management** Optimizing production costs

DO IT YOUR WAY

Full speed ahead.

GROWING STRONGER THROUGH CHALLENGES.

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## ACCEPT CHALLENGES

Some days ago I had a remarkable conversation with an Eastern European sales partner, of course we talked about the current economic situation and its short-term consequences.

It is human nature that we want to know as much as possible about developments and trends, and only high quality data allows us to make clear forecasts for the future.

The more I talk to people, the more I see that there are two main factions: the ones that act according to the Cassandra complex ("it is already getting better") and the ones that prefer to be on the safe side and think negatively; that way they cannot be wrong.

I guess we must accept that there is a crisis and that nobody knows whether we have already reached the bottom or how much time we have left until we get there. This is a very unsatisfactory situation.

However, the current situation and all the troubles caused by it may have a useful effect. In my conversations with our partners and customers, I have noticed that there is more room for reflection now. People pause for a moment to adjust future visions and to find creative ways to handle the current situation – to define their new reality. This process can be very innovative: Where can I do what? Where can we create new business?

Challenging situations probably make us do things that we would usually not do. Challenging times have a high potential for personal development.

Unfortunately, I have noticed that protectionism is on the rise around the globe, which is a very short-sighted approach to meeting the crisis. This is not an option for us, because short-sighted approaches go against our philosophy; and there is no reason to fly against our guiding principles. On the contrary: Our values have turned out to be an excellent foundation. No wonder we have experienced further growth in the first quarter of 2009.

We are used to sailing against the wind – it has always been a big challenge for us to compete with the big players on the global market. We need challenges to develop. That is why we say: Welcome aboard!

*Alexander Punzenberger, Managing Director COPA-DATA CEE*

ERP

QUALITY     PRODUCTION

PLANT MANAGMENT

WWW, INTRANET

PLANT DATA
STORAGE
MAINTENANCE                    MATERIALS
& ENERGY                    PLANT/CORPORATE
COMMUNICATION

OPERATIONAL MANAGEMENT

PROCESS OPERATION & SUPERVISION          PRODUCTION

PACKAGING

HMI          SUPERVISION          UTILITIES

BUILDING AUTOMATION

WATER TREATMENT

[Diagram No. 1]

# zenon network technology

## communication for effective food & beverage manufacturing

*During a recent visit to a beverage production plant and after discussions with the Automation Coordinator, I realised once again just how important the zenon network technology is. The production team, from maintenance staff to managers, achieve maximum benefit when the HMI projects and the SCADA applications in their plant are connected in a zenon network. The Automation Specialist spent an inordinate amount of time looking at a number of complicated solutions to his data acquisition problems. As zenon was already installed in the plant, the state of the art solution was right there under his nose!*
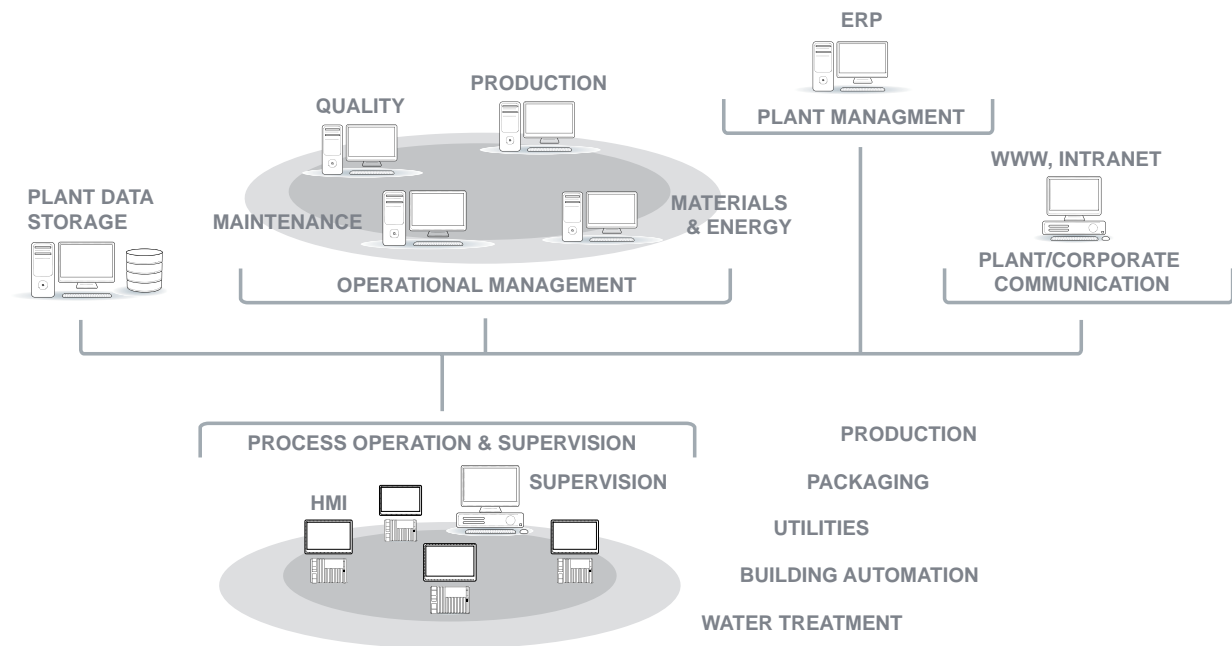
**This is the** reason why I am writing about our zenon network technology again!

The HMI/SCADA software that is placed between the plant floor and the IT infrastructure of F&B manufacturing plants faces some key challenges:

▸ The end-user often operates many different types of machines from various suppliers and the automation hardware & embedded software in the production equipment is also often from many different suppliers. The HMI/SCADA system that is deployed has to guarantee connectivity to all of these systems reliably.

▸ On the higher levels of the automation architecture, the HMI/SCADA software is required to be flexible and able to fit into the dynamic environment of the F&B Manufacturing Industry. This includes the addition of new users operating the software, on both the supervisory and management levels and new systems connecting and communicating with the HMI/SCADA software, i.e. the ERP software.

▸ The integration of these improvements to the HMI/SCADA system is expected to be at a reasonable cost.

zenon is fully prepared for all of these challenges. From the very beginning high importance was placed on the open integration capabilities of zenon, both horizontally and vertically to the process. Added to this a visionary network concept that has served as a grounding for many years of product development and

enhancement. For example, once a zenon project has been deployed, its functionality is made available across the network for other users without the project having to be reworked, only a few setting changes are required. A result of this is that the zenon network technology provides sophisticated and reliable functionality today. In spite of the technology being so advanced, zenon makes the application engineering very open, accessible and easy to use. The following are some examples from the F&B Industry:

### COMPREHENSIVE CONCEPT: MACHINE OPERATION, LINE SUPERVISION, OPERATIONAL MANAGEMENT AND MORE…

Does Diagram No. 1 appear complicated at first glance? Perhaps because it reflects the typical networking requirements of a F&B manufacturing plant. However engineering within zenon makes it simple.
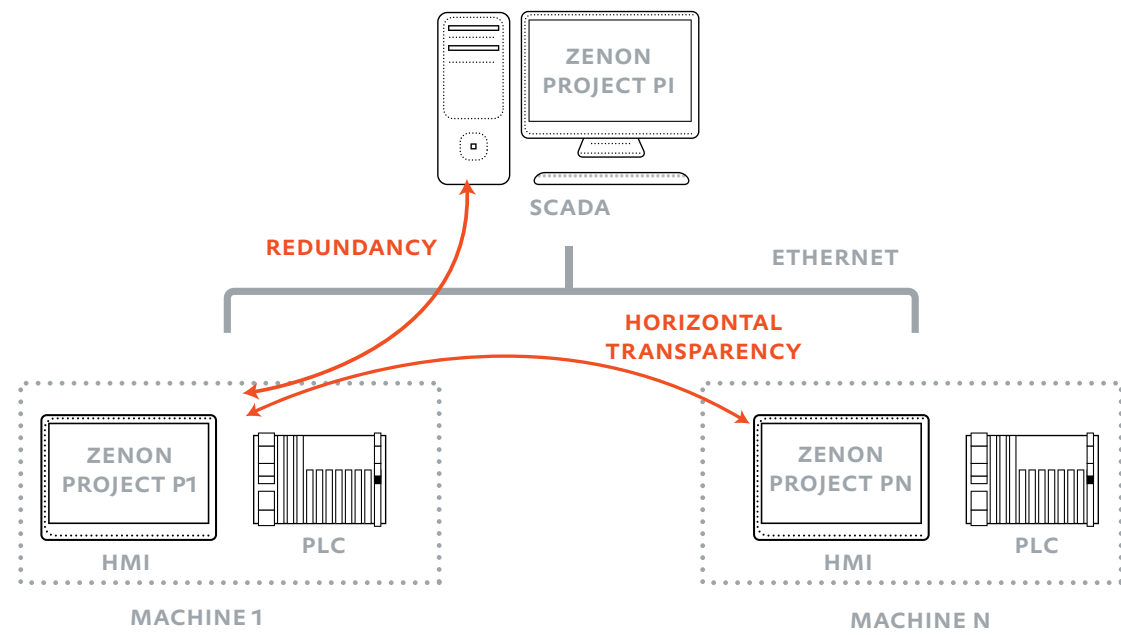
In zenon, a project is an entity with a clear object-oriented structure of components. If a stand-alone panel or PC is used for automation purposes, a single zenon project provides functionality designed for real-time operations and for historical analysis. zenon archives data, manages alarms and events, presents relevant process trends and much more.

A project has advanced networking capabilities too. In order to share information and

functionality and to extend the flexibility of the zenon network, a project can be organized hierarchically in relation to other projects. Thanks to the zenon network technology, and without special skills in managing IT networks, it is easy to define which project is the information and functionality supplier and which one is the consumer.

**System integrators:**

Let´s suppose that you want to implement a system architecture like that shown in Diagram No. 1. The satisfying consequence of using the zenon network technology is that you can approach the levels of the scheme logically, step by step. If we speak about a packaging line, just start with the zenon HMI projects of each machine and integrate them hierarchically into the line supervisory project. Next you can integrate this project into the next level assigned to operational management. This not only means that the information (variables, alarms, events etc.) from the plant floor is available immediately to the other levels, it also means that the windows and functions you have created, i.e. at HMI or supervisory functions, are available at the operational management level. In the zenon Editor you can create this structure of projects very easily by dragging and dropping them into the correct hierarchy. Sitting comfortably at your development station connected to the network, you can deliver the projects, one by

ZENON
PROJECT PI

SCADA

REDUNDANCY

ETHERNET

HORIZONTAL
TRANSPARENCY

ZENON
PROJECT P1

HMI

PLC

MACHINE 1

ZENON
PROJECT PN

HMI

PLC

MACHINE N

[Diagram No. 2]

one, to the target hardware. All you need to do next is to start each of the applications and your zenon network is up and running!

All versions of zenon from and including 6.20 SP4 can co-exist on the same network leaving you to decide when you would like to update the software on the different panels and PCs.

If you have a heterogeneous automation system in the plant, zenon provides you with the opportunity to horizontally integrate these other software systems into your network.

**End-users:**

Benefits offered by the unique zenon network technology:

▸ You are provided with a communication infrastructure covering all levels of your enterprise, from the plant floor to the board room, encompassing both plant operations and continuous improvements.

▸ Integration time is reduced because the network configuration is convenient and the projects in the network can be reused optimally.

▸ Your zenon network opens new opportunities, as described further.

**AUTOMATION NETWORK, DYNAMIC AS THE FOOD & BEVERAGE MARKET: ZENON CLIENT-SERVER**

The integration of an architecture as described in Diagram No. 1 is a cost-effective investment in performance. But food & beverage manufac-

turing does not remain constant for a long time, new requirements from the market place, new products and new regulations are challenging the production environment and the automation systems continually. A typical requirement is to provide appropriate production information to the proper persons in the network. For instance, it may be important to give more members of the production team access to the alarm management system or to the Industrial Performance Analysis functions. In other cases, it may be necessary to setup new communication channels between the production floor and the IT systems, because the machine operators or the quality inspectors have to introduce manual data into the system.

zenon completely supports these system extensions by keeping the investment costs low. As long as the information or functionality is available on the network the task of making it available to other employees is very easy when using the zenon Client-Server feature.

The supplementary hardware can be a touch panel, a PC or even a PDA connected in a wireless network. Just imagine the mobile maintenance people receiving the required information just in time for the correct prioritization of their tasks. Or imagine that the person responsible for the packaging line performance is able to walk around the production line with the real time Key Performance Indicators in his pocket.

**System integrators:**

In the zenon Editor the network configuration enables you to set the server station of your project up. When running the same project on another station, zenon will automatically realize that it is not the server. As a consequence, the project will run as a client, thus synchronizing itself with the server. During the integration phase you will also benefit from the automatic project update functionality, you only need to change a project on the server stations; zenon will automatically update the project clients.

**End-users:**

The zenon Client-Server feature provides you with:

▸ Flexible and cost-effective communication for all of your manufacturing team over Intranet or the Internet.

▸ Increased global effectiveness and quality through quick responses to events from the production environment.

