



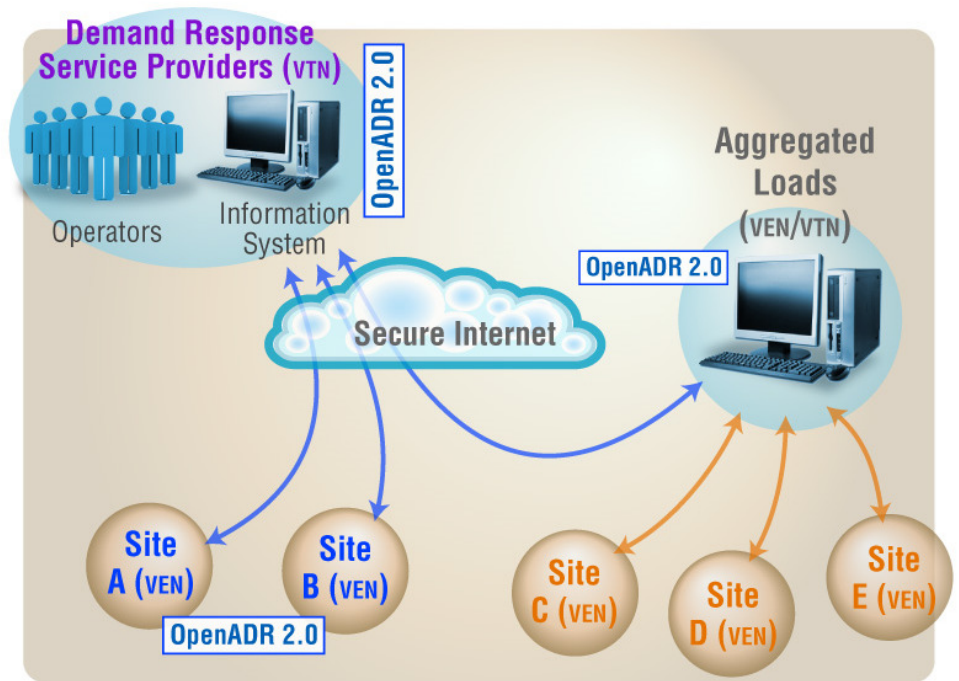
OpenADR in Japan OpenADR Overview and Updates

Rolf Bienert, Technical & Managing Director



OpenADR in a Nutshell

OpenADR provides a non-proprietary, open standardized Demand Response (DR) & Distributed Energy Resources (DER) interface that allows DR service providers to communicate DR, DER, and TE (Transactive Energy) signals directly to existing customers using a common language and existing communications such as the Internet.



OpenADR Progression



Research initiated by LBNL/ CEC

OpenADR 1.0 Commercialization
(PG&E, SCE, and SDG&E)

Pilots and field trials
Developments, tests (Utilities)

Official OpenADR specification (v1.0) by
LBNL/CEC*

- DR 2.0 Pilots** and field trials
 - Wholesale markets, ancillary services
 - Dynamic pricing, renewable, EVs
 - International demonstrations
- All end-uses and sectors**

Planned: CEN/CENELEC
and local standardization
IEEE?



- OpenADR Standards Development
 - OASIS (EI TC), UCA, IEC
- NIST **Smart Grid**, PAP 09

EI 1.0 standards
- OpenADR profiles**



- OpenADR 2.0 specifications**
 - International standards (IEC)
 - OpenADR 2.0 products/deployments.
- USGBC national pilots**
- Codes (CA T24)**



- Foster Adoption
- Test/Certify (v2.0)

Standards Interoperability Lifecycle Process: An iterative development process for a standard to be deployed in markets.***

- Research and development
- Pilots and field trials
- Interoperability standards development
- Deployment and market facilitation



* OpenADR v1.0: <http://openadr.lbl.gov/>

** OASIS EI 1.0 standards: <http://www.oasis-open.org/committees/download.php/45425/energyinterop-v1.0-cs01.zip>

*** Publication: http://drrc.lbl.gov/sites/drrc.lbl.gov/files/LBNL_5273E.pdf

Where are we today?

OpenADR Certified Product Database
Utilities and other DR/DER operators have a rapidly-growing selection of certified products to choose from for demand-side management.

Number of products on page: 10 20 30

ABC DEF GHI JKL MNO PQR STU VWX YZ

Sort Results By

Search ...

