

Deploying Systems Interoperability and Customer Choice within Smart Grid

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Driving to Grid 2020

Outline

- Background and Context
- OpenADR 2.0 Development
- OpenADR Market Facilitation (Alliance)
- OpenADR Interoperability and Customer Choice
- Conclusions and Next Steps

Background and Context

- Significant development of Smart Grid interoperability standards for customers and their systems readied those standards for deployments in commercial demand response programs.
- These standards have led to the development of interoperable systems and products for communication between the grid-operating entities (e.g., independent systems operators, utilities) and customer energy management systems.

Presentation summarizes OpenADR standardization, its development and deployment, and how grid-operating entities and customers can use open and secure communication and technologies to provide interoperability and customer choice.

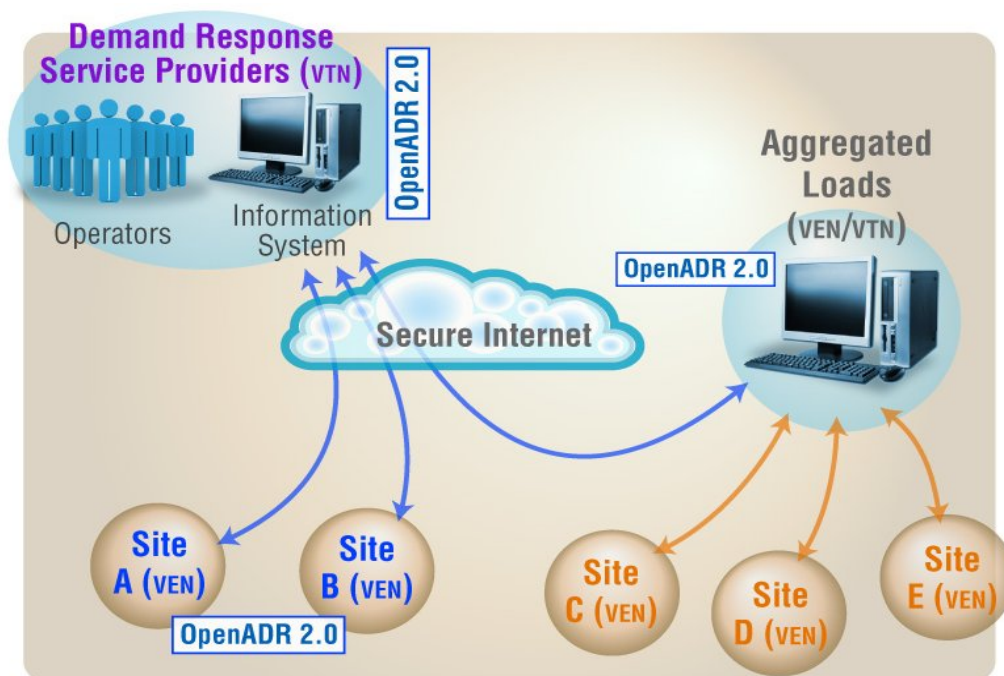
OpenADR 2.0 Deployments

- Pathways to market deployments of OpenADR 2.0 (2002–2012)
 - Research and Development
 - Demonstrations Field Tests
 - Market Deployments (focus of this presentation)

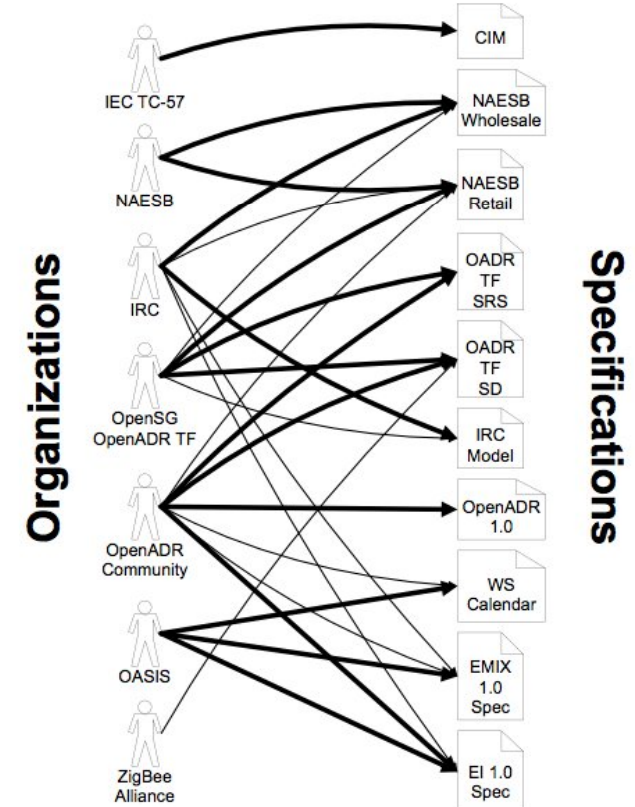


Market Facilitation (Alliance)

- The OpenADR Alliance,* was formed in 2010 to foster OpenADR adoption and to create testing and certification framework using the EI 1.0 standards
- Key goal is the development of compliant products, which will facilitate market acceptance, systems interoperability, and technology innovation of OpenADR 2.0



OpenADR 2.0 Communication Architecture



Relevant Organizations and Specifications for OpenADR 2.0 Development (weight of arrows indicate degree of contribution by organization to specification)

* <http://www.openadr.org/>

Interoperability and Customer Choice Examples

OpenADR 2.0 and PAP 19*

PAP 19 framework was mapped to make sure that OpenADR 2.0 attributes meet the requirements of the wholesale DR markets.

OpenADR 2.0 (Profile B)	PAP 19 (WDRCP)
<i>oadrDistributeEvent, oadrEvent, eiEvent, eventDescriptor, eiResponse</i>	Headers
<i>oadrDistributeEvent, oadrEvent, eiEvent, eventDescriptor, eiActivePeriod</i>	Demand Response Event
<i>oadrDistributeEvent, oadrEvent, eiEvent, eiActivePeriod, eiEventSignals, eiTarget, eiResponse</i>	Resource Deployment

OpenADR 2.0 and FLC/DLC

Facility-centric Load Control (FLC), fosters customer choice where decisions on load control are made entirely by the customer.

In Direct Load Control (DLC), a third party decides how and when customer loads will be controlled.

DLC Signals	DLC Customer Device Response	FLC Signals	FLC Customer Response
Temperature set points (°C or °F)	Increase/Decrease set points	Load change or Price Signals (kW or \$)	Program controls to Increase or Decrease set points
On or Off	Turn device On/Off	Load or Price levels	Program device to turn On/Off
Device Availability	N/A	The date/time for load change	Select the date/time when the loads are available for changes
Cancel participation	N/A	Opt-in/Opt-out	Notify service providers to opt-in/opt-out of a specific event or series of events

* Wholesale DR Communication Protocol (WDRCP)

Conclusions and Next Steps

1. Resurgence of Smart Grid demonstrations and investments, the standards require an understanding and provision of the interoperability and market deployment paradigms
2. OpenADR Alliance and 2.0 efforts require understanding of its use in DR programs, emerging markets, systems interoperability, customer choice, building codes and standards, and education

Immediate research needs are to link 2.0 reporting services, which provide customer building- and end use-level historical and real-time energy-usage, and facility state information with:

- a. PAP 10 customer energy usage information, or popularly known as, Green Button™ initiative; and
- b. PAP 17 or ASHRAE 201P with facility information models for DER.



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