**INCREASING EQUIPMENT AVAILABILITY WITH ZENON REDUNDANCY**

In Diagram No. 2, zenon fulfils the specific HMI tasks for the operation of the machines (1...N) in a packaging line. zenon is also running on a PC for line supervision purposes. The zenon network technology allows the simple integration of the redundancy functionality of the HMIs directly into the SCADA level. Typically, when a machine panel fails it is not

possible to continue with production until the panel has been repaired. The availability of the entire packaging line is usually dramatically reduced. In the described zenon architecture, the PC automatically takes over all of the HMI functions without any data loss or production stoppages.

**System integrators:**

In order to setup the described redundancy in the zenon Editor you need only to take a few steps:

▸ Set the HMI projects up as network projects.

▸ Create a hierarchical structure with the zenon HMI projects as sub-projects of the SCADA project.

▸ Set the HMI projects up as redundant projects by configuring the "server" and "stand-by server".

▸ Lastly, configure the variables for local or network calculation (i.e. the variables related to the local screen navigation remain local).

**End-users:**

The benefits of this approach are:

▸ Increased availability of the machines and of the entire packaging line.

▸ Reduced integration time at the SCADA level because all of the information from the machines is automatically available at the supervisory level: this includes every single measured value, parameter, together with the alarms, events and process visualization screens.

**OPTIMIZED OPERATION OF YOUR EQUIPMENT THROUGH HORIZONTAL TRANSPARENCY**

In Diagram No. 2 we showed the zenon HMI projects are networked with the SCADA application running on a PC. Even without using redundancy there is important functionality available within zenon: this is horizontal transparency.

On a packaging line, production management has clear targets, for instance the continuous improvement of performance, as described in Overall Equipment Effectiveness (OEE). This means a harmonized operation of

machines and operators in order to reduce the downtime and the minor stoppages. But often a machine operator is usually focusing just on his assigned machine. He often doesn't know much about the other machines or about the performance targets of the entire packaging line. By using the zenon networking technology, the operator of a machine (i.e. filler) can have access to information from other machines (i.e. labeller) and even an overview of the entire packaging line.

In this way every operator can better plan the stops of his machine in correlation with the status of others. Every operator is also informed about the actual values of the performance indicators which is key to creating a team focus on the common targets.

**System integrators:**

Let's consider the zenon network from Diagram No. 2. Using the zenon Editor inside of any HMI project, the variables of the other networked projects are available for further use. All of the variable detail is available in as much detailed as you want, just pick-up the relevant variables from a machine and show them on the HMI of another machine.

**End-users:**

The horizontal transparency brings you:

▸ Improved performance of the line operation, through:

▸ better involvement and team work of the machine operators

▸ communication of the actual and targeted performance indicators

▸ Fast integration thanks to the standard functionality provided by the zenon network technology.

There is still a lot to be said about the zenon network technology. I hope that these examples have been of some use. Please do not hesitate to contact me or your local representative if you would like to know more about the zenon network technology or about our products in general.

I look forward to your feedback by e-mail to: EmilianA@copadata.com. ✎

*Emilian Axinia, F&B Industry Manager*

## Universities of Applied Science –
# Future partners of COPA-DATA

**Thomas Punzenberger, COPA-DATA CEO,** has a clear vision of the future of COPA-DATA: "We stand for innovation, moving ourselves and our customers ahead; and doing that as a team."

We take many different measures to meet these innovation requirements together with our customers and partners. With our initiatives we want to establish a platform to stimulate and develop this innovative approach, motivating young talent and involving decision makers; and we want to do this together with other committed companies from our region. Our goal: an Excellence Center for modern technology companies.

### INNOVATION NEEDS SPONSORS
Research and Development have been a core topic for us over the last 20 years: COPA-DATA invests a large part of its turnover into research and development; in 2008, this was 25%. For several years we have been cooperating with external research institutes and universities.

Our experience backs up our commitment: Innovation requires a strong local foundation to take place. That is why we did not hesitate to take part in the newest program of the University of Applies Sciences in Salzburg, in cooperation with other business partners, namely B&R, Palfinger, Liebherr and Bosch.

The Salzburg Chamber of Commerce and five well known local companies have agreed to invest 450,000 Euros in a course of studies called "Information Technology & System Management", based at Salzburg University of

Applied Sciences over a period of three years. All partners have a common goal: Creating cross-company solutions that will be available to businesses on a long-term scale.

### SOLVING ACTUAL TASKS
### BY PROTOTYPES
The university has already performed a number of projects and diploma theses with all participating companies. However, these projects always dealt with company-specific solutions. This cooperation now allows – for the first time in Salzburg – the use of the different partner requirements as the starting point for an actual solution; a solution that will at the same time be available as a prototype. This way, international top businesses with a regional focus create a solid foundation for the future success of companies in the region.

**The background:** Industrial systems are becoming more and more complex; at the same time, they have to work reliably in demanding industrial environments. No matter whether it is about producing cars, packaging food or reducing pollution – computers and software-controlled machines today manage the complete production process. With its new educational focus "Industrial information technology", the University has reacted to the current requirements of the economy in this area.

This cooperation is the first step in the direction of a competence center in Salzburg: Lifelong learning is an important topic,

especially in the IT area. Employees who want to receive training and cannot find an opportunity for this often leave their company. A strong local partner-university can help to keep qualified employees in the region. As a partner, we expect to get research stimulation both for production processes and our current development projects. The Salzburg University of Applied Sciences is predestined to be a productive Excellence Center.

We have been developing professional software for twenty years now and we are constantly expanding our competences in this area. Thomas Punzenberger: "There comes a time when you reach your limits and require additional resources." For COPA-DATA, this cooperation will make an essential contribution towards this goal.

The essential part of this collaboration will be to analyze the different options in the area of simulation and test automation and to examine their advantages and disadvantages in a scientific way. Of course, the participating companies produce different products. However, they all share the same principle: "Software that guarantees reliable production processes and therefore customer satisfaction." ✎ *Reinhard Mayr*

*Research and Development have been a core topic for us over the last 20 years: COPA-DATA invests a large part of its turnover into research and development; in 2008, this was 25%.*

## Hannover Messe Industrie 2009
# zenon delights visitors with its continuity and independence

*"Get new technology first" – the motto of the Hannover Messe 2009 was also that of COPA-DATA. Visitors to the Fair that were looking for the latest technology experienced powerful tailor-made solutions for efficient automation from COPA-DATA during April 20th to 24th.*

**"Get new technology first"** – the motto of the Hannover Messe 2009 was also that of COPA-DATA. Visitors to the Fair that were looking for the latest technology experienced powerful tailor-made solutions for efficient automation from COPA-DATA during April 20th to 24th.
Over 6,150 exhibitors from 61 nations demonstrated the power and innovation of the industry over an area of 200,000 square meters, fascinating 210,000 visitors with new products and applications. Right at the centre: zenon, the innovation leader of HMI/SCADA solutions for more than 20 years and the focus of interest for HMI/SCADA in 2009.

### MASTERING PROCESSES
The COPA-DATA stand in hall 9 staged the VW Passat assembly line monitoring and control system. Visitors experienced the superior monitoring and optimization capabilities provided by zenon, of the production processes, as if they were in the VW plant in Emden.

Jürgen Schrödel, Managing Director of COPA-DATA Germany, explained the wide variety of applications in the area of networked automation, ranging from condition monitoring to continuous SAP ERP connections to the automatic generation of projects in the automobile industry. The automation expert explains, "The control of networked

production processes is getting more and more complex, increasing the need for the intelligent recording, processing and interpretation of information. This allows companies to act strategically and to optimize production processes with lasting effect."

### UP TO ALL CHALLENGES
The direct connection to SAP was of particular interest to visitors, causing a minor sensation at the COPA-DATA stand. The bidirectional interface manages the direct data exchange between the process level and SAP R/3 system, making intermediate solutions obsolete.

Another attraction was "zag", the zenon automotive generator. Its unique strength: the automatic generation of projects. This tool avoids errors and decreases the time to create projects, allowing for efficient automation and sustained focus on direct benefits. Jürgen Schrödel sums up: "The cost and time pressure on production companies is enormous in today's global market. At the same time, quality and security requirements are rising. Our direct connection to SAP and our project generator 'zag' support companies in a very effective and targeted way, allowing them to successfully meet these challenges and benefit earlier from the solution." ✎ *Susanne Garhammer*

# Information management
# at COPA-DATA

*According to an analysis of the International Data Corporation (IDC), the "digital universe" of the year 2011 will be 10 times as big as it was in the year 2006. We will be confronted with an enormous information growth, which will become a big challenge for many companies.*

**Information plays an** essential role for companies to stay successful in their market. On the one hand, employees need a lot of information; on the other, a lot of new data is created. This large amount of available information leads to increased pressure on employees.

To speed up workflows in companies, all relevant information must be available at any time, it must be easy to find and it must not be stored redundantly. For this reason, COPA-DATA has initiated a major improvement in the handling of its information. As a Microsoft Gold Certified Partner, COPA-DATA has decided to use the Microsoft Office SharePoint Server 2007 for this project. This tool creates a web-based information platform consisting of team pages, employee pages, a Wiki system and an enterprise search system. These components are structured as follows:

TEAM PAGES Each team possesses its own web-based platform, which it can use to present itself to the whole company. This team area can be used to store all documents created by this team in a Document Management System (DMS), to discuss internal topics and to publish news. For storing files, there is a trend towards structured storage systems with indexing functions as opposed to earlier approaches such as the unstructured storage of files in a file server.

Other aspects supporting the use of a DMS are the availability of a check-out/check-in mechanism, which makes the current processing status of documents more transparent; and the versioning of selected documents which allows the trace-back of changes made to those documents. The indexing function may lead to additional effort when documents are created, but the positive effect of this is that they will be easier and much faster to find once they have been indexed.

Because other teams in the company can also access this environment, the transparency across the company will be increased. The goal is to make sure that every employee is informed about what is going on in all parts of the company at any time.

EMPLOYEE PAGES Employees present themselves to the company on their personal pages. Every employee can use these pages to present his/her area of expertise and documents, but also personal things like hobbies, etc. As these pages are connected to the Enterprise Search System, you can search employees according to their responsibilities or skills. This makes it easy to find the right contact person in the company.

COLLECTION OF DETAILED TECHNICAL KNOW−HOW IN A WIKI SYSTEM Due to the diversity of zenon, the daily work of our engineers keeps producing new insight that needs to be shared with all colleagues in a targeted and controlled way. The targeted sharing of information is a very important topic at COPA-DATA, as it leads to new ideas and suggestions for improvement.

To implement this task, we selected a Wiki system, because the employees are already familiar with these successful and simply structured systems – e.g. Wikipedia. Simplicity plays an important role here: The fast-pace of daily work leaves only little time for research, so information must be easy to find. Additionally, the indexing of the articles in this Wiki further supports the structured storage of information.

INFORMATION SEARCH The search for information is getting more and more important due to massive amounts of accrued information. The Content Management and Retrieval

Solutions research group of the IDC questioned employees about the duration of various office activities. The result was that an employee spends on average 9.5 hours a week looking for information. A considerable part of this time – 3.5 hours – is spent without success.

In the course of this project, an Enterprise Search System (part of the SharePoint 2007 environment) will be implemented, which will allow employees to search all relevant data storage systems (software quality management system, CRM system, file server, web-based information platform) via a central interface.

The SharePoint Server 2007 also includes a useful "Alert Me" function. It can be used to notify employees about new information in their areas of interest via email or RSS feed, so they no longer have to check back constantly.

This project is the first step towards mastering the current and future information overload. The project will add value for all COPA-DATA stakeholders. ✎ *Jürgen Frühwirth*

# Red Dot Award 2008
## excellent design based on zenon

*SIG Combibloc received the internationally renowned "Red Dot Award" for the design of its interface for the control of filling machines, implemented with zenon. This confirms the excellent design of the communication interface between human and machine. The particularly user-friendly design was achieved with the software zenon by COPA-DATA.*

**An international jury** of experts selected SIG Combibloc among nearly 6000 competitors from 39 countries and issued the "red dot award – communication design 2008". SIG Combibloc is one of the biggest system manufacturers of carton packages and filling machines for food and beverages in the world. "We are very happy about this quality seal for the new interface of our filling machines. Only 6.5 percent of all submitted projects were awarded. The solutions are reviewed by a very strict jury and so we are proud to be among the best and most creative competitors", explains Peter Holzkämper, who is responsible for visualization systems at SIG Combibloc.

In cooperation with Professor Thomas Hofmann, SIG Combibloc developed a human machine interface (HMI) based on zenon for their filling machines. The jury especially liked the user-friendliness and aesthetic qualities of the user interface. The new system gives the operator a perfect overview of all important machine and line details, allowing him to react quickly in case of failures, even without any special training. The first filling machines have already been fitted with the new software and more are going to follow. While they were looking for a visualization solution, two criteria were of particular importance to Peter Holzkämpfer and Thomas Hofmann: continuity and standardization. They were looking for a completely continuous software, allowing for the use on every platform and infrastructure. Equally important, they wanted to use standard software to protect the investments of SIG Combibloc and their customers on a long-term scale.

Michael Ebel, Sales Manager at COPA-DATA Germany and head of the Northern subsidiary, "Once more, we experienced how sophisticated applications based on zenon can be. The HMI at SIG Combibloc stands out due to its functionality, simple integration of graphical elements, high quality, ergonomic design and ease of use. We hope that all other zenon users who have developed excellent solutions will also receive appreciation for their work." ✎ *Susanne Garhammer*

Perfect teamwork.

