Information Unlimited

Magazine for Automation Industry

2010 · Issue No. 18

» zenon 6.50. A multitude of new functions and possibilities for the most varied applications and industries. There is certainly something for everyone. «

REINHARD MAYR

Reveals to us why it is important to think about graphics and design when developing software. He suggests there is a gap between appearance and functionality, but it can be bridged, thanks to new technologies.

KLAUS REBECCHI

Keeps us up-to-date on news from the Italian subsidiary: Twofold success - our own customer event in Verona and participation at the Telecontrollo forum in Rome.

GERHARD ROIDER

Speaks about the high-speed evolution of web interfaces, how this process of evolution became a global phenomenon and how COPA-DATA can significantly advance this development story if we are ready to learn from the masses.

MARK CLEMENS

Is, in his own words, "addicted to zenon". He reveals which of the new functions in zenon 6.50 have made it into his personal hit list, and why their place there is justified.

ROBERT HARRISON

Discusses the improvements to user administration that zenon 6.50 delivers – in relation to user groups, Active Directory, ADAM integration, password syntax and ID system login – and explores the choices available, when using zenon, to ensure secure user administration.

BERND WIMMER

Describes how the programming system S7 Graph, commonly used on the production lines of automotive manufacturers, makes both error detection and determining the cause of any error easier – and thus saves time.

MARKUS STANGL

Unravels why no 7th generation of zenon was made from zenon 6.50, and what the magic number of 6.50 hides inside it.

THE APPEAL OF NOVELTY 2010

EDITORIAL BY THOMAS PUNZENBERGER

AND EVERY YEAR, IT'S BACK AGAIN: THE APPEAL OF NOVELTY.
We have hardly got the "quiet period" in December behind us, recuperated a little, and then it's full speed into the new year. New challenges, new developments, new tasks.

The time at the end of the year is always an opportunity to look back a little on the year gone by; however, the outlook for the forthcoming year is always exciting. There are many opportunities for us this year in particular.

We have just released version 6.50 of zenon: a big investment for COPA-DATA with many years of development put into it. It is a successful package, as many customers have already confirmed to us. A multitude of new functions and possibilities for the most varied applications and industries. There is certainly something for everyone.

We have also committed ourselves to new markets by setting up our own subsidiaries last year. And all this in the first year after the biggest economic crisis since the thirties.

Too bold? You may well ask. Would it not be better to be a little more cautious and to wait? That was definitely one option that was seriously considered. But it is not waiting that moves us forward. Isn't it novelty, the incentive of discovering something, that continues to challenge us and keeps us vital?

2010 will certainly be a test for us; to see if the groundwork that we laid last year will move us forward in the right direction. We are certainly well prepared: with a modern product, a committed team and many successful customers.

On this note – with the appeal of novelty and the desire for discovery remaining with us for a long while to come – I wish you a successful new year for 2010.

Thomas Punzenberger, CEO

zenon 6.50

**A half-version number for the biggest release that we have ever created?
Why not straight to version 7?**

The simple answer is compatibility. That, and the wonderful magic encapsulated in zenon 6.50 …

Ancient mathematicians and philosophers once thought that 6 was the perfect number - and not only because it is the sum of all its divisors, namely 1 + 2 + 3. The Greek philosopher zenon would have also liked to have conquered the goddess of love and beauty with the number six.
But there is much more to six. The fact that every snowflake is based on a hexagonal form hints at its wonder. Mathematically too, it has a few tricks up its sleeve. It is the:

1. The lowest perfect number.
2. Number for which the sum is the same as the product of its genuine divisors: $6 = 1 + 2 + 3 = 1 \cdot 2 \cdot 3$
3. The lowest positive natural number which, to the power of third, can be written as the sum of 3 positive cubed numbers: $63 = 33 + 43 + 53$.
4. The lowest natural number that is not a prime power.
5. Lowest primary pseudo perfect number.

As you can see, there are many good reasons to spend a bit more time with the number six. And to add to this the minor release number 50 and you've got a seriously auspicious pairing.

The number 50 is also pretty ingenious. For example, it is the lowest positive number that can be represented in more than one way as the sum of two square numbers: $50 = 52 + 52 = 72 + 12$

Together, 6 and 50 are virtually unbeatable:

Anyone looking for peace and relaxation should either go to Faverois, a municipality in Burgundy on **6.50** km² of land. Or they could use zenon 6.50 to simplify their working life considerably.

For anyone who prefers to have a bit of a challenge in their life in-stead of peace, we recommend either products from our competitors, or participating in the Transat **6.50** single-handed transatlantic regatta. Whilst you bravely take on the wind and waves, you could think about the benefits zenon could bring you. And: Why are the boats no longer made of steel but of plastic?

To overcome the consequences of cold forming, you need to recrys-talization anneal Steel, at **650** °C. We know of quite unusual methods to achieve this kind of heat: due to the vast development effort expended on zenon 6.50, the odd piece of office equipment was also recrystaliza-tion annealed, whilst the test computer glowed in front. Some sort of chewing gum would have been helpful to the development team to help them relax throughout this process. Coincidently, chewing gum also contains the additive E **650**.

E650 is the labeling for zinc acetate, which is used in chewing gum as a flavoring. Chewing on gum is known to increase concentration – how-ever, this is not necessary with the incredible usability of zenon. The current version of zenon gives an impressive display of how our usability experts have worked at full steam.

650 tonnes of steam is what a steam power plant - like that of BASF in Ludwigshafen - generates in an hour. And zenon 6.50 also has a tonne of new features, including special ones for the energy sector, in compliance with the appropriate norms and regulations, naturally.

Whilst we're on the subject of norms, DIN **650** defines dimensions and tolerances of T-nuts for machine tools. zenon is not yet prescribed as a norm for machine tool manufacturers, but many are already benefitting from the advantages of the zenon HMI. And they will benefit from many more features with version 6.50, which is primarily a welcome boost to productivity in difficult times. Full speed ahead!

Another speedy example is Alstom's AGV, the successor to the French high-speed train the TGV, which has seating for **650** passengers. Alstom has been 'recession-proofing' its operations and the employment it pro-vides for a long time by using zenon.

Anyone who prefers to drive rather than take the train, could manage a swift 325 km/h with the Golf GTI W12. No wonder with **650** horsepower under the hood. Then you only need to be wary of the police and their laser speed guns!

A less feared and more widespread laser, is the red laser pointer in everyday office usage. The red light that is emitted from these has a wavelength of **650** nm, just like the lasers of DVD drives, which are the method usually used to transfer zenon to your computer.

It may be the case that zenon help is not yet of the magnitude of Hom-er's Iliad, which is believed to have been written **650** years before the common era; but with over 100,000 new words, our help files have now taken on almost epic proportions.

Whereas one of the reddest stars in the sky, La Superba (the superb one) is just less than **650** light years away from us, Oktoberfest in Munich is just around the corner – even if the goings-on there seem like some-thing out of this world to someone who is not from Bavaria. The **6.50** million liters of beer drunk there certainly have some sort of influence on the galactic atmosphere there! Many of the beers consumed there were brewed with the help of zenon. And when COPA-DATA Germany and the guests of their anniversary visited the Oktoberfest at the start of Octo-ber 2009, one or two were certainly tested to ensure that they conformed to the German Beer Purity Law.

The world is full of the magic of 6 and 50. And now, more than ever – thanks to the magic of zenon! For anyone who does not already use ze-non, as the mathematically gifted magician that benefits their own plant, we recommend Paul Simon's "50 ways to leave your lover" as your first step to freedom. You can get it at any good music store. The zenon 6.50 platinum disc is, naturally, available from COPA-DATA. ✍ *Markus Stangl*

My favorite 6.50 features

CONFESSIONS OF A ZENON ADDICT

Honestly, the list of new and improved features in zenon 6.50 is just too long for one to have only a few favorite features. For each industry, specific features and modules have been implemented. But many general, maybe not so well-publicized features, are also now available. Within them I'm sure that you will find something to your liking. But right now you can read about just a small selection of my favorite new features which could be useful to everybody using zenon.

GRAPHICAL ENHANCEMENTS

For as long as the main purpose of an HMI remains to present information on screen and allow safe and comfortable operation, good design will be increasingly important and can even be a distinctive feature. With zenon 6.50, many graphical enhancements have been implemented. With them, a whole new dimension of design capabilities have opened up.

I SPY WITH MY LITTLE EYE,
SOMETHING THAT IS TRANSPARENT

Of course this is ridiculous. You cannot see something that is transparent; think a moment about the air you are breathing right now – you can't see it, but it's there all the same. In zenon 6.50, transparency is introduced and comes in different flavors. You can, for example, specify the grade of transparency for the background color of elements; the line color of elements; and the gradient color of elements. The zenon Editor properties window provides an easy to use slider which allows you to change the transparency value from 0 to 100 percent, and you can see the immediate effect of your changes on your screen. In addition, trend graphs in the extended trend can now be transparent, providing a better view of multiple trends or multiple area display. The screens themselves cannot be transparent. However, you can now define the shape of frames. A pop-up window is now no longer limited to a rectangular area, but could also be shaped like a rounded rectangle, or be circular, or even have a hole in it!

A GOOD MATCH: SOMETHING OLD, SOMETHING NEW ...

What happens when you take your project up to a newer version of zenon? You gain from all the new features that come with the new version without losing anything. It isn't really a new feature that you can take a zenon project from any version up to the latest version, just like that. And it isn't a new feature that you don't necessarily need to update your Runtime system to utilize the improvements in the latest version of the zenon Editor. You can still use the latest version of the development environment, taking advantage of all the new features and technologies, and still compile Runtime

files for an older Runtime version. But although these are not new features, they still belong to my favorites!

DRAWN FROM REALITY: SHADOWING YOUR WORK
Anyone who has ever drawn a cartoon, or has painted, knows that objects appear to be more real and more alive when they cast a shadow. In zenon 6.50 you can now add shadows to elements in your screens. All kinds of options exist for you to configure these shadows: size, transparency, color, angle of display, and distance from the element.

FAST EDITING USING YOUR KEYBOARD F2
Yes, it is also possible now to change the text relating to elements by pressing F2 when the element is selected. Together with the TAB key to jump to the next element in the picture (or shift-TAB to go back one element) this offers a very fast way of applying text to elements in your screen.

BACK TO THE FUTURE: A FEATURE RE-IMPLEMENTED
In zenon 6.50 you can now resize the elements with the cursor keys again. Just select an element, place the mouse cursor over one of the corner points, and use the cursor arrow keys to increase or decrease the element's size by one pixel. When holding the shift key with the cursor keys, the size changes by 10 pixels. You can still move an element with the cursor arrow keys, or with shift + cursor arrow keys, when your mouse cursor is not on one of the corner points. By the way, did you know that you can double click on the corner points to enter a size directly in the small dialog box which pops up? And did you know that you can resize an element and keep its aspect ratio, by resizing with the mouse and holding the shift key? Maintaining aspect ratio is also possible when creating, for example, a new ellipse or a new rectangle. Hold the shift key down before you draw the element and it will be a perfect circle or perfect square.

Speaking of re-implementing features, .dbf import and export of variables for mass editing were already re-implemented in a previous version. As some software no longer supports the editing of the .dbf legacy format, it is now possible to export and import variables in .csv format using zenon 6.50.

ROTATING ELEMENTS
While dynamic rotation of elements by means of variable values was already available in previous versions, zenon 6.50 enables you to now freely rotate your elements in the zenon Editor. Just grab the rotation anchor point of the element and give it a swing! Or you can double click on the anchor point and enter the angle directly.

TRIM THE EDGES
Previous versions of zenon already allowed you to create rounded or round elements. In zenon 6.50 you can now define the rounding for each corner of a rectangular element separately, allowing you to create elements which are rectangular on one side and rounded on the other. The curve need not even necessarily be proportional: the x and y pixel can be defined separately.

LINE + END TYPE = ARROW
In previous versions, arrows in screens usually consisted of multiple elements or were made out of symbols. Now, zenon 6.50 offers different line start and end types. You can easily change the line end type for both normal lines and polylines using the properties window. A set of arrows, squares and circles is available.

'COLOR YOUR PROJECT' USING THE NEW COLOR PALETTES IN ZENON
HMI screens need not necessarily be plain old black and white, or offer only a few additional gray-scale steps by mixing these 'colors'. But how do you organize your choice of colors? How do you effectively reflect your Company's Corporate Identity and Branding? The answer is color palettes. Users of zenon 5.xx versions may still remember the color palette accessible in the project properties. Now, zenon 6.50 offers a central color palette, where you can name and specify colors. For each element in your screen you can either use a normal color or a color from the palette. In addition, you can create multiple color palettes which you can switch online in the Runtime. This way you can, for example, create a color scheme for each product the machine is producing. Or change the colors on the screen during an alarm state. Or display different colors when no user is logged on. It's even possible to change the color scheme according to time or date.

TIME-SAVING AND SIMPLE: 'TRANSFER FORMAT'
With all these new graphical design possibilities for project elements, it is great to know that you can now copy the graphical design of an element, and paste that design to another element, while still retaining text and functionality of the target element. Just right click on an element, choose 'transfer format' and click on the target element. Or you can use the paint brush icon in the toolbar to paste the design.

While we're on the subject of icons in toolbars, these have also been enhanced and improved in zenon 6.50. Each detail view now offers an icon toolbar offering the most common functionality. By the way, did you know that, alongside the Ctrl+C and Ctrl+V or Ctrl+shift+Vkeyboard controls, you can create copies of elements in a screen very elegantly by holding the Ctrl key on the keyboard, then clicking on the element you wish to copy and, while still holding the Ctrl key, moving the element using the mouse to the new position, and then releasing the mouse button? You can do the same when you right-click and hold, then move the element to the new position. On releasing the right mouse button, you can choose to copy or paste the element from the context menu at the mouse cursor.

CAN'T SEE THE WHOLE PICTURE ANYMORE? – REMOVE YOUR FILTERS
Have you 'lost' some variables? No, they are just not visible because you have a filter set on a column in the detail view. But which column was that again? Don't worry! With zenon 6.50 you can now easily reset any filters used on the detail view with just two mouse clicks. Simply right click on the column description in the detail view and choose 'remove filter' from the context menu. For people for whom two clicks are just too much, you can also use the icon in the detail view toolbar.

TECHNOLOGY – TOPOLOGY

Transmitting changes to one or more projects to their according servers and then reloading the Runtime can be a time consuming job. Especially when you have multiple zenon projects running on different systems in your facility, possibly even with complex network structures offering redundancy and circular redundancy. With the new network topology view in the zenon Editor, updating multiple systems with the latest Runtime files becomes simple.

The network topology view simultaneously provides you with an easy configuration mechanism for the zenon network structure. It allows you to define a PC, specify where the Runtime files should be placed on the hard drive and specify which project in the multi-hierarchical structure should be started on this PC. Depending on the network configuration of the project, an automatic check is performed if this network configuration is valid. Just select all configured PCs you want to transfer the Runtime files to and, one after the other, Runtime files are transferred. The results are displayed in the output window.

The output window in zenon 6.50 is even cleverer because you can choose which information to display in it, by setting a filter on errors or warnings. This makes it a lot easier to identify those errors created during compilation or during transmission.

INDIRECT ADDRESSING

When using indirect picture addressing you only have one screen and you define which variables and functions are used in the screen through the screen switch function. This basic feature has now been enhanced to substitute interlocking as well. With the function to open the pop-up screen, for example for a motor, you can now also replace the interlocking used at elements in this picture. Which could be useful in our example, for instance, to prevent turning on the motor when the safety is off.

REPLACING[2]

One of the powerful features of using symbols, is that you can generate a symbol out of a set of elements, put the symbol in your library, and create instances of this symbol in your project. Nothing new here you think. While in previous versionsyou could, for example, replace *motor1* with "2" to link the variables of the structure "motor2" in an instance of the symbol in your screen, it is now possible in zenon 6.50 to use multiple replacement strings for one symbol by separating each replacement string with a semicolon. This offers higher flexibility for object oriented parameterization in zenon. Speaking of symbols, it is now possible in zenon 6.50 to use linked symbols in other linked symbols. This way you can create one set of basic elements as a linked symbol, and use instances of this linked symbol in other linked symbols. Just try it out; you will soon discover the potential of this feature when working with symbols.