FILTER PRODUCTS

- SERVER ▾
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- OPENADR PROFILE ▾
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BLEnDer@DR, one of BLEnDer series package software from Mitsubishi Electric Corporation, is fully complied with the OpenADR 2.0b profile. The software offers necessary func...
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opconnect

Community Connect
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- Two completed specifications
 - >8 years for 2.0a
 - >7 years for 2.0b
- 8 test houses validated
- > 247 certified systems
- ~ 169 member companies

Survey in Progress

- Southern California Edison (SCE) is conducting an industry survey to characterize the market adoption of the OpenADR communications protocol in the utility industry. The work is being conducted by Energy Solutions in collaboration with the OpenADR Alliance. The objective of the study is to provide an up to date assessment of the currently active OpenADR deployments, detailing the jurisdictions and equipment types of these deployments, and quantifying the controlled MW and number of connected end nodes and devices. The information, when finalized, will be shared with industry stakeholders later this year. Please be on the lookout for more emails coming soon. If you have any questions, please email survey@openadr.org.
- To participate, please follow this link - <https://www.surveymonkey.com/r/F368K7D>

The 'Entities' of OpenADR

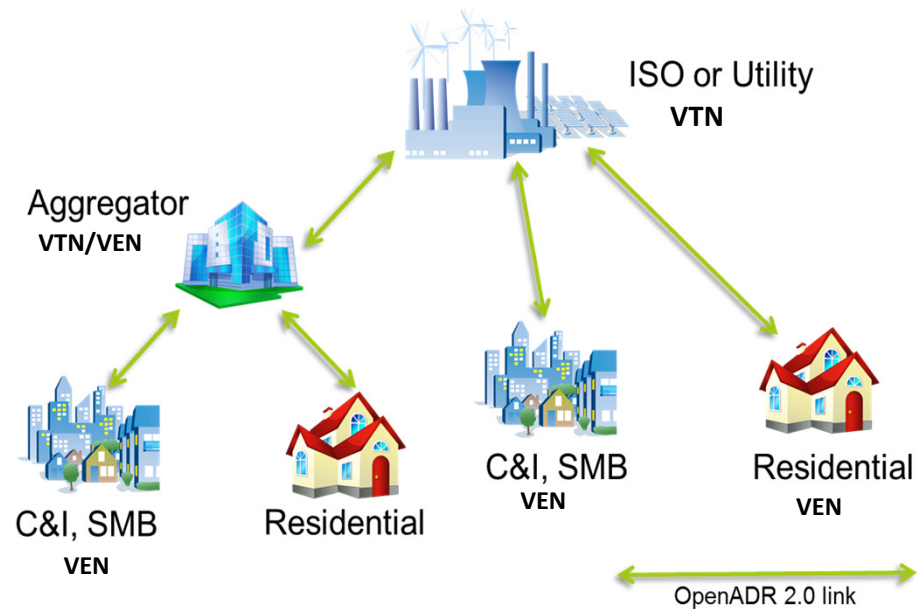
OpenADR is a message exchange protocol with two primary actors aka 'entities'

Virtual Top Nodes (VTN)

- Manages Resources
- Creates/Transmit events
- Request Reports

Virtual End Nodes (VEN)

- Receive events and respond to them
- Generate reports
- Control demand side resources

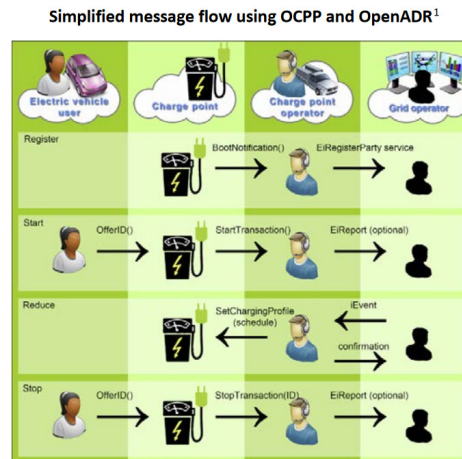


The 'Services' of OpenADR

- Web Service like logical request-response services
 - Event Service – Send and Acknowledge DR Events
 - Opt Service – Define temporary availability schedules
 - Report Service – Request and deliver reports
 - RegisterParty Service – VEN Registration, device information exchange
- XML Payloads
- Communication through broadband or dedicated internet connection
- Security: TLS1.2 with server and client cyber sec certificates

