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COURSES

## IEC 61850 Interoperability of Multi-vendor Devices and Systems

### Overview

This course will focus on the interoperability of multi-vendor devices and systems for Global Standard IEC 61850. Course participants will gain skills and in-depth knowledge through interactive participation in technical workshops presented by experts working in Kinectrics' state-of-the-art labs.

### Course Outline:

#### Module 1: Introduction to IEC 61850

- History of IEC 61850
- Documentation and organization of IEC 61850 standard
- Substation configuration description language
- Abstract communication service Interface
- Data models for information exchange
- Security & reliability
- Benefits of IEC 61850

#### Module 2: Ethernet Architecture

- Pros and cons of typical Ethernet architectures
- Reliability requirement and N-1 criteria
- Redundancy and interoperability
- Traffic control and data flow management
- Scalability and maintainability
- Migration path for accommodating full-scope deployment from pure station bus applications to combined station bus and process bus applications

#### Module 3: Station Bus Applications

- Overview of data models for GOOSE exchange
- Mapping to MMS
- State-of-the-art configuration tools
- Horizontal integration
- Typical GOOSE applications
  - Inter-tripping schemes
  - Breaker failure protection schemes
  - Interlocking schemes
  - Open/close breakers

#### Module 4: Process Bus Applications

- Overview of IEC 61850-9
- Merging unit and sampled value streams
- Data sink relays
- Time synchronization
- Interoperability & Interchangeability

#### Module 5: Modeling Approach and Naming Convention

- Overview of IEC 61850-5 and IEC 61850-7
- Basic information models
- Modeling approach
- Self-descriptive names
- Pre-defined names for logical devices
- Naming convention
- Function and product-related naming systems

#### Module 6: Deployment Strategy

- Functional specification
- Architecture evaluation
- Cyber security design
- System-wide naming convention
- Data flow management
- Operational & non-operational data
- Traffic mitigation strategy

#### Module 7: Migration Strategy

- Harmonization between IEC 61850 / 61970 / 61968
- Strategy for new substations
- Retrofitting brown substations
- Migration path for existing substations
- Control center connections
- Field trial

#### Module 8: Maintenance Strategy

- Isolation design
- Cope with naming changes
- Conditional assessment vs. periodic testing
- Life cycle management
- Firmware version control
- Spare parts

**See page 2: *Workshop – Modules for Hands-On Training and Course Registration Details***

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## IEC 61850 Interoperability of Multi-vendor Devices and Systems *Cont'd*

### Workshop Outline:

#### Workshop Module 1: Integration of Multi-vendor IEDs for GOOSE Applications

- Overview of bottom-up approach
- XML schemas
- Substation configuration description language
- IED and system configuration tools
- GOOSE publication and subscription
- Step-by-step integration procedures
- Horizontal integration for GOOSE applications

#### Workshop Module 2: Interoperability Testing of Multi-vendor IEDs & Systems – GOOSE Applications

- Test system architecture
- Test system configuration
- Configuration tools and Integration
- GOOSE simulation using Omicron / RTDS
- GOOSE performance testing
- GOOSE transfer trip vs. local hard-wired trip

#### Workshop Module 3: Integration and Interoperability Testing – Client / Server Applications

- Test system architecture & configuration
- Client / server integration
- Data point mapping & signal scaling
- Buffered and un-buffered reporting
- Alarm Processing
- Automatic Control

#### Workshop Module 4: Testing of Multi-vendor Merging Units & Data Sink Relays

- Test system architecture
- Test system configuration
- Configuration tools and Integration
- Time synchronization
- Interchangeability between merging units & IEDs
- Traffic control / simulation over the LAN

### Who Should Attend?

This course is designed for:

- Utility P&C Engineers
- System Integrators
- Maintenance Staffs
- Consultants
- Substation Automation System Designers

### Key Benefits:

Gain an understanding of:

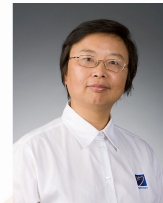
- Gain Practical Knowledge to build station and utility performance
- Experience “plug-and-work” solutions in Kinectrics’ Interoperability Testing Lab
- Platform IEDs covered include:
  - GE
  - SEL
  - AREVA
  - Siemens
  - ABB
  - Cybectec

### Price:

Three days - \$1,900+GST Theory & Workshops.

Complimentary lunch & coffee breaks

### Instructors:



**Dr. Jian-Cheng (J.C.) Tan** is Principal Engineer, Protection and Control



**Drew Baignet, B.A.Sc., P.Eng** is a Principal Engineer.

### Register Now:

On-line: [www.kinectrics.com](http://www.kinectrics.com)  
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