GETTING ORGANIZED

In the global symbol library you've always had groups and you could always create your own groups to organize the symbols in the library. In zenon 6.50 you can now organize your symbols in the project

by creating categories. By filtering to categories, or grouping by categories in the detail view, you can very easily manage larger numbers of symbols.

To help you get organized still further, you can now create user groups in zenon and assign authorization levels to a group. In turn, you can assign a user to one or more groups. In combination with groups in active directory access or ADAM (Active Directory Application Mode) this allows very flexible and universal user administration.

FOR SHOWING OFF YOUR PROJECT OR TESTING WITHOUT HARDWARE

Until zenon 6.50, almost each driver had a hardware mode (for communicating to the PLC), a simulation static, and a simulation counting mode. Now a fourth mode (simulation programmed) is introduced where you can actually use straton logic to program your simulation. This allows you to rebuild the logic, which usually resides in your PLC, in a straton simulation project - without the need to communicate to the PLC itself. This can be very helpful when demonstrating the zenon project.

It's also helpful during design time when testing the response of the zenon project if the actual PLC is not available or not even programmed yet. Simply set the driver to 'simulation programmed' and create a simulation project. Your variables are available in the straton workbench automatically. Now you can add some logic to simulate your process. Or you can simply go online with the straton workbench while the zenon Runtime is running and modify values for your variables manually.

Did you have fun trying this out? I can imagine ideas starting to develop in your head already: how exciting! Imagine what stunning projects you could create by using just some of these features. Did you enjoy reading this article? Would you like to hear about more favorite features? Let us know: send your feedback to *info@copadata.com*. ✎ *Mark Clemens*

GRAPHICS AND DESIGN FOR HMI

When we refer to a Human Machine Interface (HMI) generally we mean a system that enables interaction between humans and machines. It should be easy to operate by humans and be able to be specially adapted to their requirements.

But what constitutes a specially adapted, or "tailor-made", interface? In the world of automation, this question remains largely unanswered. Whilst other industries devote a lot of time to this subject, this is still something of a "terra incognita" in the world of classic automation. We know that users now intuitively place high demands on their working environment, due to their experiences with the variety of media encountered in everyday life. Users who are familiar with modern tools and interfaces such as mp3 players, virtual communication rooms or even standard office products now have exacting ideas on how an interface should be designed in order to be considered functional.

So the question remains: does an interface that an operator uses for many hours during the day also need to fulfill other, less functional requirements? Experience shows that people prefer using an interface which they consider to be visually pleasing and beneficial, i.e. when it is attractive to their users. In other words, if the user interface creates a good user experience for the user. In addition to good functionality, the ideal is a well thought-out and suitable design that enables easier and, consequently, safer operation.

EFFICIENT, RELIABLE, MOTIVATING

The effect of a well-designed user interface is often underestimated and, as a result, given too little attention. A suitable design motivates the operator to engage with their working environment more diligently. More efficient work is a verifiable result of this.

In the traditional everyday life of automation technology, user interfaces are defined by a designer (or Systems Integrator) and presented to the technicians for implementation. This "definition" is generally carried out in an external graphics program and the result is usually saved in a picture file. The technician then has the task of implementing the actual application logic and, in addition, implementing the interface according to the design brief. He tries to recreate the user interface as accurately as possible using the means available to him. Difficulties in set-up and technical limitations rarely allow the technicians to precisely realize the design brief. The challenge is then to bridge the frequent gap between functionality and design as fully as possible and, if appropriate, to identify the common denominator.

In answer to this challenge, the team here at COPA-DATA searched for a practical solution. We asked ourselves the question: How can we create a modern software tool that will help our users to better get this problem under control or even avoid it completely?

We found the answer in a new technology that had, in the main, previously been used in the web area: Windows Presentation Foundation (WPF) and XAML (Extensible Application Markup Language) format.

WPF SEPARATES DESIGN AND FUNCTION

When designing user interfaces with WPF the designer retains, as before, the freedom to work with their trusted graphics programs. This includes many trusted tools such as Adobe Illustrator or other special tools, like those provided by Microsoft. The designer therefore has the possibility of saving the user interface created in XAML format and giving it to the technicians in this format.

A zenon user can directly integrate these interfaces into their application using XAML format. He does not face the task of having to "copy" the requirements; he simply uses a new dynamic element for the WPF display and automatically receives the finished user interface element. He does not need to make any more effort to implement a given design.

However, as before, the technician still needs to implement the logic and functionality that relates to those elements. This logic is, for example, used to link an element with a process variable in order to display current process values in the user interface. Or, perhaps, he may wish to link a function that displays the alarms that relate to the element to it.

In short: The technician takes care of, as he did previously, the pure functionality of the application and, in doing so, can rely on designs and any design changes being automatically transferred into his application. There is no more doubling of design work and the setup process is limited to a simple exchange of data.

This technology offers zenon users a multitude of new possibilities when creating a completely new user interface. All our expertise has been brought to bear on zenon 6.50, as we put a great deal of thought in to user interface design as part of the latest product release.

SUPPORTING YOUR CORPORATE BRANDING

WPF designs can now be quickly exchanged, but what is the case with standard elements? How can I adapt these individually and easily? Especially when some of them are used in combination.

The topic of corporate design, in particular, can no longer be ignored by the automation industry. Companies are increasingly keen to standardize all elements of corporate design, from flyers to user interfaces, in order to achieve a consistent look and feel which consolidates brand recognition. This usually means that the company colors, just like the company logo, are used on all forms of company communication. Another general feature of corporate branding is that a chosen font is consistently used.
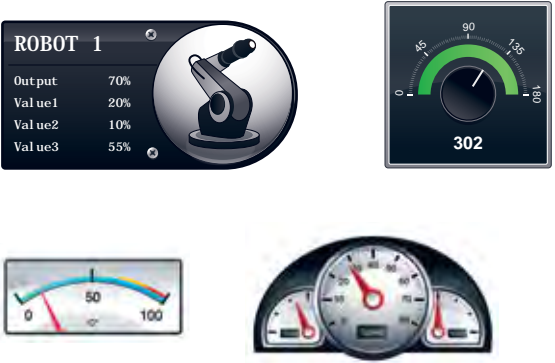
zenon helps the application developer implement the appropriate corporate design into their projects. Developers are now able to pre-prepare the applications, taking corporate branding guidelines into account. Any alteration to allow for different requirements then only requires a 'one step process'.

Global color palettes make it possible to link all graphical elements (switches, texts, trend curves etc.) in the projects to colors. If the design has to be adapted to the guidelines of a new customer/user, a central change of colors within the palette is sufficient to give the user interface a completely new appearance. This central maintenance is made possible by the configuration of whole color palettes. These can be defined externally by a designer and can even be subsequently switched dynamically whilst the program is running. Only the language and/or the design and the layout need be adapted at the local or user-specific requirements – and this can be done at the press of a button in zenon. The application developer needs to make no further changes to the application.

FORM AND FUNCTION IN ZENON 6.50

zenon 6.50 makes it considerably easier to develop demanding but really functional user interfaces. With the integration with WPF, complex designs can be implemented very easily by means of an XAML file. The new color palettes make it possible to quickly switch an entire color scheme whilst the program is running and therefore enables simple and uninterrupted compliance with corporate design standards - whatever the future requirements may be. ✎ *Reinhard Mayr*

Desgined by designers, engineered by technicians – the new WPF elements can be loaded into the HMI exactly as they are. Outcome: appealing visual appearance, reduced operator errors, higher efficiency.

INTERFACES 2.0
LEARNING FROM THE MASSES

The South Eastern Sahara, 400,000 years B.C.: A man sits on a rock face and observes a hippopotamus trampling loudly over the Savannah. Two humans are running for their lives in front of the hippopotamus. One climbs a tree hurriedly; the other tries his luck on some open ground. The man sitting on the rock face has learnt an important lesson for survival: in the event that he has to flee from a hippopotamus, he will also climb a tree. Maybe the observer also noticed that the hippopotamus had just eaten its offspring as the two men crossed his path. Maybe he observed the whole situation, analyzed it, correctly deduced the lesson and learned from it. He then succinctly passed this information on to his tribe. First with signs and sounds, then with language, using stories, fables and analogies. Using songs. And much, much, much later by means of writing and books.

In what is provisionally the last chapter of this success story, we are involved; we are actively advancing it: Knowledge is available in networked form and can be called up when needed. It is commented on, classified and evaluated. And ideas are used and developed at breathtaking speed.

**HIGH-SPEED EVOLUTION OF INTERFACES,
FOR EXAMPLE THE WEB**

Salzburg, COPA-DATA Headquarters, Spring 1998: Our marketing team is sitting in front of a large monitor and looking at websites from major companies such as Apple, the BBC and BMW. We decide their websites are good and learn from them. To us, the designs appear modern, with the presentation of information being clear through out. Linear texts are separated by hypertext, static photos interspersed with animated pictures.

But a mere 11 years later, the old web designs look like a relic of longgone times. The evolution of web Interfaces advances rapidly: features are coded, mutations are created, recombinations ensure genetic variability. Different web formats, websites, web logs, wikis and forums are created. What are the drivers of this evolution? One of the most important factors is global availability and, thus, also comparability. The process of developing web interfaces is no longer based on the creative efforts of individual designers, but instead on huge 'crowdsourcing': it has become a global event; the search for a solution is farmed out to the communities of Internet users. This exchange is supported by suitable technical web tools: designs are put forward in weblogs, new approaches are developed. Finished examples and snippets of code are offered as free downloads. The masses copy, comment, reject and improve.

EVOLUTION DRIVERS FOR HMI DESIGNS

Salzburg, COPA-DATA Headquarters, Summer 2010: Our Usability Task Force Team is discussing the new prototypes of our Online Pattern Laboratories. We have learnt from web development and developed a web 2.0 tool that should speed up the development of HMI designs and demonstrate new solutions to our customers. In doing so, we rely on interface patterns, recurring interface modules and samples that help us to overcome the variety and complexity of HMI solutions. The use of interface patterns in the software world is indeed quite common, but the coupling of a pattern language to a web 2.0 portal may speed up and influence the evolution of HMI patterns even further. We see patterns not as something unchangeable, but instead we assume that these samples are created and evolve. Initial concepts focus on solutions. Only once concepts have been established and topics have arisen can focused topics be discussed, developed further or even rejected. A wide range of approaches to finding a solution are developed in this way.

2012

Salzburg and Melbourne, late Summer 2012: Our product managers in Salzburg and Melbourne are discussing interesting solutions for multitouch navigation with the people in charge of development. This solution has already caused heated discussion in our online pattern laboratories (online since 2010) with over 500 posts from a total of over 30 zenon project engineers around the world. For fun, a student at our partner university, the Vienna University of Technology, has put a multi-touch switch for a simple hand mixer online as a pattern. This solution inspired a project worker in Mumbai to come up with a bold solution for machine control, which is now being hotly debated.

The current status of the discussion on September 27, 2012, 6:45 pm: The new feature will be incorporated into zenon. ✎ *Gerhard Roider*

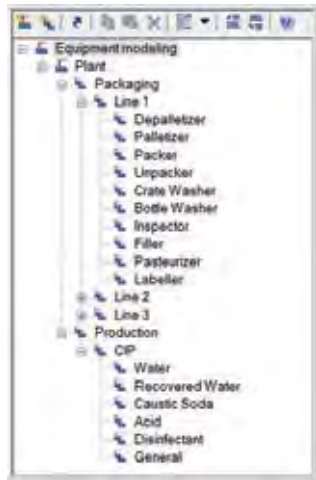Equipment hierarchy according to ISA-S95 standard – Part I.

TOWARDS MANUFACTURING GOALS

with the new equipment modeling of zenon 6.50

Food & Beverage manufacturers face continuously increasing requirements with regards to their production processes. It is not only about innovation & flexibility - so-called "agile manufacturing". More effectiveness, less material, reduced energy consumption and better quality are also demanded. And the investments should have a good ROI and low TCO . The automation systems addressing such challenges are more and more complex. An increasing volume of data is needed to keep the flow of information across the enterprise, from plant floor to management and back. The main question is: How to easily manage these requirements during application engineering and plant operation?
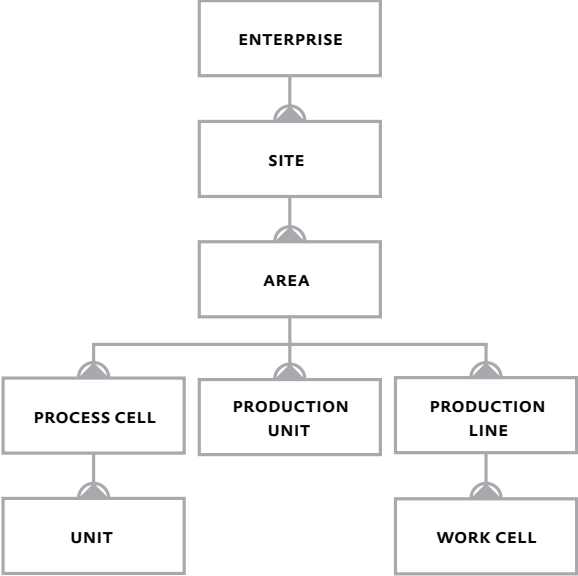

Equipment modeling in zenon: an example of a Food & Beverage plant.

MODELING: ADEQUATE STRUCTURE AND CLEAR FOCUS

The process control system zenon is typically used to integrate large applications across a plant, its production areas and its various equipment and machines. Let us consider the example of a food manufacturing plant consisting of areas such as: production; packaging; utilities; waste water; water treatment etc. Looking closer at the packaging area, we will find various packaging lines. Each line consists of a chain of machines, each of them with its own functionality, e.g. filling or labeling. Then, at the machine level, each machine could also be split in to various sub-components.

To integrate systems across such plants, the application engineer uses large amounts of variables to connect to processes and, very likely, a considerable number of application objects like screens and functions. Since the earliest versions of zenon, filtering and sorting mechanisms have been available to help to make list management more convenient. The names given to the project components and their properties are always a good starting point to select just the equipment one wants to focus on, either during the engineering phase or, later, during application maintenance.

Thanks to zenon, a production supervisor in the plant in our example has support to deal with large amounts of information. For a quick and clear understanding of process data, zenon brings focus by filtering on time frames or following other criteria. For instance, if at a certain moment only the events belonging to the category "critical" and to a certain production batch are of interest, zenon enables our production supervisor to view only the relevant information. Such sophisticated and standardized filters are available for other functions such as alarm management, reporting and trending. But do manufacturers need even more support?

A process control system supposes varied involvement of plant personnel in engineering, operation and maintenance phases. These personnel are better able to work together when they formalize the structure of their facility in a way comprehensible for everybody – as a common language. The ISA-S95 standard defines a widely accepted way of modeling a manufacturing plant. The equipment hierarchy allows a clear definition of levels, from enterprise to units/working cells.

The equipment modeling in zenon 6.50 is designed to boost the performance of application integration and maintenance, as well as of plant operation. zenon answers to the clear need to integrate and operate process control systems in a way that is as close as possible to the real world. The models can then be flexibly adapted to the peculiarities of any given plant. Various parallel models give users different views of their processes and always focus attention quickly to where it is needed within the large amount of complex information mentioned before: equipment hierarchies, areas of responsibility, aseptic/non-aseptic packaging areas, supplier-related equipment etc.

The free definition of your own models in zenon supports proper management of plant complexity: standardized, but still flexible.

INTEGRATOR OR END USER – SIMPLY ENJOY THE BENEFITS!