GROWING STRONGER THROUGH CHALLENGES.

# Who's who?

## JULIA ANGERER

**Function at COPA-DATA:** Public Relations. **Responsibilities at COPA-DATA:** Managing international public relations and corporate publications. **Born:** in Linz, on August 13th, 1983. **What did you do before COPA-DATA:** After finishing the commercial academy in Perg (Upper Austria), I came to Salzburg in 2003. This decision was caused by the flair of the city and, above all, by my decision to study communication science at the University of Salzburg. I moved into a student's residence, which marked the beginning of a new stage of my life. Soon, Salzburg had become my new home. In addition to the rather theoretical basic classes, I also took classes in Psychology, Spanish and Rhetorics. During studying, I also did some internships and voluntary services – in the financial sector, by taking part in the management of a study course, during the European football championship, in a publishing company and as a tutor at university. I satisfied my fascination for languages and foreign cultures with a language holiday (Spain, 2005), a study visit (Georgia/USA, 2006), an intensive course (Intercultural Competence Summer School Salzburg, 2008) and with a lot of travelling. During the "Karriereforum" (career forum) at the University of Salzburg in 2008, I got in touch with COPA-DATA. **Hobbies and interests:** traveling/culture (Asia), reading, playing the piano, nature, various sports (seasonal). **Favorite books:** depends on my mood; preferably in English: thrillers (Dan Brown), romantic novels (Jane Austen), personal tragedies (Khaled Hosseini) or youthful fantasy stories (Stephenie Meyer/Christopher Paolini/Joanne K. Rowling). **Music:** Rock/Pop (from the USA and UK), Reggae/Ska, movie soundtracks. **Motto:** "Carpe diem"

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## SUSANNE GARHAMMER

**Function at COPA-DATA:** Public Relations Manager, Germany. **Responsibilities at COPA-DATA:** Press work and public relations, focusing on success stories. **Born:** on March 11th,1969 **What did you do before COPA-DATA:** While I was still studying computer science, I had already realized that my heart did not lie in programming or binary search trees. Journalism seemed much more promising: meeting interesting people, travelling around and accepting every week's challenge of delivering a magazine to the market on time. For about ten years, I worked as a deputy and executive journalist for different IT magazines for companies like Vogel IT Medien, CMP-WEKA and Verlagsgruppe Handelsblatt. Since 2002, I have been working as a freelancer in the area of PR, corporate publishing and training for publishers, agencies and medium-sized IT companies. **Hobbies:** New York City – I love to be there as often as possible. **Favorite books:** Everything about New York (New York authors like Paul Auster, Jonathan Franzen, Jonathan Safran Foer, NY travel guides, books about architecture, life style etc.). When I am on vacation, I prefer reading detective stories from authors like Henning Mankell, Karin Slaughter, Jilliane Hoffman, etc. At the moment, I am reading "We call it work" by Holm Friebe and Sascha Lobo. **Music:** Right now, I like jazz, soul, r&b and swing (Charlie Parker, Frank Sinatra, Ella Fitzgerald, Ray Charles etc.), but that changes on a weekly basis. **Motto:** "Per aspera ad astra" – through adversity to the stars. Or, as Hunter S. Thompson and Bill McKenna put it: "Life should NOT be a journey to the grave with the intention of arriving safely in an attractive and well preserved body, but rather to skid in sideways, chocolate in one hand, martini in the other, body thoroughly used up, totally worn out and screaming WOO HOO what a ride!"

Susanne.Garhammer@copadata.de

## REINHARD HURTAK

**Function at COPA-DATA:** Sales Engineer **Responsibilities at COPA-DATA:** My main task is to acquire new customers and also to look after existing ones. My focus lies with F&B. **Born:** Near Aachen, Germany, on November 16th, 1957. **What did you do before COPA-DATA:** For some years, I was responsible for electronic construction and worldwide commissioning at a machinery construction company in the area of process technology. After that, I changed to Telemecanique, which is now Schneider Electric. After one year in the technical support team, I started working in regional sales and then became head of sales management for automation technology at the office in Düsseldorf. From January 1996 to October 2008, I was working as a self-employed trade representative in the area of automation technology and industrial technology. **Hobbies:** Photography and riding motor bikes. **Favorite books:** Most of the time the book that I am reading at the moment. Currently, that book is "The shadow of the wind" by Carlos Ruis Zafón. **Music:** Country, Irish Folk and everything by Mark Knopfler. **My motto:** We live life looking forward and only understand if fully looking backwards.

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## KARIN GRÜNFELDER

**Function at COPA-DATA: Marketing:** Responsibilities at COPA-DATA: Operational marketing, Web management, support of new customers, newsletters, print/media and cooperation with sales. **Born:** in Meran on May 31st, 1968. **What did you do before COPA-DATA:** I worked as an administration manager in private companies for many years. I then entered total quality management in the area of software services 10 years ago. Followed by becoming a self-employed sales and marketing consultant in Italy for five years. **Hobbies:** Internet, economy, politics, sports, driving fast cars and listening to hardcore/trance music at the same time. **Interests:** books, good cooking, environment and nature, and equal opportunities for women in Europe. **Favorite books:** I have many, but my current favorite is "Engel der Armen" (Rita Schiffer). And my daily companion at work: the business magazine "Harvard Business Manager" **Music:** Hardcore/Trance, Beethoven, Falco. **Motto:** I am not in this world to be like others want me to be. Do it your way, don't turn around, fight and never give up!

Karin.Gruenfelder@copadata.it

## NEW MEMBERS OF THE COPA-DATA FAMILY

**We are happy** about the new members of the COPA-DATA family in Great Britain and Austria. Esther Rutter, Marketing Manager at COPA-DATA UK, gave birth to two wonderful girls – Ava Lilly and Claudia Rose on April 7th, 2009. And in Austria, Alexander Punzenberger, Managing Director, COPA-DATA Central and Eastern Europe, has been enjoying every day with his new-born baby girl Alma Rosa since her birth on November 19th, 2008.

A warm welcome to the children and congratulations to the parents!

## New Industry Manager Energy

Jürgen Resch,
Industry Manager Energy

**On May 1st,** 2009, Jürgen Resch assumed the position of Industry Manager Energy at the COPA-DATA headquarters. Before this, he successfully established the integrated softPLC and SCADA logic straton® in the market in cooperation with the COPA-DATA subsidiary CO-PALP. As Industry Manager Energy, he will be responsible for the technical support of key energy accounts, making sure that their requirements influence the development of zenon. An important focus of his new position will be to acquire new customers and to support international sales and marketing with his comprehensive knowledge of this specialist industry.

**Jürgen Resch: about zenon and the energy industry**

I am now Industry Manager Energy; manager of the most profitable industry served by COPA-DATA; manager of the industry that zenon and COPA-DATA grew up with. This is a lot of responsibility. This industry will continue to be a cornerstone of COPA-DATA – and it will be further expanded and strengthened. There is a lot of competition in the energy industry. However, it is an industry that is rarely affected by economic pressures. IDue to the economic climate there are a lot of political driven investments in the infrastructure sector for example energy, this is zenons opportunity. Even after the crisis, zenon will keep its important role, because the subject of renewable energy (think of climate change) will lead to on-going investments in this sector. At the same time we want to keep competing with other established products in the market. This means that we will develop and promote new USPs (Unique Selling Propositions) consisting of features and the support of standards, extend our know-how and demonstrate our first class skills and expertise. The existing customer base of about 5,000 licenses constitutes an excellent reference, which is of vital importance in this industry. This will particularly help us succeed in the new markets on the Iberian Peninsula and in the USA. Of course, we will continue with the dedicated support and development of our established markets. I am looking forward to the cooperation of my colleagues and to many encounters with both new and existing loyal customers. ✎

# COPA-DATA UK scores Hatrick!



Beth playing football
for Keflavik (Iceland)



Anne as a child in
South Africa



James during is visit
in Salzburg

*Three new stars join the growing team at COPA-DATA UK...*

*As the UK office enjoys continued success, so the team is growing. In the last six months we've taken on our first dedicated Support Engineer, James Elllicock; Marketing Assistant, Anne Fletcher; and now, Sales Administrator, Beth Ragdale.*

## BETH REGDALE

*Did you know COPA-DATA'S UK office now boasts its very own football star? The latest addition to the COPA-DATA UK team is Beth Ragdale. Beth is a local Sandbach girl who attended Sandbach Girls High School and who has returned home after stints at Loughborough University (where she gained a BSc Sports Technology First Class) and 6 months playing professional football in Iceland for Keflavik Kvenna.*

**So Beth, how did you end up playing football in Iceland?**
Keflavik approached my club chairman with knowledge of me getting on the England squad and playing premiership football in England. I played for Everton Ladies team here in the UK, but women's professional football in the UK isn't that well supported or rewarded, so I leapt at the opportunity to play full-time.

**Do you still play, now you're back in the UK?**
Yes, at the moment I am balancing my job as Sales administrator with playing for Crewe Alexandra Ladies team.

**Is there anything you miss about Iceland?**
The hot dogs called 'pylsar' which the Icelandic's like to boast are the best in the world - and the friends I made over there.

**What do you love about being back in the UK?**
I love being back with all my family and friends as well as getting stuck into renovating my new house. I also love playing football with Crewe Alex and following my favourite team Bury FC.

**What are you looking forward to most about joining COPA-DATA UK?**
I'm looking forward to a new challenge and meeting new people, as well as extending the knowledge I have gained from my degree.
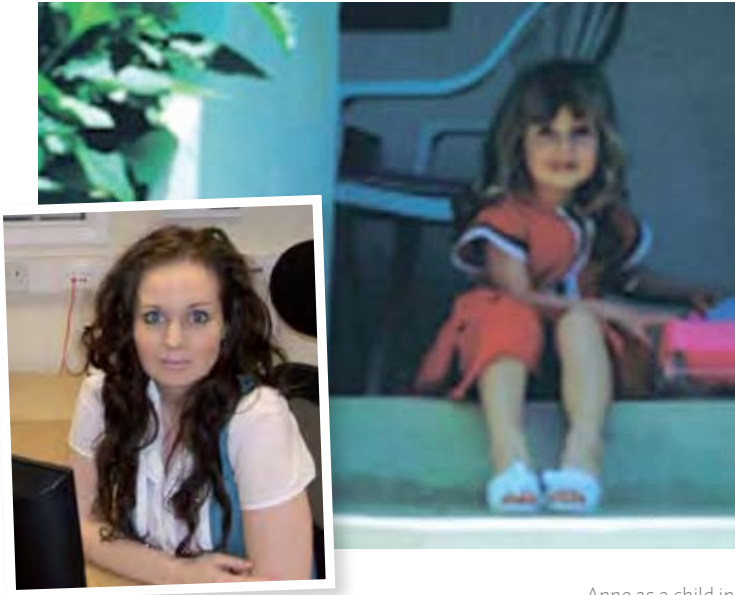
## ANNE FLETCHER

*Anne Fletcher has been managing COPA-DATA's local UK marketing activities since October 2008, including organising a very tasty Christmas Press Briefing at Le Pont de la Tour restaurant in London. Although born in South Africa, Anne is also an alumnus of Sandbach Girls High School – although she studied there four years later than Beth.*

**You completed your BTEC in Business Studies in 2007. What have you been doing since then?**
I worked in Retail and Insurance before joining COPA-DATA UK. At the moment, I'm also studying part-time at Warrington Business School to gain my CIM Professional Certificate in Marketing.

**Do you miss living in South Africa?**
I do miss having a pool in the back garden and the sea and the sunshine. Those things are in short supply in Cheshire! I also miss being able to see the elephants and giraffes and I miss the way monkeys used to sneak in to our lounge and steal the fruit from the fruit bowl!
We lived in various places across South Africa – in Kloof in Durban, in Johannesburg, and in Secunda, an Industrial Town in the High Velt. But my family left South Africa back in 1997, when I was just 9 years old, so I feel British really.

**What makes you feel more British than South African?**
Well, I'm a British citizen now. In fact, my family take the mickey out of me for my 'horrible' British accent! Plus, like most British women I am obsessed with shoe shopping!

