

Breaker Failure Procedure

- 1) Initiate Trip with GOOSE PIOC.Op (X=Target IED)
- 2) Trip Breaker Attempt
- 3) Breaker Failure
- 4) Broadcast GOOSE Breaker Failure (RBRF.OpEx = True)

More Detail about the Demonstration

Watch Our Free Protocol and Product Training Videos
TriangleMicroWorks.com/video

Distributed Test Manager (components shown in green)

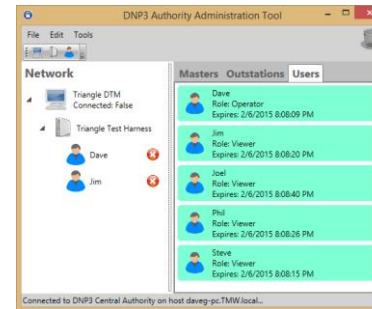


- Instantiates IED's by loading the SCD File
- Simulates the Object Model and Protocol Communications
- Simulates data changes in Servers with custom displays
- Simulates breaker failure behavior in IED's with JavaScript
- Publishes GOOSE based on DataSets and Control Blocks
- Subscribes to GOOSE based on External References
- Real devices can be substituted for simulated devices
- Built with multiple .NET Protocol Components from TMW

Benefits:

- Debug configuration in the lab before commissioning
- Test devices in a system without having all system hardware
- Identify interoperability and configuration issues earlier
- Test coverage includes networking components

DNP3 Key Manager



DNP3 Secure Authentication Key Management:

- Generate Keys and Certificates
- Choose Hash Functions to use
- Add Users to Outstations
- Manage roles for each User
- Set expiration dates for Users
- Add or Delete Masters/Outstations
- Master and Outstation devices are automatically updated

SCADA Data Gateway



Software based Gateway:

- Protocol translator and data concentrator
- Software based solution for Windows™
- IEC 61850, DNP3, IEC 60870-6 (TASE.2/ICCP), IEC 60870-5 (101, 102, 103, 104), Modbus, OPC, ODBC
- Built with C and C++ Libraries from TMW

IEC 61850 Test Suite (Anvil)



In the demo, Anvil simulates an IED:

- Object Model defined by SCD File
- GOOSE Publishing/Subscribing
- Custom display created with InSight
- Behavior modeled with graphical scripting interface for logic and state machine
- Built with IEC 61850 .NET Components from TMW

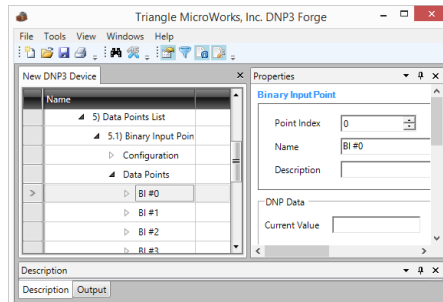
Iron - TASE.2/ICCP Test Tool



In the demo, Iron is used to:

- Simulate a TASE.2/ICCP Peer-to-Peer Device
- Establish a secure connection with IEC 62351
- View Object Model with data mapped from IED's
- Built with IEC 60870-6 .NET Components from TMW

DNP3 Forge



DNP3 Forge is used to:

- Create/Edit DNP3 XML Device Profiles
 - Map DNP3 data points to IEC 61850 Object Models
 - Import or export points lists with CSV files
- Free Version available for editing DNP3 Device Profiles and mapping data points to IEC 61850 Object Models

IEC 61850 Source Code Library



IEC 61850 Stack Implemented on TI Sitara™ AM335x ARM® Development Board

Full Support for GOOSE External References (ExtRef's):

- GOOSE publisher/subscriber configuration is defined within SCD File by the System Configuration Tool with no private fields for greater interoperability
- GOOSE publishing is configured with Control Blocks and DataSets
- The two BeagleBones in this demo subscribe to the same RBRF.OpEx GOOSE messages, but use a different intAddr assignment in the ExtRef statements in the IED section of the SCD File to trip different breakers
- Supports multi-cast (one to many) and multi-subscription (many to one)