As an application engineer, if you are already familiar with zenon, you are ready to derive full advantage from the equipment modeling feature in zenon 6.50:

▷ in your old or new projects, flexibly create bespoke or standard-based models (i.e. ISA-S95)
▷ Simply assign variables and project components to your model nodes
▷ Quickly focus on parts of your application by using filters based on your models
▷ Give system operators the power to use filters based on the model through shortcuts or by free selection
▷ Reuse models by transferring them between applications through XML import/export

Once the process control application has been implemented, it is the turn of the end-user, be it a production manager, a line supervisor or maintenance staff, to profit by using a system that is well integrated with their plant.

In the Alarm Management, Chronological Event List or Recipe Group Manager modules, end-users can easily and clearly see if any areas or equipment require attention at any given moment. For instance, the production supervisor can request zenon to show just the alarms coming from one of the lines within the packaging hall. The maintenance manager, using the PC in his office or even a PDA when walking around in the production area, is able to quickly filter the events on his screen, for example, those occurring at a certain part of a machine.

This structured and focused approach to real time information brings greater insight into running processes and faster responses. With zenon, corrective action is made possible before it's too late. Plus, when the historic process information is subject to analysis, the model-based approach in zenon delivers information across production entities in a clear and appropriate way. The equipment modeling in zenon 6.50 supports end-users to continuously improve productivity, consumption management and quality, at optimized engineering and maintenance costs. I look forward to your feedback; *EmilianA@copadata.com.* ✎ *Emilian Axinia*

FAULT LOCATION

Reducing the pressure on the control room operator in stressful conditions

With the new version 6.50 of zenon, COPA-DATA is making a further contribution to the monitoring and control of energy grids – enabling you to respond more quickly and under less stress. zenon 6.50 includes a new feature, called fault location, which is a function for displaying short circuits and ground faults in a topologically calculated grid.

PREREQUISITES

Fault location is included in the zenon Energy Edition topology package and is a real enhancement. Worth mentioning: the price of the topology package remains unchanged by this addition.
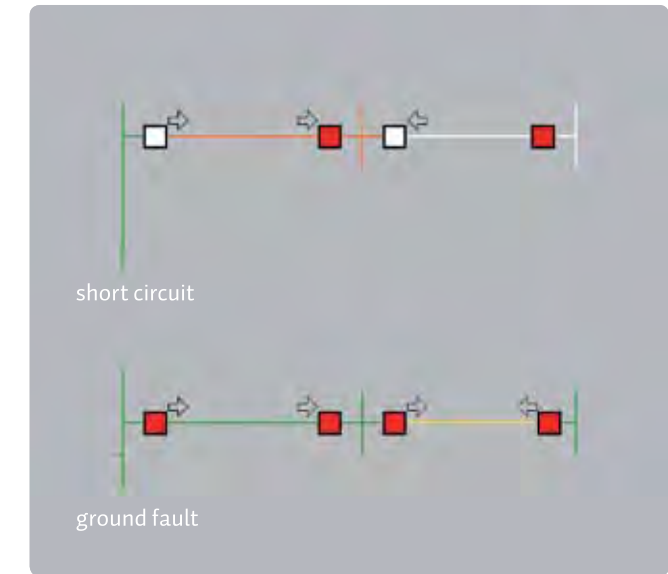
In the grid, protective devices (overload protection; ground fault location) must be present that can recognize short circuits and/or ground faults and report these in an appropriate way. The messages can be reported to zenon in the following manner:

▸ Triggering/stimulus
▸ Direction (forwards/backwards)
▸ Triggering/stimulus and direction

HOW IT WORKS

If a short circuit is triggered, the corresponding circuit breaker shuts off the part of the grid affected by the short circuit. Using the data (triggering and direction) from the protective device concerned, the zenon topology model can color the section affected by the short circuit with a predefined color. For non-selective triggering (the next circuit breaker after the short circuit does not trigger), the topology model colors the whole area accordingly. The control room operator can thus react immediately and further limit the short circuit by manual switching. He can then send his service staff to the correct section after the alarm so that they can rectify the problem. A medium or high voltage grid with an insulated neutral point, or a neutral point equipped with ground fault compensation, can continue to be operated after a ground fault. In these grids, there is not a grid protection device that shuts them off automatically. Nevertheless, the staff operating the facility must start looking for the error immediately (VDE 0105). Medium voltage networks may be operated for time intervals of 30 minutes to four hours with ground faults – for errors that last longer than this, it could lead to issues such as thermal overloads in the area of ground fault compensation.

When reporting a ground fault, no circuit breaker is triggered in the corresponding grids. Therefore, in the topological model, only the precise area that is subject to the ground fault according to information from the ground fault location system is colored. As a result of the new functions in zenon, "start ground fault search" and "stop ground fault

short circuit

ground fault

search", the reporting of new ground fault messages can be temporarily blocked in stressful conditions. Such stressful conditions may occur during a heavy thunderstorm, for instance. Using this example, a thunderstorm may lead to a deluge of process reports. Using the "start ground fault search" function, the current situation can be 'frozen' and the location of the problem can be found in your own time, analyzed further and actioned accordingly. You will not be irritated by new ground fault notifications that may be triggered by any lightning strikes. After you acknowledge the original fault, the "stop ground fault" function can free the way for new ground fault notifications.

The new zenon fault location helps to quickly localize ground faults and short circuits and enables operators to rectify them. As a result, you always have an overview, however stressful the conditions. ✎ *Jürgen Resch*

IEC 61850 Client Driver

The certification of communication protocols contributes significantly to the safe use of applications that need to be used with equipment from different manufacturers. For the same reason, when projects are offered out to tender, it is necessary to certify not only server/slave protocol implementations, but also client/master protocol implementations. In order to be best prepared for the certification process for our IEC 61850 client, COPA-DATA has now started the appropriate pre-certification test. This test is just the first of the certification process. The major steps to certification are:

1. Pre-test
2. Conformity test
3. Re-test

We are currently in the pre-testing phase (pre-certification test). The next step, the conformity test, is the actual certification test, which is carried out at KEMA. Re-tests can also be carried out in the event of changes to the IEC 61850 clients or the IEC 61850 standard.

The pre-tests are carried out using special software ('UniCA Multi IED simulator' which simulates Intelligent Electronic Devices (IEDs) and 'UniCA 61850 analyzer'). This software simulates up to three IEC 61850 slaves and executes special sequences that are also carried out during the conformity test. To execute the test, the zenon IEC 61850 client is set up so that it connects to the three virtual servers in the UniCA Multi IED simulator. The UniCA 61850 analyzer analyzes, monitors, records and saves the communication frames. Because the analyzer is equipped with knowledge of protocols, it can recognize and reports protocol errors.

WHO IS KEMA?

KEMA is a global leader for Energy consulting, testing and certifications and plays a significant role in guaranteeing the availability, reliability, sustainability and efficiency of Energy and related products and processes. ✎ *Jürgen Resch*

S7-Graph as screen type

The current market conditions require car manufacturers to become increasingly flexible. To achieve this, both the manufacturing facilities and the employees face great challenges. Often the people operating the facilities must now operate and monitor several stations at the same time. The systems used also need to support less qualified and less experienced production staff and assist in error detection. Due to the increasing flexibility demanded in manufacturing, control programs are also becoming more and more complex. Experts can often be necessary for error detection. zenon is the optimum tool for error detection using "S7-Graph", the standard commonly used in production line manufacturing. Using the "S7-Graph" screen type within zenon, programmed functional charts can be displayed. In addition to a detailed display of selected steps and transitions, it is also possible to have an overview of the whole sequence.

To generate the screen display, zenon provides a range of graphical options. Using zenon, the user can have all current status of operands shown dynamically on screen. Therefore, all status of individual links can be seen at a glance. To view this information the user can switch between displaying a Ladder Diagram (LD) or a Function Block Diagram (FBD).

All operands can also be displayed clearly in a table with their absolute addresses as well as with their symbolic names. The information needed to display this is taken directly from the control program. They are therefore integrated into the zenon project and are available in the whole of the zenon network.

The standard functions in zenon enable changes to be made and to be automatically distributed to all systems. When using substituted screen switches, the screens can consistently be reused.

If a sequence is interrupted, the user can use the heuristics in zenon to determine the cause. This function analyses the failed step in the sequence and reports the most likely cause in text form. Users can therefore rectify the causes of the problem without having to use further programming systems. Because the text display is updated on an ongoing basis, the user can immediately recognize other problems or even problems that arise as a result. This not only minimizes the effort required to analyze the problem, but also considerably reduces downtime for the facility. The net result: Efficiency and productivity increase. ✎ *Bernd Wimmer*

COPA-DATA GOES GLOBAL

NEW SUBSIDIARIES FOUNDED FOR
CENTRAL AND EASTERN EUROPE, IBERIA,
USA AND SCANDINAVIA

COPA-DATA SCANDINAVIA

Scandinavia – breathtaking landscapes, modernity and quality at the highest level. Minimalist, stylish and elegant. Nordic aesthetics as an exquisite subject; unmistakable and pure. Design and functionality as the source of any production. Perfection as a timeless benchmark. Ideal prerequisites for challengers. Ideal prerequisites for zenon.

COPA-DATA *Scandinavia*
since September 2009

COPA-DATA
IBERIA

Iberia – sparkling temperament, blazing passion. Powerful, colorful and lucent. Buzzing metropolises, fascinating passion for life. Stimulating, refreshing, captivating. Spurred on by adrenalin and collective passion. Devotion evident in even the smallest act. Charm meets tradition. Cordiality meets high emotion. Ideal prerequisites for challengers. Ideal prerequisites for zenon.

COPA-DATA *Ibérica*
since August 2009

COPA-DATA
USA

USA – symbol of the Utopian, home of Democracy. Centralizing production. Pioneering and multicultural. Trailblazing and industrial; inspiration of the modern age. Extraordinary diversity. Industrial landscapes meet a wide wild world. Advanced, visionary, powerful. Ideal prerequisites for challengers. Ideal prerequisites for zenon.

COPA-DATA USA *Corporation*
since August 2009

COPA-DATA
CENTRAL EASTERN EUROPE

Central Eastern Europe – diverse, exhilarating, progressive. Memories of past monarchies, embodiment of upwardly mobile societies. Cultural and linguistic diversity, untapped potential. Progressive and progressing. A new heart of Europe beating: the pulse of the economy. Ideal prerequisites for challengers. Ideal prerequisites for zenon.

COPA-DATA *GmbH, Central Eastern Europe*
since Juni 2009

With the founding of a total of four new subsidiaries in the period of June to September 2009, we have continued our strategic plan of further internationalization and continued growth. The subsidiary for Central and Eastern Europe (CEE) opened for business on June 1, 2009. Additional subsidiaries followed on August 1 in Lisbon, Portugal, and on September 1 in Stockholm, Sweden. A US office has been in existence since 2006 but, as part of market repositioning, it was relocated to Princeton, New Jersey and launched as a new subsidiary on August 1, 2009.

A hearty welcome to all new COPA-DATA employees.

Who's who?

ULF BEXELL

Role at COPA-DATA: Managing Director, COPA-DATA Ibérica Lda. **Responsibilities:** Sales and management for Spain and Portugal. **Background:** MSc Electrical Engineering. I began my career in technical roles for ABB and Siemens. I later moved into International Business Development and Sales with Siemens and then also with smaller start-up companies. I have spent a few years as Managing Director of subsidiaries of European companies located in Asia. Since my time there I still feel an affinity for the people, the way they do business, and have a taste for genuinely Asian food, especially Chinese. Since 2005, I have lived in Portugal. My wife is Portuguese and we have three children. **Hobbies and Interests:** Aside from my job and family, I like to spend time at the beach in Lisbon, both in winter and in summer. In Sweden, I enjoy forestry and hunting deer and moose when there is time. My greatest challenge right now is to introduce my 15 year old daughter to deer hunting. **Me in three words:** persistent, friendly, optimistic

JOANA MARTINS

Function at COPA-DATA: Marketing Assistant, COPA-DATA Ibérica Lda. **Responsibilities:** Operational Marketing and Communication. **Background:** Before I finished my university degree in Portugal, I had the opportunity to participate in the student program Erasmus, which took me to Salamanca (Spain) where I studied for five months. After finishing my course, I did an internship at an IT company operating in the e-learning sector. I really enjoyed this training sector, but I realized that I want to work more exclusively in corporate communications. I found a company that welcomed me as a marketing assistant where I gained first-hand experience. It was there that I also first learned the "dos and don'ts" of the business. Unfortunately, the company was hit heavily by the economic recession and so I had to leave. Like my namesake Joaninha, the lady bug, I composed myself and flew on to a new beginning at COPA-DATA. **Hobbies and interests:** I like many things. I like being with my family and friends; listening to music all the time because it's a good medicine; and watching TV. I also love reading. I prefer books about romance because of their historical and sentimental value, as well as professional magazines filled with news and lifestyle features. And finally: dancing. Dance is like an artistic form of nonverbal communication. **Myself in three words:** a fighter, friendly, happy. **My greatest challenge:** Achieving my goals all by myself!

OLOV EMÅS

Function at COPA-DATA: Managing Director, COPA-DATA Scandinavia AB. **Motto:** Be interested, not interesting. **Responsibilities:** Since July 2009, I work as Managing Director at the newly launched subsidiary, COPA-DATA Scandinavia. I'm responsible for the Scandinavian market including sales, support, technical presales and marketing. **Background:** Previously, I worked as sales manager at ESRI in Sweden, a subsidiary to ESRI Inc, USA. I studied Law at the University of Stockholm between 2003 and 2007. **Family and interests:** I'm married to Åsa and have three children aged thirteen, five and three. Anyone who has experience of a similar situation knows that free time is very limited, but occasionally I play golf, read about history or hunt. I love doing business where all parties are getting a good deal: the end-customers, the system integrators and COPA-DATA. I like the challenge of finding real value in order to justify investments and to see the products delivered as promised; creating value, on time and on budget. **Myself in three words:** curious, committed, spontaneous.

CECILIA KJELLBOM

Function at COPA-DATA: Sales and Marketing, COPA-DATA Scandinavia AB. **Motto:** Life's too short to be anything but happy! **Responsibilities and background:** I'm responsible for sales and marketing at COPA-DATA Scandinavia, as of November the 9th, 2009. Previously, I was the Area Business Manager for the Swedish arm of an Israeli software protection company called Aladdin, for three years. I have a Bachelor in System Analysis as well as a Degree in Marketing. This will be my third time starting up a business in Sweden; the most successful previously was Glocalnet, back in 1997. It was the first IP telephone company outside the US and is now Sweden's third biggest telecom operator. **Family and interests:** I have a man in my life as well as three kids, now thirteen, ten and three years old. In my spare time, I like to spend time with family and friends, travel and be involved in interior design projects - my own or others! The best part of being in Sales and Marketing is the opportunity to meet lots of people and "convince" them that they really need our product! I like the challenge to be part of something that is still evolving. **Myself in three words:** passionate, persistent, curious.

NEW MEMBERS OF THE COPA-DATA FAMILIY

Jonas saw the light of day on October 4, 2009 and made Nicole Kaindl, who works in Business Administration at the COPA-DATA Headquarters, a very proud mother.

On August 13, 2009 Eugen Podsypalnikov from the COPA-DATA Development Department announced a very special release. 51 cm in size and weighing 3080 grams: his daughter, **Melissa** was born.

COPA-DATA congratulates Ralf Wallner, who works in the Documentation department at the Salzburg headquarters, and his wife on their new offspring. Their son, **Quirin** Maximilian Pankraz, was born on November 2, 2009 in Bad Reichenhall. The new arrival measured 57 cm and weighed a respectable 4570 grams. We wish the families much happiness with their new arrivals.

Photos (from left to right): Jonas Kaindl, Melissa Podsypalnikov, Quirin Wallner

Who's who?

