Essential Technology
2-day Course

1. Overview
- i. Objectives
- ii. Benefits

2. IEC 61850 Fundamentals
- i. SCADA vs. SAS (more than DNP3)
- ii. Using the whole Standard – understanding each Part
- iii. What is a Logical Node and associated elements
  - LN Groups and names
  - Common LN items
  - LLN0
  - Data Objects
  - Attributes
  - Common Data Classes
  - Say No to GGIO
  - Logical Devices
- iv. What is GOOSE & what to use it for
- v. Sample Values
- vi. Merging Units and NCIT
- vii. ACSI
- viii. Understanding Compliance vs. Interoperability
- ix. Beyond just substation protection & control

3. SCL Engineering
- i. Creating and using SSD/SCD/CID/IID/ICD/ SED files
  - Vendor-centric bottom up
  - System-centric top-down
- ii. System Specification
- iii. IED Specification
  - Meaning and Use of Conformance Certificates
  - PICS, MICS, PiXIT
- iv. Re-usable Engineering
- v. Datasets
- vi. Commands
- vii. Reports

1. Function implementation and modelling
- i. Protection - O/C, Rev Block, Distance, Diff, CBF, PTRC
- ii. SCADA
- iii. Control
- iv. Automation - VR, A/R, Synchrocheck
- v. Condition Monitoring
- vi. Substation Metering & Recording
- vii. Smart Grid domain applications
  - Wind farm
  - Hydro
  - Distributed Energy Resources
  - Electric Vehicles
  - Photo-voltaic
  - Revenue Metering and Billing

5. The Ethernet Substation
- i. Architectural Considerations
  - Duplication vs. Redundancy
  - Complying with National Electricity Rules
  - Star/Ring
  - RSTP
  - PRP
  - HSR
  - VLAN
  - Priority Tag
- ii. Security vs. Operation
- iii. Time Synchronisation
- iv. Testing IEC 61850 systems

6. Organisational Development Activity
- i. Intellectual Property – policies, specifications, standardisation
- ii. Intellectual Capability – tools, processes, documentation
- iii. Intellectual Capacity – training and roll out
- iv. SAS scope evolution – technology impact plans

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