



Smart Grid Standards Wholesale Demand Response Project

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- Project Support Organizations
- Smart Grid Projects
- Project Development Process
 - How Organizations Contribute
 - IEC Common Information Model
 - NAESB Measurement & Verification Use Cases
 - IRC Profile Development
- Project Status

Project Support Organizations

Standards Development Organizations

- International Electrotechnical Commission (IEC) - www.iec.ch
- National Institute of Standards (NIST) - www.nist.gov
- North American Energy Standards Board (NAESB) - www.naesb.org
- Organization for the Advancement of Structured Information Standards (OASIS) - www.oasis-open.org

Trade & Technology Associations

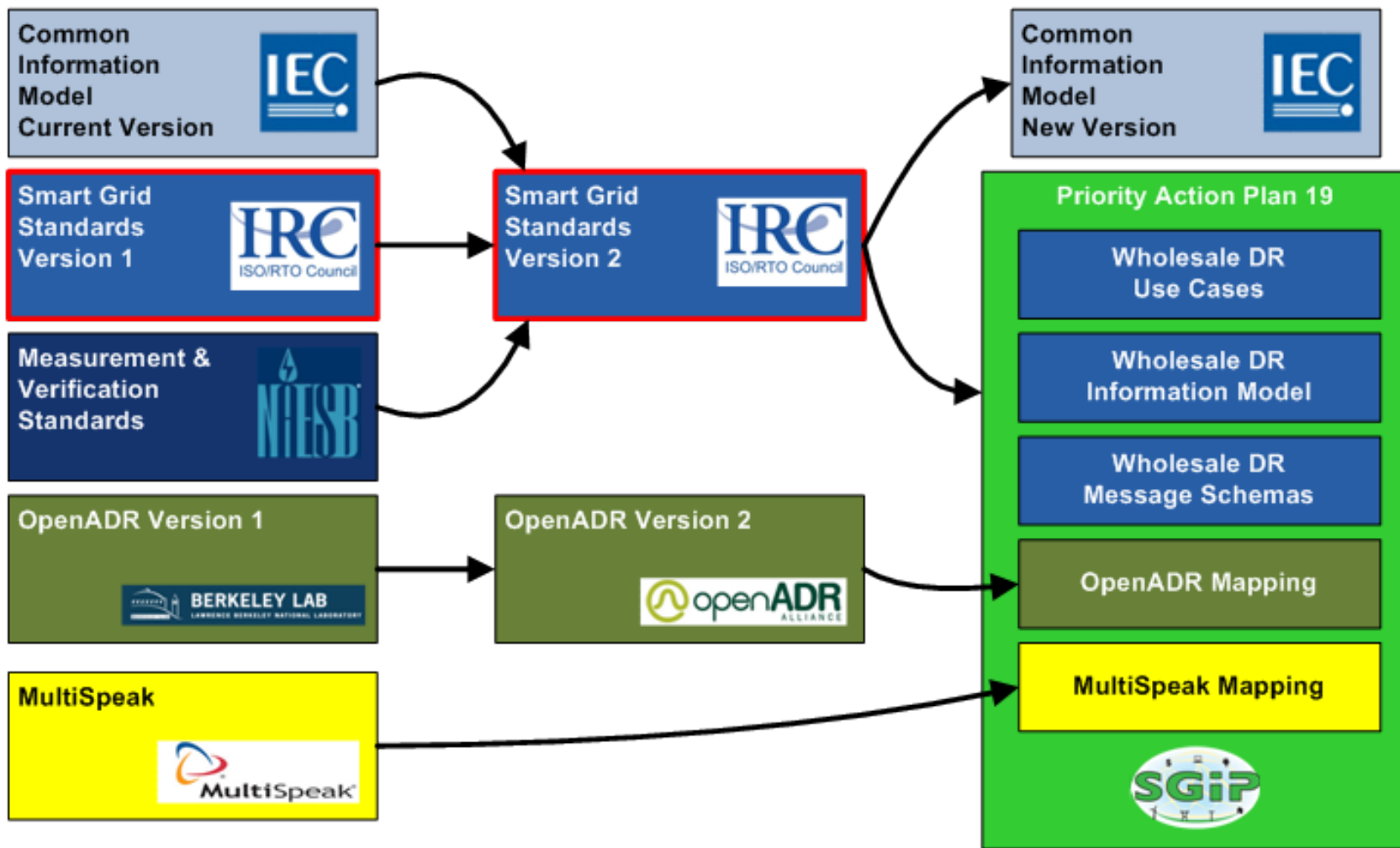
- ISO/RTO Council (IRC) www.isorto.org
- Multispeak Initiative - <http://www.multispeak.org/>
- OpenADR Alliance - <http://www.openadr.org/>
- Smart Grid Interoperability Panel (SGIP) - <http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/WebHome>

