



SMART ENERGY SERVICES

Integration Test Services In Support of Utility Smart Grid Demonstration Projects

QualityLogic has a long track record of working with product developers, system integrators, end-user and Standards Development Organizations in a variety of ways to help them achieve their interoperability and conformance goals.



The Challenges

The Smart Energy industry has made great strides in establishing standards that enable communications interoperability in demand response, DER integration and distribution automation projects. Standards, such as OpenADR, IEEE 2030.5, IEC 61850, OpenFMB, etc., provide a common method for communicating the critical information needed by devices and systems to coordinate smart grid behaviors that improve reliability, resilience, security and flexibility to add new capabilities and vendors at minimal cost and time.

But the selection of technology standards is just the starting point. Challenges utilities and implementers encounter when using standards include:

- Understanding how best to specify and benefit from a selected standard
- Training your team how to adopt, acquire and deploy selected standards
- Assessing the maturity of various standards you are considering to avoid orphaned or obsolete implementations.
- Designing implementation processes to insure interoperability of products from multiple vendors
- Accelerating development and deployment of pilot and demonstration projects

The Solutions

QualityLogic's services address these challenges and include:

- Training Workshops on System Interoperability help you understand and implement new communication protocols, such as IEEE 2030.5, OpenADR, IEC 61850 and more.
- Maturity assessment of smart grid standards you are considering ensures informed decisions about specifications, development and implementation plans

- Development and execution of test and certification process and procedures for your pilot or demonstration-specific implementations, including test planning, test tool development, test execution, analysis and reporting
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- Creation of custom test tools and platforms to accelerate testing and deployment.

Design of Integration Test Projects

Successful integration of new technologies with multiple vendors requires:

1. An understanding of how interoperability is achieved efficiently (we can always pay an integrator or consultant to develop one-one integrations, but this is inefficient)
2. An understanding of standards and how to best use them
3. Test and certification prior to actual system integration
4. Use of off-the-shelf test tools and development of customized tools that can be useful (and valuable) beyond the specific project

QualityLogic's capabilities address these success factors in multiple ways.

Training on Interoperability, Standards and Software Test

- Training on interoperability:
 - What is it?
 - How is it achieved?
 - Proprietary and/or custom interoperability vs. open standards
 - The roles of utilities, system integrators, vendors and standards alliances in creating an interoperable ecosystem
- Assistance and training to ensure a good implementation. As developer of both certification and interoperability test tools for OpenADR and IEEE 2030.5, QualityLogic is in a unique position to provide in-depth protocol training. Our domain expertise and exposure to other protocols – e.g., DNP3, SunSpec, IEC 15118, and others – enables us to advise on implementing these protocols.

- Training on test and certification aspects of software development to assist development teams in better planning and executing projects, and consulting on the selection of specific standards for communications in a pilot or demonstration project. QualityLogic has been developing software and firmware test tools and performing development test services for over 30 years.

Pilot and Demonstration Integration Testing Services

- Conduct a comprehensive, standardized interoperability test prior to integration testing to identify potential interoperability issues that can be fixed by the vendors early in the process. This reduces the time and costs of integration of products from different vendors.
 - The interoperability testing can be conducted by a utility, a vendor or an independent third party. The value of using an independent third party is the availability of detailed, impartial information to each vendor.
- Develop project specific test requirements (where the project specifies use of standards). While formal industry certification programs greatly improve interoperability, certifications do not guarantee that specific use case scenarios will work with all certified products. It can save time and argument to have a very specific supplemental “certification” for the precise scenarios that a pilot or demonstration project will implement.
- Develop and use a project-specific test specification, test procedures and associated test tools to pre-qualify products to ensure they will interoperate in the specific environment (in situations that do not employ standards with associated industry certification programs). The results of the testing should include detailed test information on issues that occur.
- Make the process available to any utility, vendor or aggregator implementing similar requirements. This accelerates a standardized, interoperable ecosystem of vendors and consultants that reduces individual project schedules and costs. When warranted, this could include developing and publishing an open program specification, including the requirements and test spec.

