zenon Energy Edition

Switch on for more efficiency, integration and ergonomics in energy generation, transmission and distribution.
COPA-DATA has been active in the energy industry for 20 years. In 2006, we launched the automation software zenon Energy Edition as an edition of zenon, specially dedicated to the needs of the energy industry. With its IEC 60870 and DNP3 driver, zenon became a well-known player in substation automation. The IEC 61850 Edition 2 certification was a further important step towards becoming the leading system for communication, visualization and control.

Preface.

COPA-DATA, YOUR RELIABLE PARTNER IN THE ENERGY INDUSTRY.

EXPERIENCE AND KNOW-HOW
Trust zenon for enhanced energy generation, transmission and distribution. zenon is proven in:

- Local control for substations of any voltage level
- In control centers for medium voltage
- In hydro-electric power plants
- For farm management for renewable energy resources (like wind and photovoltaic)

GLOBAL PRESENCE – LOCAL CARE
We’re active in more than 50 countries, providing local support together with our competence partners, and looking out for your needs. Our headquarters in Salzburg, Austria, is responsible for product development and quality management to maintain the highest standards in reliability and security. This is also true for all our drivers and supported protocols. Certificates like the TÜV Süd certificate for our IEC 61850 Edition 2 driver underwrite our quality standards.

CLEAR FOCUS AND STRONG PARTNERSHIPS
COPA-DATA focuses purely on developing world-class automation software. Within the COPA-DATA Partner Community we support our strong network of system integrators and technology partners, thus ensuring the consistent delivery of sophisticated solutions to all clients.
Thanks to protocols like IEC 61850, IEC 60870 and DNP3, zenon integrates seamlessly into control centers. The simply perfect solution to deliver full control and connectivity.

One product family.
One integrated environment.

ZENON COVERS ALL AREAS, FROM HMI/SCADA RIGHT UP TO POWERFUL REPORTING

Use the industry tailored solution to meet all your requirements; from flexible and secure communication, visualization and control, to comprehensive reporting. Save time and money with one integrated solution:

- Use built-in drivers for communication
- Create effective HMI/SCADA visualization and control projects
- Prepare powerful reports out of the box
- Configure your gateway for IEC 60870 or DNP3
- Use the SCL Editor for IEC 61850 documents
- Benefit from integrated IEC 61131-3 programming
- Analyze with built-in Data Historian
- Carry out safe command processing with the Command Sequencer

Furthermore, COPA-DATA is SIL 2 certified, thus enabling the implementation of zenon for process visualization and control in safety-critical applications.

ZENON ENERGY EDITION

zenon Energy Edition is the industry-specific SCADA solution from COPA-DATA for power plant automation and substation automation, grid control technology and wind park management.

The drivers developed by COPA-DATA guarantee adherence to international standards such as IEC 61850/IEC 61400-25, IEC 60870 and DNP3.

With the seamless integration of zenon Logic, the IEC 61131-3-based PLC system from COPA-DATA, zenon Energy Edition becomes a comprehensive solution for energy automation.
No matter where zenon is applied, your benefits are rapid engineering, sovereign reliability and industry-leading security.

The clever solution for a broad range of applications.

WITH OVER 20,000 INSTALLATIONS, ZENON IS FIRMLY ESTABLISHED IN THE ENERGY INDUSTRY.
SUBSTATION AUTOMATION
Realize the most reliable and secure substation automation with zenon. Enable connections to all types of devices, while ensuring that processes always run smoothly – providing precision monitoring and operation. zenon runs in transmission and distribution substations.

HYDROELECTRIC POWER PLANTS
zenon is perfect for the control and monitoring of Hydroelectric Power Plants. Provide advanced visualization and control of all the components of your plant.

WIND FARMS
Choose superior turbine controller visualization and farm management. With its IEC 61400-25 driver, zenon is optimally prepared for communication, supervision and control of wind power plants and makes the process data available to control centers (by using, for e.g., the IEC 60870-104 gateway).

PHOTOVOLTAIC PLANTS
Automated operation and remote supervision and control are the key to profitable photovoltaic power generation. Supply full transparency with sophisticated event handling and detailed reporting to reduce maintenance costs and enable continuous optimization.

