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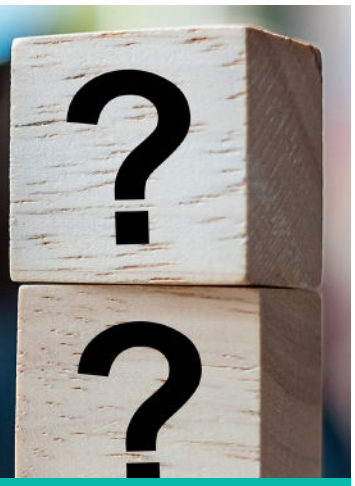
Webinar Q&A:
Introduction to IEEE 2030.5



On June 17, 2020, QualityLogic held an introduction to IEEE 2030.5 and CSIP webinar to the public. These are the questions that were asked by the webinar attendees along with our answers.

To view the webinar in full, visit **www.qualitylogic.com/webinar-introduction-to-ieee-2030-5/**

Question: **Does the aggregator control all inverters as a single resource or must the aggregator also contain geographic location data on all inverters to control them according to region?**

Answer: In CSIP, the aggregator controls it's inverters as discrete end-devices. The utility DERMS knows where each inverter is located, its capabilities and restraints through its commissioning process. The aggregator's role is to collect status, monitoring (metering) and settings information for each inverter and communicate that to the DERMS. It also gets 2030.5 instructions for each inverter from the DERMS and passes them on to each inverter. Inverters are likely to be assigned to groups for easier management by the DERMS so that DERMS-Aggregator management interactions can be about groups of inverters instead of each individual one.

Question: **What does the Aggregator certification process currently look like? For example, how many devices will the Aggregator need to aggregate during testing, and where will those devices need to be physically located/installed? How are phases 1 and 3 tested for Aggregators?**

Answer: While the Aggregation certification requirements are focused on the message exchanges between it and a simulated utility DERMS or communications server, there is a need to simulate or have a small number of inverters connected to the aggregator platform to complete the testing. Some of the tests ask for information on the managed inverters. How the actual test set-up is implemented is between the certification lab and the aggregator vendor.

Question: **How are phases 1 and 3 tested for Aggregators?**

Answer: Phase 1 are autonomous inverter functions which can be modified by communications and Phase 3 functions all need communications from the utility DERMS. In the Aggregator CSIP testing, messages about the Phase 1 and 3 functions are used to test that the Aggregator properly communicates these functions and responses are sent by the Aggregator (for its inverters) that confirm the actions for these Phase 1/3 based DER events. However, there is no actual inverter electrical testing required in the CSIP certification tests.

Question: **Is an Aggregator permitted to fulfil a control targeted towards several devices in aggregate, rather**

than ensuring that each individual device fulfils the control as specified? For example, if a server uses "Set Active Power Mode" (opModFixedW) to tell 10 identical devices to charge at 50% of their max charge rate, would an aggregator be allowed to instruct 5 devices to charge at 100% power and 5 to do nothing, in order to for example achieve better inverter efficiency?

Answer: If the Utility DERMs server is assigning to each inverter specific opmodFixedW with specific values, it is expected that the 2030.5 responses sent acknowledge the device is acting upon those included commands. However, there is no end to end verification included in CSIP certification that validates that the inverters are applying those specific instructions. Facility EMS model allows the EMS to make decision similar to the scenario described in the question..

Question: **For an Aggregator, do we need to perform electrical tests for end inverter during the certification?**

Answer: No. CSIP is a communications test only. There are no electrical tests defined in any of the CSIP IEEE 2030.5 certification tests unless the inverters are going through UL1741 SA tests with the NRTL.

Question: **Can we convert 2030.5 to DNP?**

Answer: For DER management, the new DNP3 Application Note 2018-001 defines all of the IEEE 1547.1 functions for DNP3 management so there is a one-for-one mapping between IEEE 2030.5 DER functions and DNP3 DER functions. Beyond the DER functions, there are other messages included in 2030.5 that also need to be handled. The full 2030.5 technical workshop reviews all of the 2030.5 messages and features that are part of the CSIP specification and would be helpful in understanding what needs to be translated.

Question: **Which protocol is the most used with inverter? IEEE 2030.5, OpenADR 2.0b or OCCP 1.6?**

Answer: IEEE 2030.5 is the only protocol that is officially mandated for inverter communications anywhere. The two other most popular open protocols for inverter communications are DNP3 and SunSpec Modbus. All three are named in IEEE 1547-2018. Outside the US, IEC 61850 is also used for inverter communications. OpenADR has defined messages that can communicate with inverters but outside of one demonstration project we know of (CA Solar Initiative 4), it has not been used for directly managing inverters. If the inverter is in an EV charging station, then OCPP is the most popular communications protocol but it does not have specific smart inverter control functions.

