DOCKETED

Docket Number:	19-TRAN-02
Project Title:	Medium- and Heavy-Duty Zero-Emission Vehicles and Infrastructure
TN #:	236567
Document Title:	QualityLogic Comments - on Draft Solicitation Concept
Description:	N/A
Filer:	Patty Paul
Organization:	QualityLogic
Submitter Role:	Public
Submission Date:	2/2/2021 12:07:36 PM
Docketed Date:	2/2/2021

QualityLogic Comments on DRAFT SOLICITATION CONCEPT: Clean Transportation Program: Interoperability Test Events: Docket 19-TRAN-02

QualityLogic is pleased to submit comments to the CEC regarding its DRAFT SOLICITAION CONCEPT for a series of EV related Interoperability Testing Events. As a company, we are heavily involved in smart grid interoperability and the EV communications area is particularly challenging today.   We support the goal of 100% zero-emission passenger vehicle sales by 2035 and are doing our part to enable this outcome through interoperable communications between systems.

For context, QualityLogic has been in the software quality business for over 30 years, providing test services to a range of industries and developing both conformance and interoperability test tools for standardizing interoperable communications between systems. In 2010 we started working in the smart energy field and currently develop and support official conformance test tools for OpenADR, IEEE 1547.1, IEEE 2030.5 and interoperability test tools for IEEE 2030.5.   We work closely with the Alliances and certification programs for these protocols, providing training, test tools and support to the test labs, utilities and vendors implementing these protocols.   We have also written extensively and given numerous talks to the industry on interoperability.   More information is available at www.qualitylogic.com and QA Best Practices From Our Software Testing Firm - QualityLogic.

Our comments are focused on application protocol interoperability – e.g., OpenADR, OCPP, IEEE 2030.5, etc – rather than product standardization.   Product standardization for EVSE's is certainly a critical area and is foundational to any interoperability standards and testing. If products don't do the same functions, communicating in a standard way gets challenging.   Further, a focus on functionality leads to testing that must validate product performance against a standard such as IEEE 1547-2018.   There are efforts in the industry by EPRI (driven by CA IOUs) and UL to create an EVSE functional standard that may or may not include communications interop as part of it.   This is a direction that, in our view, could use some CEC investment. It is related to but much more complex, both technically and politically, than addressing interoperability of communications between utilities, EV charge networks, EVSEs and EVs.

Solicitation Objectives

The comments we wish to make concern the goals and objectives of the DRAFT Solicitation.   The problem it is addressing is well stated:

> *For California to achieve its transportation electrification goals…the industry must continue moving towards interoperability, where vehicles, chargers, and software systems work together, without special knowledge or effort by the user. The market is still nascent, and there are several competing standards for hardware and software. Furthermore, new products are rapidly entering the market, posing a challenge for interoperability.*

Notably absent from the systems that need to interoperate are the distribution utilities (IOUs, MUNIs, etc) which have a major role in the business of decarbonizing the transportation system.   It's also not clear why "new products" inherently pose a challenge to interoperability. This is true if these are new technologies or using a non-standard communications protocol. But there is no reason that new

products that *conform* to industry standards need pose greater interop issues in themselves.   This could use some clarification.

In our own work we think it important to separate goals and objectives from the solutions.   The DRAFT conflates the two:

- *The overall goal of this effort is to further California's leadership on innovation in the EV and EV charging industries* **[this is a clear goal]**
- *by establishing a recurring forum that will support interoperability testing, product development, standards implementation, collaboration, knowledge sharing,* **[this is the "solution"]**
- *and a more competitive market composed of advanced and interoperable products.* **[another clear goal]**

California desires to be a leader while establishing a competitive market that presumably drives up quality and interoperability while driving down costs.   But the "solution" presupposes a key strategy for achieving these goals while covering an exceedingly broad set of objectives:

- Interoperability testing – which can be numerous different kinds of activities.
- Product development – again means numerous different activities and requires a clear rationale for the State of CA to be involved.
- Standards implementation – but not development? This can also mean many things and has multiple aspects.
- Collaboration and knowledge sharing – an area the CEC excels at and is in a great position to facilitate.

Notably missing in the DRAFT is a discussion of the desired outcomes with associated metrics for assessing success.   Specifying the number and kinds of companies to be involved, the protocols to test and other specific activities does not address how progress towards the goals of an interoperable eco-system and more competitive market is measured.   If the CEC has existing metrics for progress on these goals, they could be included. If not, it seems like outcome metrics might include project contributions such as:

- Establishment or acceleration of new test and certification programs specific to the EV domain;
- Number of product certifications attributed to the project activities;
- Influence on design and execution of demonstration projects focused on interoperability of EV systems;
- Influence on CPUC and CEC dockets and rulings;
- Recognition and emulation outside of CA.

Any one of the objectives is worthy of millions in investment and we think that such a broad scope will be hard to manage to achieve useful outcomes.   These objectives also overlap activities of other organizations in many aspects. For instance, as noted on the call, the OCA already conducts their own Interop events 2x per year in pursuit of evolving their standard and interoperability. What is the value that a CEC funded Interop activity could add to existing industry activities?   Further, unless such

activities are done in collaboration with the organizations (SDO/ITCA[1]) responsible improving the standard and certification programs, much of the potential improvements are left to chance and may not occur.