CHRISTOPH DORIGATTI

Function at COPA-DATA: International Sales Consultant, COPA-DATA Headquarters. **Responsibilities:** Looking after the sales activities of the international subsidiaries and distributors of COPA-DATA; international sales. **Background:** After completing my studies, focusing on electronics and IT, at the HTL (vocational college) in Braunau am Inn, I had to, in common with all people leaving the HTL, make the difficult decision: work or study? After civilian service, I went straight into professional life instead of studying, due to the economic boom at the time. I started my career at BEKO Engineering & Informatik AG as a programmer for automation solutions, mainly B&R and Sigmatek control systems. It was then that I had my first contact with zenon. I was commissioned to carry out a project simulating an iron ore pelleting system for VA Erzberg that was based on zenon and straton. As a result of this project, I made a great deal of contacts at COPA-DATA. **Hobbies and interests:** I would describe myself as a sports freak - but in a good way! If I have time, you will usually find me doing some type of sport (football, volleyball or triathlon). In my free time, I am seldom found without my headphones, since I am nearly always listening to music. I do not really have a favorite type of music. I listen to rock, dancehall and house as well Johnny Cash and Ray Charles. When I read books, these are mainly biographies (the last book was about Barack Obama) and I also like to watch sport or a good Hollywood movie on TV. **Myself in three words:** ambitious, friendly, sporty.

STEFANIE TÖGLHOFER

Responsibilities: Administration, order processing, billing, financial accounting, personnel matters. Inge Steger, Team Leader of the Administration department at the COPA-DATA headquarters, informed me of the vacant position at the new COPA-DATA subsidiary for Central and Eastern Europe, for which I applied and I started my new job on June 1, 2009. **Background:** Before COPA-DATA, I worked in Italy in the tourism sector for 13 years and then went on to work in Vienna, at a large Austrian family-run company, as assistant to the Marketing Manager for seven years. **Hobbies and interests:** I like to take it easy and do some (moderate) sport such as running, walking and hiking. In addition, I spend a lot of time with my family and friends. I am a big lover of animals; my three cats and my dog enjoy much attention and devotion. **In ten years time I see myself:** Hopefully I will have retired by then! I will be either on the beach sipping a cocktail or at home in my garden. My biggest wish is to stay healthy, get old and continue to enjoy life. **Myself in "three" words:** precise; loyal; still not smarter than I was at 20 (although I really should be wise at 50!).

SARAH STROBL

Function at COPA-DATA: Trainee Administration, COPA-DATA Headquarters. **Background:** After finishing my studies at secondary school, I had to make a difficult choice: Should I get a job or continue with education? I ultimately decided to get a job and so, after attending the Polytechnic School in Oberndorf for my final year of schooling, I looked for work. After an interview and a day of work experience at COPA-DATA, I was hooked and they took me on as a member of their team. I officially started my apprenticeship at COPA-DATA on August 3, 2009. **Hobbies and interests:** In my free time, I play football and volleyball. I like going out with my friends and am always out doing something. **In ten years time I see myself:** Successful in my career. **Myself in three words:** sporty, adventurous, friendly.

TOBIAS WÖGERBAUER

Function at COPA-DATA: Trainee Technical Consultant, COPA-DATA Headquarters. **Responsibilities:** Software quality assurance and customer support. **Background:** Before I got my apprenticeship, I attended the Walserfeld Polytechnic School, where my classes focused on electronics. I really enjoyed the electronic stuff! However, I ultimately decided to get a job in IT, because I am more interested in IT than electronics. **Hobbies and interests:** I'm a bit of a PC freak. I really spend a lot of time in front of a monitor. I usually program something just for fun! If I'm not doing that, I sometimes like to play vintage PC games with my like-minded friends. **Myself in three words:** ambitious, egotistic, creative. **My greatest challenge:** To switch from being a technical consultant to being a developer.

BERNHARD EBERT

Role at COPA-DATA: International Sales Consultant, COPA-DATA Headquarters. **Responsibilities:** In my role as International Sales Consultant, I have been responsible for the sales activities of international subsidiaries and distributors and have looked after the international distribution network since July 2009. **Background:** After completing my course at HTL Holztechnikum Kuchl (a vocational college for woodworking), I studied Communication Science as well as Law and Economics at Salzburg University. I then started at COPA-DATA in the summer of 2009. I mainly spend my free time participating in sports. In winter I like to go cross-country skiing in the mountains. In summer I run a lot and sail. I am also passionate about surfing. **In ten years, I see myself:** Being healthy and strong, both in my private life and my professional career. One of my dreams is to own my own sailing boat and to sail the world's oceans in it. **Me in three words:** sporty, helpful, ambitious.

RAINER MICHELIS

Function at COPA-DATA: Managing Director, COPA-DATA USA Corp. **Motto:** The customer always comes first. **Responsibilities/Background:** Since October 2009, I am the Managing Director of COPA-DATA USA Corp. which serves the entire North-American market; Canada, the United States and Mexico. Before joining COPA-DATA, I worked at Siemens Corporate Research where I was responsible for the development of the US market. **Myself in three words:** committed, accessible, reliable.

ROBERT HARRISON

Role at COPA-DATA: Industry Manager Pharmaceutical. **Motto:** Chance favours the prepared mind. **Background:** I really have made use of the free immigration status within the EU. I grew up in a small village in the North of England. I worked there as 'man and boy' at the Michelin Tyres production plant. I trained as a Design Engineer at Michelin responsible for automation design across the factory, then progressed to become an Engineering Manager. I studied for a Degree with the Open University in England, alongside my career. With over ten years under my belt and a wealth of experience, I left the sunny shores of England to work in France. In Grenoble I got to know a totally different culture: how to cook, speak French and ski. It was a rich life which also involved a little work; at the Institut Laue Langevin (ILL), a leading nuclear research facility. I worked for the controls division and continued my engineering in the form of research & design for cryogenic environment control. CERN, Switzerland, was my next port of call; to work on the world's largest particle accelerator, the LHC (Large Hadron Collider). Making things work is the engineer's goal, and sometimes the only focus; with systems as large as the LHC, where the prospect of failure could mean catastrophic consequences and nuclear exposure, 'how things fail' is much more the focus. All in all, it was a tremendous learning experience. I then travelled to Stockholm, Sweden, for a project building a new pharmaceutical plant. I was a Project Manager responsible for the BMS & EMS design and commission. My last role before coming to COPA-DATA was with EPLAN Software & Service, as an International Engineering Consultant. There, I used my experience as an engineer in different environments and transferred know-how about EPLAN's CAx software through training, presentations and consultancy. Now, I continue to embrace all my previous experience, through my work at COPA-DATA. **Family and interests:** I have a beautiful young family and, for the most part, I happily spend time with my son Felix and my wife Angela. I love to cook; France has never really left me. My Piano and guitar playing quite heavily afflict my poor family's ears. Cycling and running help to keep the weight off and to keep me fit, and I like swimming in the nearby lake in the summer months. **In ten years time I see myself:** I am very new to COPA-DATA and this has many challenges. I would like to gain the knowledge to achieve the demands of today and transfer this knowledge to others.

Human resource development at COPA-DATA

EXPERIENCE AND INSIGHT FROM THE CONSULTING DEPARTMENT

Like any company that is constantly growing, we also have the challenge of employing the right people. The quality of the company's performance in the future is ultimately hugely dependent on the qualifications of these new employees. This is the reason why we consider recruitment very important at COPA-DATA and why we act responsibly when recruiting.

Two aspects must always be taken into account: On the one hand, the expert know-how and, on the other, the oft-cited 'soft skills' that an employee must have in order to best integrate themselves into the existing structure of both their area of professional expertise and socially. Only if there is a good balance of these two aspects can it be assumed that the new worker can be both productively deployed and that he/she enjoys their work.

To ensure this is the case as much as possible, we have developed a suitable recruitment process. However, before it gets to the recruitment process, all qualified applicants must contact us and submit an application. In the past, primarily up to the start of 2008, this was a major problem, because there were very few specialists on the market who met the given requirements.

From the point of view of the Consulting team, there were very high technical requirements: from classical IT, through programming, databases, and operating systems, including CE, to the process level (PLC, field bus systems, numerous protocols etc.). There is currently no formal qualification that fully covers all the technical areas we require – no 'one-stop-shop' qualification. It is, therefore, evident that we can only concentrate on partial areas. Even when carefully assessing applicants, we can have no assurances that we have selected precisely the right person. We only find out how well someone fits in with us and our customers after practical experience.

Naturally, there is an induction period where a feel for the new employee is gained. Nevertheless, this usually only happens at a late stage in the recruitment process, once the Job Specification has already been defined and the pay has been established. By that point, if the decision does prove not to be 100% satisfactory, it is then very difficult to make changes.

This usually leads to a quick separation, where all resources that had previously been used to appoint the employee were, in retrospect, in vain. The only thing that remains is the cost of recruiting.

For this reason, we decided to take a different approach to recruiting. Three approaches have proved to be promising:

1. Students as part-time employees
2. Practical semesters and/or work carried out as a dissertation for a degree course
3. Training apprentices

STUDENTS AS PART-TIME EMPLOYEES

We started to cooperate with educational institutions at an early stage in the company's development so that we could gain long-term specialists for our needs. Thanks to this cooperation, we give students the chance to earn a commensurate additional income alongside their studies. Many apprentices are happy to take advantage of this and take on diverse roles at COPA-DATA, in order to study and gain practical experience at the same time.

Furthermore, they experience a pleasant and motivating working environment where they are supported by colleagues so they can also experience complex and challenging work in an enjoyable way. This cooperation has a long-term focus and offers us the chance to get a sense of potential new employees over a longer period of time. Does somebody particularly like a certain area, or do they tend not to like certain activities? All these findings are of great importance for any future cooperation. We try to place employees in areas where they are most happy, where they enjoy working and also where they can develop their expertise in their chosen subject area. Thus, we can be sure

that their output also corresponds to our expectations.

PRACTICAL SEMESTER AND/OR WORK CARRIED OUT AS PART OF DEGREE COURSE

We also offer students at institutes of further education the opportunity to carry out project work, practical semesters or diploma theses as part of a degree course when working with us. This usually happens at the time when they are switching from part-time employment to a longer term working relationship, so the students can spend more time at the company.

There are enough possible topics for joint work; there are many new things to research. As a result of our constant striving to improve in all areas of the company, there are numerous possibilities for students and their final year work. In doing so, we ensure that the topic chosen is one that reflects the student's studies, that the student agrees with the topic and that the student can identify with it. A real, practical focus is important to us, so that all the people involved can ultimately benefit from the experience. This helps the student to complete their studies and provides them with valuable practical experience, the company can evaluate the results of the work, and the educational institutions have gained a valuable partner which enables them to train their students with a sound practical basis. This is demonstrated by the many examples of committed cooperation with technical colleges, universities of applied science, academic universities and research institutions.

This well-proven method of going from a part-time employee to a practical semester and then to a final year project, where we permanently supervise students and then, hopefully, welcome them to our team as a full-time employee is one we prefer. Nevertheless, it is

also possible to enter into this process at a later stage and even possible to start by completing your final year project with us. Whichever way, we have had only good, successful experiences from this kind of collaboration.

APPRENTICE TRAINING

For several years, we have also worked to try and train apprentices in our different departments. The market for apprenticeships is a very dynamic market. New and exciting apprenticeships are always being created to meet the demands of the economy. Great value is placed on 'dual training' in Austria. Around 40% of all school students decide to do an apprenticeship after completing their compulsory schooling. No company can cut themselves off from this potential and, with our "Information Technology" apprenticeship, we have found something suitable for the market conditions and us. This apprenticeship involves, simply put, everything to do with the lifecycle of the development of a piece of software. In May 2007, we were finally able to welcome our first apprentice for this vocational training in our Consulting department. It was a very exciting time. Although the apprentice was considered the best by means of our usual selection process, we did not know how much 'know-how' a secondary school leaver would already have and what we could expect.

With us, the apprentices go through all stations in the lifecycle of a piece of software. Starting with the requirement specification, through the creation of training documentation up to maintenance of the finished product. The commercial aspect is also covered. The apprentices experience basic training in all areas and they have the opportunity to act independently, although naturally under professional supervision. We now employ a total of four apprentices in the COPA-DATA headquarters, two of which are in the Consulting department and another two in the Administration department. We would like to employ an apprentice every year in the future. This means that, with an apprenticeship duration of three and a half years, we will employ three to four apprentices in Salzburg at any given time.

With regards to technical know-how, it was surprising for us to see how much basic know-

ledge the apprentices already had. They are keen to learn and have no problems integrating themselves into new environments and contribute attentively and productively. In addition, it became evident that the apprentices brought a completely new atmosphere to the team. Besides the technical training, the challenge of contributing to the personal development of an adolescent is important to us; to promote new approaches and give new ideas for them to consider. I personally observed that the general manner in which people dealt with each other became more and more positive. The apprentices are a very important part of our team.

Against this backdrop, COPA-DATA is an ideal training location for young people looking to start their professional career. With the training of apprentices we not only guard against a lack of skilled staff in this area, we are also training in the very technical areas that are needed in the future. A pleasant side effect is that we are also making an important contribution to the development of young people in society.

These three options provide some decisive advantages in comparison to common recruitment measures. Training in our own company provides:

▷ Qualified staff that can be deployed immediately: staff are equipped for own needs and those of the marketplace. We can focus better on specialties and priorities that are important for our company.

▷ Less "miscast" staff, because there is enough time in an apprenticeship period of one to three years (work experience placement or apprentice), to establish the personal and professional suitability of a person, as well as their motivation and ability to work under their own initiative.

▷ Lower rate of staff turnover because good and challenging vocational training also increases the sense of belonging and general job satisfaction.

▷ A good reputation in the regional employment market because organizations that train people also assume some social responsibility for the younger generation.

▷ More stable salary and wage structure because new employees must usually be attracted with salaries above those normally paid.

▷ Personnel shortages are often overcome because apprentices can usually be deployed at short notice to carry out other duties.

▷ Productive output because apprentices can be deployed directly and have obtained precisely those skills they need for their subsequent activities thanks to specific training.

Our experience has shown that young people are committed, can work independently and that it is very important to them that they produce good work. If you give them responsibility, they embrace it and can be trusted with it. Our training at COPA-DATA is undertaken in line with this principle – a training method that we also wish to continue in the future. ✍
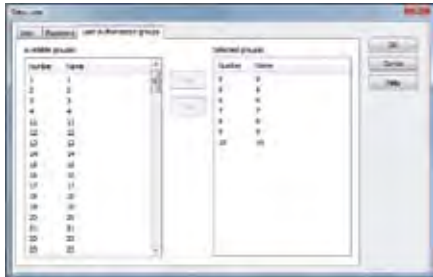*Wolfgang Moser*

USER ADMINISTRATION IN ZENON
Reduced effort, easy handling

The management of user access in today's automation environments is increasingly important, especially with the constraints of the FDA regulations and the GAMP guidelines. zenon version 6.50 makes improvements right at the heart of user administration; making user management clearer and much easier to achieve.

[SCREEN 1] User authorization settings, zenon 6.22

USER GROUPS

In the previous versions of zenon, a user is granted access to a project with certain rights set by the administrator. (See Screen 1)

In zenon, the authorizations are given by numbers and for each user of the project the levels would have to be given individually. When a system incorporates more than one project, the administration would have to be carried out on each project individually.

This achieves the goal of restricting user access on a system, and also adheres to the strict FDA regulations for the Pharmaceutical and Food & Beverage industries. However, customer feedback and interaction has made the team here at COPA-DATA realize how cumbersome this method was becoming to manage for the IT systems engineer, and has motivated the development team to progress the functionality.

zenon version 6.50 offers the same functionality for user administration in order to keep previous projects and previous practices alive with no need to modify. Now, in addition, user groups have been implemented. A user group is attributed certain authorizations which relate to a certain function, for example:

OPERATOR   Has the rights to select and load recipes, to view
                running data.

MAINTENANCE   Has the rights to adjust running data, but not able
                to load recipes.

MANAGER   Has the rights to view and modify all data.

When a user is added to the project, predefined user groups can be attributed to this person. Thus all the access administration is concentrated on particular group activities, and a person is then given the right to these activities. (See Screens 2,3).

