



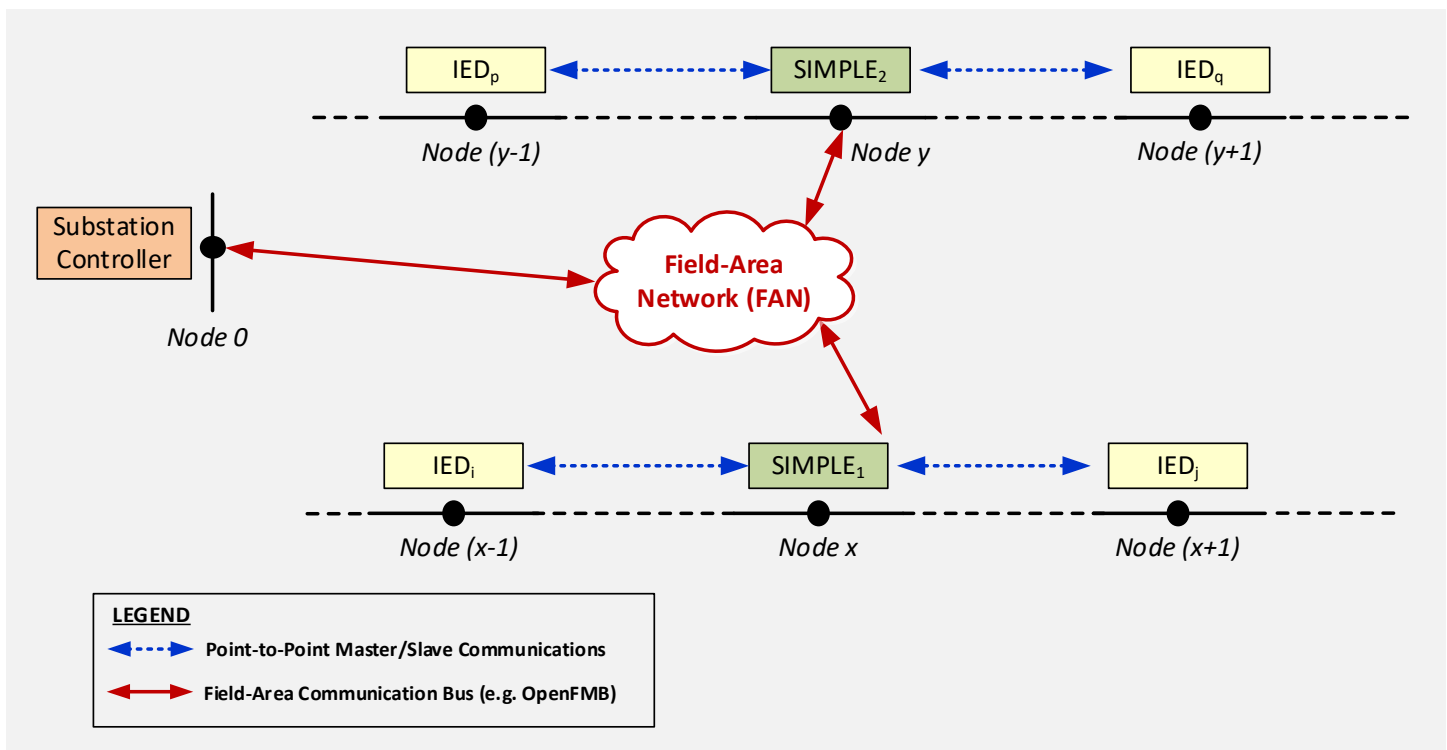
Field Area Communications and Monitoring

As the number of intelligent electronic devices (IEDs) outside the substation grows, communication platforms will become more reliable, flexible, and scalable, providing more efficient management of the data exchange between these nodes and enabling new applications. To fulfill the data exchange and control considerations using publisher-subscriber (pub-sub) models will be essential. This directly relates to the large number of distributed energy resources (DERs) across the system, enabling new communication systems outside of the substation environment. Like any new advanced technologies, the new communication models can act as either a threat or an opportunity to the utility business, depending on the level of preparedness. Utilizing appropriate communication platforms and designing them well in advance will allow utilities to take advantage of these new features on future projects.