Question: ***What utilities are buying DERMS that are 2030.5 certified?***

Answer: The CA IOUs are mandated to use IEEE 2030.5 and are developing DERMS with 2030.5 communications servers. Some of the utilities in Australia are also implementing IEEE 2030.5 for DER management and we know of at least two major US utilities also implementing DERMS with 2030.5 communications. Hydro Ottawa has a program called MyGen that uses IEEE 2030.5 for DER and DR communications.

Question: **Is 2030.5 only required in CA, what is the plan to promote this requirement to other states, why not widely adopted by other part of the country?**

Answer: First, very few utilities outside of CA have the immediate problem of significant DER penetration and have the luxury of observing the CA rule 21 experience before having to make a commitment to a communications standard (if they even decide to do so). There is adoption in other states and countries. If you think about the fundamental DER functions that are required in CA Rule 21 and supported by IEEE 2030.5, they are common and not a California specific need. These DER functions are derived from IEEE 1547 standard which also has influenced updates of other DER communication protocols. There is an IEEE 2030.5 Ecosystem Steering Committee Chaired by Tom Tansey (Exec Dir of SunSpec) that has a mission to promote the IEEE 2030.5 standard beyond CA.

***Question:* Where is the decision made that specifies the actual monitored data that client needs to send to the server?**

Answer: CSIP includes number of examples of monitored data that are required to be sent by DER clients to the Utility DERM server. The utility can expand or specify additional specific requirements for the monitored data through its Interconnection Handbook.

***Question:* Is there a specific inverter response time limits defined in the 2030.5, for example the Vol-Var control?**

Answer: If the DERM server requires Response messages for its DER events, the DER client (such as an inverter) must send these response message within a specific timeframe. Beyond that, since the CSIP certification testing is not end to end, there is no requirement in CSIP that requires the inverter to perform them at the electrical power level. 1547.1 is expected to have this type of response time at the electrical level.

***Question:* I would like to just understand whether the IEEE 2030.5 limited to inverter in the utility or does it help control other devices in a similar way as a Data Acquisition System does?**

Answer: The IEEE 2030.5 standard was designed to directly communicate with and manage any system or device behind the meter on the electrical system. This includes water heaters, thermostats, electric vehicle charging, battery storage, etc. It is a very broad protocol that covers other smart energy functions beyond DER such as Demand Response, Pricing, Messaging, Energy Flow Reservation, etc. CA Rule 21 CSIP has specified which specific function sets in IEEE 2030.5 are need to meet the CA Rule 21 requirements.

***Question:* Does it cover all the requirement of IEEE 1547.1-2020?**

Answer: IEEE 2030.5 can communicate about all of the IEEE 1547 functions for which communications makes sense. For instance, 2030.5 can communicate IEEE 1547 required settings for Volt-Var curves but it would not communicate about environmental requirements such as temperature and moisture.

***Question:* Are there other states/ISOs planning on using 2030.5 in the near term?**

Answer: Yes. However, it is not clear which of these is public knowledge at this time outside of Hydro Ottawa. The need to manage smart inverters goes well beyond California and this is the reason why other states/countries would adopt such standard.

***Question:* Do you have the phase III test plan to share?**

Answer: Assuming this means CA SIWG Phase 3 Advanced Inverter Functions, most of these are covered in IEEE 1547.1-2020. The exceptions are Functions 8 (Scheduling Power Values and Modes) is not defined in IEEE 1547-2018. There is no nationally defined test for this function. However, CSIP tests that the messaging about schedules can be successfully communicated in the CSIP certification tests but does not validate that the schedules are implemented in the inverters.

***Question:* Is an Aggregator permitted to fulfil a control targeted towards several devices in aggregate, rather than ensuring that each individual device fulfils the control as specified? For example, if a server uses "Set Active Power Mode" (opModFixedW) to**

tell 10 identical devices to charge at 50% of their max charge rate, would an aggregator be allowed to instruct 5 devices to charge at 100% power and 5 to do nothing, in order to for example achieve better inverter efficiency?

Answer: As far as CSIP certification, it is not an end to end test that verifies what the inverters are actually doing. The verification for CSIP is done at the 2030.5 protocol level so if the DERMS requires each inverter that's been assigned a specific opModFixedW command with specific values, it must send a series of DERControlResponses for that DERControl instance. Whether you send the responses but change the behavior as you describe on the back end with the inverters is currently not verified in CSIP certification. I'd recommend you to contact your NRTL/lab this question. Hope this helps.

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