ACTIVE DIRECTORY

Active Directory is complimentary to the user administration in zenon. Because Active Directory is centrally stored on the server, for zenon projects administration of user rights can be centrally controlled and maintained.

Two methods exist to make use of Active Directory. The first stores the authorization levels for each individual person. The second makes use of the zenon user groups.

Active Directory stores individual authorization: no users exist in zenon, and therefore no authorizations have been defined in zenon. For a user there are 128 authorization levels in zenon (0 -127), each level is stored as a bit. If the bit is set to true, modification of data for this level can take place. The bits are stored in four double integers (32 bits), giving the 128 bits necessary.

In Active Directory each user is allocated certain authorization levels using these four double integers which are represented in HEX. Active Directory uses groups to identify zenon projects, the Active Directory group is the zenon project name, and the following is the syntax used:

zenon project name##description of the project or logon (free text)

The HEX number for each authorization is added in the Active Directory 'Group description'. Each number is separated by a dash; with the lowest double integer first, leading zeros can be omitted. Example syntax is shown below, with a zenon project called 'Machine01', with authorization levels for 'Operator'.
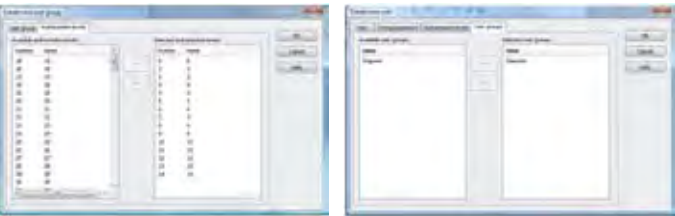
Group name: Machine01##Bediener
Group Description :   ##GRP=FFFFFFFF-FFFFFFFF-FFFFFFFF-
                        FFFFFFFF

The individual users for this logon would be added to the group in Active Directory. The figure Screen 4 displays the name of the zenon project 'Machine01', the authorizations rights in HEX '400-D0FF' and the users allocated these user rights, in this example 'RobertH'. When you logon to the zenon project using your ID and password, these are passed to Active Directory together with the project name. If the project name exists in Active Directory, and the user is a member of this group, the user is granted the authorization levels defined in the HEX value.
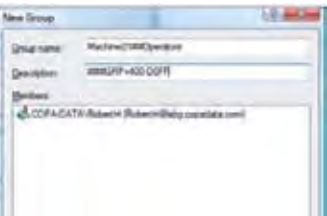
As all user details are stored in Active Directory the administration can be maintained centrally for all the projects on the system. This removes the need for local administration on each zenon project and therefore reduces management time for user access control significantly.

ACTIVE DIRECTORY & ZENON USER GROUPS

The second method of using Active Directory, described earlier, is based on the use of the zenon user groups. User groups in zenon are set up with a specific purpose, i.e. Operator, Maintenance, Engineer, Manager, and the groups are defined and allocated to authorization levels.

In Active Directory the 'Group name' can be linked to the zenon project user group. As a result, an existing logon which is not exclusive to zenon can be attributed to a zenon project. For example, a person using a company's system login (e.g. COPADATA_Salzburg) with a zenon project with the user group 'COPADATA_Salzburg' will be granted appropriate authorization. The figure below shows the user group for the COPADATA_Salzburg login and its authorization levels. When the user logs on to the zenon project with his ID and password, Active Directory validates the user to this project and passes the group name to zenon. If the user group exists in this project the appropriate authorization levels are granted. The advantage here is that the specific control is achieved in zenon, and the generic access is controlled from Active Directory. Thus, knowledge of the actual process is separated from user access control.

ADAM (ACTIVE DIRECTORY APPLICATION MODE)

Active Directory has distinct advantages, as seen above, but this comes with overheads for the IT system manager. Active Directory aims to reach across all systems large and small; this adds cost and time to the system administration. ADAM is a lightweight version of Active Directory without the need for a domain controller. This reduces the setup and maintenance time, and is much more easily scaled for multiple installations. ADAM provides a central management of user accounts for multiple zenon projects, where the password is changed in one place and all the projects are updated. Using ADAM with zenon provides the same functionality as with Active Directory. The software is available free for Windows Server 2003, but is renamed AD LDS (Active Directory Lightweight Directory Services) for Windows Server 2008.

ADAM is far less rigid than Active Directory. For example, multiple instances of ADAM can be running on the same server, thus structuring the system administration to meet your organization's requirements.

This flexible approach can also be of distinct use to the system developer. During a large project that will use Active Directory in the final installation, development in the workshop can be over complicated due to the needs of Active Directory. Using ADAM in this case will allow for the flexibility of development on a smaller scale in the workshop, but facilitate transfer to Active Directory for the final installation.

PASSWORT SYNTAX

Regulations dictate how an organization operates to produce the desired product. But, depending on the industry, regulations and demands can be different. The syntax of a password falls under these regulatory constraints; with password length, upper/lower case, use of symbols and numbers, being factors in the requirements. It is increasingly necessary to verify the syntax of the password automatically, so there is no risk of failing the regulations. With each industry having different demands, this check needs to be as flexible as possible.

When a new password has been changed at Runtime, zenon calls a VBA event 'ValidatePassword'. Two new parameters have been added to this event in order to check and control the password syntax. In addition to the user ID (bsIdentification), the password (bsPassword) is now passed to the event, and a password validity variable (bOK) can be set on the success of the syntax check.

When the event is called, VBA code can be used to verify that the password falls within your company's regulations. The VBA code reflects the needs of the password structure, and returns the value bOK, depending on the success of the test.

SYSTEM VARIABLES 'DAYS UNTIL PASSWORD EXPIRES' AND 'IDLE TIME'

Two new system variables have been added to aid user access control: 'Days until password expires' and 'Idle Time'. 'Days until password expires' returns the number of days remaining until the expiry of the currently logged in password. This is a read only variable and informs the user to change the password before the expiry date is passed. Visual functionality can be added at the design stage to warn the user several days before expiry. 'Idle Time' indicates the time without any user operation in the current login session. This is a read only variable that holds the number of seconds since the last operator activity. The functionality to automatically logout the user can then be implemented in your project.

IDENTIFICATION SYSTEM LOGIN

To use an external identity system, zenon has the functionality to logon without password. In previous versions this was possible only through VBA script, where a new script had to be programmed for each user. Now it is possible through internal settings. When creating a function to 'Login without password', a dialogue box appears. In the dialogue you can select where the user ID originates. If the function is linked to a zenon event (a button for example) the 'User Direct' option is used. If the user ID information is from an identification system the 'Variable' option is used. The identification system writes its data into a variable, this variable is then linked to this function.

The string contained in the variable is used for the user ID, the user needs to be active with authorization rights attributed. The validity for security comes from the identification system, as there is no password in zenon to verify the user identity.

As projects and demands differ throughout a system's life-cycle, flexibility within user administration is essential to achieving your security goals. zenon achieves these goals using internal administration features or via external means such as Active Directory, ADAM, and card/key identification systems. Whichever route suits your project best, zenon helps you do it your way. ✍ *Robert Harrison*

[SCREEN 2,3] User administration showing user groups, and attributing the operator group to a new user.

[SCREEN 4] New group creation in Active Directory specifying zenon authorizations.

[VBA CODE] VBA script verifies new password length & content.

[SCREEN 5] Login without password dialogue, select user name or variable.

Thanks to zenon, the energy supply in Bad Bocklet has been secured – around the clock and according to is energy needs
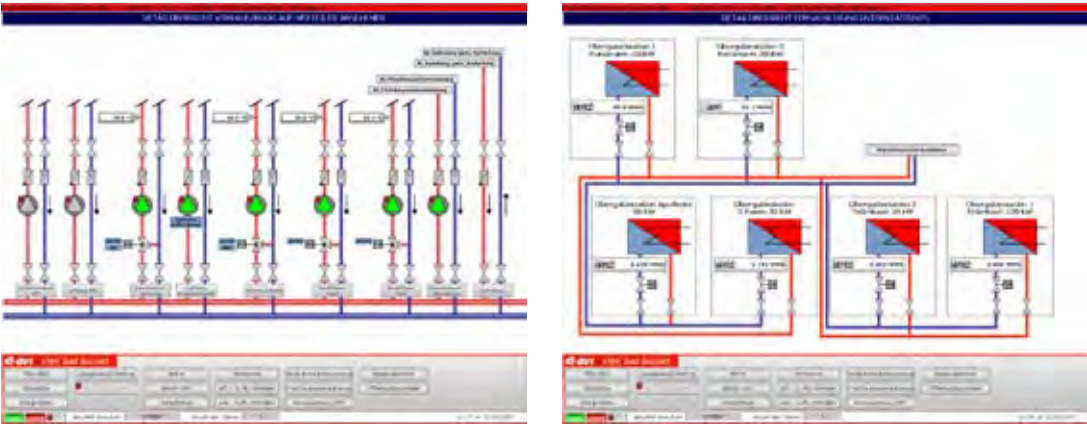
E.ON – ECONOMIC ELECTRICITY AND HEAT GENERATION

Efficient Energy Management with zenon

E.ON Bayern Wärme has implemented a pioneering Biogas project in Bad Bocklet, investing around 1.5 million euros. To visualize and monitor energy creation and energy distribution, the company uses zenon from COPA-DATA.

The concept of biogas combined heating and power generation was convincing for the local authority of the spa town of Bad Bocklet – in both economic and environmental aspects: in the biogas facility, only biomass materials are processed into biogas. In a combined heat and power station, heat and electricity are generated from the biomass material. E.ON Bayern Wärme built the biogas combined heating and power station and operates the town's heating grid. The biogas facilities need around 12,000 tons of sustainable raw materials (mainly corn) annually to generate approximately 4,700 megawatt hours annually, which E.ON Bayern Wärme feeds into the network. The CHP plant therefore provides around a third of the overall electricity required by households and businesses in Bad Bocklet with renewable energy. At the same time, around 3,200 megawatt hours of heat are produced to heat resort facilities, hotels, a pharmacy and a private household.

ZENON – AN OPEN, HARDWARE-INDEPENDENT SOLUTION
The biogas facility has fermenters, post-fermenters and fermented product storage, in which the silage from corn or other biomaterials is processed. In this fermentation process, a methane-rich gas is created from the biomass that is fed to the combustion engine as fuel. The mechanical output at the engine shaft is transformed into electrical energy by an alternator and fed into the electricity grid. The heat lost from the motor through exhaust and through its coolant water is also fed into the heat grid and can thus be used for heating. To illustrate and monitor energy generation and energy distribution, E.ON Bayern Wärme uses zenon software from COPA-DATA. Martin Schütze, project leader at E.ON Bayern Wärme GmbH in Bayreuth and his colleagues decided on zenon for reasons including the fact that it is an open solution and thus the energy company can use all types of hardware as a platform. The energy

company found a qualified partner with whom they could implement the whole project in Prozesstechnik Kropf GmbH. Today, E.ON Bayern has an overview of all important information: with zenon, the operators can control all components of the facility used within the energy generation process and monitor the energy distribution. zenon visualizes and monitors all necessary information on processes, units and machines as well as events, alarms and conditions in the CHP plant The user can select individual components, for example the steam boiler, the heating boiler, the freshwater heating, differential pressure regulator, distributor, standard parameters and time-switch programs in the menu bar. zenon provides not only information on the current status; the solution also provides the basis for optimum operation of facilities.

SECURE PLANNING AND COMPLETE MONITORING
The processes are not only displayed and monitored; they are also documented, analyzed and ultimately archived. To do this, E.ON Bayern Wärme uses the zenon "Extended Trend" module, alarm management and the zenon archive server. The users have the alarm list, event list and report evaluations available, so that they can observe not only the current status, but also evaluate data recorded over a long period of time. Therefore they can not only see which values the equipment is reporting thanks to the "Extended Trend" modules, but can also see how they interrelate and how the efficiency of the equipment is progressing. "In times where optimization of operating costs and comprehensive monitoring is becoming more and more important, it is immensely important that analyses and information that describe the operation of facilities is available at any time and in detail. zenon provides the best possibilities for analysis for our requirements, which always guarantees optimum operation", explains Martin Schütze.

ACCESS EVERYWHERE AT ANY TIME
E.ON Bayern Wärme also uses the zenon WEB Server to publish data throughout the company. The zenon WEB Server brings zenon projects onto the Internet on a 1:1 basis; no adaptations need to be made to the product for this. All screens and information are available online. The web client provides the same look and feel as zenon Runtime. If a project is changed, a project is also available online. This means that all users throughout the company are kept up to date. E.ON Bayern Wärme also uses the zenon remote desktop; with this, employees can log in over the weekend and monitor the equipment for the purpose of upkeep and maintenance. Because the overall operation of the spa in Bad Bocklet depends on a reliable energy supply, safe operation around the clock is an absolute necessity. For the supervisors, zenon provides not only security but also greater ease of use. Energy specialist Martin Schütze comments: "General control of operations, remote maintenance, analysis and secure management of alarms are of great importance to our energy generation and distribution. My many years of experience in managing facilities have shown that zenon from COPA-DATA is a solution that can comprehensively master all duties for the safe and efficient operation of facilities."

OVERVIEW OF PROCESS-RELATED STATISTICS
zenon ensures that preventative upkeep and maintenance as well as economic evaluation of energy generation and energy distribution are possible. For economical operation and optimum supply to the spa, it is essential to have a powerful alarm management system as well as an integrated concept for remote monitoring. ✑

24 HOUR MOUNTAIN BIKE RACE IN MUNICH:

TEAM ZENON ON THE START LINE!

June 20, 2009, the clock strikes twelve: the starting shot is fired. Team zenon starts the first round of many in Munich's Olympiapark; and begins the first minute of 1,440.

Our team consists of four mountain bikers: Tobias Sedlmeier (COPA-DATA Germany), Markus Ziegler (from outside the company), Thomas Gruhn (from outside the company) and me, Christian Hübner (COPA-DATA Germany). We are looking forward to Europe's largest 24h mountain bike race.

Just under 2,500 participants from many countries will be completing lap after lap with us in Munich's Olympiapark. After two laps each, a changeover is made. Therefore, everyone in the team also has enough time to rest. We ride a total of 53 laps with an average time of 00:26:24.

The changeover area in the Olympic stadium is a place with an electric atmosphere. The rider enters the stadium by going through the large Marathon Gate, then the changeover zone is reached and the next rider takes over. He finishes that lap in the stadium then speeds through the large Marathon Gate out onto the course again.

Spurred on by the many spectators, the riders pass by the Olympic swimming pool. Here, an additional metal bridge has been constructed as an "obstacle". It's a wonderful opportunity to jump and really make the metal parts rattle.

Behind the swimming pool, the route leads up to a hill and down again over lawned terraces. After this, hard cobblestones and the Olympic lake await. The rain makes every surface hard work by softening the grass and making the paving extra slippery. Some riders do not make the curve at the lake and wind up in the water. None of our team go for a swim thank goodness!

After circling half of the lake, an overgrown, narrow, muddy path leads to the Olympic Hill. From there, it's downhill again and on to the second hill – past the "Sommertollwood" festival; a really mean challenge because there is the most delicious aroma of festival foods.

The return journey leads back through one of the paddocks to the Olympic stadium. However, because no change is necessary after the first lap, we ride past the changeover zone. Here we also go past our box, which is good, because this helps us with an extra burst of support each time. Then, on the other side of the stadium, it's out to the velodrome, on to another part of the lake and one of the key areas: the slope.

From flat ground, you ride at full speed towards the slope, which can barely be climbed on foot. Only a good amount of momentum can help. It is so steep that you barely have the time to shift down from the very high gear to one of the lowest gears to make it possible to complete the ascent on the bike. Even the pros amongst the very diverse group of riders have to get off repeatedly.

But, with a little bit of luck, the slope is free and it is possible to cycle up it quickly without a blockage. But during the course of the 24 hours we do crash at this point, however it doesn't cause us any problems other than a little bit of lost time.