**What do you love most about working for COPA-DATA UK?**
I like being able to learn while I'm working and the friendly atmosphere in the office. Perhaps the best thing is doing a job I enjoy – that is the best motivator to work hard.
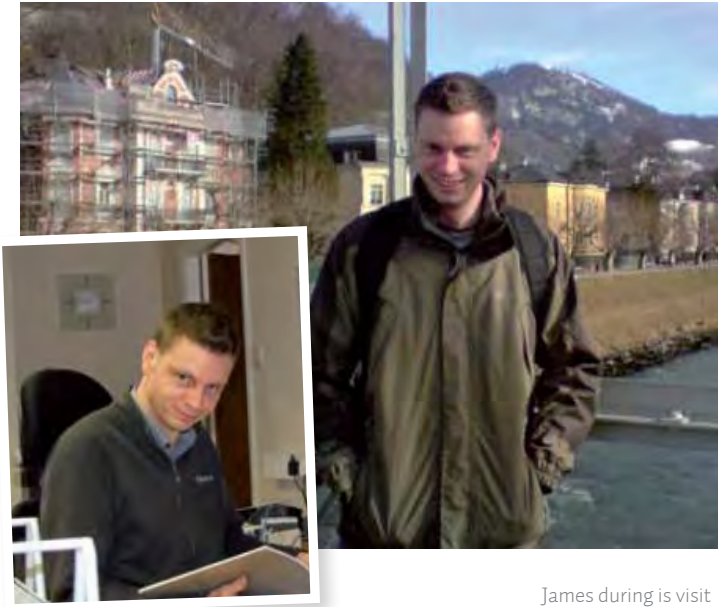
## JAMES ELLICOCK

*James Ellicock has just returned from COPA-DATA's Salzburg head office, where he spent a month shadowing members of the support team. He will be the main local contact for UK customers who have technical queries or wish to log support calls.*

**Did you enjoy your time in Salzburg?**
It is a beautiful city, very romantic, and a fantastic atmosphere. Its inhabitants are extremely friendly people – especially the team at COPA-DATA.
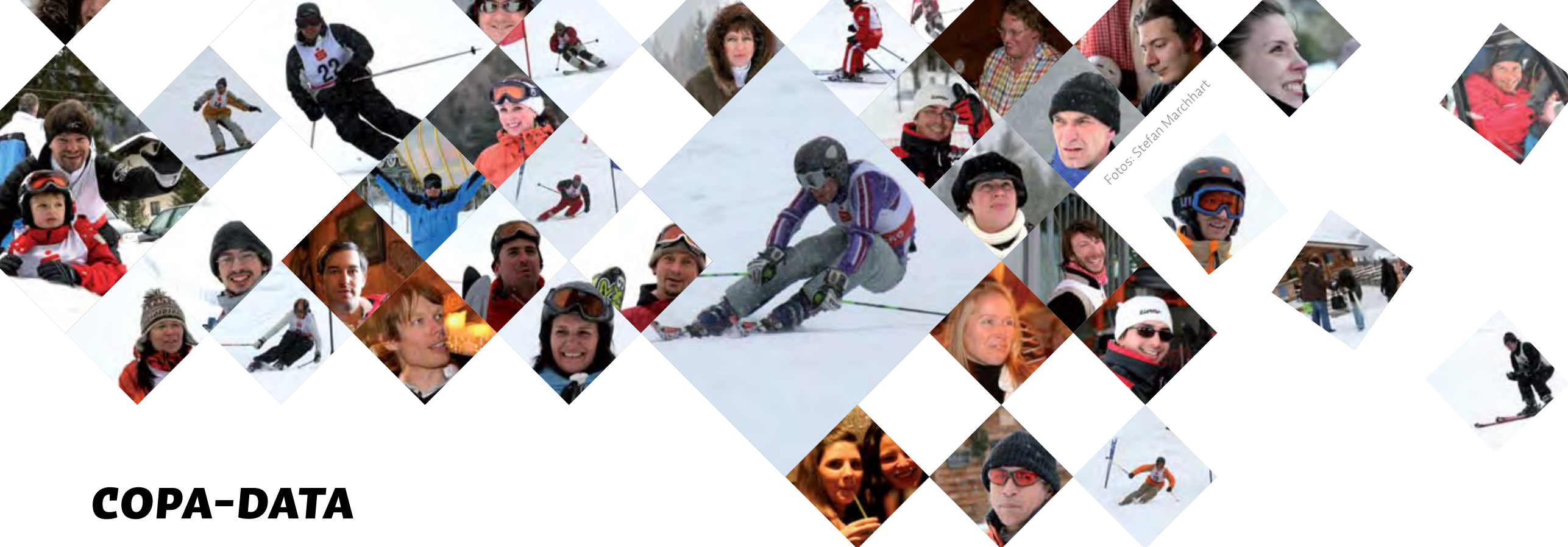
**What were you doing before you joined COPA-DATA?**
In 2000, I decided I wanted a career change, so I retrained in IT with a local training company. With that qualification, I secured a job as Field Service Engineer for a company that sold EPOS systems to a wide variety of retail outlets. After seven years experience of Field Support, I decided that I needed a fresh challenge and, luckily, found COPA-DATA UK, who were in the process of setting up a local UK support team.

**What do you like most about working for COPA-DATA UK?**
It is very challenging but extremely interesting and worthwhile. There is a great feel to the company. I get a lot of job satisfaction when I resolve customers' issues. I'd like to expand my knowledge of zenon, to become a more capable service Engineer, and then go on to help develop more flexible local training for our UK customers.

*David Brearley*

**CHILDREN'S CLASS**
1. Max Schrödel (COPA-DATA GERMANY)

**SNOWBOARD LADIES**
1. Monika Ziegler (COPA-DATA HEADQUARTERS)

**SKI LADIES**
1. Mirjam Riesemann (COPA-DATA HEADQUARTERS)
2. Ursula Piela (COPA-DATA HEADQUARTERS)
3. Sandra Dietl (COPA-DATA HEADQUARTERS)

**SNOWBOARD GENTS**
1. Markus Stangl (COPA-DATA HEADQUARTERS)
2. Hans-Peter Ziegler (COPA-DATA HEADQUARTERS)
3. Robert Ficker (COPA-DATA HEADQUARTERS)

**SKI GENTS – BIRTH YEAR 1973 AND OLDER**
1. Alexander Punzenberger (COPA-DATA HEADQUARTERS)
2. Jérome Follut (COPALP)
3. Wolfgang Moser (COPA-DATA HEADQUARTERS)

**SKI GENTS – BIRTH YEAR 1974-1978**
1. Jürgen Resch (COPA-DATA HEADQUARTERS)
2. Herbert Oberauer (COPA-DATA HEADQUARTERS)
3. Markus Helbok (COPA-DATA HEADQUARTERS)

**SKI GENTS – BIRTH YEAR 1979 AND YOUNGER**
1. Tobias Sedlmeier (COPA-DATA GERMANY)
2. Gerd Klier (COPA-DATA HEADQUARTERS)
3. Bernhard Feldbacher (COPA-DATA HEADQUARTERS)

# COPA-DATA
# Ski Challenge 2009

*From March 5th to 7th, COPA-DATA employees dressed warmly and headed into the mountains. They all went to the third COPA-DATA Ski Challenge, which took place in Filzmoos (Pongau) this year. The main attraction was a two-round giant slalom with a total of 20 gates – a challenge that was met by 37 winter sports fans. For the first time, there were international participants in the race, which fuelled the ambition of the skiers even further, as there was a national title to be won. This is a report about the winners and how they came to be.*

**FRIDAY, MARCH 6TH, 2009 – 8:00 A.M.**
While the competitors are still sleeping or eating breakfast, things are getting busy at the foot of the Papageno track in Filzmoos. Start numbers are being sorted, roll-ups are set up, gates are positioned and technical preparations are made. The first brave early risers get into their skiing boots, their faces contorted with pain, and take a doubtful look into the cloudy sky that seemed as if it could explode with heavy snowfall at any moment. Nevertheless: they pick up their start numbers and get on the slope.

**10:30 A.M.**
The slope is very rough and icy and so some of the racers decide to go back to the cabin for a while. After warming up again, they inspect the track. Everybody has put on their start numbers and the timers are ready. The spectators at the side of the slope are now watching eagerly, waiting for the start.

**11:00 A.M.**
The voice of race host Duncan Fletcher, CEO of COPA-DATA UK, sounds from the speakers: The first round can begin! The hearts of the racers are pounding and now Günther Haslauer, head of development, gives the starting signal. The crowd cheers whilst one after the other the racers plunge down the steep slope on skis, snowboards or even touring skis. By the third gate, the racers have lost all sense of safety and change to 'aggressive mode'. After all, Austria, Germany and France all have the same goal: the first place!

**12:00 NOON**
After the first round the racers return to the start full of enthusiasm. They all agree: everybody wants to improve their time from the first round. The strategy: more speed, tighter around the gates, low squat and full use of the ski's rails. After going through the goal with the crowd cheering, the pulse calms down again: the challenge is mastered; now all that is missing is a perfect time. But it is lunch time …

**01:00 P.M.**
Lunch at the beautiful Moosalm. Käsespätzle, Kaiserschmarren and some delicous Germknödel replenish the energy supplies and the racers return to the slope after this short, but great lunch break. The mountains are calling!

**04:00 P.M.**
Feet hurt, the sky is getting dark and the last cable car of the day leaves down the valley. The time has come to say goodbye to the powder snow, even for hardcore skiers and snowboarders. At the Unterhof hotel, a sauna, an indoor swimming pool and massages are waiting for the racers.

**07:30 P.M.**
After resting and refreshing themselves, the racers accept Thomas Punzenberger's invitation for dinner: a wonderful fondue has been prepared for the hungry and exhausted winter sport enthusiasts. Rumors are now flying thick and fast: Who was the fastest? During the dessert, the gaze of the racers starts wandering towards the cups and certificates that the winners will be awarded.

**09:00 P.M.**
After dinner, everybody is waiting for the event of the evening: the award ceremony. The organizers of the race, Mirjam Riesemann, Business Development Manager, and Jürgen Resch, Product Manager for straton at COPA-DATA, ask for everybody's attention. Lots of applause, raised glasses and happy faces – the winners are presented!

The COPA-DATA headquarters team won with the COPA-DATA Germany team second with a margin of 1:05:33. Therefore, the challenge cup goes to Salzburg! Let's see if one of the other teams manages to win it back next year …

In the name of all participants, I would like to thank Thomas Punzenberger, COPA-DATA CEO, for the invitation to this wonderful event. Thanks also to Jürgen Schrödel, COPA-DATA Germany CEO, for inviting us for lunch on the Moosalm. Many thanks also to the two organizers, Mirjam Riesemann and Jürgen Resch, who did a great job. Additionally, we would like to thank the Riesemann family and Mr. Nachlinger of the sports club SV Taching for managing the race – your support means a lot to us! Thanks also to Günther Haslauer, who did a great job dispatching all the racers onto the slope. And last but not least, a big thank you to all participants, who gave their best to make this an unforgettable event. We are looking forward to the COPA-DATA Ski Challenge 2010! ✍
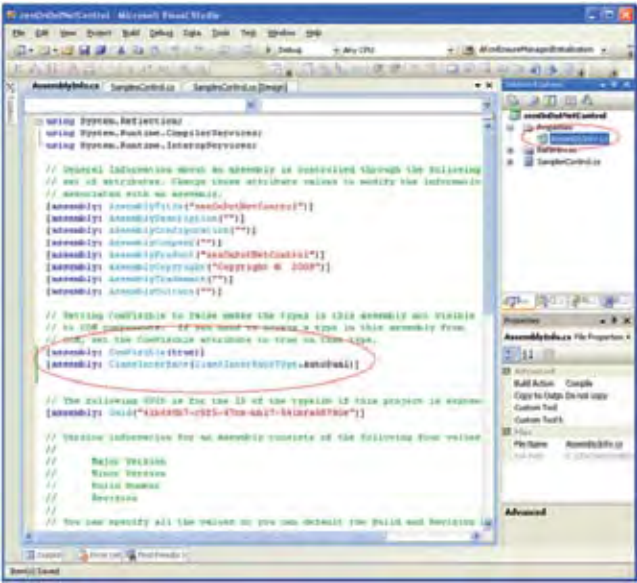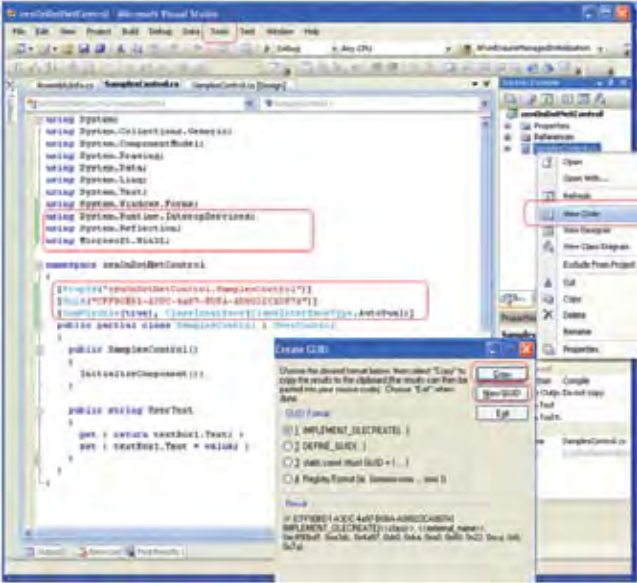*Julia Angerer*
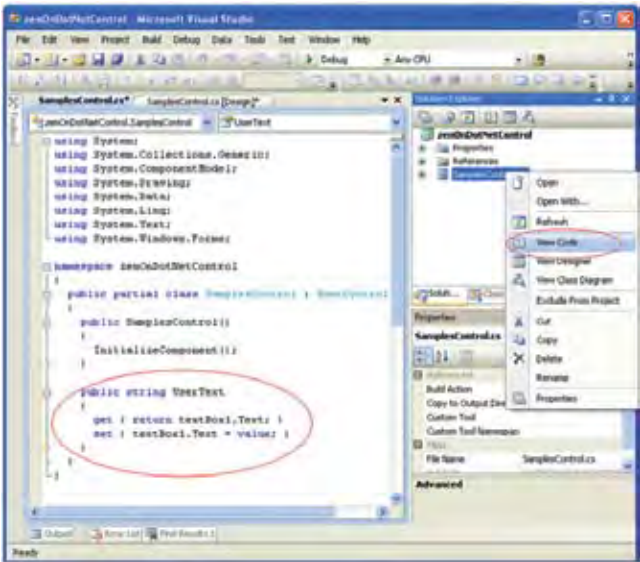
Screenshot STEP 1
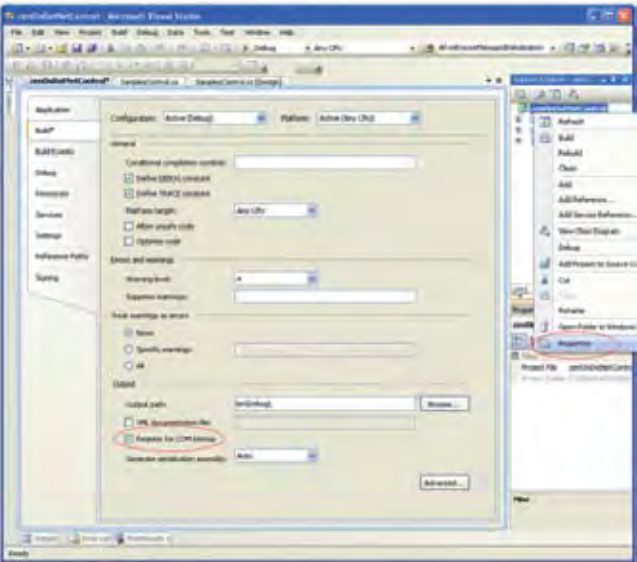