Interaction with other Standards

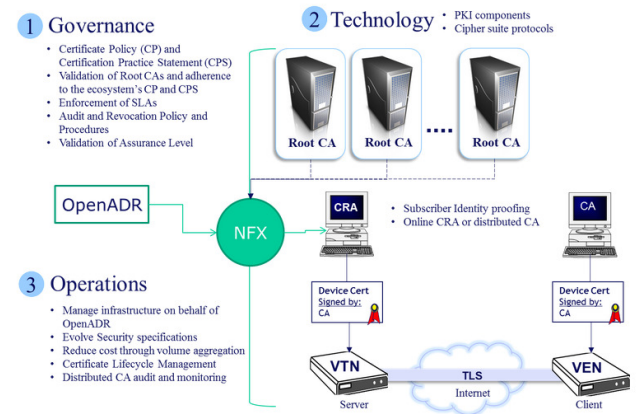
- OpenADR prefers to “inform & motivate”
- Therefore, it is well suited to integrate with other downstream standards like EEBus, OCPP, and others
- No direct translation
- Use of information elements to make decision



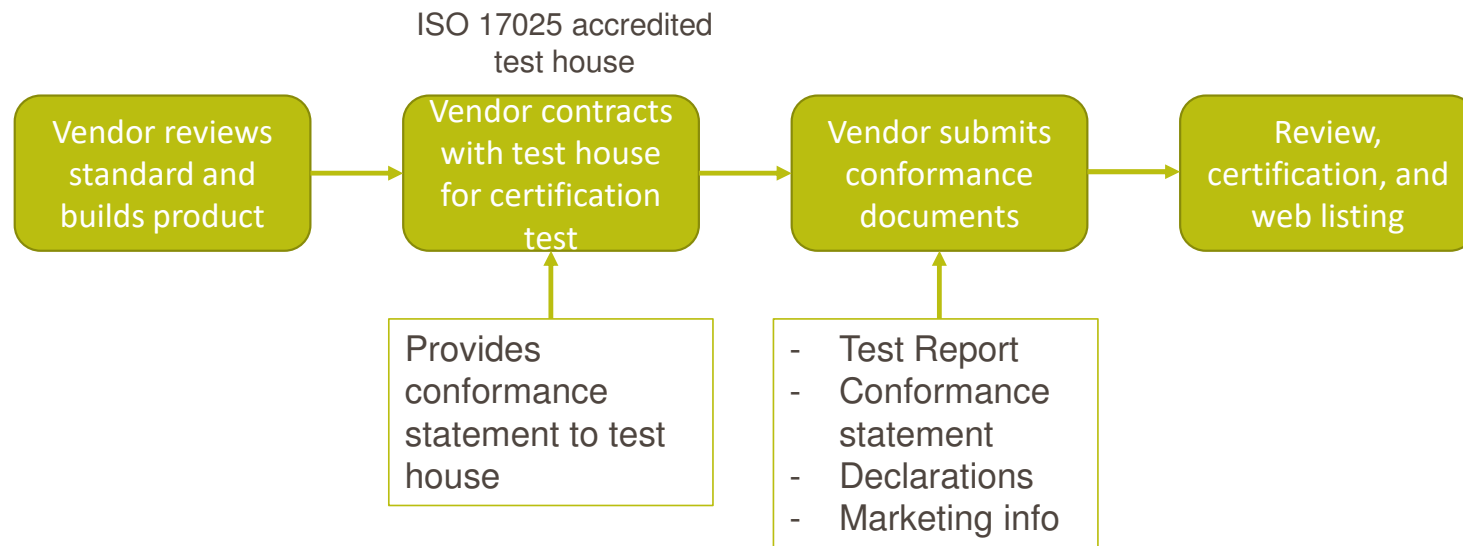
¹ <https://openadr.memberclicks.net/assets/using%20openadr%20with%20ocpp.pdf>

Cyber Security Aspects

- Transport Layer Security 1.2
- Server and Client certificates
- Dedicated OpenADR ECC and RSA certificate authority
- Application up to user → utilities
- OpenADR allows for demarcation between utility network and customer owned equipment
- Security reviews performed by NIST/SGIP and IEC working groups



Certification Process



Future Specification Updates (NOT DECIDED)

- Reduced function set for price-only communication – California Energy Commission price server communications
- Add optional support for JSON payloads.
- Adding a flag in a report request to control whether reports provide aggregate data for all resources listed in the register report reportDataSource element or to provide non-aggregated data for each individual resource listed in reportDataSource. .
- The ability to provide report data as part of the oadrCreatedEvent response to an event. This would provide a way for a VEN to say, yes I will participate in an event and here is what my planned participation will be.

