



Program

Tuesday | April 9, 2019

Afternoon Arrival

* optionally booked program

- 13:00 IEC 61850 Warm-Up Training registration*
- 13:30 IEC 61850 Warm-Up Training*
- 15:30 Coffee break*
- 15:50 IEC 61850 Warm-Up Training*
- 17:30 End of the training*

- 18:00 Event registration and aperitif
- 19:00 Welcome dinner (until 22:00)

Wednesday | April 10, 2019

- 08:30 Opening
Dr. Fred Steinhauser, OMICRON
- 08:45 Keynote: P + AC + IEC 61850 = PUC
Dr. Alexander Apostolov, PAC World
- 09:20 Testing Substation Automation Systems – From Engineering to Automated Testing
Thomas Schossig, OMICRON
- 09:55 SCL Quo Vadis: End to End Engineering with IEC 61850
Paul Eichhorn, HELINKS
- 10:30 Coffee break
- 10:55 Attacking an IEC 61850 Substation
Andreas Klien, OMICRON
- 11:30 Digital Substations – from Pilot Projects to Deployment
Dr. Fred Steinhauser, OMICRON
- 12:05 Lunch
- 14:00 Workshop introduction
- 14:15 Workshop
- 15:00 Coffee break
- 15:20 Workshop
- 16:50 Surprise session – experience the prototype of a future product
- 17:35 End of the meeting day

- 19:00 Aperitif
- 19:30 Dinner (until 23:00)

Thursday | April 11, 2019

- 09:00 Workshop
- 10:30 Coffee break
- 10:50 Workshop
- 11:35 Round-up and Q&A session

© **OMICRON** 2019 – Power Utility Communication Tutorial & Workshop

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Program description

IEC 61850 Warm-Up Training (*optional program*)

Tuesday | April 9, 2019

This optional training gives an introduction to the IEC 61850 standard for participants with no or little experience. It helps participants to become familiar with the concept and technologies of the standard, to be able to follow the tutorial and effectively use the workshop.

Tutorial

Wednesday | April 10, 2019

In tutorial presentations, each one focused on a selected topic, experts of the corresponding field provide information about the state-of-the-art and an overview of the available solutions.

Please find below the presentation topics:

Keynote: P + AC + IEC 61850 = PUC

The Smarter Grid of today requires improvements in the efficiency, reliability and security of the changing electric power grid that is made possible by the object models and services defined in IEC 61850 and implemented for power utility communications. The keys for the acceptance of this technology are the advanced engineering, commissioning, testing, condition monitoring and maintenance tools for the industry.

Testing Substation Automation Systems – From Engineering to Automated Testing

During the last years it became obvious that testing substation automation systems (SAS) became an essential part of factory acceptance, site acceptance and maintenance testing. This presentation describes a solution for testing the SAS. Taking into account engineering files of IEC 61850 an automated workflow is developed. The requirements for the SCL file will be explained practically. During the presentation testing scenarios and its validation will be explained.

Attacking an IEC 61850 Substation

If an attacker targets a modern IEC 61850 substation, how could he achieve his goals? This presentation analyzes previous attacks on power systems and describes yet unused attack vectors through which an adversary could influence protection and automation functions. Based on real and invented scenarios it will be depicted how such attacks could be mitigated by security measures.

Digital Substations – From Pilot Projects to Deployment

Over the past 10 years, numerous pilot projects for evaluating the applications of Sampled Values have been implemented. In particular since 2016, the number of such projects has boomed, delivering much „best practice“. Based on these experiences, the regular deployment of Digital Substations is now starting.

SCL Quo Vadis: End To End Engineering with IEC 61850

This tutorial gives an overview of end to end specification and engineering. End to end comprises two dimensions:

1. End To End Signal Flow: From process input to Station Scada and Dispatch Center. Here we talk about Logical Nodes for Process Inputs and Outputs, device independent data flow in SCL, virtual IEDs, protocol mapping in SCL, new XML schemes for HMI engineering with IEC 61850.
2. End To End Process Chain: From specification of a Power System over simulation to implementation and test. We show how SCL supports the integrated engineering process.

Conclusion is a concrete example for End To End engineering.



Workshop

Wednesday | April 10, 2019 & Thursday | April 11, 2019

The second part of the event is an intense and interactive workshop on IEC 61850 which includes six different demo stations manned by different vendors and OMICRON experts. During the workshop participants will visit all stations based on a predefined schedule.

At the demo stations, each focused on a specific topic, tutors will practically demonstrate how the actual equipment and tools work. Participants will have the opportunity to interactively engage in these demonstrations and to ask any questions.

Participants are welcome to bring along their laptops to connect to the demo network and work with the connected IEDs, the networking equipment and the related tools.

Please find below the workshop topics and representing companies:

Testing Automation and Control | OMICRON

This demo shows how offline data from configuration files and online data obtained from the Automation & Control system provide an intuitive insight into the information exchange in an IEC 61850 SAS and how this will lead to automated testing of functions such as interlocking.

Measuring Performance in IEC 61850 PAC Systems | OMICRON

This demo shows how performance in IEC 61850 systems is measured with specialized tools. There are multiple aspects covered, from protection response to the time behavior of the messaging through the communication network.

IEC 61850 Engineering – Story Mode | COPA-DATA

Let yourself be guided through the engineering phase of a virtual substation. Also, you get the chance to see TLSv1.3 securing control center communication before it is even standardized. Finally you can learn how OPC UA may be used securely in the power domain.

IEC 61850 – Aware Redundant Communication Networks | Moxa

We will demonstrate how standard switches can detect cybersecurity attacks related to the GOOSE protocol. A PRP/HSR communication network will help to demonstrate the performance difference between recovery-based redundancy and seamless redundancy. It will be monitored by a SCADA system, which relies exclusively on IEC 61850 modeling of switch functionality.

End to End Power System Engineering | HELINKS

We will demonstrate the end to end engineering process of a multi-vendor IEC61850 based system. We show a standardized engineering process based on libraries which spans different vendors and technologies.

- > IO and internal address allocation for PLC
- > IEC 6850 control and protection communication engineering with automatic generation of Reports, GOOSE and SV configurations.
- > Handling and generation of all kind of SCL files. We import ICD, IID CID, SSD a SED and SCD files. We produce SSD Files for specification and SCD files for the integration of a multi-vendor IEC 61850 system. We export CID files for the configuration of individual IEDs. Generation of configuration files for Gateways and HMI



In the workshop we will run through the different steps of the engineering process. We are going to show tool support from specification over integration and test including life cycle support for IED IEC 61850 setting and comprehensive signal engineering. We conclude with the configuration of a ZENON HMI (SCADA) and Infoteam StreamBridge (Gateway) and finally we run the system by simulating the relays.

In a final step we show the automatically generated documentation with all relevant engineering data: Single Line, Functions, IEC 61850 communication configuration, IED overview Network and IO List.

Simplify and Accelerate Substation Commissioning Thanks to Smart Protocol Gateways | InfoTeam Energy Solutions

Discover how the substation commissioning could be accelerated thanks to an advanced IEC 61850 Integration. During the workshop we will demonstrate how the Infoteam protocol gateways can be configured from SCD files generated by HELINKS STS (System Specification & Integration Tool). We will also show how some signal engineering methods at protocol gateway would simplify the substation commissioning.