Screenshot STEP 2



Screenshot STEP 3



Screenshot STEP 4

# .NET Windows Form Controls in zenon   [PART 1]

*Microsoft recently released.NET framework 3.5, which does away with a large number of the "teething troubles" found in versions 1.0 and 2.0 of the framework and extends it with a huge amount of new classes. For example, it is now possible to reload the source codes of the framework by Microsoft during debugging. Therefore, .NET is now becoming more attractive for professional developers and more complex applications.*

On the other hand, there is not really a way around C++ and ATL/MFC when it comes to very large applications, especially when they need to be high performance and memory efficient. After all, Microsoft has not planned a change to .NET for Office and SQL Server yet. This means that – at least in the medium term – managed .NET applications and controls will have to coexist with unmanaged native applications and controls. This creates a new challenge of using .NET controls in native applications. Although this affects all existing native applications – not just zenon – we have decided to address this issue, because we consider it as very important and we keep receiving questions related to this.

This article is the first in a series of articles that will present different solutions that are mostly universal and can therefore be used for other similar requirements, as well. For the first two parts, we will gladly supply the sample source code and a more detailed description, if required. For the third and fourth part, we are planning to include the solution on our DVD.

### EXAMPLE 1
**The current situation:**
There is a native application on the one side, which is an ActiveX container (e.g. zenon).
On the other side, there is a control that we created in C#.
We need to integrate and use our control in the native application.

**The challenge:**
Basically, .NET controls created with the Visual Studio wizard are not ActiveX controls, so they cannot be used in a native applications working as an ActiveX container.
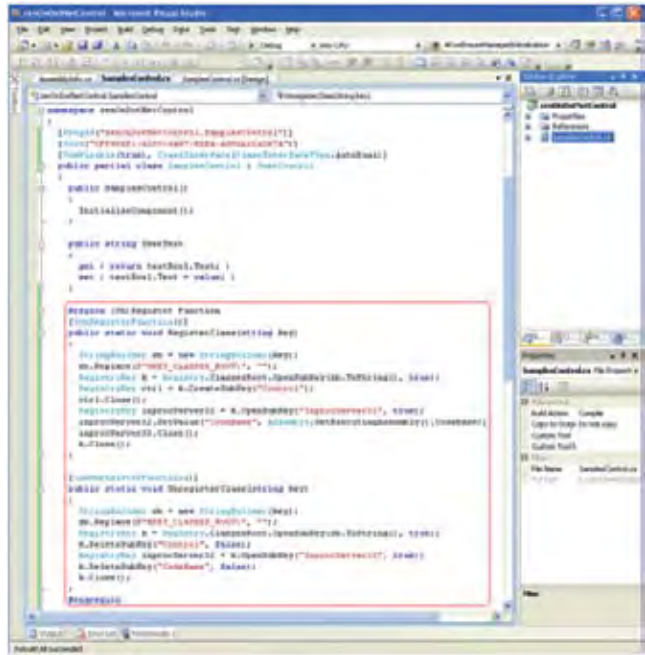
**The solution:**
According to us, the best solution for this kind of tasks – i.e. the insertion of a self-made .NET control into an ActiveX container – is to create a dual control. A dual control is a .NET control and an ActiveX control at the same time. This dual control is a managed control and created in .NET (in C# in this example); like every .NET control, it can be used in .NET applications and forms and also in ActiveX containers. Additionally, this dual control can use the extended interface functionality of zenon, e.g. to directly access zenon variables. Usually, ActiveX controls need to be customized for the use with zenon in order to make use of this advantage.

**And this is how it works …**
We start with a control created in the Visual Studio wizard, which contains no functions in addition to what we need for this example. If you want to upgrade an existing control to be a dual control, you can skip step 1.

### STEP 1
We create a new "Windows Form Control Library" project in Visual Studio. Then, we rename the control, e.g. "SamplesControl.cs". Of course, we can try and add a few elements in the control designer to get a feeling of what it looks like. We use a text box in this example.
As controls usually also have properties, we insert the externally visible property "UserText", which contains the text in the text box.
After compiling, our test control is ready for use in forms (do not forget to use "Choose items…" in the toolbox, so the control can be selected there).

Screenshot STEP 5



Screenshot STEP 6/1



Screenshot STEP 6/2

**STEP 2** To turn our .NET control into a dual control, we first have to activate the COM interface for ActiveX controls. Open the project properties and activate the option "Register for COM interop".

**STEP 3** Set the ComVisible attribute in the file "AssemblyInfo.cs" to "true" and add the ClassInterface attribute.
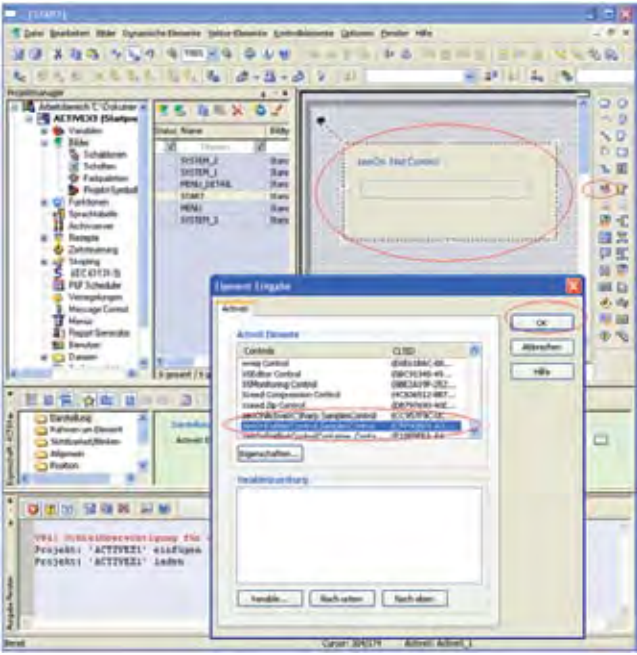
**STEP 4** Now we need to add the necessary information using entries and ActiveX attributes in the code designer. You can generate a unique GUID with the GUID generator tool (menu "Tools" > "Create GUID").

**STEP 5** To make sure the control can be selected as an ActiveX interface control, we need to insert the functions "RegisterClass" and "UnregisterClass". After this, the control can be registered in the Registry.

**STEP 6** After building, the dual control is ready for use as an ActiveX control. All you have to do now is copy the .dll file and the .tlb file to the target computer and register them with
"%windir%\Microsoft.NET\Framework\v2.0.50727\regasm.exe zenOnDotNetControl.dll /tlb:zenOnDotNetControl.tlb".
After this, you can insert the extended Windows form control as an ActiveX control in the zenon Editor.
Use the Init macro in the picture element to access all properties of the control during Runtime, as is the case for "normal" ActiveX controls.

The next article will deal with the implementation and use of zenon-specific interface functions in the ActiveX control. This allows you to use the complete object model of the zenon Runtime from within the .NET control and to insert variable values really easily. ✎ *Günther Haslauer*
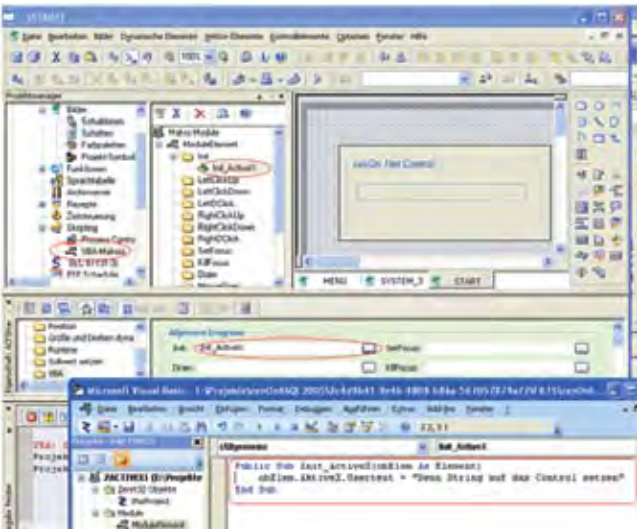
## COPA-DATA Service Agreements
# Customer benefits and a clear view!

*In November 2008, we responded to the request of many customers who wanted a legally binding document for COPA-DATA support by presenting the new service agreements. These were introduced and to the end of 2008, all customers were able to test the different versions of the agreements free of charge. Since January 1st, 2009, we provide support to our customers to their exact requirement according to their chosen service agreement. But it all started much earlier…*

**If you cannot find** an answer in the forum, our consulting team will provide you with clear responses and creative solutions – for as little as € 0,- . Every customer automatically gets the free Basic version of the service agreement with their zenon license. By opting for an Advanced or Premium service agreement, customers receive a number of advantages: this includes, for example, the (legally binding) guaranteed support by COPA-DATA within an a precisely defined time. The requests of customers with a service agreement will be prioritized before other requests and therefore processed and answered much quicker\*. Our customers can pass on this guarantee to their own customers, so they can rely on the timely solution of problems. These faster and better solutions provide companies with a sustainable competitive edge.

Customers with an Advanced or Premium agreement define particular contact persons in their company. This way, they build up know-how in their own business and profit from the fact that support matters are carried out between specialists, increasingly on a personal basis. This avoids the delay in the provision of solutions owing to "misunderstandings".

Investing in an extended service agreement is a professional way of securing the fast and skilled support for the successful implementation of projects, and their continued operation.

There are numerous advantages, including rebates for training sessions, Webinars, forums, sample projects or remote diagnosis. You can get a PDF file containing an exact list of all advantages from our website at the following link: www.copadata.com/sla

Advanced and Premium – the service agreements by COPA-DATA for real added value.

Both guarantee comprehensive support. The Premium agreement additionally guarantees customers an increased availability of our technical consultants – including callback – and always provides them with the most modern technology available.

As there are still some uncertainties regarding service agreements and their contents, I would like to address these misunderstandings here: The introduction of service agreements does *not* mean that customers without a service agreement will not be supported anymore. The

Basic service agreement is included in every zenon license. Customers now have the choice to select the exact level of service that they require. Of course, it also does *not* mean that you have to now pay for the rectification of software defects. Trouble shooting and bug fixing remain a free service and part of our core responsibility.

One of our customers asked us in an ironic voice, "What am I allowed to ask now?" Our clear answer was, "everything, of course". There are no limitations whatsoever. As usual, we will be available for all of your problems and questions – via telephone as well. As usual, we will reliably process your requests.

Our experience from the first quarter of this year has shown the clear advantages for customers and consultants: that concentrating on what is essential – i.e. the actual level of support required by the customer – leads to faster solutions.

By the way, customers without a service agreement also receive their answers on time. Although they do not get a guarantee of response time, we have an internal procedure that makes sure such requests are also handled in a timely matter. None of the requests will be lost and none of them will be left 'lying around in the system'.

Another side effect is that the freed resources can be used for further increasing our software quality. Therefore, all of our customers continue to profit from reliable and robust software products. ✎ *Wolfgang Moser*

*\*The automatic email informing you about the creation of a ticket is not regarded as a reply, of course. It is only to inform you about the ticket number.*

# Circular redundancy safeguards steel production:
# Ferriere Nord goes with zenon.

*As far as high-quality rolled steel is concerned, the steel producer Ferriere Nord SpA sets great store by dependable production processes, regulated safety and high availability in its plants. The company is a steel producer based in northern Italy, and it has carried out an ambitious project to create state of the art automation systems. For the purpose of process control the company opted for COPA-DATA and its zenon visualisation system. zenon's circular redundancy ensures that data is acquired continuously, thus ensuring reliable production.*

**The Pittini Group** has been part of the history of the steel industry in Italy for generations. The largest company in the Group, Ferriere Nord SpA, is based in Osoppo in northern Italy. It comprises an electric steel plant, a wire rolling mill, a rod rolling mill and production facilities for reinforcement steel meshes and grid fencing for the construction industry. All the steel products it produces are first-rate in terms of elasticity and safety standards. They are ideally suited to applications where high quality is a requirement, such as construction of roads and houses.