Japan – Current OpenADR Membership

- ABB Bailey Japan
- Azbil Corporation
- Daikin
- Doosan
- Eneres (VPP application)
- Enestone
- Fujitsu
- Grid Solutions (Nishihara)
- Hitachi
- Kyocera
- Meidensha Corporation
- Mitsubishi
- NEC
- Nippon Koei
- Nissin
- Osaki
- SystemNihonKyushu
- Takaoka Toko Co.
- Toshiba
- Toyota Tsusho Corporation
- TUV Rheinland (testing partner)

Recent Examples - OpenADR Adoption in Europe

- U.K. - Demand Response aggregator Pearlstone Energy is using OpenADR to integrate with distribution utility National Grid.
- Germany – OpenADR is used in Project ELBE, a German funded project to create and scale an interface for grid-friendly charging with distribution network operator Stromnetz-Hamburg.
- Netherlands – Elaad NL, a partnership of Dutch utilities, supporting OpenADR as a standard to integrate EVSE with the grid.
- Europe
 - OpenADR was employed in EU Horizons Project Holisder, Integrating Real-Intelligence in Energy Management Systems enabling Holistic Demand Response Optimization in Buildings and Districts.
 - OpenADR was leveraged in an Electric Mobility Europe funded project for Orchestrating Smart EV Charging.