The rest of the course up to the Marathontor is then easy. Up to the Olympic stadium for the next changeover, one twin lap after another until Sunday at 11:45, when the bell rings for the last lap! And now, after the race? The course was really tiring, but the race was a great deal of fun.
Christian Hübner

The successful team , from left to right: Markus Ziegler (extern), Thomas Gruhn (extern), Christian Hübner (COPA-DATA Germany), Tobias Sedlmeier (COPA- DATA Germany)

FORUM TELECONTROLLO 2009
COPA-DATA Italy presents zenon Energy Edition

The eleventh Telecontrollo symposium, which focuses on telecontrol, took place on October 14 and 15, 2009 in Rome. COPA-DATA Italy used this as an excellent opportunity to position itself as a central player in the energy sector by showcasing the zenon Energy Edition.

As part of the debate "Future scenarios – substation automation" on the second day of the event, Giuseppe Menin, Area Sales Manager at COPA-DATA Italy, demonstrated the best way to automate and control energy equipment; how it can be networked using IEC 61850 with an IED (Intelligent Electronic Device) and also how it is connected to remote substations using 'Process Gateway' and IEC 60870-5-104. zenon Energy Edition, software adapted especially for the discerning energy sector, was used. This software enables complex requirements for process management, automation and remote control of substations to be implemented easily.

In one single development environment, zenon Energy Edition integrates HMI and SCADA functions, in addition to the soft-PLC IEC 61131-3 straton and the IEC 61850 communication protocol, as well as Process Gateway for the exchange of process variables and data to remote stations. Specific customer requirements can also be incorporated. For instance, at Terna, one of the largest energy supply companies in Italy, complete compliance with the SAS2006 standard is also delivered by zenon Energy Edition.

As part of the symposium, the core product functionality of zenon was presented. Our Italian colleagues demonstrated how zenon is excellently suited to the conditions of industrial PCs: redundant server, client/server network, web function and archiving of process data. Even the manufacturers of embedded systems get their money's worth: they can use zenon to supply their machines with IEC 611131-3-programming and connect to the most common field bus systems – Profibus, Profinet, CanBus, Ethercat, Bacnet and Modbus. With its diversity of drivers, zenon simplifies access to embedded systems, the world of telecontrol and the latest generation of network solutions. ✎ *Klaus Rebecchi*

COPA-DATA ITALIA
Event in Verona

On October 6, 2009, a total of 40 interested people accepted COPA-DATA Italy's invitation to the Park Hotel Villaquaranta in Verona, where the new features of zenon version 6.50 were presented for the first time worldwide.

"Anyone who uses a HMI/SCADA system primarily needs to be able to visualize process data quickly and clearly. This is one of the priorities that our experts concentrated on when developing zenon", said Klaus Rebecchi, Manager of COPA-DATA Italy, when opening the event.

In addition to the graphical enhancements, the new .NET development environment was the center of attention. Plus, vertical data integration (by connecting to the SAP ERP platform) was also covered during the event. Vertical integration ensures that data from the process level can be optimally used in SAP R/3; the bidirectional communication enables continuous transfer of data.

Using a real customer example, Mr. Massimiliano Baruzzi showed how zenon contributes to effective automation at Sacmi Imola S.C. After this, Mr. Massimiliano Cassinelli, Technical Director of the Automazione Industriale department (industrial automation department) presented a new Internet platform which focuses on the topic of automation and described the different aspects of media cooperation with COPA-DATA.

COPA-DATA would like to thank all attendees and people involved in the event! ✎ *Klaus Rebecchi*

SALZBURGER BUSINESSLAUF 2009
Top positions

On September 17, 2009, the Salzburg Rif University was the setting for the Salzburger Businesslauf (an athletics race organized in Salzburg for businesses to compete against each other) for the third time. We entered the event that is held over a 6km course, with three teams consisting of three members. Around 2,100 guaranteed starters and 700 corporate teams set a new record for the number of participants competing in this event, which ensured not only increased competition but also more networking opportunities. The consistent race preparation, stretching, dextrose and a good portion of pasta on the day of the event enabled our teams to perform to the best of their abilities. Statements such as "It's not the winning or the losing, it's the taking part" or "The time I get isn't important" paled in to insignificance when the starting pistol was fired. That which had previously been referred to as 'only a hobby' now looked like a top-level competitive sport on the track. The trick is to focus mentally on the finish line, manage how you exert your strength, control your breathing and to not let yourself be influenced by the pace of others. All nine COPA-DATA participants managed great results. ✎ *Julia Angerer*

AT 500 METERS ALTITUDE
The COPA-DATA alpine hike 2009

The weather God was good to us when we went on our planned walk up to the alpine hut at St. Koloman (Hallein) and we took advantage of the end of the spell of good weather we had in 2009. The rain that had been forecast did not arrive, so we were able to enjoy the excellent food and authentic alpine schnapps in a relaxed atmosphere. Unfortunately, it was not possible for everybody to be present, since the business also has to continue to run when the mountain calls! Approximately 15 fans of fresh mountain air took the opportunity to enjoy the open air, pleasant conversation and substantial snack. Because everybody was so good on foot, we made the descent whilst it was still light and the headlamps stayed in our rucksacks! We have already planned the next peak for 2010... ✎ *Inge Steger*

THEMED WORKSHOP 2009 AT THE STARNBERGER SEE

10 years of COPA-DATA Germany – success all the way

"Usability – visualize perfectly with zenon" was the theme for the COPA-DATA workshop on October 2, 2009 on the Starnberger See (Lake Starnberg). Over 200 visitors took advantage of the opportunity to explore the topic of user-friendliness at first hand. It was a special day for the company: The German COPA-DATA subsidiary was also celebrating its 10-year corporate anniversary.

"In the past ten years, COPA-DATA Germany has Successfuly established itself in key industries, namely the automotive industry and the food & beverage industries. For this I thank not only my competent and committed staff, but also our customers, who put their trust in zenon HMI/SCADA software", said Jürgen Schrödel, Managing Director of COPA-DATA Germany, when opening the event.

During a boat trip on a catamaran, the MS Starnberg, the guests enjoyed exciting expert contributions from experts and practitioners. First class speakers showed how you can manage technology, optimize work and exploit potential with the aid of user-friendly solutions.

USABILITY ENGINEERING
IN INDUSTRIAL AUTOMATION

Dr. Elke Maria Deubzer started with her presentation "The laws of perception, thinking and acting" as a basis for user-friendly creation of human-machine interfaces. She is the head of the PMO Psychological Institute for user research and usability engineering in Munich. The usability expert bridged the gap between theory and practice graphically and with well-researched information. Dr. Deubzer stated "The uppermost objective when creating a Graphical User Interface (GUI) must be that the user can always concentrate on the content and that as little effort as possible is required to recognize and interpret screen elements". She went on to explain important design principles for user-orientated GUI development.

One of these principles is 'the law of the magic number 7'. "The capacity limit of the working memory is seven, give or take two units. 'Chunking', i.e. the grouping of elements in 7+/- units, makes it easier to record and retain information. In doing so, it is essential that these groupings make sense to the user," explained Dr. Deubzer. Using impressive examples, she explained other principles including some of those applicable from Gestalt theory, such as the law of proximity and the law of similarity.

ERGONOMICS IN PRACTICE –
HOW SIG COMBIBLOC AND KHS
EXPLOIT POTENTIAL

The presentations based on practical experience also aroused particular interest. Peter Holzkämper, responsible for visualization and industrial PCs at SIG Combibloc Systems GmbH, explained how a human-machine interface based on zenon can best be designed using the actual example of a packing line. The company is a leading manufacturer of cardboard packaging systems and filling machines for drinks and foodstuffs. It supplies both the packaging material and the corresponding filling machines. To create a scalable structure and an HMI that can meet the demands of the future, it was essential for SIG Combibloc to consider a modular concept. That means creating a user-friendly master plan which takes into account factors such as industry standards, regulations (such as FDA regulations), a style guide and requirement specification. Altogether this leads to a consistent look and feel. When developing a new GUI one has to consider that demands of every user group – from system experts to end customers – should be met. Holzkämper said: "HMI solutions that are adapted to the intellectual, sensory and motor requirements of the user are highly sought after. They perform a bidirectional interpreter function, so to speak." Developing a new user interface in this way naturally takes some effort. "But the advantages clearly outweigh the disadvantages: higher quality, higher availability of equipment, lower incidence of problems, less training required, simple maintenance – to name just a few, " continued Holzkämper.

Wolfgang Buchkremer, head of the Line Automation department at KHS AG provided a comprehensive insight into the activities of the company. KHS AG operates internationally as a manufacturer of filling and packaging equipment for the beverages, food and non-food sectors. The KHS Group now employs 5,700 employees and generates total revenues of nearly a billion euros. For Buchkremer, it is most important to apply standards on a technological and ergonomic basis. This is vital for an organization with a diverse range of products including mixers, filling machines, labelers, conveyors and packaging machines through to MES systems. "However, what is ultimately decisive when creating the user interface for production systems is not to merely implement what is technically possible but to strive to create the interface in a way which would enable the employees to operate equipment in the best way," explained Buchkremer.

In this context, it is important that not only technicians are included in the design stage, but also other disciplines such as designers and psychologists, in order to create a modern,

Usability-Workshop at the MS Starnberg

Jürgen Schrödel,
Managing Director COPA-DATA Germany

open and contemporary solution. Buchkremer stated; "The time invested in concept development and benchmarking must be worthwhile for the company and its end customers. For example, if the operational safety increases quantifiably, staff costs are reduced, the machine or line efficiency increases etc. The end customer must be able to clearly see value added."

In addition to these technical highlights, the views around the lake, good music and magnificent food ensured that the guests were entertained and enjoyed themselves. COPA-DATA Germany would like to sincerely thank the people who gave presentations for their excellent preparation and handling of the topic of usability. And we would also like to thank all visitors for their interest and active participation. We look forward to the next themed workshop in 2010! ✍ *Susanne Garhammer*

SMART AUTOMATION AUSTRIA 2009
Positive, promising, motivating

You needed to be ready for anything in an economic year like 2009. Anyone for whom it has been "business as usual" really counts as one of its few lucky winners. It was to be expected that the market situation would not leave the trade fairs unaffected. The Austrian automation industry was therefore very apprehensive about SMART Automation Austria in Autumn 2009: what repercussions would the economic crisis have in the Design Center? This was naturally also the main question for us, and we went to Linz with mixed feelings. But expectations were still very high, since SMART is of course the leading Austrian trade fair for industrial automation. Our trade fair presence focused on smooth-running line management and effective energy management with zenon. Using different demo examples, we aimed to explain and demonstrate, how you could configure equipment individually with zenon, and be quick and save resources in the process. We also presented our Energy Management Systems (EMS) at the trade fair stand and showed how consumption peaks can be recognized in advance. Thanks to quick automated reactions, EMS can be used to avoid exceeding the agreed amount of energy consumption, which can be expensive; this leads to the optimum use of energy in compliance with terms set out in energy supply contracts. On the first day of the trade fair, all fears of a decline in visitor numbers and over-cautiousness went up in smoke. SMART had many visitors from the start. This resulted in positive impulses, promising contacts being made and an inspiring atmosphere. With 184 direct exhibitors and 8,297 trade visitors, the exhibition, which ran from October 7 through October 9, also managed to maintain its role as the industry meeting point for national and trans-regional automation industry players in this year of economic crisis. We would like to thank all visitors for their keen interest! *Gerd Klier*

SPS/IPC/DRIVES 2009 IN NÜRNBERG
A dynamic sector with exciting prospects for 2010

In 2009, Europe's number 1 trade fair for electrical automation, SPS/IPC/DRIVES, took place for the twentieth time in Nuremberg. 48,595 visitors and decision-makers from construction, development and production were interested in the automation solutions offered by the 1,237 exhibitors. We also presented our new products and expertise on a 175m2 stand.

The main theme of COPA-DATA's presence at the trade fair, undertaken by COPA-DATA GmbH in Ottobrunn near Munich, was automation solutions for the automotive sector that utilse zenon. Additional highlights were energy management using zenon and the possibilities for analysis and evaluation that zenon provides to the Food & Beverage sector. Our experts also gave advice about connecting directly to ERP systems (such as SAP).

The trade fair also provided the perfect opportunity to present zenon version 6.50 to the wider public for the first time. The software release features numerous improvements. A multitude of new graphical features guarantee personalized user interface design and increased user-friendliness. For the three key industries of Automotive, Food & Beverage and Energy, zenon 6.50 offers a range of bespoke features. Examples of these bespoke features are discussed in articles elsewhere in this edition of IU.

For example, you can read more about the integrated "S7 Graph" screen type for automobile production on page 23. Further information on equipment modeling based on ISA S95, which is primarily significant for the process industry, can be found on page 20. Details on the error detection that has been implemented, making it possible to find short circuits or ground faults in the topologically calculated energy grid more quickly, can be found in the article on page 22. *Susanne Garhammer*

zenon heats the spa town of Karlovy Vary

Karlovy Vary in the Czech Republic – also known as Karlsbad in German-speaking countries – has an excellent reputation worldwide as a thermal spa town. One of the town's main suppliers of teleheating is Karlovarská teplárenská, a.s. The company's main activity is the production and distribution of heat energy. Karlovarská teplárenská, a.s. employed the experienced System Integrators Prozesstechnik Kropf s.r.o. to deploy zenon in order to modernize their SCADA system.

HEATING THE TOURIST HOT-SPOT OF KARLOVY VARY

The popular historic spa facilities with thermal springs and baths made Karlovy Vary a popular destination for spa guests and tourists. The town also boasts the second oldest golf course in Europe and many architectural sights worth seeing.

To ensure that guests and residents are supplied with heat and electricity, the 79 employees of Karlovarská teplárenská a.s., have laid out 63 km of hot water pipes, 17 km of warm water pipes and 1 km of steam pipes across Karlovy Vary. The company produces, distributes and trades in thermal energy. In 2007, over 1.4 million gigajoules (GJ) of energy was put into circulation; 765,000 GJ of this was produced by the company itself.

In addition, Karlovarská teplárenská is active in the production and trading of electrical energy. In this capacity, approximately 1,300 MWh of energy was fed into the electricity grid in Karlovy Vary in 2007.

Karlovarská teplárenská operates the Bohatice combined heat and power (CHP) plant and the hot water boilers in the Doubí and Tašovice boilerhouses. In addition, heat is purchased from Sokolovská uhelná, a.s. This heat is generated from the fuel supplies of the municipality of Vřesová and directed to Karlovy Vary by means of a teleheating pipeline. Two hot water boilers from LOOS International are used in the Bohatice CHP plant. One produces 18 tonnes per hour (t/h) of superheated steam and the other produces 30 t/h. This takes place at a temperature of 230°C and a pressure of 13 bar. In addition, a 1 MW gas turbine, which is also equipped with a waste heat boiler, runs with an output of 4 t/h of superheated steam, also at a temperature of 230°C and a pressure of 13 Bar. The waste heat boiler uses the heat from the exhaust gases of the gas turbine. The heat gained from the superheated steam supplies a steam pipe for two industrial laundries and three independent steam-water transformer stations with 34.0 MW, 7.2 MW und 4.0 MW respectively.

QUICKER, SIMPLER, SAFER

Obsolete technology – the FactoryLink IV system running under Windows 95 - had been in use, unchanged, for twelve years. This, combined with the large distances from the control center to the turbines, as well as communication that used several convertors, caused an increasing amount of problems. As a result, Karlovarská teplárenská a.s. decided to use a modern SCADA system to manage the supply of heat and energy to Karlovy Vary. To implement this, a company experienced in SCADA integration was chosen - Prozesstechnik Kropf.

Petr Mandák, Process Control and Monitoring System Manager at Karlovarská teplárenská a.s., says: "We wanted the new SCADA system to provide us with the latest technology, including the possibility of being able to change projects independently." Given these requirements, the engineers at Prozesstechnik Kropf decided to use zenon from the European automation experts, COPA-DATA.