Interop Events

There are a number of dimensions to interop events in the EV domain:

1. **Intra-Protocol Interoperability – Certified Products**: testing already conformance certified products with each other that support the same protocol – e.g., OpenADR, OCPP, etc. – to ensure that they work together and identify issues with the protocol and test specifications. This is typically something done by an Alliance like OpenADR or OCA ((or should be done by them).
2. **Intra-Protocol Interoperability – Major Standard Update:** such activities are used to validate and improve a developing major update to a technical specification – e.g., an update with major new features that require a major update to the certification testing. Test products would be certified to an existing program but not the update being tested.
3. **Inter-Protocol Interoperability:** such activities are not that common but would be very useful in environments that require multiple protocols to execute a utility command at the EVSE-EV level. For instance, a very logical communications channel could be OpenADR to an EV Network system; OCPP to an EV via ISO 15118. The systems in the Interop would all be certified for the protocols they used, given a certification program for them. The translation points however are not likely to be certified for the translation between protocols so the real value is in testing those translation systems as well as the end-end validation. Interoperability testing like this seems to be a valid and important contribution the CEC could make to EV communications interoperability.
4. **New Standard Interoperability:** if a group is working on a new protocol standard, Interops are a valuable way to discover issues with the standard itself and develop a test specification in the process.

Our perspective is that Interop types 1 and 2 are best left to the ITCAs (Interoperability and Certification Authority – alliances like OpenADR, SunSpec, OCA). This is a major aspect of their business. If the CEC wanted to accelerate this type if interoperability testing it could issue RFPs specific to protocol Interop testing that would be aimed at supporting ITCA operated interoperability programs. The key relevant vendors are already participating in the alliances and it would be the most efficient method to accelerate this form of interoperability activities.

The actual interoperability status for each protocol eco-system is not readily obtained. There is no standard for assessing eco-system interoperability for a specific protocol and the ITCAs have a vested interest in projecting an image of interoperability that may not be entirely accurate.   A potential pre-cursor to the DRAFT SOLICITATION CONCEPT could be to commission some form of assessment of current intra-protocol interoperability (and perhaps Inter-protocol interoperability) in order to establish a baseline and identify the most valuable contribution(s) the CEC could make towards its goals.

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[1] An SDO is a Standards Development Organization such as IEEE or IEC An ITCA is an Interoperability Testing and Certification Authority such as OpenADR or Wifi Alliance.

In lieu of better intra-protocol interoperability, we think an RFP for more Interop activities would be most valuable if focused on Interop type 3. This is more challenging and is also key to developing a multi-protocol, interoperable eco-system in CA and beyond. There is room for innovation in this type of activity and no single organization today focuses on this issue.

A side benefit of conducting inter-protocol interop testing would be to identify issues with intra-protocol interoperability while accelerating progress on the inter-protocol interoperability challenge.

Interop type 4 is also an area where the CEC could accelerate innovation and standard development. It is not clear to us what new standards are in development (or could be) but if there are it is a valuable area to accelerate.

Product and Test Tool Development

This area is another multi-faceted domain. In our experience, product development activities and test tools associated with Interops include:

1. **Finding conformance and interoperability issues** with certified products by testing them against other certified products. This is something that vendors do routinely as part of their participation in an ITCA or other Interop event. As noted, the ITCAs routinely provide (or should provide) these venues and vendors take advantage of them. Any events of this nature sponsored by the CEC would achieve similar results but could be redundant or even cause confusion among vendors.
2. **Finding issues with new technology** (either a major standard upgrade or a developing standard) through Interop events. Vendors that participate are developing new technology and use Interops to both learn of issues they need to fix and to influence the evolution of the technology standard itself. Such a focus is most effective is conducted by an organization that can use the results to improve both the standard and a future certification program.
3. **Development of test tools** for conformance and interoperability testing for **existing standards** with certification programs. These tools are typically funded by the ITCAs for the standard or by private vendors in partnership with the ITCAs. This is the case for OpenADR, OCA and SunSpec (IEEE 2030.5 and SunSpec Modbus). ISO 15118 is less clear (primarily because we are not involved with it). There is always room to improve the conformance and interop test tools but care needs to be taken to not cause confusion that results in less interoperability.
4. **Development of test tools for new technology** such as a test program for gateway systems converting between protocols or a new standard that is being developed in CA (not sure what that would be). This is an area that CEC funding seems to us to be particularly useful since it is pre-commercial and there is significant market risk for vendors and ITCAs.

It seems to us that the use cases described in items 2 and 4 could be good candidates for the type of solicitation the CEC is planning. However, we don't have any insights to share as to what new standards or technology is needed.

Summary of Comments

Our recommendation is to narrow the focus of the Interop Solicitation to those interoperability problems that are not already being addressed by industry and industry alliances. These could be specifically:

1. **Intra-Protocol Interoperability Assessment**: aimed at providing a baseline for measuring interoperability of an eco-system. The assessments of the relevant EV protocols could be valuable in further refining the focus of subsequent CEC investments.
2. **Inter-Protocol Interoperability:** such activities are not that common but would be very useful in environments that require multiple protocols to execute a utility command at the EVSE-EV level. For instance, a very logical communications channel could be OpenADR to an EV Network system; OCPP to an EV via ISO 15118.
3. **New Standard Interoperability:** if a group is working on a new protocol standard, Interops are valuable as a way to discover issues with the standard itself and develop a test specification in the process.
4. **Finding issues with new technology** (either a major standard upgrade or a developing standard) through Interop events.
5. **Development of test tools for new technology** such as a test program for gateway systems converting between protocols or a new standard that is being developed in CA (not sure what that would be).

The area of standardization of EVSE functionality may also be a useful area of focus. It would require some research into the EPRI, UL and any other related industry activities – e.g., SAE J3072 work on requirements for V2G functions and communications.   But there may be a logical role for a CEC project to test the emerging standardization of EVSE requirements. This is similar to the work done with CEC funding to validate both comms and functions for CA Rule 21 Phase 2 (IEEE 2030.5 CSIP) and IEEE 1547-2018 as they were developing.

We hope these comments prove useful to the CEC.

Respectfully submitted,
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