OpenADR Alliance - EV Interest Group

Addenergie

AmpUp

AmpedUp

Blink

Chargepoint

Chargie Intelligent Energy

Driivz

electriphi.ai

Evercharge

Everon

eMotorwerks

EV Connect

Evercharge

FleetCarma

GreenCharge

Greenlots

Innogy eMobility

KIGT

Loop

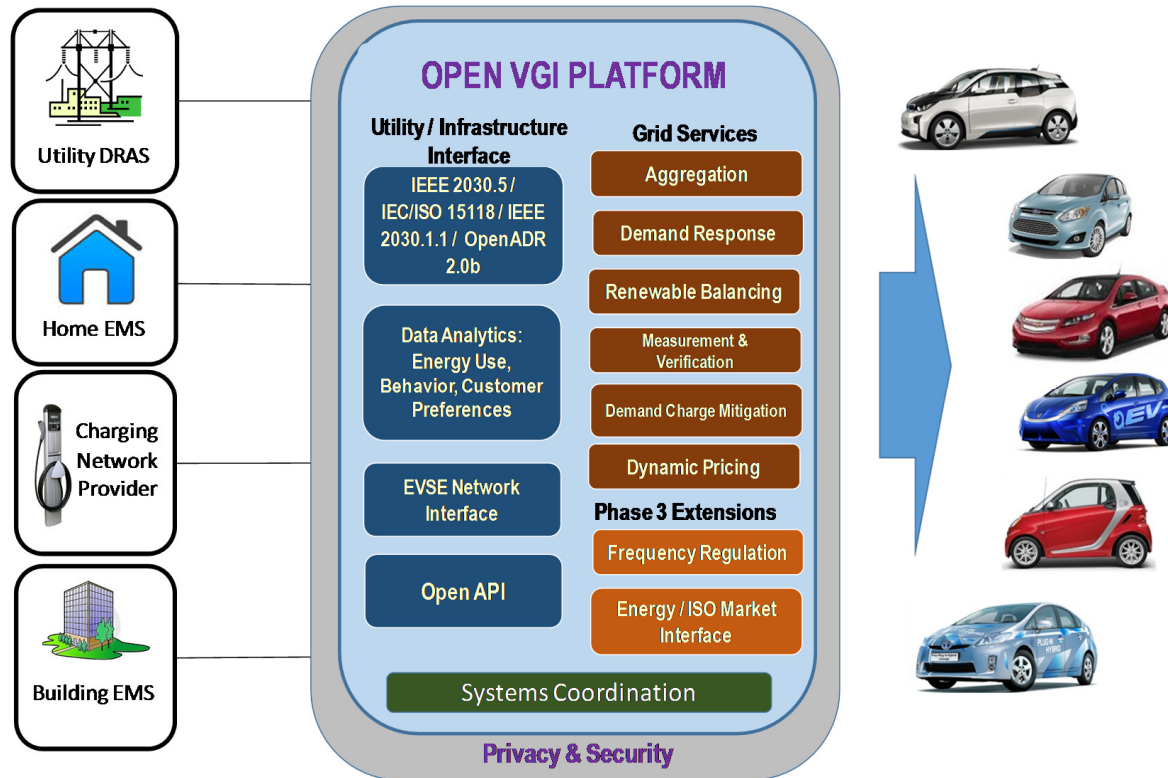
Noodoe

SEMAconnect

Zero Net Energy

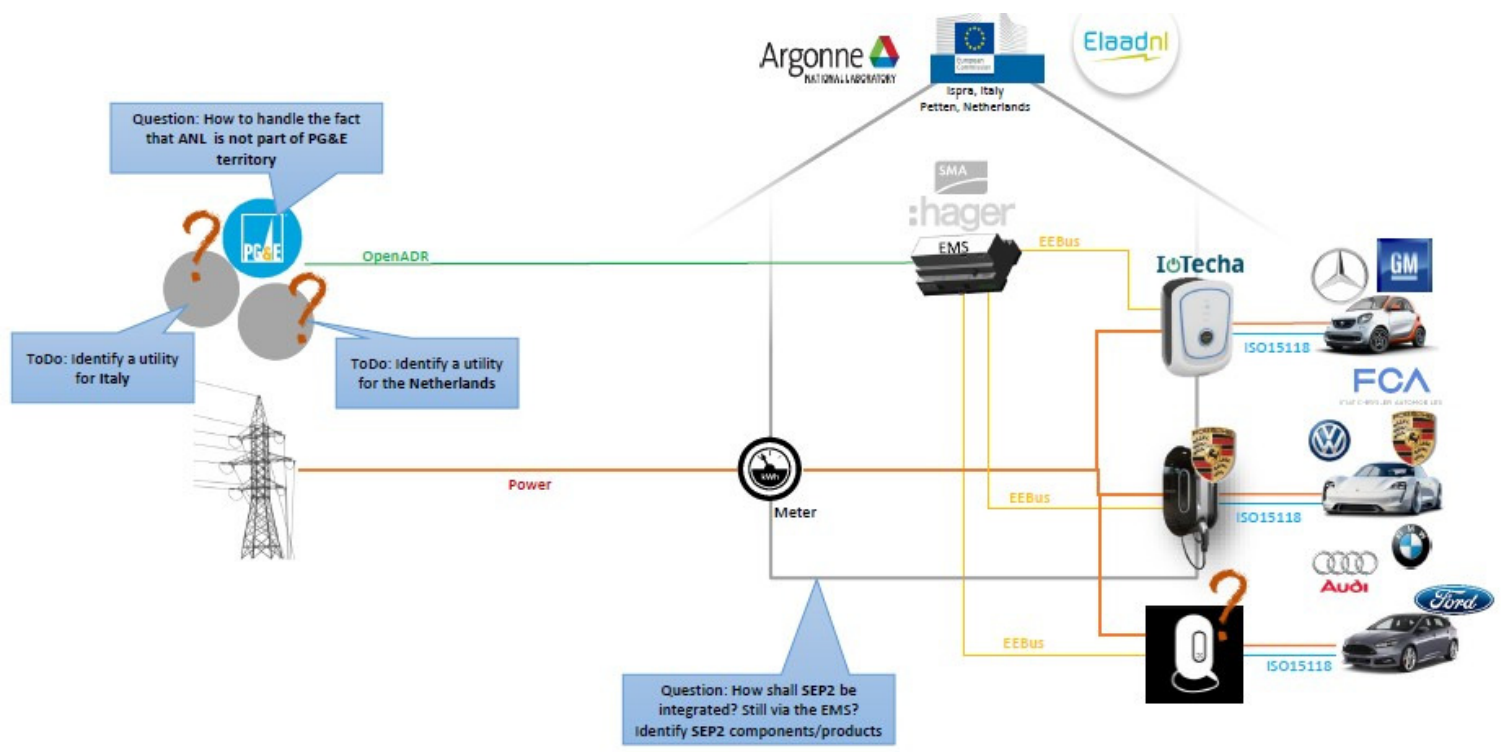
Zevtron

EPRI Open Vehicle-Grid Integration Platform



Automotive OEM Participants: BMW, Ford, General Motors, Honda, Mercedes-Benz, Toyota

Global Grid Integration Project



Thank you!

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