Field Message Bus

One of the key elements of grid modernization is field area communications. These enable both advanced distribution automation and distributed energy resource (DER) integration. Since data can be shared amongst many intelligent electronic devices (IEDs) and DERs in the field, the communication models are shifting from traditional client-server models, like MODBUS and DNP3.0, to publisher-subscriber models, like Open Field Message Bus (OpenFMB) and IEC 61850.

OpenFMB is an example of a publisher-subscriber framework and reference architecture – comprised of existing standards – that enables grid-edge interoperability and distributed intelligence, augments operational systems, and enhances integration with field devices. OpenFMB supports three protocols: Data Distribution Service (DDS), Message Queue Telemetry Transport (MQTT), and Advanced Message Queue Protocol (AMQP).





Why Quanta Technology?

Quanta Technology has been leading several utility communications projects. These projects have included supporting, executing, evaluating, and consulting for various types of communications requirements. The communications are associated with deploying distribution automation schemes, enhancing SCADA systems, implementing distributed PMU applications, and managing DERs. Quanta Technology has a team of industry experts and thought leaders ready to help utilities plan, justify, select, and implement various type of communications.

Communications Strategy

- Standardization of information exchange
- Architecture development
- Communication media and protocol selection
- Migration strategy considering legacy systems

Communication Protocols and Interfaces

- Protocol and interface evaluation
- Implementation of utility communication protocols using gateways and intelligent hubs such as: DNP3.0, IEC61850 (GOOSE), IEC61850-9 (Sample Value), DDS, MQTT, IEEE C37.118-2-PMU, MODBUS...
- Point list / data model design
- Communication verification and troubleshooting
- Defined communication based on the application requirements and features

Technology Assessment and Solution Integration

- Embedded computing and communication assessments
- Cloud resources assessments (ruggedized computer, PLCs, wireless radio, cloud servers)
- Communication system design review
- Development of test strategy and test plans
- Interoperability testing

OpenFMB and Grid Modernization: “Monitoring, Communication, and Control Infrastructure for Power System Modernization” is one of the projects Quanta Technology has successfully delivered for SDG&E. The project demonstrated communication interoperability among different vendor products (including the devices with legacy communications protocols). The OpenFMB network for that project used multiple communication protocols, including MQTT, DDS, and R-GOOSE, to accomplish thirteen use cases developed for this project. Read more about this project in the SDG&E EPIC report here: https://www.sdge.com/sites/default/files/EPIC_SDGE_Annual%20Report_Final_2-28-2018.pdf

SIMPLE: A New Concept of Data Sharing: Quanta Technology, in collaboration with ComEd, has designed, implemented, and built an intelligent measurement device (IMD) capable of reading, correcting, and – most importantly – sharing low-voltage measurement sensors through various types of communications. The SIMPLE (Sensors with Intelligent Measurement Platform and Low-cost Equipment) platform supports Modbus, DNP3, IEC 61850-GOOSE, IEC 61850-SMV, DDS, and IEEE C37.118-2 (PMU) protocols. It can communicate over its built-in serial ports, Ethernet copper and fiber ports, and RF (radio frequency) wireless radios. Read more about this project here: https://www.smartgrid.gov/files/SIMPLE_final_v10.pdf

About Quanta Technology

Quanta Technology is an independent technology, consulting, and testing company providing business and technical expertise, along with advanced methodologies and processes, to utilities and others in the power and energy industries. Our mission is to provide unparalleled value to our clients in every engagement across the value chain by using advanced software and hardware, laboratories, and custom tools for a holistic approach to practical service and the most insightful thought leadership in the industry.

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