MUNICIPAL GRIDS
zenon is your perfect match for use in municipal grids and provides one integrated system for controlling electricity and all other media like gas, heat, water and wastewater. Build your 24/7 control room, equip it with zenon – and you’re done.

SMART GRID
The ‘Smart Grid’ is one of the ‘hot topics’ of the 21st century. Distributed energy generation and virtual power plants create an increased demand for secure, fast and reliable communication. With comprehensive communication capabilities, zenon adds value and increases cyber security in many areas of Smart Grid technology.
Create sophisticated and secure applications with only a few mouse clicks. With zenon Editor, the most efficient engineering environment on the market, you will become an expert in no time. Get started quickly and create your first working project in less than an hour thanks to intuitive use and out-of-the-box functionalities. Over 20,000 zenon installations in the Energy Industry speak for themselves – you can trust in a reliable and proven system. In order to further secure your project’s success, our technical consultants support you whenever you need them.

Why switch to zenon?

SAVE TIME IN ENGINEERING, CREATE LEADING-EDGE AUTOMATION PROJECTS AND DELIGHT YOUR CUSTOMERS.
SAVE TIME WITH ZENON RAPID ENGINEERING

All specific functionalities required in energy automation projects are native to zenon. Create even sophisticated applications with just a few mouse clicks and see how your project creation times drop significantly. Easy to use substitution mechanisms and wizards make engineers’ lives easier.

Apply ready-to-use functionalities out of the box – quick and secure to implement:

- Redundancy
- Alarm Management
- Command processing
- Breaker tripping detection
- Switch locking
- Topology and topology check
- Worldview
- Simulation
- Multi-Touch
- Impedance-based fault locating
- GIS (geographic information system) integration
- and many more.

“Use advanced features and functionalities out of the box without having to write code. Create even the most complex projects in a breeze.”
Aim for optimal profitability.

HIGH RETURN ON INVESTMENT (ROI) IN SYSTEM IMPLEMENTATION
zenon stands for optimum return on investment with effective, fast and secure engineering and the ability to integrate perfectly in heterogeneous infrastructures. We can guarantee this through:

- Flexibility, large bandwidth of applications, few restrictions
- Rapid engineering
- Distributed engineering capabilities
- Simple extensibility – open product
  (with integration of VBA or VSTA .NET)

LOW TOTAL COST OF OWNERSHIP (TCO) IN SYSTEM OPERATION
The system’s lifetime operating and maintenance costs are crucial. Efficient project maintenance and readiness for expansion make zenon a system with excellent TCO. Made possible by:

- Openness and independence
- Efficient maintenance
- Modularity
- Backward compatibility
At COPA-DATA we understand that the security of a SCADA system is never a static condition but always an evolutionary process which needs continuous improvement.

By incorporating this philosophy from the first line of code in 1989, zenon became one of the most robust SCADA systems available. Our product managers and engineers are continuously engaged in making zenon even more secure.

**ZENON SECURITY FEATURES**

- IEC 61850 authentication
- DNP 3 secure authentication v2 and v5
- Encrypted network communication
- Data encryption with password and hash encryption
- Certified for Windows 10 – supporting all its sophisticated security features
- Active Directory
- No data stored in plain text
- Signed files
- Password protected SQL database access
- Each action can be locked/attributed to user rights
- Change history logging
- Chronological Event List (CEL) logging security incidents
- For NERC/CIP we provide information and documentation for parts CIP-002 through CIP-009
- Webserver offers HTTP Tunneling
- Webserver available solely for monitoring without operational functions
- Authorization via Equipment Model

To ensure cyber security we follow the IEC 62351 standard and provide information for NERC/CIP if required by the system integrator. In order to be compliant to S1 of PICS for ISO 9506 profile, the IEC 61850 client driver supports the ACSE Authentication (8650-1 authentication). We are constantly working on compliance with other profiles and will implement them step by step.

**ZENON IS SETTING INDUSTRY STANDARDS IN SECURITY.**

"zenon combines cutting edge technology with perfect economics. It is a rounded solution and a profitable investment."

Put security first.
With its native drivers and communication protocols, zenon Energy Edition is perfectly suited for all communication tasks, whether with various IEDs or to remote systems.