Test Automation

- Use existing test and certification tools to qualify (accept) the communications interfaces in a project. We use existing tools (either ours or another third party's, depending on the protocol) to conduct a project qualification test.
- Automate the testing where feasible using available test tools or extend them and adding specific implementation test procedures and reporting. This not only reduces the time and costs for product qualification, the test automation can be used by vendors and other utilities with similar requirements.

QualityLogic Corporate Profile

QualityLogic was founded in 1986 to help the fledgling desktop printer industry achieve interoperability goals by providing rigorous test solutions for page description languages. During the past 30 years, QualityLogic expanded beyond printer languages and has developed test solutions for numerous interface and communications protocol standards found today in the consumer electronics, telecom, smart grid, and media industries.

In these industries, QualityLogic has a long track record of working with product developers, system integrators, end-user and Standards Development Organizations (SDOs) in a variety of ways to help them achieve their interoperability and conformance goals.

- Technical training and support for development of standard communications protocols.
- Test planning and product qualification for specific pilot and demonstration projects.
- Integration test planning and execution.
- Test Specification Development – using a protocol specification, QualityLogic develops test specifications for conformance, performance, and/or interoperability.
- Test Suite Development – using the test specifications, QualityLogic develops a test suite or series of test suites to assess conformance, interoperability, performance, and other quality attributes.
- Certification program development – we develop and execute a certification program based on the developed test suites, either for industry standards alliances or individual customers.

QualityLogic is again at the forefront of addressing interoperability and conformance issues in a new industry – the Smart Grid. In November 2009, the Department of Energy selected a Pacific Northwest team, including interoperability testing partner QualityLogic, to conduct a regional Smart Grid demonstration project.

Since then, QualityLogic has become critical to the success of the OpenADR and IEEE 2030.5 (SEP 2) emerging ecosystems by developing test and certification tools, training utilities and vendors and supporting their development and implementation activities.

Most recently, QualityLogic has made significant contributions to the emerging DER integration challenges in California, Hawaii, Korea and elsewhere.

QualityLogic's qualifications for Smart Energy System Services include:

- Major contributions to the OpenADR Alliance
 - A and B profile definition schema and specification editor
 - Wrote OpenADR 2.0 A and B Test Specifications
 - Editor for the "OpenADR DR Program Guide"
 - Developed OpenADR 2.0 A and B Test Harnesses
 - Chair Marketing Working Group
 - Trained hundreds of Engineers and DR Program Implementers in OpenADR Implementation Workshops
 - Contributor to articles and white papers
- Major contributions to DR and DER Management Using IEEE 2030.5 (SEP 2)
 - Contributor to IEEE 2030.5 Specification
 - Contributor to Consortium for SEP 2 Interoperability (CSEP) PICS and Test Specification
 - Successfully completed CSEP Test Harness Qualification Program
 - Two successful IEEE 2030.5 Accelerator Programs for Interoperability
 - Developed a Conformance Test Program being implemented by two world-class test labs, UL and TTA (Korea)
 - Contributed to EPRI CEC Smart Inverter Communications Demonstration Project

- Contributed to California Common Smart Inverter IEEE 2030.5 Profile (CSIP)
- Initiated 1st and 2nd IEEE 2030.5 Symposiums
- Member of EPRI CEC IEEE 2030.5 Open Source Client Project
- Partnered with Korea Electric Power (KEPCO) to distribute IEC 61850 test tools worldwide
- Founder of the International Transactive Energy Conference (fourth year in 2017)
- Member GridWise Architecture Council
- Past Chair, Smart Grid NW
- Contributor to UL 1741SA
- Contributor to IEEE 1547.1 Interoperability
- Presenter at PACWorld (Protection and Control)
- Original Member Test and Certification Committee of SGIP
- Numerous industry papers and articles – see www.qualitylogic.com/knowledge-center/
- Completed and presented or submitted over 20 papers, articles and conference presentations.
- Developed in-depth mapping analyses between Transactive Control and 10 emerging smart grid standards, including OpenADR, SEP 1, SEP 2 (IEEE 2030.5), IEC 61850, DNP3, MultiSpeak and others.
- Participated as an original member of the Smart Grid Interoperability Panel Test and Certification Committee.

For More Information

Visit www.QualityLogic.com or call +1 208-424-1905