## CONVERTING SCRAP AND CAST IRON INTO HIGH-GRADE STEEL

The production of rolled steel is an extremely challenging process requiring large amounts of energy. Production plants must be controlled and monitored with great precision.

The raw material used is scrap metal. In combination with a number of other substances, whose role is to lower its melting point, the scrap is fed into the main furnace. A system of electrodes increases the melting point. Ladles are then used to move the metal to a second furnace, the refining furnace. This is where the refining processes take place, procedures for cleaning and refining the material through the addition of other metals. The ladles are then passed on for the actual production of rolled steel.

Ferriere Nord has resolved to thoroughly update its automation systems by 2011. This affects all the steps in the production process as well as the majority of components, from machinery right through to software. The anticipated total amount of investment comes to around € 800,000. The automation system has already been upgraded by RB Automazione, using technology from COPA-DATA.

## CIRCULAR REDUNDANCY SAFEGUARDING THE SYSTEM

The plant for producing rolled steel consists of three linked systems: the main furnace, the ladle furnace and the continuous casting machine. Each of these three systems is controlled by a server. Ferriere Nord's previous control system did not operate reliably enough. Furthermore, maintenance tasks carried out from a PC frequently resulted in lengthy downtime for the plant, and if the server failed, data would inevitably be lost.

The highest priority for managers on the technical side at Ferriere Nord was to significantly increase availability of the production plant. The aim was for the new system to make secure data available to users at all times without having to double the number of computers.

This was where zenon, with its circular redundancy, entered the frame. This SCADA system from COPA-DATA is based on client-server architecture, and is capable of networking servers using circular redundancy. Each computer doubles up as a stand-by for another computer. In this way only three PCs are needed to implement a secure system with circular redundancy.

"We were looking for a solution that would ensure that systems would be safeguarded in the event of failure and could guarantee uninterrupted data acquisition without increasing the number of components. zenon has enabled us to create a system based on circular redundancy between the servers that significantly reduces both the failure risk and maintenance costs", explains the electrical maintenance and automation manager from Ferriere Nord.

The network linking the three servers is especially fast, and has been reserved for data traffic between the servers. There is thus no risk of delays. This solution, implemented using zenon, controls a total of 16,000 tags: 8,000 for the main furnace, 4,000 for the ladle furnace and 4,000 for the continuous casting machine.

## CLIENT WITH DOUBLE MONITOR

There are eight zenon clients running with the three servers: 2 in the continuous casting machine, 2 in the area containing the ladle furnace, and 4 in the main furnace. One important strength of the new clients is their ability to work with two monitors: you can decide whether to show the same display or two different displays on the two monitors. This was an important factor for the management team: "This facility is very important to us as it enables us to visualise a larger quantity of information for each client at the same time. This makes our staff's work a great deal easier."

The data for visualisation originates from a number of field controllers. The continuous casting machine incorporates one S5 135 Sinec H1, six S7 400 RFC1006 TCP-IP, six C7 with Echolink and one S7 300 RFC1006 TCP-IP. The ladle furnace has two S5 135 Sinec H1s. The main furnace, on

the other hand, has two S5 135 Sinec H1s, three S7 300 RFC1006 TCP-IP and one S7 400 RFC1006 TCP-IP.

Since zenon supports communication based on the TCP-IP protocol, the automation project can be updated very easily, and it is also straightforward to link the servers, clients and PLCs together.

## SIMPLIFIED MAINTENANCE

With zenon's redundant architecture, each server controls its own section whilst at the same time acting as a backup server for another section. This configuration ensures that in the event that one server fails, another one will take over its functions. As a result, costly interruptions to the process are avoided.

System maintenance is also simplified: "If you have restored the functionality of the faulty server, or have replaced that server", explains Roger Bogna, owner of the system integration firm RB Automazione, "the machine can be quickly reintegrated into the circular redundancy, and the clients can resume communication with their main server."

The fact that the TCP/IP protocol is supported represents another advantage in terms of system maintenance. "With zenon it is possible to transfer project changes direct from the development site to the runtime server using the TCP/IP protocol. The data – which is constantly synchronised between the servers – is updated and automatically forwarded to the clients". This enables the project to be controlled remotely: the

system integrator, RB Automazione, can access the system using a remote computer and make changes to the program online via an internet connection. The customer thus saves both time and expense.

Roger Bogna is also happy with the technical support provided by the experts from COPA-DATA: "The technical support, which COPA-DATA guaranteed they would provide, was outstanding. From our point of view as the system integrator, support is vitally important".

Improving performance and flexibility in the visualisation module. "With the old system we had a problem with visualising the trends from one of the two furnaces in real time because the data simply took too long to capture and process. zenon, on the other hand, works very fast. Thanks also to the fact that data is updated at a high frequency, it can deliver the trends we want in real time", explain Ferriere Nord's managers happily.

Users can also choose exactly which variables are to be displayed. They can add any variables they like, they can exclude others, and they can change the colours, etc. As soon as the visualisation mode has been defined that best corresponds to the specific requirements, it can be saved in a profile and retrieved at any time with a simple mouse click.

In many different situations zenon exhibits excellent flexibility, even when working with historical data. In this case, zenon's Extended Trend facility proves especially useful. This allows historical data to be managed in the form of a table using the report generator.
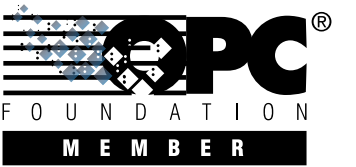
About standards and independence:

# OPC UA and the philosophy of "do it your way"

*There are over 300 communication protocols in zenon — a number that we are proud of. However, some of our competitors that are significantly less communicative may ask, "What about standards? And you use so much of your energy for your own developments!"*
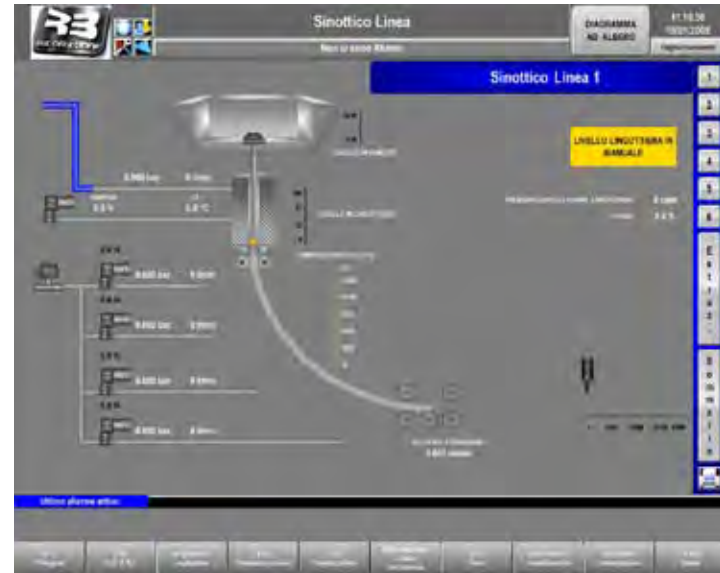
## PRECISE CONTROL OVER ENERGY

Energy charges represent an important cost factor in a production plant. The ability to control energy consumption accurately is therefore of key importance. zenon provides a module for controlling energy consumption in the shape of its Energy Management System (EMS). This module monitors consumption in real time and predicts the trend for the next 15 to 30 minutes.

Contracts with grid operators define specific windows for consumption, and it can become costly if consumption fails to be kept within these windows. EMS enables a strategy to be designed and implemented to manage the use of energy and to prevent the agreed supply from being exceeded. This system is valued particularly where production is organised in so-called production islands and where the sequence of frequency-dependent load shedding can be programmed. In this way blackouts can be avoided, and the most important machines in the plants will continue to operate.

However, it is not always ideal or even possible to program load shedding or the shutdown of an entire production section, which is very advantageous to companies like Ferriere Nord: "In our case, load shedding and the associated shutdown of the plant would prove very costly. Our preferred approach was to renegotiate the tariffs with the grid operator. We are now no longer obliged to remain within a specific consumption window, but instead merely to maintain a certain balance to our consumption throughout the day. Even so, we still find it very useful to keep our consumption under control at all times."

## TARGET ACHIEVED

Ferriere Nord has achieved the targets it set itself in terms of reliable plant management: increased reliability, data security and continuous operation even in the event of server failure. zenon ticks boxes with its circular redundancy, data backup, less time-consuming maintenance schedule, simultaneous display of two screens for each client, flexible trend configuration and smooth transition from Windows NT to Windows XP. zenon performed superbly both in terms of accuracy and speed: "Redundancy has been implemented quickly and easily, and the configured system works extremely reliably." ✎ *Klaus Rebecchi*

**The answer is simple:** standards are a valuable basis for creating user benefits. Our driver specialists make sure that zenon not only conforms to these standards, but they also make optimum use of them. Let's look at OPC UA for example; as usual COPA-DATA is one of the first to support this recent standard.

Developing our own drivers allows us to give our customers the freedom to decide. We do not limit the choice of the hardware or the platform they use. We do not prescribe what is important for their automation systems. zenon users make these decisions and we supply them with the necessary tools. Of course, it would be easier for us to offer only a few communication protocols and label them as "The Standard" and therefore as the only available option. We prefer to address all communication methods, as long as they help you reach your particular goal.

In practice, this means the large number of additional protocols give users the freedom to go their own chosen way. If you require a certain driver, you will get it. Standards such as OPC, IEC or SNMP and popular protocols like Modbus are the supporting pillars of zenon and therefore, they are implemented with particular care. OPC is a standard interface with zenon by default.

## OPC UA

OPC UA stands for OPC Unified Architecture. The real-time zenon OPC UA driver is based on the official stack of the OPC foundation, which was recently published. It can communicate spontaneously with several OPC UA servers and read variables directly from the servers. It is available for all current Windows PC platforms, from Windows 2000 and XP to Vista, Server 2003 and Server 2008.

The address of the discovery server is usually the only thing required for configuration. The server then provides all further data. When the driver is initialized for the first time, zenon automatically creates a certificate authority (CA) and the client key pair. During online operation, variables can be imported in a very convenient way, either directly from the server or from a CSV file.

We have supplied our customers with OPC UA as fast as possible; at the same time, we have ensured that it is thoroughly quality tested. The fact that the time-to-market of the OPC UA drivers was really short in spite of extensive quality tests demonstrates how skilled and well-trained our driver developers are. Their constant dealing with standards and sometimes exotic protocols gives our developers a good overview, comprehensive insight and increases their design and implementation skills; all to the benefit of our customers.

In-house developments are not a contradiction to standards, rather they increase our skills and provide higher levels of independence. ✎ *Markus Stangl*

Fast reactions.

GROWING STRONGER THROUGH CHALLENGES.

# straton delivers IEC 61850 and GOOSE to the substation

*In the last issue of IU, I wrote about straton's capability of communicating via IEC 61850 and IEC 60870. We took a close look at these two protocols and at the excellent teamwork of zenon and straton.*
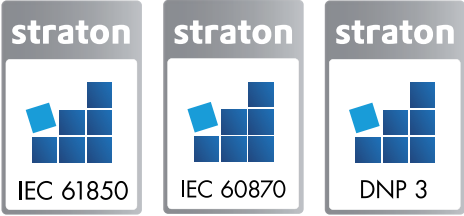
**In this issue,** we will continue with this topic and take a look at the use of these protocols in "real life".

Modern substations (transformer stations) of energy suppliers are used for transforming the electric power from high voltage overland lines to medium-voltage lines. These substations are spread all around the country and are connected to the load dispatching center via remote communication.

In a substation, all incoming and outgoing lines are connected to a bus bar. These inputs are called line bays. One or more transformers are connected to these bus bars, transforming the electric power from high voltage to medium voltage. These connections are called transformer bays.

Electric power at medium voltage is delivered to the immediate vi-cinity of end-users (transformer houses, pole-mounted transformers), where it is again transformed to the low-voltage supply that we all know (for example 230V). Both line bays and the transformer bays are connect-ed to the bus bar. Every bay is monitored and controlled by several devic-es, monitoring the electric current or the position of the switches, for ex-ample. These switches can be set to switch line bays or transformer bays on and off. The control units are usually called IED (Intelligent Electronic Device). In particu-lar, they are called BCU (Bay Control Unit) and BMU (Bay Metering Unit). BCUs and BMUs are devic-

es with or without a user interface and with physical inputs and outputs. The inputs and outputs are used to monitor the switch positions of the primary switching devices (circuit breaker, power switch) and to measure the values of the current transformers / voltage transformers. Addition-ally, they can be used to send commands for controlling the switching devices.

The superordinated control system is usually a local redundant SCA-DA system (station computer) such as zenon. This is where all values and messages from the devices in the bays are received, displayed and passed on to the load dispatcher via IEC 60870-101 (see IU 16).

The bay units and the station computer communicate via the IEC 61850 protocol, with the bay units acting as the IEC 61850 server and the station computer acting as the IEC 61850 client. The GOOSE (Generic Ob-ject Oriented Substation Events) protocol is used for the communication between the bay units, which must be very fast. This is called "interbay communication" when referring to such connections. Interbay commu-nication is about the transmission of status changes in the switching devices (e.g. switch position on/off). Such information is important for other bay units, because it may lead to interlocking conditions.

