

October 30, 2017 WEBEX MEETING NOTES

Summary

- Attendance: approximately 50 attendees via Webex
- Presentations and notes available online: <http://www.cpuc.ca.gov/vgi/>
- Presentation 1: Proposal
 - Tyson Eckerle, GoBiz:
 - Enable VGI capabilities
 - What type of hardware wouldn't need to be upgraded?
 - Carrie Sisto, CPUC:
 - Briefed Commissioner Peterman
 - Each protocol has its limitations
 - What are the common aspects of hardware?
 - Deliverable 3 can identify policies, value categorization and venue to address
 - Recommendation will be incorporated into proceeding record.
 - Stephanie Palmer, ARB: Minimum functionalities
 - EVSE – Utility: Wifi & Ethernet to Push over the air upgrades
 - Use protocols in combination until market signal creates dominant ones
 - EVSE – EV: Homeplug Green PHY
 - Must document compliance
 - Rey Gonzalez, CEC:
 - CEC will continue the standards conversation, as communications standards have been the approach in its EPIC research and ARFVTP demonstrations.
 - Stakeholders should address the concerns regarding the hardware design.

Action Items & Next Steps

- Parties should provide feedback on the proposal by 11/8 COB:
 - Reasonableness of the design, particularly the EVSE Performance Requirements
 - What are the non-functional requirements that impact hardware design?
 - Concerns to address:
 - Would requiring the hardware with the previous criteria encourage scaled EVSP and OEM charging investments that provide VGI capability?
 - How could hardware change over time, given design innovations and new use cases?
 - Do today's commercial EVSEs meet the proposed hardware functions?
 - Can VGI software be implemented within the proposed hardware?
 - Will the hardware proposal assist in vehicle/EVSE/utility connectivity across California?
 - How can utilities and regulators best ensure that EVSEs which include the proposed hardware are functional with grid-integrated vehicle charging?
- Comment on Deliverable 1.3 due by Friday 11/3 COB.
- Next meetings
 - November 14, 2017 (In-person in San Francisco with Webex option).

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- December 18, 2017 (In-person in San Francisco with Webex option). This is planned to be our last working group meeting of the year. CPUC Commissioner Carla Peterman will also join the meeting and make some remarks.

Resources

- Email the state agencies (CPUC, CEC, ARB, CAISO, GO-Biz) with any questions or comments: vgiworkinggroup@cpuc.ca.gov

Detailed Comments

QUESTION 1

- Josh McDonald:
 - Does this refer to Multi-use EVSE: publicly accessible Level 2?
 - What if the EVSP doesn't use it?
 - Intended to be a universal design
 - Implementers would need to define the physical layer for northbound communications (e.g. Wifi)
- Mike Bourton:
 - The physical aspects of design change.
 - The commonality is Internet Protocol.
 - Design freedom to change technology over time to remain compatible.
 - Oleg Logvinov: Correction to not compatible but "capable."
- Craig Rodine:
 - Networking capability will be able to recover hardware by reaching station with IPv6, and could be implemented via a variety of technology: Wireless WAN, 2G/3G Modem.
- Josh McDonald:
 - Utilities can easily request equipment that supports IPv6 in a procurement.
- Jeremy Whaling:
 - Design represents the lowest common denominator.
 - 802.11n, and future ones for additional bandwidth
 - Good proposal, open performance requirements.
 - Implementers have to figure out what to do with this.
- Mike Bourton
 - Need to clarify the middle part: intent to design module or physical layer?
 - Justin: Hardware universality that will be able to persist. Daughter boards will be designed to get plugged in.
 - Mike: some of those are physical layers, some are interfaces. Potential mix up: USB Physical and Connectivity. Bluetooth is just connectivity. Need 2 parts for complete specification.
- Craig Rodine:
 - It's problematic to design a physical form factor at all different points in devices.