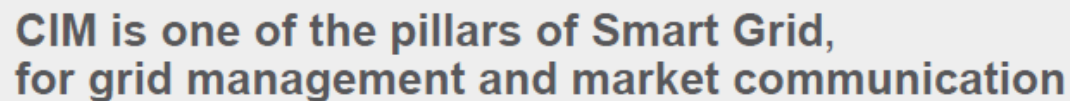
Smart Grid Projects

- IRC sponsored Smart Grid Initiative in 2009
 - Completed information model & use cases for ISO to Aggregator using Common Information Model (CIM)
 - Submitted to NAESB
 - Submitted to NIST Smart Grid Interoperability Panel (SGIP)
 - Incorporated into Priority Action Plans 3 & 9
 - SGIP adopted into catalogue of standards in December 2011

- A second IRC sponsored project jointly supported by the IT and Markets Committees
 - Update 2009 IRC use cases and information model to the latest version of the CIM
 - Create common message format using the CIM for Demand Response
 - Map the OpenADR implementation profile to the ISO common CIM message
 - Map the MultiSpeak implementation to the ISO common CIM message
 - Publish the work in the US through the NIST SGIP processes
 - Publish the work internationally through the International Electrotechnical Commission (IEC) process

How Organizations Contribute





Energy Management Systems
Distribution Management
Market Communication



NAESB M&V Use Cases

- **Market Products**

- Energy (Economic)
- Energy (Reliability)
- Capacity
- Reserve
- Regulation

- **Deployment Type**

- Bulk
- Resource
- Self

- **Performance Evaluation Types**

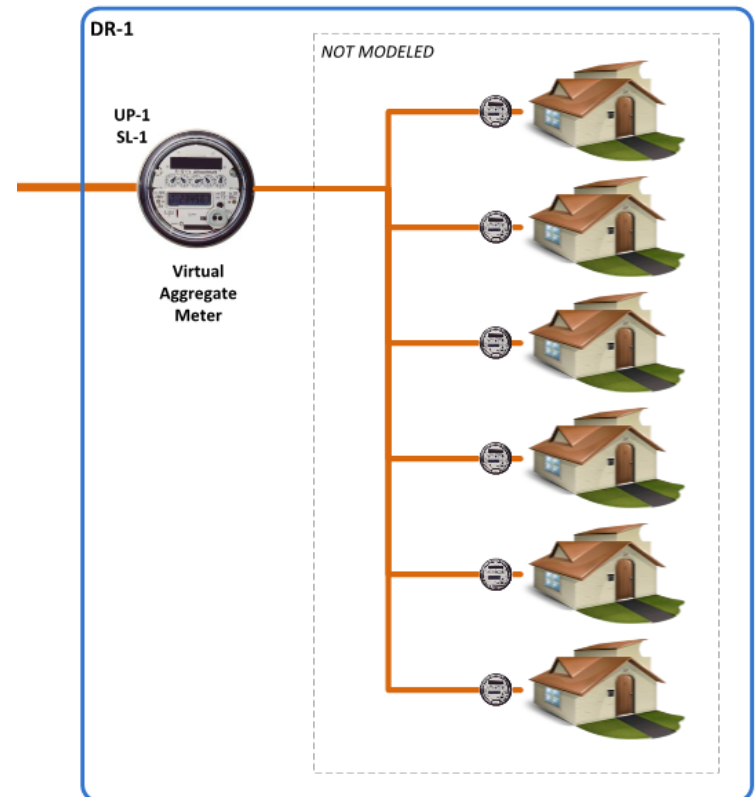
- Historical Baseline
- Meter Before / Meter After Comparison
- Maximum Base Load
- Metered Generator Output

Details about all of these concepts are defined in the NAESB Measurement & Verification Standards

IRC Modeled Configurations



From Simple



To Complex

IRC defined a common message

Option 1: BULK-DEPLOYMENT (ZONAL)

In order to deploy a number of resources by zone, the system operator would create a demand response event in the DRMS (with or without an Endtime), perhaps set a Status or a Type, and also optionally set a MWRequested value (otherwise an empty value here would be interpreted as "all available response").

Next, the operator would select a number of Demand Response Zones (Aggregated Nodes) over which the event is to be called. Here the operator would have the option to set zonal RequestedMW values, and the logical DRMS reaction would be to set the total in the Event's MWRequested Value.

Because each Resource is located in one (and only one) Demand Response Zone, when creating deployment messages, the DRMS would simply cycle through each ZonalDeployment and create ResourceDeployments for associated Resource.

The message will contain the official Deployment Instructions as defined in the ResourceDeployment class, but also contains useful supplemental information about the DemandResponseEvent and associated ZonalDeployments – even though this information is not generally needed for automated response.