As the bay units also need to calculate interlocking implications in addition to normal communication activities (IEC 68150 server and GOOSE), the obvious thing to do is to handle this using PLC function-ality. This is why straton is the perfect software for a bay unit. straton understands both IEC 68150 and GOOSE – and the calculation of logical operations is one of its basic strengths.

The IEC 68150 client running on the station computer can be operat-ed by both COPA-DATA systems. zenon and straton both speak the right language for this. zenon, for example, is recommended for the record-ing and archiving of buffered reports. Buffered reports are spontaneous values that were not transmitted in the event of a communication failure and are sent to client after communication is re-established. straton is the better choice if values must first be pre-processed by the server and then passed on to zenon. In any case, both IEC 68150 clients can be used in a redundant system.

Each of the two systems – zenon and straton – is perfectly prepared for the automation of substations. The combination of the two systems, however, is an especially powerful and unique solution for this critical application. ✍ *Jürgen Resch*

| straton | straton | straton |
|---------|---------|---------|
| IEC 61850 | IEC 60870 | DNP 3 |

## COPA-DATA SUBSIDIARY COPALP HAS BECOME A VOTING MEMBER AT PLCOPEN

**Standards create efficiency** and independence from proprietary re-quirements. PLCopen is an important organization in the area of in-dustrial control technology, developing standards that are independent of manufacturers and products. These standards aim at increasing the efficiency of application development and lowering maintenance and training costs.

The work of PLCopen and its different working groups ensures the distribution and application of international standards. One of its core activities concerns the IEC 61131-3 standard, the only global standard for industrial PLC programming.

As a member, COPALP can contribute to increasing the acceptance of the IEC 61131-3 standard, which is also implemented in the straton Workbench. At the same time, COPALP stays informed about all mat-ters regarding control technology standardization, keeping straton fully compliant.

The next step for COPALP will be to apply for the certification of the straton Workbench by PLCopen. ✍

## STRATON SETS NEW TRENDS SOFTPLC WINS AWARD BY SPS MAGAZINE

**Every year, the** leading automation magazine "SPS Magazin" awards the most remarkable solutions in the automation industry, in cooperation with its readers. straton is one of the top 100 products of for 2008/09.

The readers of "SPS Magazin" select 100 products from all presented product introductions that are particularly innovative or user-friendly and either follow a current trend in a special way or set a new trend.

straton is currently the most flexible IEC-61131-3 environment on the market and therefore received an award as a top product. The visual-ization solution zenon and the IEC 61131-3 programming tool straton are integrated in such a tight way that the engineering of SCADA and PLC applications is significantly improved and quicker. That is why the com-bination of zenon and the integrated softPLC straton is perfect, as a data concentrator for condition monitoring.

Jürgen Schrödel, Managing Director of COPA-DATA Germany ex-plains, "We are very happy about this quality seal of SPS Magazin and we are proud of the fact that renowned experts have underlined the sig-nificance of straton in the market." ✍
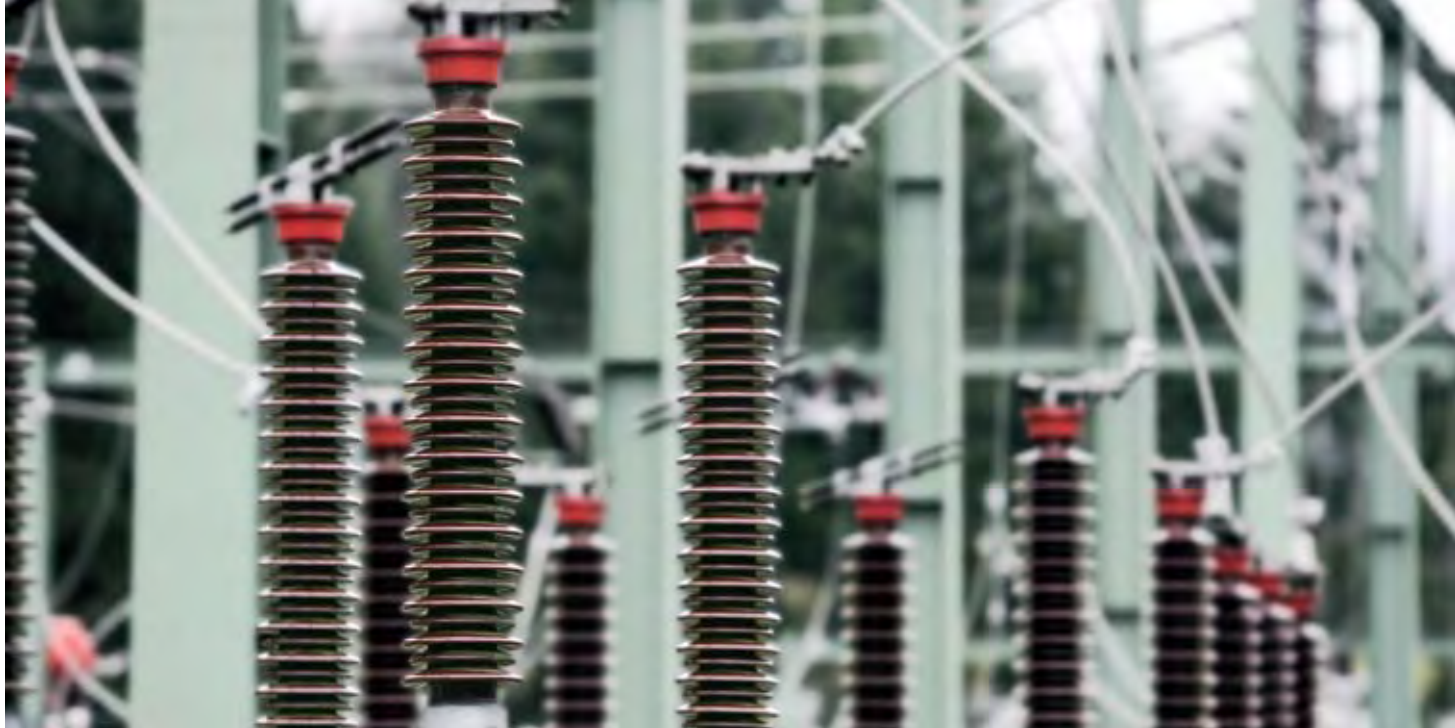
# Energy – the most important factor for optimizing production costs

*When it comes to optimizing production processes, many things are usually considered: material, sequence, throughput, timing and the optimum synchronization of single steps. These considerations then turn into potential for optimization, or, to put it differently, potential for cost reduction. However, most of the time, one important and costly factor is omitted: energy consumption!*

**Nearly every industrial** production company can save significant costs in this regard, provided they have an intelligent energy management system that allows for the complete transparency of all energy consumption in the company. Such a system can optimize the energy usage of the whole company – thereby reducing production costs.

One thing is for sure: in recent years, the industrial energy demand has continued to rise, despite efforts to save energy.

Most European countries are still able to meet this energy demand, but it is predicted that the available capacity will not be enough in the medium term unless the energy demand is expanded. Therefore, production and industrial companies are well advised to take a closer look at their energy consumption as costs are almost certain to rise. For example, most companies are using directly connected electric motors that are either not suitable for their purpose or oversized. Other power demands include compressed air, lighting systems, IT and communication technology. Experts state that up to 40% of industrial power consumption could be saved with technical solutions that are already available – a saving that goes directly to 'bottom line profitability'.

Modern companies therefore focus on using energy-saving products, identifying reduction opportunities and thinking actively about energy management for their production processes.

## HOW DO ENERGY PROVIDERS CALCULATE THEIR COST OF POWER?

Energy providers are constantly calculating average power demand, based on a sample rate of 15 or – much less frequently – 30 minutes. This results in 96 average values per day and 2880 per month (with 30 days). In most cases, the monthly maximum – the monthly chargeable demand – often called peak demand is used for calculating the charges. Before the deregulation of the energy market, some energy providers calculated their charges on an annual basis, using the average of the three highest monthly values. This calculation of charges on an annual basis is however becoming less typical.

The liberalization of the energy market resulted in a number of new tariff models, in which the demanded power plays a much bigger role. Reducing the chargeable demand now no longer affects only the contingency costs. It also increases the so-called annual load utilization period (ratio of annual kilowatt hours to annual peak demand), which may result in cheaper tariffs (and also the cost per kilowatt hour).

So-called net demand forecast based on individually created load forecasts helps to increase the reliability of planning by energy suppliers. If the customer sticks to these load profiles, the energy supplier will reward the customer with lower-priced tariffs. However, this can only be achieved by using intelligent load management systems. Any deviations from these load forecasts will be penalized with higher costs for the additional required energy.

This is where we asked ourselves: how can an intelligent SCADA system address these issues? The answer is obvious: all relevant process data (including energy) is brought together in the control system. It is analyzed and the results (consisting of switching actions) are returned to the process. Based on this concept, we developed a new zenon module that supports the user in monitoring supply threshold limits: the zenon Energy Management System (EMS) was born.

The zenon EMS offers two main functions:
a) Forecasting the expected consumption
b) Optimizing consumption during the course of the charge period
The goal of both forecast and optimization is to avoid exceeding the contractually defined consumption limit – the planned and therefore contractual consumption during a particular period is by all means possible. Additionally, the energy consumption should stay to just below the set limit in order to utilise as much energy as possible, assuming that the energy is required, at the best cost.
The consumption optimization is performed by way of a short-term trend calculation. The measured values that were gathered during the processing interval (typically 30, 60 or 180 seconds) are used to perform a trend analysis. The calculated trend is then projected to the end of the period, thus the potential for exceeding demand can be forecast in real-time.

*So-called net demand forecast based on individually created load forecasts helps to increase the reliability of planning by energy suppliers.*

The advantages of such a system for the user are obvious:
a) adherence to contractually defined limits; no extra costs due to demand violations
b) full cost transparency
c) dynamic adjustment to changing business situations (summer, winter, different batch types)
d) perfect basis for negotiating with energy suppliers – you have the detail that they need

The zenon EMS is the perfect tool for optimizing energy consumption and increasing system security. SCADA and EMS use the same database. Therefore, every switching action and every device status change has immediate effect in both systems. You can find out more about the basics of EMS in the white paper "The successful and efficient management of power generation and energy importation: zenon Energy Management System (EMS)", which you can download here: www.copadata.com/ems.
↪ *Reinhard Mayr*

# FAQs

*Which ports does zenon use? How can I get rid of a constantly growing file? And: How can I send SMS messages with zenon? We are going to answer the questions that are on top of the list of the consulting team right here. You can find many other answers in our online forum.*

**Which ports are used by zenon and which ports do I have to configure in my Firewall so that zenon will work properly?**

The following ports are used by zenon and straton and must be unlocked in your firewall:

| | |
|---|---|
| stratonrt[k].exe: | 1200-1210; 4500-4510; 7000-7010; |
| | 9000-9010 (default setting) |
| zennetsrv: | 1100 |
| zensyssrv: | 1101 |
| zenWebSrv: | 1102 |
| zendbsrv: | 1103 |
| zenAdminsrv: | 50777 |
| zenvnc: | 5600; 5610 |

Sometimes, another application may use one of the above ports. That is why these TCP ports will be reserved in the registry during the installation of zenon (version 6.22 SP1 and above).

**How can I find out which process is using which port?**

There are two methods for this: Either with operating system tools such as the task manager, the command prompt or with a port scanner.
When using the task manager and the command prompt, do the following:
▸ Open the process view in the task manager. Click on "Select columns…" in the "View" menu and activate "PID". The running processes will then be displayed with their process ID (PID), name and description.
▸ Find out the process ID (PID) of the zenon processes:
zenSysSrv, ZENONE32, zenDBSrv, zenAdminSrv, zenvnc, stratonrt and zenrt.
Attention: you must start the processes zenvnc, stratonrt and zenrt first. Additionally, find out the PID of the processes sqlwriter, sqlservr and sqlbrowser, which are important for the SQL database. The SQL processes are required (among other things) for the connection to the zenon SQL instance to work properly.
▸ After finding out the PID of the zenon and SQL processes, open the command prompt and enter the command "netstat -n -o -a". You will then see a list of all currently used TCP and UDP ports.

The column "local address" contains the port number. The column "status" shows whether the port is currently in use or whether a "listener" is monitoring this port and waiting for a connection. The column "PID" shows the process ID of the process using this port. Compare this PID with the PID from the task manager to find out the ports being used by the zenon processes.
You can also use special port scanners like Currports http://www.nirsoft.net/utils/cports.html .
Now make sure that these ports are not blocked by your firewall.
You can unlock programs and ports in the Windows Firewall via the Control Panel/Windows Firewall/Exceptions by selecting "Add program…" or "Add port…".  ↪ *Alexander Reisinger*

**The file Project_Log.ldf in the zenon SQL folder has reached a size of several gigabytes and is still growing! What is this file for? Can I delete it?**

The zenon Editor stores certain data (e.g. variables, data types, functions, etc.) in an SQL database. zenon version 6.21 and above use Microsoft SQL Server 2005 Express Edition®, whilst previous zenon 6.xx versions use MSDE 2000®. Every change to the project database (Project_Data.mdf) is automatically recorded in its entirety in the according SQL log file (Project_Log.ldf).
Attention: If you delete this file, you will not be able to read the project database anymore. The zenon project will be lost!