Energy Drivers and Protocols:

- IEC 61850 Client/Server and GOOSE
- TÜV SÜD certificate for IEC 61850 Edition 2
- IEC 61400-25
- IEC 60870-5 (101/103/104)
- DNP3
- IEC 62056-21
- OPC UA
- Modbus
- IEEE C37.118 (Synchrophasor)
- IEC 61850-90-5
- Slave/Server Side with the zenon Process Gateway for ICCP/TASE.2/ IEC 60870-6, IEC 60870-5, DNP3, OPC UA, Modbus
- Integrated SCL Editor for IEC 61850 documents
Highly reliable network technology

REDUNDANCY
zenon provides a reliable client/server network technology. Benefit from consistent availability and zero downtime through the intelligent redundancy concept. zenon offers three different types of redundancy modes for the servers in order to fulfill different requirements:

- The dominant mode:
  Easy and straightforward.
  This mode enables a clear and predictable behavior. Define one server that is always appointed primary server if available.

- The non-dominant mode:
  As little switchovers as possible.
  The primary server stays on the same machine as long as possible.

- The rated mode:
  Intelligent switchovers.
  Considering connection status and other calculated data, the servers decide which one shall take the role of the primary server.

PROJECT UPDATES WITHOUT DOWNTIMES
Project updates can be implemented while the system is running. The system stays online, available and operating at all times during updates.

STAY FLEXIBLE IN COMMUNICATION
Benefit from many different possibilities in upstream and downstream communication.
Read and write data to all types of IEDs. Use the integrated gateway and web server technology. Use client workstations for operation but also for simulation and testing of command sequences.
**Tech Features.**

**COMMAND PROCESSING**
- Error-proof command processing (integrating “select before operate” for DNP3, IEC 60870 and IEC 61850)
- Breaker tripping detection
- Switch locking
- Topology check

The integrated, dedicated module handles secure command processing; allowing two stage and two hand commands, including the consideration of protocol-specific features such as select and execute (IEC 60870) or select before operate (IEC 61850). In order to prevent the operator from incorrectly switching, an interlocking-logic can be added to each command. The interlocking-logic can be calculated by the use of switch status or by consideration of the topological status of the grids. Command Processing comes with integrated functionalities like Breaker Tripping Detection and Switch Locking (Tag Management).

**COMMAND SEQUENCER**
Usability of command processing in zenon is even more enhanced by the Command Sequencer. The user easily edits, tests and implements command sequences himself, without the help of a programmer. Even complex sequences with parallel executions or conditional actions can be arranged via drag and drop in the graphical editor.

**TOPOLOGY**
See the power status of the lines at a glance. Choose different colors for powered, unpowered and grounded. Define a color for each voltage level and see if a transformer feeds back. For more security, undefined or faulty switches cause different coloring of the lines. This presents the information in an easily-recognizable way, so operators have immediate notification of problems. The calculated topological model can also be used for the interlocking of commands. The engineering of topology is carried out just by constructing the single line diagram.

**SIMULATION**
In order to see what will happen with the grid when a certain switch is opened or closed, the operator can take a process image and run a workstation in simulation mode. Now he is able to handle all switches without affecting the real process. The simulation results can be seen by the coloring of the lines using the topological model calculation in the background.

Additionally, it is possible to design a training simulator with a workstation. The engineer just has to define the process behavior by using IEC 61131-3 language programming. Teach and test the command sequences in simulation mode. Just by doing the switching commands in the single line diagram the sequence is recorded. Just a mouse click can test to see if the results are as expected. After testing the sequence it can be passed on to the workstations for active use.

**ALARM MANAGEMENT**
A sophisticated alarm management concept is crucial to safe system operations.
As alarm management is a native feature in zenon Energy Edition it is quickly set up and configured without having to write code. The alarm handling allows for optimum handling and usability and is fully-integrated with zenon’s redundancy functions.
Visual Alarm Guidance: the alarm areas allow the creation of applications which lead the user from a summarized alarm indication to the detailed screen of the alarm. Creating a visualization of the number of alarms active, active/acknowledged and inactive/unacknowledged in an aggregated manner is also possible.
INTEGRATED STATUS FLAGS
A zenon Energy Edition tag allows up to 64 status flags in addition to its value and time stamp. The status flags include:

- Protocol specific information (e.g. not Topical, Invalid, Substituted, Cause of Transmission, Blocked)
- Product-specific information (e.g. breaker trip, network select)
- User-specific information (set by programming interface)

CLIENT/SERVER AND REDUNDANCY
zenon client/server network technology provides a completely platform independent solution. Benefit from consistent availability and zero downtime through the intelligent redundancy concept. The zenon functionality offers an easy set up of a redundant network. zenon makes distributed operations simple and secure to set up, operate and maintain.