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- Design could be costly if considering at the board/module level. Specifying 802.11n or Ethernet is helpful, but not further. ChargePoint can repurpose hardware without a costly module.
 - Justin: Idea was for a low cost way for extensibility and enable to plug something in.
- Mike Bourton:
 - Open questions include how to define: processors and memory for use cases. Should we be paying for the benefit? Replacement via a truck roll could be the cost of an EVSE?
- Oleg Logvinov:
 - Agree with previous statements (Craig, Mike). The cost to specify a form factor is unknown. Why is CEA 2045 better than PCIE? Need communication northbound, but it'll be cheaper to replace the whole device rather than to upgrade via an insertion of cards. Depends on environmental factors, installation quality, etc.
 - Justin Regnier: Proposal is open to modularity as designed by the manufacturer
- Josh McDonald:
 - Supports IPv6 and let the implementers decide architecture.
- Craig Rodine:
 - Vendor strength is design. Could allow field upgradeability and interfacing.
- Carrie Sisto:
 - Trying to identify which functionalities should be supported, not necessarily specify particular hardware types
- Barry Sole:
 - It is not possible to completely separate definitions of hardware vs software
 - Functionality makes more sense.
- Steve Davis:
 - It is less valuable to discuss hardware.
 - Goal is to enable connectivity between vehicles and stations: we haven't risen to the level of what is needed to enable the automakers to make design decisions.
 - Justin Regnier: Proposal intention is for a repurposing capability, should we not understand the need of the market. While the protocols are unknown, to best safeguard funds, hardware will be useful
 - Step back. What was the purpose of the VGI working group? To resolve a market dysfunction so that automakers could authenticate, achieve functionality. Automakers and EVSPs want to enable grid functionality. Cannot make production decisions without anything to connect to.
- Barry Sole:
 - We as automakers do define EVSE specifications, but it does not have a southbound conclusion.
 - Justin Regnier: A multiplicity of different paths are possible but the proposal suggests that there is no single answer. Proposal allows for losing pathways to not cause problems.
- Hank McGlynn:
 - There will be differences between charge-only EVSE and Rule 21 EVSE. Should not require everyone to be Rule 21, which requires specific hardware.

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- Oleg Logvinov:
 - Very difficult to constrain form factor.
 - Agree with Barry. Look at usability. Do we pay the price now? Why make X if the cost is 1/2x later?
 - In 10 years, upon excavation of connectors, what does product reliability look like, given physical and environmental conditions?
 - A good start to require upgradeability, but need to drive software functions, not hardware functions.
- Mike Bourton
 - Need to determine what (processor and memory) are we building to meet use case functions.

Question 2:

- Mohammad Abdul-Hak
 - Need to shift solution, narrow down. Can't move to production without standards.
- Mike Bourton:
 - IPv6 northbound and southbound.
 - Need requirements
- Barry Sole:
 - Final solution: need to be able to upgrade.
 - Risk of overspec the hardware
 - Mike Bourton: Make a common platform that everyone can utilize, but the time range affects design (5 years, 25 years?).
 - Carrie Sisto: 10 year EVSE lifespan for most of the IOUs' proposed infrastructure investments.
- Craig Rodine:
 - For Southbound, what market signal should be sent? Ensure the EVSE has flexibility to enable VGI. Northbound interface is 90% of the matter, given different vehicle technologies. Want flexibility to change amount of energy, enable V2G.
 - Mike is right: most important cost model is above the device level costing. Instead of examining microeconomics, should abstract.
 - Most important aspects of EVSE:
 - Lifetime (years)
 - Processor power and memory – 10 year
 - Malleable (how much cheaper is replacement vs future adaptability)
 - Field Upgradeability
 - Device interfaces (software to enable the utility communication)
 - Example: OpenADR works because the interface was agnostic to hardware and vendors could implement.
 - Security- encryption/decryption (TLS, IP).
 - Southbound: analogue design PWM, canbus, ethernet. All are capable of VGI including 2 way. To get as many vehicles, don't put software or hardware interfaces on the southbound.
- Jeremy Whaling:

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- HPGP is enabled for any vehicle with CCS, which is manufacturer dependent.
- Mike Bourton:
 - Excluded DC (ChaDeMo)
 - DC is not seen as needed for VGI.
- Craig Rodine:
 - How about DC 11kW at home? Why limit this to today's AC EVSE for multi-use public charging? VGI is important for home stations too.
 - HomePlugGreen PHY may have different cost design, and the EVSE should be able to participate regardless of its power type AC or DC.
 - Carrie: Keep in mind other use cases

Question 3:

- Steve Davis:
 - We don't know the pace at which the market will require or move toward inductive. If the utility investments for AC L2 conductive – the physical layer will need to be revisited.
- Jeremy Whaling:
 - Over the next few years: maybe a 2nd working group for inductive, but depends on wireless standards.
- Craig Rodine:
 - IEC standards for southbound uses IPv6
 - ChaDeMo external wireless charging that doesn't have [IPv6].
 - Where will it fit in multi-family?
 - If this is a "Point Recommendation" for certain stations, it needs to be something that lasts, is based on clear VGI goals: What load will be involved? All of the above: wireless and DC in the home.
- Mohammed Abdul-Hak:
 - Foresee need to define common standard for EVSE.
 - Waiting until next technology continuously challenges limited resources, so must narrow down the options.
 - Technology roadmaps may require reevaluation, but for now narrow down.
- Barry Sole:
 - What do OEMs' 10 year roadmaps look like?
 - Mercedes Benz: AC solution HomePlug Green PHY (2011), DC (also HPGP), Wireless (J2954) – all using ISO 15118.
 - BMW: Currently AC and DC HPGP. Future inductive, which requires standardization. All using same communication standard ISO 15118.
 - Porsche, VW, Audi: ISO 15118 AC & DC, wireless in development. Standards in development (2018) uses ISO 15118.
 - Fiat Chrysler: AC conductive SEP 2, DC ISO 15118, Wireless WiFi w/ ISO 15118 Ed.2
 - Honda: Wireless a premium product, AC with a TBD means for High Level Communications, DC using CCS based on DINSPEC/ISO15118. V2G products for AC & DC.

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- Nissan: Nothing official, AC telematics. DC ChaDeMo, wireless in development
- Lucid: ISO 15118 for AC & DC
- GM: Don't support AC high level communications. DC: DIN. No timeframe for ISO. Wireless with WiFi and Telematics
- Ford: Confirmed with Dave McCreadie

Automaker	AC Conductive	DC Conductive	Wireless Inductive
BMW	ISO 15118 (HomePlug Green PHY)	ISO 15118 (HomePlug Green PHY)	ISO 15118
Fiat Chrysler	SEP 2.0	ISO 15118 (HomePlug Green PHY)	WiFi, ISO 15118 Ed.2
Ford	Telematics & ISO 15118 (future)	ISO 15118 (HomePlug Green PHY)	ISO 15118 Ed. 2
GM	No High Level Communications	DIN Spec, no timeframe for ISO/IEC	WiFi and Telematics
Honda	TBD High Level Communications, V2G	DIN Spec / ISO 15118, V2G	Premium product
Lucid	ISO 15118 (HomePlug Green PHY)	ISO 15118 (HomePlug Green PHY)	
Mercedes Benz	ISO 15118 (HomePlug Green PHY)	ISO 15118 (HomePlug Green PHY)	J2954/ ISO 15118
Nissan	Telematics	ChaDeMo	In development
Porsche/Audi/Volkswagen	ISO 15118 (HomePlug Green PHY)	ISO 15118 (HomePlug Green PHY)	ISO 15118 (in development - 2018)

○ EVSPs roadmaps?

