SISCO IEC 61850 Tutorial

Description

IEC 61850 is an important new international standard for substation automation that will have a very significant impact on how electric power systems are designed and built for many years to come. IEC 61850 is a part of the International Electrotechnical Commission's (IEC) Technical Committee 57 (TC57) architecture for electric power systems. The model-driven approach of the TC57 standards, including IEC 61850, is an innovative approach that requires a new way of thinking about substation automation that will result in very significant improvements in both costs and performance of electric power systems.

SISCO's IEC 61850 Tutorial takes a practical approach to helping utility engineers understand how IEC 61850 can be used to benefit their organization. The tutorial begins by explaining why these standards are important, how they differ from legacy technology, and how these differences will benefit users. The student is then guided through the IEC 61850 standard itself to illustrate how IEC68150 delivers these benefits via standardized device, object, and service models. Definitions and overviews of the most important concepts will be presented with detailed examples that relate to actual power systems. The tutorial is concluded with a hands-on session in which the attendees will install and configure an actual IEC 61850 application and network analysis software on their own laptop computers and communicate over an Ethernet network with an IEC 61850 server.

Agenda

1. **START:**
    - 1.1. Agenda Review
    - 1.2. Why Standards are Needed
        - 1.2.1. Interoperability and Integration
        - 1.2.2. How Systems Evolved
        - 1.2.3. Protocol Standards
            - 1.2.3.1.Overview
            - 1.2.3.2.Limitations of Legacy Protocols
            - 1.2.3.3.New Approach of IEC 61850
        - 1.2.4. Application Programming Interface (API) Standards
            - 1.2.4.1.Overview
            - 1.2.4.2.Limitations of Legacy API Standards
        - 1.2.5. Data Modeling Standards
            - 1.2.5.1.The Common Information Model (CIM)

1.6.5.3. Detailed Review of CDCs:
1.6.5.3.1. Single Point Status (SPS)
1.6.5.3.2. Double Point Status (DPS)
1.6.5.3.3. Integer Status (INS)
1.6.5.3.4. Controllable Double Point (DPC)
1.6.5.3.5. Controllable Integer (INC)
1.6.5.3.6. Protection Activation (ACT)
1.6.5.3.7. Measured Value (MV)
1.6.5.3.8. Device Name Plate (DPL)
1.6.5.3.9. Logical Node Name Plate (LPL)
1.6.6. Logical Node Descriptions and Example Object Names
1.6.6.1.Physical Device Logical Node (LPHD)
1.6.6.2.Common Logical Node (LLN0)
1.6.6.3.Circuit Breaker (XCBR)
1.6.6.4.Switch Controller (CSWI)
1.6.6.5.Measurements (MMXU)
1.6.6.6.Other LNs of Interest to Attendees
1.7. Abstract Communications Service Interface (ACSI)
1.7.1. ACSI Service Model
1.7.2. ACSI Objects and Mapping to MMS per IEC61805-8-1
1.7.3. ACSI Services
1.7.4. ACSI Server Object
1.7.4.1.Application Communication Model
1.7.5. Logical Device Object and Services
1.7.6. Logical Node Object and Services
1.7.7. Data Object and Services
1.7.8. ACSI Service Mapping
1.7.9. Data Set Object and Services
1.7.10. Reporting Model
1.7.10.1. Unbuffered Reports
1.7.10.2. Buffered Reports
1.7.11. Control Model
1.7.11.1. Direct Control
1.7.11.2. SBO Control
1.7.11.3. Control with Enhanced Security
1.7.11.4. IEC 61850-8-1 Mapping of Controls to MMS

1.7.11.5. Examples
1.7.11.5.1. Select Before Operate
1.7.11.5.2. Select with Value
1.8. IED to IED Data Exchange
1.8.1. Multi-cast Messaging Model
1.8.2. Generic Substation Status Event (GSSE)
1.8.3. Generic Object Oriented Substation Event (GOOSE)
1.8.4. Reliable Multicast and Performance
1.8.5. Unique Applications – Wide Area Protection/Remedial Action
1.9. Substation Configuration Language (SCL)
1.9.1. Overview and Application
1.9.2. File Types
1.9.3. Sample SCL File
1.9.4. Example Usage of SCL to configure data concentrator
1.10. IEC 61850-9-2 Process Bus
1.10.1. Sampled Measured Values (SMV) Objects and Services
1.10.2. Applications
1.11. Migration Issues
1.11.1. Legacy to IEC 61850
1.12. Testing
1.12.1. Test Procedure and test cases
1.12.2. Quality Assurance Process
1.12.3. Technical Issue Process
1.12.4. UCA International Users Group
1.13. Security Profile for IEC 61850 based on the IEC 62351 Standard
1.13.1. Digital Certificate and Public Key Technology Overview
1.13.2. Data Encryption
1.13.3. Application Level Authentication for Client/Server Communications
1.13.4. GOOSE and Process Bus Security
1.14. Hands-On: Using IEC 61850
1.14.1. SISCO Company and IEC 61850 Product Overview
1.14.2. Installing and Configuring the AX-S4 MMS IEC 61850 Client
1.14.3. Installing and Configuring the AX-S4 MMS IEC 61850 Server
1.14.4. Typical Applications
1.14.5. Ethernet Network Analysis using Etherreal
1.15. END