Internal tests at COPA-DATA and customer reports has showed: This problem affects SQL files of Microsoft SQL Server 2005 Express Edition. This is the file that grows continuously, even if you do not work in the Editor – and even if the Editor is closed! Despite intense consultation with Microsoft SQL specialists, we have not managed to discover the cause for this.

***Solution:***
The size of an SQL log file is determined by the recovery model of the SQL database, which is set to "full" by default. As zenon projects are secured by a separate backup mechanism, COPA-DATA has decided to set the recovery model to "simple" in zenon version 6.22 SP1 and above.

This means: In zenon 6.22 SP1, the recovery model is set to "simple" and the log file is reduced to its minimum size of 1024 kB:
▸ when a new project is created
▸ when a project is converted
  (from an older version to 6.22 SP1 and above)
▸ when a project backup is loaded

For zenon versions 6.21 or 6.22 SP0, you can use the tool "DB_Maintenance" developed by COPA-DATA to manually reduce the size of the SQL log files and set the recovery model to "simple". You can download this tool in the COPA-DATA forum at the following address: http://www.copadata.com/forums.  ↪ *Herbert Oberauer*

**Where and how do I configure the GSM modem in the Message Control module in order to send SMS?**

The SMS service in the Message Control module is configured in the Editor and requires an installed driver for the employed GSM modem. Open the settings for GSM/SMS in the properties of Message Control module to create a symbol called "message master (SMS SDK GSM/PC)" in the Windows task bar.

Every time the GSM/SMS configuration is used, another instance of the program will be started and another symbol will be added to the toolbar. If you try to configure the interface for the Message Control module here, you may receive an error message. To avoid this, make sure that there is only one such symbol in the task bar at any time!

Configure the service via the context menu of the task bar symbol (right-click).

Check the following settings:
▸ General tab: Activate outbox and inbox spooler
▸ Ports tab: The configured transmission rate must match the rate of the installed modem (standard = 56000 bps)
▸ Service tab: Enter the correct provider numbers
↪ *João Gomes da Cruz*

# SERIES "EFFICIENT ENGINEERING".

*Part 2: Object-oriented parameterization.*

*In the last issue of IU, you learned about our philosophy of parameterization and about the „global/central instead of local" principle. This time we will talk about the topic „object-oriented parameterization". You will see that this is not just an empty phrase but a philosophy that will help you save a lot of time when creating and managing variables. Even if you have never heard of object-orientation, you will quickly understand the significant advantages of this concept and maybe you will put it to use in your next project.*

**Let us think** of the most important statements from the last issue:

In the beginning, there was the zenon philosophy: parameterizing instead of programming. We are convinced that, with this concept, our customers are more successful and efficient in all phases of the project lifecycle. Projects are created much faster, they are easier to commission and finally, even maintenance becomes a breeze, even after years of operation. These are attractive advantages.

The practical part of the first article dealt with "global and central" instead of "local". Global, i.e. project-spanning settings, as well as central settings allow you to change things really quickly. This allows you to change the design and behavior of complete projects with only a few mouse clicks. No more tedious searching and replacing. We will come across this central approach more than once in this part.

But now, we will talk about today's topic in detail: "object-oriented parameterization". This description refers to zenon variable management. How can you easily and efficiently create and manage a lot of variables? You will get to know different data types and learn from a practical example how much you can profit from zenon's object-oriented structure.

**VARIABLES IN ZENON**

Firstly, we have to take a closer look at variables. Every variable in zenon is based on two things: a driver and a data type. The driver, however, is not connected directly, but via a driver object type. This driver object type defines the area of the PLC that will be addressed.

There are many different driver object types, e.g. standard PLC markers, data blocks, inputs, outputs, counters, etc. – and also special types such as alarm or driver variables. I want to take a particular look at driver vari-

ables, because users do not use them often enough – even though they can be very useful. Driver variables are offered by every driver. They do not communicate with the PLC but read out an internal memory area of the driver. This area contains mainly statistical information. But you can also control special functions like telephone numbers for modem connections or dial/hang-up commands with variables in this area. The online help file contains an exact definition of the driver variables. A dBase file with the most important driver variables is included on the zenon installation CD. You can use it for the simple and efficient import of these variables into every driver instead of creating them manually.

Back to the driver object type: It defines the granularity of the driver in a memory area. If that is all Greek to you, here is a short explanation: granularity matters when using numerically addressing PLCs like Siemens SIMATIC S7 – as opposed to symbolically addressing PLCs like straton. Not every PLC has the same resolution and not every area in a PLC has the same resolution. E.g. the data block area of a Siemens S5 PLC is word-oriented, whereas its marker area is byte-oriented.

This means that the smallest unit that can be addressed is one byte or word. Now if you want to write a bit into such an area, you have to read at least a whole byte/word, mask the desired bit, change it, and then write the whole byte/word back to the PLC. The same information is required when addressing the areas, called offset. You start with zero and go on counting in byte/word steps.

If you use automatic addressing in zenon, granularity will automatically be considered. So, granularity does not depend on the driver but on the driver object type.

But now back to the actual topic. The driv-

er object types determine the area in the PLC and the granularity. But they also bring along another property: they define the data types that can be created in the memory area, e.g. not every area allows you to create a String or a WString (Unicode String). That is why you always have to select the driver first, then the driver object type and finally the data type when creating variables.

**DATA TYPES**

Data types are the heart of object-oriented parameterization. As you cannot change anything at the driver object types, they do not matter for object-orientation. Therefore, we will have a closer look at data types. There are three different kinds of data types: simple data types, structure data types and structure elements. Let us start with simple data types. They always constitute IEC data types. An IEC data types is one of the data types defined by the IEC in the 61131-3 standard, like BOOL, INT, USINT, UDINT, STRING, WSTRING, etc. They define the size of an area with BOOL: 1 Bit, INT: 16 Bit signed, UINT: 16 Bit unsigned etc.

If you take a closer look at the data types in zenon, you will see that you can change even more settings than the ones defined in the IEC data type. You will see that the properties have the same names as the properties of the variables: you can define an ID, a unit, a value area and even limits. But what is the sense of having everything twice?

The reason is easy to explain: Just as a dynamic element takes over the font type and size from the linked font, the variable also takes over the value calculation, the unit and the limits from the data type it is based on. We can see that the central approach has been strictly applied here.

But we took it one step further.

## OBJECT-ORIENTATION

As opposed to the linking of dynamic elements and fonts, we are dealing with an object-oriented approach here: The variable inherits its properties from the data type object. But where is the difference? Or, to put it differently: what does object-orientation mean?

Easy to explain: the linked/derived properties of the variable can be separated / overwritten. This works for every single property, but also for all properties at once. This means you can take over the unit from the data type centrally, yet overwrite the identification or the address directly at the variable.

### How does that work?

Quite simple: Just change the desired value at the variable and the link will be separated – or as the developers would put it: the property is overwritten at the variable. You can also see that directly at the property. The little check mark, which you can see next to many properties, has disappeared. Properties that do not have a check mark next to them from the start, are not derived from the data type and cannot be further derived - e.g. the variable name.

You can use further functions via the context menu:
▸ Link property with data type: if you have separated the link, you can re-establish it.
▸ Separate property: you can separate a single property without having to change the value. If you change the value of the data type later on, the variable will not be modified by this. This allows you to define exactly where the inheritance concept should be applied.

A useful option: you can also link or separate all properties from the data type with one mouse click. This allows you to switch to and from the original state (with everything inherited) really quickly. What is the benefit of this as a user?

Increased flexibility: If you have many variables with the same limit, e.g. an alarm for TRUE, you can simply make this setting at the data type. The actual limit can then be set for every variable separately.

You no longer have to create and update the limit for every single variable, which will dras-

tically increase your engineering efficiency. By the way, the standard BOOL data type already has predefined limits at 0 and 1!

Now you may say: "I do not want a limit for every BOOL variable. Do I have to edit every variable and switch of the limit again?" No, you don't!

Simply make use of the functions offered by zenon and create your own BOOL data type. Just leave the standard data type as it is and click on <Datatype new>. You will then see the list with the already existing data types. Select the standard BOOL data type and create a new one, for example MyBool. All properties of the new data type will be taken over from the old one – another useful function offered by zenon.

Delete the limits of MyBool. Use this new data type MyBool to create all BOOL variables that are not supposed to have limits – this removes all unwanted limits. The other limits, which you do want to stay, will remain untouched. This saves you a lot of time.

Of course you can also create more of your own BOOL data types - one for every case you need. All variables that require the same settings for most of their properties get their own data type. If one of the properties changes, you can perform the changes centrally and all derived variables will automatically be updated – except the ones whose links you separated.

### Now we should also talk about the advanced data types:

Structure data types and structure elements What exactly is a structure data type? A group of data types whose sequence and arrangement is exactly defined. For example, a structure "Motor" consisting of the elements "Actual speed" and "Power input".

A structure can also be nested. This means you can also create a structure within a structure. You can have any number of hierarchy levels.

**Your advantage**: you can build up your variable pool exactly as it exists in the PLC or in reality.

Let us look at a pump, for example: It consists of two motors: Every motor has a few variables like "Actual speed", "Power input", "Output" etc. Every motor also has a regula-

tor, adding the data points "Target speed", "P-contribution" and "I-contribution".

### We can model this constellation as follows:

First, create a structure data type. A structure is actually just a shell that bears the name of the structure but does not have any properties of its own. There will be properties only after adding structure elements to the structure data type. You can choose whether you want to use a linked structure data type or one of your own.

### A short explanation of the difference:

The linked data type is a reference to an already existing data type. This means you take over all properties from that data type into your structure, except the name. The advantage is obvious. If your structure element has many properties of an already existing data type, you can simply reuse that data type, again applying the central approach. Of course, you can still change each of the variable properties or separate them from the data type.

If you want to make sure that the data type is only used for this structure so that you can make addressing settings, choose your own embedded data type. This creates a new data type that can only be used within this structure.

### Back to our example:

Create a structure "Regulator" from one data type for the "Target speed", another one for the "P-contribution" and another one for the "I-contribution".

In the next step, create a Motor structure. It contains, as separate data types: the abovementioned "Actual speed", the power input etc. Now simply add the regulator to this structure. Finally, create the pump structure and integrate the motor into it. And as we have two motors in our pump, you simply add the motor data type to your pump structure twice. Now all you have to do is create a variable based on this structure data type. That is easy. Just create a new variable and select the structure data type "Pump" – and you are done. You now have a variable consisting of the whole structure. The elements of this structure variable are called structure elements. You can use each of these

elements everywhere in zenon - in pictures, as alarms, in archives, in recipes, etc.

## EFFICIENT ENGINEERING

Of course, the concept of object-orientation also applies here, and again you benefit from the central approach: If you need to change the structure, you can simply change the structure data type. With just that, all the variables contained in this structure will automatically be updated. You can make all kinds of changes: from simple properties like the data type's unit to complex actions like adding or deleting limits or even changing the whole structure, e.g. by changing the sequence of the elements or by adding or deleting single structure elements in the structure data type.

This means you can make a wide range of adjustments and adapt to your requirements as exactly as possible. That is what we call "Efficient engineering"!

But we will take it another step further.

## STRUCTURE ARRAY

Imagine you have not one pump, but one hundred pumps. No problem. Just create a structure array from your structure variable. With just a mouse click, you have not just 100 variables, but 100 structure variables.

Sticking to our example, we have to create 12 variables for each of our pumps, which results in a total of 1200 variables for one hundred pumps. With our "object-oriented parameterization" approach, we can do just that with a few mouse clicks – and additionally, all variables are already configured. Every single variable already comes with all the properties it needs, e.g. unit, value calculation, alarms, CEL entries etc.

It does not get any faster than this – not even with automatic engineering, because you would at least have to write a few lines of code first ;-)

## HINTS

Finally, two useful hints for you:

### Addressing hint:

For numerical PLCs, you can use automatic addressing or semi-automatic addressing.

### Automatic addressing:

The offset and, if required, the byte and bit addresses are calculated automatically, based on the position of the structure elements. For arrays, this also works across the whole array. If you have created the same structure in the PLC and in zenon, everything works fine and you do not have to care about addressing.

### Semi-automatic addressing:

Here, you assign separate start addresses already at the data type. The other addresses will then be determined based on these addresses. Of course, you can also change them later. Please read more about this in the online help file.

For symbolically addressing PLCs, you have to use the same names in zenon and the PLC, so that there can be a match between the two. All properties described here can also be accessed via VBA. This means you can also make use of these benefits when you use automatic engineering and create ingenious solutions.

### Hint XML Export/Import:

Information like data types, structures, inherited properties etc. are also included when importing or exporting. This means that, once defined, you can comfortably export structure data types and structure variables and import them in other projects to reuse them or adapt them as needed. Where to go from here?

Just think of the advantages of links to dynamic elements. Read more about that in the next issue of IU. Until then, happy experimenting and efficient engineering! ✎

*Markus Helbok*

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## In the next issue…

… you will get to know part 2 of our series **.NET *Windows Form Controls*** in zenon

…you will read about COPA-DATA Germany's 10th anniversary

…we will present our ***new subsidiaries***.