- Greenlots: Echo the OEMs: more hardware is 15118 capable. We're also seeing wireless. Options in development today (are sooner- 1-3 years). Majority of EVSE capabilities are developing 15118 + OCPP + OpenADR.
- IoTecha: Developing "blocks inside of EVSE." Judging the interest of the market, the manufacturers have clear and concrete plans for ISO 15118 in AC and DC available this year and next year. EVSE will be platform capable to support functionality, and designed for 10 year survivability.
- ChargePoint: Developing load control via PWM and DIN 70121 (a subset of 15118). Technical trial completed with Daimler in AC for a home/fleet/multi-family station. In 2018, there will be an aggressive transition from DIN to 15118 for interoperability and conformance—a key factor for rollout. OEM partners are moving to 15118.
 - For DC stations: CCS (ISO 15118), ChaDeMo (CAN bus)
- Kitu:
 - Everyone has a platform that can support simultaneous platforms, via the ST2100 chip.
 - Currently there are many dumb EVSE that can't support protocols.
 - Justin: Do most with HLC hardware also have capability of speaking everything?
 - Mike: No depends on security and the fact that requirements were not affecting hardware design.

- Oxygen Initiative: Is protocol agnostic and is working on different methods, but is focusing on ISO 15118, which has garnered most traction from Automakers supporting AC & DC.

Question 5:

- Utilities:
 - Dean Taylor, SCE: The proposal could allow different options to develop, instead of picking winners, and this is similar to the proposal from IOUs and select OEMs
 - Abigail Tinker, PG&E: Appreciates flexibility.
- Adam Langton:
 - Need to resolve the missing piece of use cases and value.
- Jeremy Whaling:
 - Disagrees that cost/benefit value is unclear. Example: what is the case where VGI can support additional stations or vehicles on the road? Each individual vehicle can be supported because additional chargers can accommodate load.
 - Concerned about conflicts in provider signaling, power levels for charging, and stranding risk. Any customer problem with smart charging results in immediate dropout via bad customer experience. For example, how will the OEM ensure that you are not in a program with another provider? How to develop joint programs? Further, VGI potential could be limited in public charging because the vehicles don't have the dwell time.
 - Noel Crisostomo: Would hardware designs alone resolve the fragmentation problem?
 - Jeremy Whaling: "It could." The charger needs high level communication and depends on the implementation.
- Adam Langton:
 - If you don't know what value is you're not going to get vehicle to make implementation.
 - Jeremy Whaling: Disagree because there is value in installing more stations.
 - Barry Sole: What's value to customer? We want e-mobility, so how do we make it as satisfactory as possible?
 - Lisa McGee: Given short EV range, need to charge them and get them back on the road.
 - Peter Klauer: The expectation from the ISO (to be discussed perhaps beyond this group), is that there's a control system that accounts for the information needed to protect the customer. Need a layer atop the hardware that is proposed to orchestrate vehicle activity to the ISO.

Participants

- Jeremy Whaling, Scott Turik, Abigail Tinker, Kelsey Johnson, Hank McGlynn, Steven Yip, Niki DeLeon, Ted Bohn, Tom Ashley, Mike Bourton, Barry Sole, Steve Davis, Stephan Voit, Josh McDonald, Craig Rodine, Oleg Logvinov, Hank McGlynn, Mohammad Abdul-Hak, Adam Langton, Alec Brooks, Anne Smart, Brian Chen, Dean Taylor, Elpiniki Apostolaki, Eric Bach, Eric Cutter, Fahad Saadat, Hannah Goldsmith, Jim Tarchinski, John Mengwasser, Jordan Smith, Kelsey Johnson, Lance Atkins, Liam ?, Lisa McGhee, Mike Ferry, Rick Scholer, Ross Ponder,

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- CA Agencies: Carrie Sisto, Peter Klauer, Stephanie Palmer, Elise Keddie, Justin Regnier, Noel Crisostomo, Rey Gonzalez, Kiel Pratt, Matt Fung, Elizabeth John, Tyson Eckerle, Quang Pham