Tomáš Lípa from Prozesstechnik Kropf explains, "With zenon we have a reliable and easy-to-use tool for monitoring and controlling our teleheating production. zenon has enabled us to integrate different stations with different communication protocols into a common network without problems". In addition zenon makes it very easy to set parameters, and the employees at Karlovarská teplárenská quickly learned how to adjust settings for their projects for themselves.

Harmonizing the communication throughout the plant appeared to be a major challenge within the project to modernize the equipment. Six Schneider PLCs were connected using Modbus Plus. A Siemens S5 also ran via Modbus RTU. With the old system, each computer had to be equipped with the appropriate communication card in order to be able to visualize and thus be able to read required data – an expensive, inflexible and, thus, unsatisfactory solution for the long term.

Tomáš Lípa continues: "We used zenon's ability to communicate with various control systems and to integrate easily into a network. Using a

Schneider converter and the W&T ComServer, we harmonized Modbus Plus to Ethernet TCP/IP Ethernet." As a result, all data is available on all computers at any time via the intranet. It is primarily the client/server architecture that reduces load placed on the network and, therefore, reduces costs. Even the subsequent expansion to a fully redundant system has been prepared for: with zenon, all that is required is two standard PCs and a few mouse clicks to configure them.

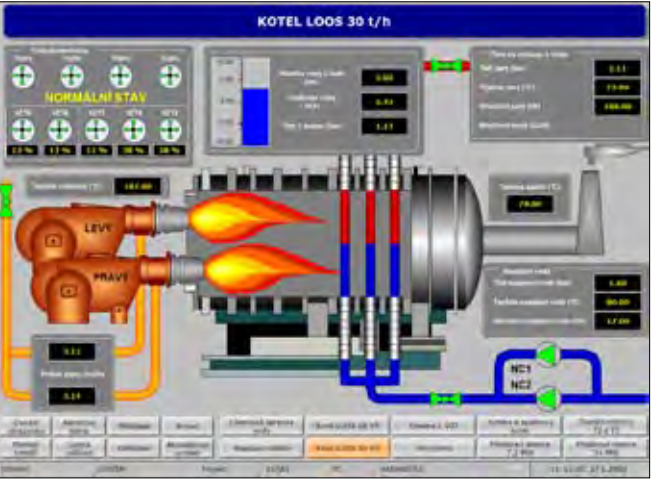**AN OVERVIEW PROVIDES SECURITY**

In order for the engineers at Karlovarská teplárenská a.s. to have an insight into all events at all times, Tomáš Lípa and his team rely on a zenon web server with three clients. zenon can get such projects onto the web, with no additional work required. With no extra programming, the equipment can be monitored using the web browser, even by computers that are not directly connected to the system. Thanks to zenon's implemented security standards, access is only possible for authorized users.

In the CHP plant itself, the users now enjoy long-sought-after reliability. Visualization runs as a dual monitor system, which ensures a good overview and, thus, improves safety. Every alarm and even every system event is recorded and can be evaluated in detail. zenon's Extended Trend displays historical values and online data as graphic curves. It allows for an unlimited number of curves, which can be displayed at the same time and scaled as desired. COPA-DATA Product Manager Reinhard Mayr says, "In Extended Trend, each curve has its own independent y-axis, for which parameters can be set, the curves can be scanned with a cursor and all desired variable values can be shown." Because two time axes can be displayed in a diagram at the same time, two different time periods can be easily compared with each other. The trend can also be stopped, freely scrolled or zoomed, to analyze or measure particular sections precisely. Tomáš Lípa: "An overview in the control room and precise analyses give our customer, Karlovarská teplárenská a.s.

precisely the tools they need for efficient and secure production. Because zenon is also compatible between different versions, control and visualization can be subsequently expanded as and when required. It's also no problem to integrate applications such as SAP ERP." ✎

TELEHEATING FOR KARLSBAD:

▸ Visualization for CHP plant's multi-monitor systems
▸ zenon Editor 6.22 with 1024 Tags
▸ zenon Runtime 6.22 with 1024 Tags
▸ Ability to track alarms and events
▸ zenon Extended Trend provides historical values and displays online data as graphics
▸ all data is available throughout the intranet
▸ zenon web server with 3 clients for monitoring by means of the web browser
▸ Simple maintenance and further development of projects
▸ Reduced maintenance and development costs
▸ Simple communication via TCP/IP

All values displayed in the screenshots in this article are for illustration only.

Condition monitoring with zenon – all the key figures at the press of a button.

A streamlined production system is based on all the relevant key figures for production and performance always being available, and on production being standardised to the greatest possible extent. At Volkswagen in Emden, zenon is responsible for transparency in assembly, increased productivity and greater plant availability. Thanks to the zenon-based assembly information system, the maintenance engineers benefit from instant access to all production-related information and key figures.

The Volkswagen plant in Emden has a daily capacity of 1,200 vehicles, and has produced more than 9.5 million vehicles since the plant was opened in 1964. The Passat Limousine has been built in Emden since 1977, and the Passat Variant is only built here. The Emden site has been the leading plant in the world for this successful model.

ZENON SETS NEW STANDARDS
Several generations of Passats have been manufactured here. Half way through 2003 the 12 millionth Passat, and in September 2004 the 13 millionth Passat from all Volkswagen plant was produced. The sixth generation of Passat Variant was launched in August 2005. In November 2007 Volkswagen in Emden produced its 1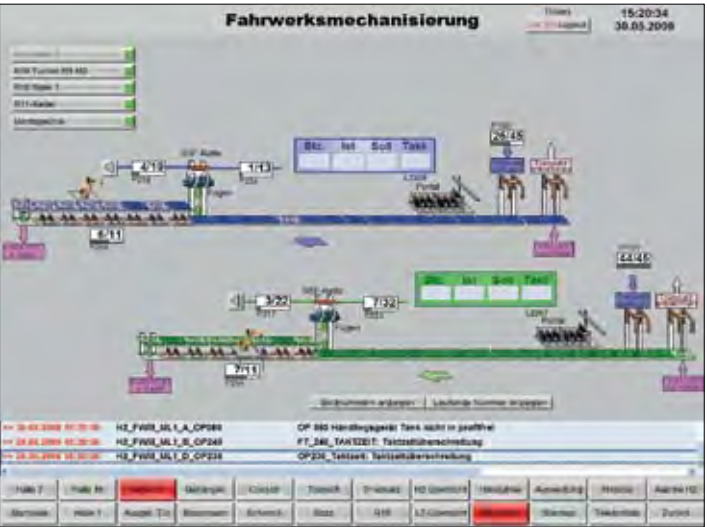5 millionth Passat worldwide. 2008 was the launch year for the new model, Passat CC, that is produced exclusively in Emden. The launch of a new model is usually also the event that triggers investment in new machines and software. Volkswagen in Emden took the production of the new series of Passat models as a trigger for modernising the assembly plant and standardising the base software as well as the overlaid visualisation software. Here, the zenon software from COPA-DATA, which is used for the central plant monitoring system, has been setting new standards in production.

CONSISTENCY IN THE VW PASSAT ASSEMBLY PROCESS
In the assembly process at Volkswagen's Emden plant zenon is now responsible for a total of four assembly shops as well as for communication with high level and low level systems, for the entire flow of information in the assembly plant and for preparing all the data for use in a high-performance, effective information system. There was no other system that was capable of satisfying the requirements of Volkswagen's project managers. An important evaluation criterion for zenon was its use of different controllers and its extensive integration ability. "Because of the increased volume of data in modern plants we were not able to capture data from all sections of the plant and to visualise it all. The systems were overloaded and grew considerably slower. A new solution was required", explains Mario Ewen, project leader at Volkswagen in Emden. In this case more than 120 controllers are involved – different models from different manufacturers. zenon visualises and oversees the entire production flow using more than 50,000 variables, which are transferred to zenon. The entire assembly process is now visualised with 172 displays. Another incentive for developing a new application was the fact that the previous operating system, Windows NT, was to be discontinued. What's more, one of the tools used was no longer supported by the manufacturer. "Overall, the applications from our previous providers were no longer up to the job with the modern, upgraded structure. We compared a number of systems, taking into account our requirements, and reached the conclusion that zenon met all the criteria on our list. We are now using a consistent, standard solution for the entire assembly process", explains Georg-Joachim Loger, maintenance engineer at Volkswagen's Emden plant. This project was implemented by process management staff and production facilities management staff working with staff from COPA-DATA.
Volkswagen was especially happy with the efficient, direct approach and the readiness of the COPA-DATA team to try and give them everything they wanted as well as to incorporate changes as they presented themselves in the course of the project.

DISTRIBUTED, SECURE AND FUNCTIONAL
zenon features all the modern technology that a car manufacturer could possibly ask for. The Volkswagen software is configured as a client/server system with redundancy, and is therefore fail-safe. The internal network at Volkswagen now incorporates eight zenon clients. As well as the redundant server pair, there is also a database and a web server. The COPA-DATA web server serves 100 web clients simultaneously. The various process displays are brought up according to the specific task or functional area. For storing and archiving data, the managers at VW decided on a (Microsoft) SQL-Server. The database is automatically populated from the zenon-SQL-Server connector, which also ensures that the data is read back automatically. Also included is a powerful user management module for defining access rights to the project and system. The user management module is used to specify which users are permitted to view or modify which functions – such as the shift schedules.

WELL-THOUGHT-OUT PROJECT STRUCTURE
The umbrella project, which integrates all the systems in the four assembly shops, includes the system overview displays, the industrial performance analysis, the production and facility manager (for the shift models), the higher-level alarm management, the chronological events list, counters and plant downtime, plus the initial project for the web client. The individual sub-projects include the system displays with detailed information, the driver links and control variables, alarm zones and the plant's shift reference.

ZENON – SUCCESSES BECOME MEASURABLE
One of the important goals for the new overall system at Volkswagen was to gain clear and total control over the assembly processes, both for management and for those working in the assembly shop. One of zenon's exceptional strengths is its ability to manipulate large volumes of data and to display them in a useful format to managers or those working in the plant. Volkswagen's main interest for its Emden plant lay in presenting the key figures for the production process and output in the form of graphs and tables. The car manufacturer can now use these key figures to see how cost-effectively the assembly shop is operating. In other words, results become measurable. The key figures might, for instance, include target and actual values for the overall life of a production line, possible differences, the cycle times, the setting up of events in the plant and their causes, and the number of finished cars. Mario Ewen explains: "Monitoring the key figures ensures that the assembly process is

running as efficiently as possible, and at full capacity. This system provides us with an overview of all the important information, allowing us to carry out detailed analyses and react quickly to events as necessary." Volkswagen could also use this data to detect any delays in the course of the assembly process and the causes, allowing an appropriate response. The integrated soft PLC, straton, which complies with the IEC standards, is used to calculate the buffer, unit, and output counters. To ensure that all the key figures reflect the assembly processes exactly, Volkswagen uses an additional zenon module. The production and facility scheduler (PFS) controls the chronological sequence of operations in Emden: at this plant a number of working hours models (shift system, lengths of breaks, etc.) are used. The shift hours entered from the PFS can be classified, grouped and evaluated. They are also fed into the performance calculations. "When all the figures are combined, they tell the story of how many cars we are actually producing. The opportunities for evaluating and monitoring our assembly processes are more detailed and sophisticated than ever before", observes Mario Ewen.

ALL THE KEY FIGURES, CLEARLY PRESENTED AND READY FOR USE
VW managers can view all the key assembly figures in either table or graph form. Individual users can choose how they want the information to be presented. They can also select from many time scales, and different periods of time can be compared with one another. In this way, Volkswagen workers have access to extensive and at the same time highly condensed information that is available at the press of a button in the form of lists and analyses. The report generator shows the archive entries in table form, and outputs the reports in HTML format - likewise either as a graph or a table. The Extended Trend module is provided for preparing data in graph form. Runtime users can arrange for various graphs to be displayed, and even for more than one graph to be compared. This ensures that all the relevant operators can view and use analyses, reports and graphs. "The central plant monitoring application is a tool for improving availability", explains Mario Ewen.

TOTAL CONTROL
The higher-level visualisation is now also used as a central point for all events in the plant and system messages. Volkswagen used to operate two systems for this purpose, but these have now been replaced by a single standard system. "As well as the system and plant monitoring we also wanted detailed analyses – on the one hand to ensure maximum availability and on the other hand to exploit any potential for optimisation", explains Mario Ewen of Volkswagen. All the operators now know instantly what they should do if they receive a system message, and can respond straight away. Around 5,500 operating messages and system messages per day are produced by the assembly lines in Shops 1 (engine and gearbox), 2 (main assembly, drive assembly, disks, cockpit, etc.) 7 (headlamps, batteries, seats, wheels, doors, etc.) and 16 (initial assem-

bly following paint). All the information is on hand to enable statistical evaluation and analysis with the industrial performance analyser. This information can also be viewed in the form of bar charts or pie charts. Filtering options enable online alarms, historical alarms, pending alarms or reset alarms to be shown, and to specify their display order: by time, class or priority. At Volkswagen the alarms are also cleaned up at a break or shift change. This overlaid cleanup process ensures that overlapping messages are not only added, but that the net downtimes are taken into account in calculating the duration of an alarm. Every alarm that has caused a downtime is stored along with the possible discrepancy in unit numbers. The discrepancies are evaluated either individually or in total using the line, time, and shift plan filters, and are displayed on a zenon screen.

OPTIMISING MACHINES ACTIVELY
To ensure that the entire system can be serviced, maintained and upgraded efficiently, Mario Ewen and his colleagues have opted for zenon. It is important to the managers that all future system upgrades as well as all maintenance operations can be carried out without involving a service provider or other external partner. This saves both time and money.

The industrial maintenance manager is responsible for looking after the machinery and maintenance data. Service and maintenance intervals are easy to specify, manage and schedule, as are the detailed instructions. Those employees who are responsible for maintenance can now see at a glance when equipment, plant and machinery is due for maintenance. All maintenance operations are documented in logs. ✎

VSTA (.NET)
IN ZENON 6.50 – (R)EVOLUTION?

Visual Basic for Applications (VBA) has been a companion in the history of zenon for many years. VBA has offered zenon users the possibility of adapting zenon to their specific needs since version 5.0 (1999).

It is fundamentally impossible for a software developer to cater to every individual customer wish. It is, therefore, self-evident that the users themselves should be given the tool they need to perfectly adapt the software to their specific requirements. VBA, based on Visual Basic technology from Microsoft, was originally intended to control operations in Office programs. Microsoft has made the technology available to interested companies since 1991 but the technology behind VBA has since become a little long in the tooth.

Let's take a look back: 18 years ago, in 1991, an Intel 486 with a breathtaking 50 MHz was considered a really high end system. Much has changed since then; the concepts within VBA are no longer modern or up to modern requirements. Microsoft has indeed expanded VBA with additional features with each new version; however, significant baggage has also been carried over from old versions because the basic concept limited fundamental changes.

For this reason, Microsoft decided to provide software developers with a modern tool for customizing applications based on to current technologies – Visual Studio Tools for Applications. This technology, known as VSTA, is built on the company's own .NET Framework. The .NET Framework provides the developer with over 10,000 classes (in just under 300 namespaces) that can be used to develop completely object-orientated software.