Benefit from zero downtime through the intelligent redundancy concept. Redundancy in zenon guarantees interruption-free availability and lossless data recording. zenon offers three different redundancy modes, depending on the various requirements.

NETWORK SETUP
The setup in zenon is carried out with a few mouse clicks due to the native incorporated network functionality. Project updates can be implemented while the system is running, keeping the system online, available and operating at all times.

SSD/SCD WIZARD
zenon provides supporting wizards to offer more comfort and to speed up IEC 61850 configurations. The wizards guide the engineer when configuring the communication, including the configuration of Attributes, Datasets and Reports. Furthermore, zenon accelerates the engineering process, as single line diagrams are drawn automatically with the use of SSD files.
Tech Features.

WEB SERVER
With zenon’s web server technology you can bring your projects to any web browser without any additional engineering effort. This gives you complete freedom and flexibility regarding where your projects can be accessed. For enhanced security, the zenon Web Server is available as a standard version, only for monitoring purposes – no operation is possible.

INTEGRATED HISTORIAN
Precise archiving in millisecond timestamp resolution with secure data consistency through real-time data acquisition. Export your historical data to any format you need to store it or further process it in other systems.

MONITOR ADMINISTRATION
You can easily configure projects for single and multiple monitors. Project screens can be allocated to multiple monitors. zenon multi-monitor projects can also be displayed on single monitor systems without additional project engineering.

WORLDVIEW
The Worldview functionality lets you display large process screens clearly. Functions like zooming, panning and decluttering are natively incorporated and can be activated via mouse click.

MULTI-TOUCH
COPA-DATA’s product family offers first worldwide HMI/SCADA applications with native Multi-Touch capabilities. This ranges from simple two-hand operation to advanced functionalities like zooming or scrolling with two fingers or the use of gestures for command entry.

OBJECT ORIENTATION (SYMBOLS, VARIABLES)
Create perfect usability for operators with a library of templates and symbols. An extensive library of templates and symbols helps you to create your projects quickly, with superior graphics and usability. At any time the predefined templates and symbols can be re-configured or extended with individual ones.

zenon variables are based on a consistent object-orientated concept. The basis of each variable is a data type from which it is derived. When creating a variable, this provides all the properties of the allocated data type.

MULTI-PROJECT MANAGEMENT
In zenon Runtime multiple projects can run simultaneously. This means you can split up large projects easily into different smaller projects. Enjoy advantages in project maintenance, load distribution and sophisticated network functionalities like zenon’s circular redundancy.

USER MANAGEMENT
Well-defined user management is the key to secure operations. Each element can be assigned to one of 128 user right levels, to give you full flexibility to integrate any security concept.
In addition, zenon Energy Edition is fully Windows 10 and Windows Server 2012 (R2) compatible, which means that it can be integrated into Windows user administration (Active Directory).

DRIVERS AND PROTOCOLS
Drivers and communication protocols are key to integrate systems with great flexibility and performance. COPA-DATA develops all drivers in-house and has native protocol knowledge. This guarantees the maximum in performance, security and support.
zenon enables full freedom and flexibility with over 300 native drivers and support for all relevant protocols.
EVENT LIST
The event list records all relevant events and cannot be manipulated, which makes it ideally suited for full traceability of all user actions and system events.

DISTRIBUTED ENGINEERING
In the engineering stage projects can be made available centrally and can then be edited from several workplaces. This way, teams work together efficiently, configuring freely, regardless of location. Zenon ensures safe synchronization. For enhanced engineering security, project backups can be created automatically.

PROCESS RECORDER
The Process Recorder offers advanced options for error diagnostics. By continuously recording processes, it allows you to get a detailed look at previous events and states directly on the process screen, detached from the live operation. The Process Recorder makes identifying and analyzing errors easier, and gives detailed information in addition to the AML and CEL. Furthermore, it can be used for training and simulation purposes.
SOLUTIONS FOR THE ENERGY INDUSTRY

With over 20,000 installations, zenon is a proven solution in power generation, transmission and distribution.