EVENT TYPES

Option 2: BULK DEPLOYMENT (NON-ZONAL)

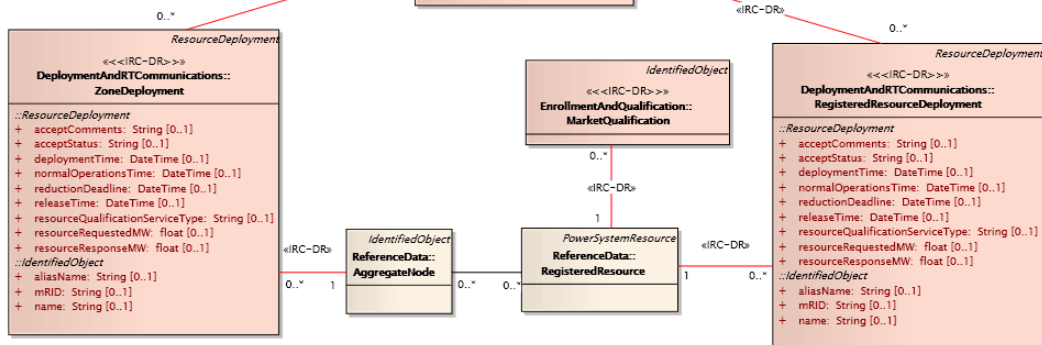
Alternately, the system operator may create a Demand Response event (as in option 1), but instead of selecting groups of resources based on DR zones, the operator could associate one or more Resources directly to the event.

Any number of business rules could be implemented here, including selecting Resources most likely to resolve a system emergency, resources enrolled in some special market program type (MarketQualification), resources of a certain size, etc.

OPTION 3: RESOURCE-SPECIFIC DEPLOYMENT

If a Resource is deployed under normal system conditions when it becomes economic in the markets, a ResourceDeployment is created to describe when and for how much the Resource is to reduce.

There is no DemandResponseEvent needed in this case, however if, by policy, the system operator wishes to instantiate one, it is not forbidden by the model.



A single message to handle reliability and economic deployments across all ISOs

Current Status of Objectives

- Complete - Update 2009 IRC use cases and information model to the latest version of the CIM
- Complete - Create common message format using the CIM for Demand Response
- In Progress - Publish the work in the US through the NIST SGIP processes
- In Progress - Map the OpenADR implementation profile to the ISO common CIM message
- In Progress - Map the MultiSpeak implementation to the ISO common CIM message
- In Progress - Publish the work internationally through the IEC process

All materials are available at the SGIP site for PAP19

<http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/PAP19WholesaleDR>

Questions



Standards Organizations

- International Electrotechnical Commission (IEC) - The **International Electrotechnical Commission** is the world's leading organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

The IEC is one of three global sister organizations (IEC, ISO, ITU) that develop International Standards for the world.

- National Institute of Standards (NIST) – Founded in 1901, NIST is a non-regulatory federal agency within the [U.S. Department of Commerce](#). NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.
- North American Energy Standards Board (NAESB) - The North American Energy Standards Board (NAESB) serves as an industry forum for the development and promotion of standards which will lead to a seamless marketplace for wholesale and retail natural gas and electricity, as recognized by its customers, business community, participants, and regulatory entities.
- Organization for the Advancement of Structured Information Standards (OASIS) - **OASIS** (Organization for the Advancement of Structured Information Standards) is a not-for-profit consortium that drives the development, convergence and adoption of open standards for the global information society.

OASIS promotes industry consensus and produces worldwide standards for security, Cloud computing, SOA, Web services, the Smart Grid, electronic publishing, emergency management, and other areas. OASIS open standards offer the potential to lower cost, stimulate innovation, grow global markets, and protect the right of free choice of technology.

Trade Associations

- ISO/RTO Council (IRC) - The ISO/RTO Council (IRC) is comprised of 10 Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs) in North America. These ISOs and RTOs serve two-thirds of electricity consumers in the United States and more than 50 percent of Canada's population.
- MultiSpeak Initiative – The MultiSpeak Initiative is a collaboration of the National Rural Electric Cooperative Association (NRECA), leading software vendors supplying the utility market, and utilities. The Initiative has developed and continues to expand the MultiSpeak Specification for Interoperability a [specification](#) that defines standardized interfaces among enterprise software applications commonly used by electric utilities.

The MultiSpeak Specification is a key industry-wide standard for realizing the potential of enterprise application interoperability. The MultiSpeak Specification is the most widely applied *de facto* standard in North America pertaining to distribution utilities and all portions of vertically-integrated utilities except generation and power marketing. It is currently in use in daily operations of more than 600 electric cooperatives, investor-owned utilities, municipals, and public power districts in at least 15 different countries.

- Open ADR Alliance - The OpenADR Alliance was formed to build on the foundation of technical activities to support the development, testing, and deployment of commercial OpenADR and facilitates its acceleration and widespread adoption. This approach needs to engage service providers (such as electric utilities and systems operators) within the domain of the Smart Grid that publish OpenADR signals, as well as the facilities or third-party entities that consume them to manage electric loads. The OpenADR Alliance will enable all stakeholders to participate in automated DR, dynamic pricing, and electricity grid reliability.
- Smart Grid Interoperability Panel (SGIP) - The National Institute of Standards and Technology (NIST) initiated the [SGIP](#) to support NIST in fulfilling its responsibility, under the Energy Independence and Security Act of 2007, to coordinate standards development for the Smart Grid. Established in late 2009, the [SGIP](#) is a public/private partnership that defines requirements for essential communication protocols and other common specifications and coordinates development of these standards by collaborating organizations.