VSTA thus supports basic object-orientated technologies such as inheritance, polymorphs and encapsulation and also provides new programming languages: Visual Basic.NET and C#. VB.NET provides a derived, but basically very similar, syntax to classic Visual Basic and will be the first choice for new users and VBA veterans. Whereas, C# offers a modernized language concept that primarily combines the basics of C/C++ and Java. C# is geared more towards the "full-blooded programmer" who has already written object-orientated software and now wants to create methods and classes in zenon in a familiar way. Ultimately, the developers themselves have the choice – C# or VB.NET? Both languages offer the same functionality thanks to the use of the .NET Framework, because the classes used are identical. Individual preference is the decisive factor when choosing between the two languages.
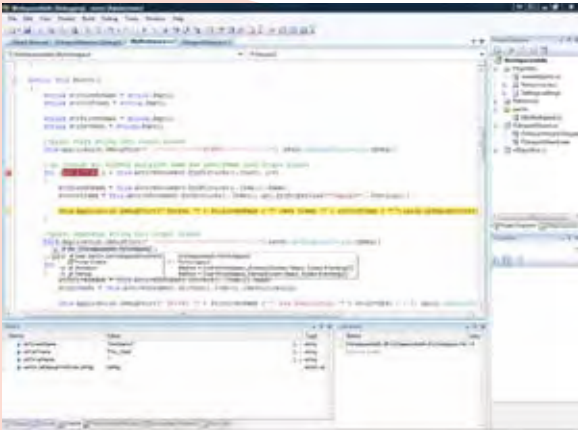
Furthermore, VSTA offers a modernized development environment that will be very familiar to many programmers. Microsoft decided to use the proven Visual Studio development environment instead an IDE it developed itself (thus the naming). In comparison to the VBA code Editor, this means a major step forward, in particular in the areas of user-friendliness, clarity and the developer tools provided.

All programmers value the use of different window modes, which can be used to adapt the user interface to their tastes and requirements.

Plus, with the IntelliSense feature, Visual Studio supports the programmer with functions for automatic integration of code. In addition, IntelliSense offers the possibility of inserting often-used code fragments (such as if/else or try/catch) quickly and simply. Other helpful features include improved syntax highlighting, simple debugging of code and - not least - the integration of MSDN help in Visual Studio – a reference tool for every developer that that leaves virtually no questions unanswered.

DEBUGGING AN EDITOR ADD-IN – VISUAL STUDIO IDE IN USE
VSTA is suitable for both small duties, such as adding a value in the CEL, as well as for complex projects such as Windows Forms applications for automated Import of large amounts of data. In this respect, a significant advantage of zenon 6.50 is that VBA is still available and can be used at the same time as VSTA without problems. Therefore there is no risk of having to port old applications and code quickly and hastily; the change from VBA to VSTA can be done in your own time, if at all. It is possible that one or two people do not want to do without the VBA know-how they have accumulated over the years. In such a case, old forms can be used and macros can be retained even if new requirements are implemented using VSTA. Ultimately, VSTA offers an additional option to adapt zenon flexibly to your requirements and create your visualization as individually as your own product. ✎ *Martin Stark*

Debugging an Editor add-in – Visual Studio IDE in use.

.NET Windows Form Controls in zenon   [PART 2]

In the first part of this series, we looked at the question of whether we can generate an ActiveX control from a .NET control, whether we could then use this in zenon and change it using VBA. In this second part, we intend to look one stage further to expand this .NET ActiveX control in such a way that the zenon-specific expanded functions can be used, i.e. variables can be linked etc. The complete object model of zenon Runtime from the .NET control can then be leveraged and variable values can be connected very easily without using VBA.

This guide is based on the dual .NET control prepared in the first part. We will now show you, step by step, how the additional interface functions necessary for zenon integration can be inserted. It covers the following functions in particular:

```
// called up in zenOn Runtime during Initialize Control
public bool zenOnInit(zenOn.Element dispElement)
// called up in zenOn Runtime during Discard Control
public bool zenOnExit()
// supports the control variable links
public short CanUseVariables()
// which data types the control supports
public short VariableTypes()
// The maximum number of variables that can be linked to the control.
public short MaxVariables()
```
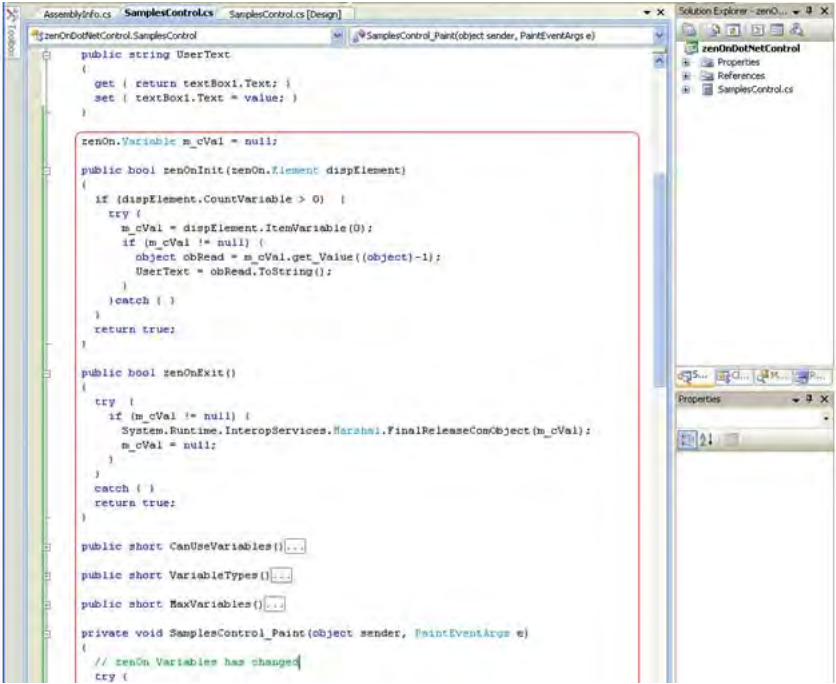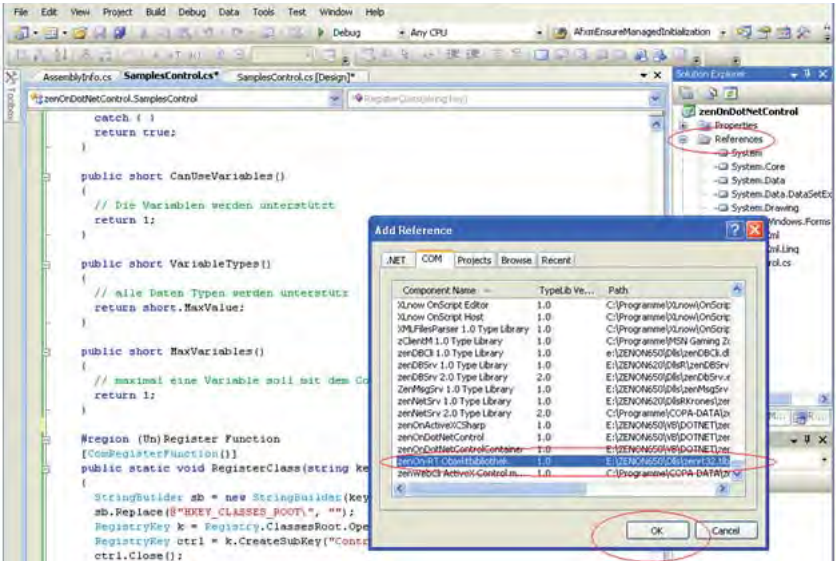
For more detailed explanations on how these interface functions work and how to use them, please refer to the ActiveX tutorial in the zenon online help. This article only covers the technical issues involved in creating this function.

STEP 1
In zenon, you have the possibility to access the internal object model from an embedded ActiveX control using the zenon API (COM Automation interface). To do this, the zenon Runtime object library must be selected under Project References with "Add References…".
By doing this, all objects of the zenon object model are known and therefore accessible.

STEP 2
Now the expanded features can be inserted into the control's class code. This makes it possible for the whole zenon API to be accessed and gives zenon the ability to request information from the .NET control. The control receives its screen element object via the zenOnInit() function, for example when initializing; so to speak as the entry point into the whole hierarchy.

In the following example, the COM object of a zenon variable is temporarily saved in a member, so that it can later be accessed in the control's paint event.

```
zenOn.Variable m_cVal = null;

    public bool zenOnInit(zenOn.Element dispElement)
    {
        if (dispElement.CountVariable > 0)  {
            try {
                m_cVal = dispElement.ItemVariable(0);
                if (m_cVal != null) {
                    object obRead = m_cVal.get_Value((object)-1);
                    UserText = obRead.ToString();
                }
            }catch { }
        }
        return true;
    }

    public bool zenOnExit()
    {
        try {
            if (m_cVal != null) {
                System.Runtime.InteropServices.Marshal.FinalReleaseComObject(m_cVal);
                m_cVal = null;
            }
        }
        catch { }
        return true;
    }

    public short CanUseVariables()
    {
        return 1; // the variables are supported
    }

    public short VariableTypes()
    {
        return short.MaxValue; // all data types are supported
    }

    public short MaxVariables()
    {
        return 1; // a maximum of one variable is to be linked to the control
    }

    private void SamplesControl_Paint(object sender, PaintEventArgs e)
    {
        // zenOn Variables has changed
        try {
            if (m_cVal != null) {
                object obRead = m_cVal.get_Value((object)-1);
                UserText = obRead.ToString();
            }
        } catch { }
    }
```

We now have a .NET control which is not lacking any functionality when compared to a typical ActiveX control. Quite easy really, isn't it?
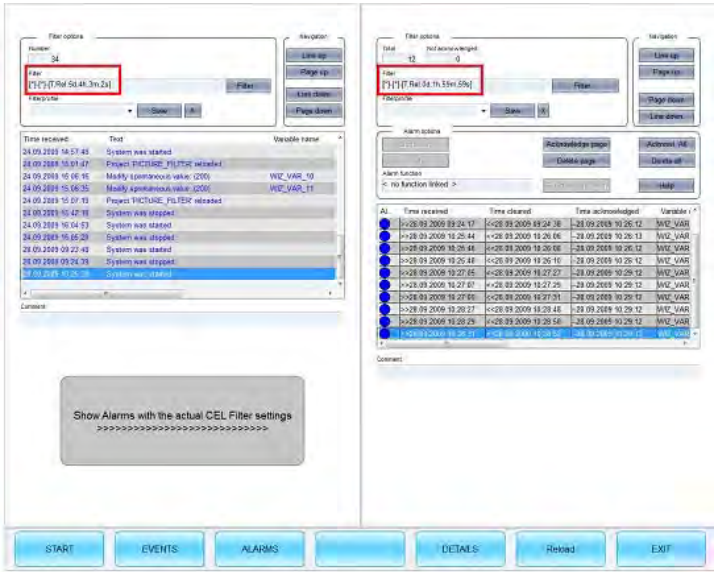
In the next part of this series, we will show you a somewhat different topic on the theme. How existing and non-changeable .NET controls can be integrated into zenon using a wrapper control. Wrapper controls are the only possible solution if you do not have the source code of the .NET control, or you are not allowed or do not wish to change it. ✎ *Günther Haslauer*

Picture-Filter

A NEW GATEWAY IN THE ZENON OBJECT MODEL

The "PictureFilter" object is a collection of DynProperties. These reflect the current filter settings of an MDI screen. Using the PictureFilter, it is possible to read any current filter settings; for example, the current time filter. The time filter is identical for all screen types, but it is necessary to look closer at the other filter settings. For example, a trend screen filter is much more complex than an alarm screen filter.

In the following example, we show you how Chronological Event List (CEL) screen filter settings created by the user are read and how the alarm list is opened on account of these settings. In order for the right screen to be identified, we recommend using a "LeftClickUp" event on a text button. It is then possible to read the filter settings of the screen on which the button is located.

In this screenshot, the CEL screen can be seen on the left and the AML screen on the right, which is linked to the "LeftClickUp" macro. At the beginning, the lists show different content because of different filter settings.

```
Public Sub LeftClickUp_ShowAlarms(obElem As Element)
    'call procedure with actual DynPicture object
    Call basPicFilter.ShowAlarmsByCELFilter(obElem.Parent.Parent)
End Sub
```

To better keep track within the VBA code, the actual VBA code is located in a separate module identified as "basPicFilter". The CEL screen is transferred as an object to the "ShowAlarmsByCELFilter" procedure, so that the current screen's filter can be read off. This process happens in the

"GetAllDynProps" procedure, which reads out all DynProperties of the "PictureFilter" object recursively and saves them in a string array ("vProps").

The DynProperties will then be enumerated and the filter settings will be copied to the function which opens the alarm screen. In the process, the "IsAML" DynProperty and all "ListInfo" DynProperties are ignored, in order not to change the alarm list display.

As soon as the desired settings are copied to the screen switching function, this can be executed to open the alarm screen with the same filter settings.

Screenshot of CEL filter (user-defined) :


```vba
Dim zPicFilter As PictureFilter
Dim zFctAML As RtFunction
Dim vProps() As String

'Name of the PictureSwitch Funktion to open the AML Picture
Const strAMLFunction As String = "picALARM"

'#############################################################################
'## Procedure: ShowAlarmsByCELFilter                                      ##
'## ------------------------------------------------------------------- ##
'## Change settings of the function to show the ALARM picture with actual  ##
'## information of the PictureFilter from the CEL picture (given as object) ##
'#############################################################################
Public Sub ShowAlarmsByCELFilter(zCELPicture As DynPicture)
    Dim vProp As Variant
    Dim i As Integer

    'get CEL picture objects
    Set zPicCEL = thisProject.DynPictures.Item(strCELPicture)
    'get AML function object
    Set zFctAML = thisProject.RtFunctions.Item(strAMLFunction)

    'check if Picture and Function exists
    If Not zCELPicture Is Nothing And Not zFctAML Is Nothing Then
        'if picture is not opened, then exit...
        If zCELPicture.Online = False Then Exit Sub

        'get actual PictureFilter
        Set zPicFilter = zCELPicture.PictureFilter
```

```vba
        'take all Filter settings from actual CEL picture
        'and show ALARM picture with same filter settings.
        ReDim vProps(0)
        GetAllDynProps ("")

        'change Filter Settings in 'Picture Switch' function...
        For i = 0 To UBound(vProps) - 1
            vProp = Split(vProps(i), ",")
            'ignore IsAML property, defines the Filterstyle AML/CEL
            'ignore ListInfo properties, define the column settings...
            If vProp(0) <> "IsAML" And InStr(1, vProp(0), "ListInfo") = 0 Then
                'check type, because DateTime must be converted...
                If vProp(1) = "ZT _ DateTIME" Then
                    zFctAML.DynProperties("PictFilter." & vProp(0)) = _
                            CDate(zPicFilter.DynProperties(vProp(0)))
                Else
                    zFctAML.DynProperties("PictFilter." & vProp(0)) = _
                            zPicFilter.DynProperties(vProp(0))
                End If
            End If
        Next i

        'execute function
        zFctAML.Start
    End If
End Sub


'#############################################################################
'## Procedure: GetAllDynProps                                             ##
'## ------------------------------------------------------------------- ##
'## Enumerate all Dynproperties from the PictureFilter - recursive       ##
'#############################################################################
Sub GetAllDynProps(StartString As String)
Dim tmpProps As Variant
Dim tmpProp As Variant
Dim i As Integer
    'get all DynProperties of the PictureFilter below the given entry point
    tmpProps = zPicFilter.DynPropertiesEnum(StartString)
    For i = 0 To UBound(tmpProps)
        tmpProp = Split(tmpProps(i), ",")
        If tmpProp(1) = "SUBITEM" Then
            'SystemModelGroup needs a GLOBAL project,
            'not always available...
            If tmpProp(0) <> "SystemModelGroup" Then
                'get also properties of subitems (recursive)
                If StartString <> "" Then
                    GetAllDynProps (StartString & "." & tmpProp(0))
                Else
                    GetAllDynProps CStr(tmpProp(0))
                End If
            End If
        Else
            'fill string array with all DynProperties...
            If StartString <> "" Then
                vProps(UBound(vProps)) = StartString & "." & tmpProps(i)
            Else
                vProps(UBound(vProps)) = CStr(tmpProps(i))
            End If
            ReDim Preserve vProps(UBound(vProps) + 1)
        End If
    Next i
End Sub
```

In case you have any questions or suggestions regarding the PictureFilter object or VBA in general, have a look at the VBA library in our Online Forum: www.copadata.com/Forums. ↳ *Robert Ficker*

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do it your way