

A New Era for Building Participation in the Smart Grid

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Presentation overview

- BACnet tools for demand response:
 - BACnet objects and services for energy management
 - BACnet Load Control object and Meter Object
 - BACnet web services in the DRAS
- NIST and the 2007 Energy Independence and Security Act

BACnet enables DR

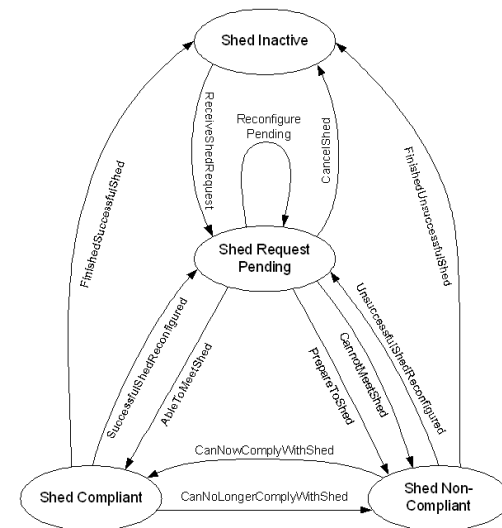
A few facts

1. Commercial and residential buildings account for 40% of total energy consumption in the US. Same for CO₂ production.
2. HVAC and Lighting account for 60% of commercial building electric energy usage.
3. An EMCS can trim 5-10% of load, and do this with intelligent strategies that reduce occupant discomfort.
4. BACnet is a robust control protocol and the leading open standard for building automation.

BACnet tools



- The BACnet protocol is all about building controls and designed for monitoring systems, managing schedules, trending, controlling loads.
- BACnet has metering specific tools like the Accumulator and Converter objects.
- We are working on a generic Meter object to allow for interoperable access from meters or meter gateways.
- BACnet has a specific Load Control object (LCO)



Load Control object

- The Load Control object (LCO) provides an interface to execute predetermined control actions and to view current load shed status.
- Load Control object does not specify how the electrical consumption is to be reduced or how consumption baselines should be determined.
- Three parameters may be written:
 - Requested_Shed_Level
 - Start_Time
 - Shed_Duration
- LCO can be in one of four states: inactive, shed pending, shed compliant, or shed non-compliant.
- can be linked in a distributed, hierarchical fashion for controlling complex combinations of electrical loads

BACnet Web Services

- BACnet WS is NOT the same as the BACnet protocol used on the building network.
 - It is a generic BAS web service
 - designed to enable business applications to access data in building control systems
- Different object model—simple node tree with path references
- Generic data access services: read and write simple data values and retrieve trend data.
- Conforms to the Web Services Interoperability Organization (WS-I) Basic Profile 1.0
- Being extended to support complex structures as needed for DRAS shed events and RTP

BWS in the DRAS

- The current implementation of the DRAS uses BWS for the DRAS server to DRAS client communications.
- The goal is to enable a building system vendor to manufacture an EMCS with a standard BACnet web services client that is configured to talk with the DRAS server.
- Thus the customer facility does not need custom configuration and can exchange DR information with any utility.

Conclusion

- BACnet has tools now for effective building control in response to DR signals.
- BACnet web services forms one piece of the standards chain in OpenADR with the goal of an open national standard for DR communications.

Energy Independence and Security Act of 2007 (EISA)

- NIST has the role to coordinate efforts toward an interoperability framework for the Smart Grid.
- In cooperation with DOE, FERC, GridWise, NERO, IEEE, NEMA.
- NIST is meeting with stakeholders, laying out a plan to move forward, preparing for a workshop in the fall. Report due in December on path forward.
- Visit us at: <http://www.nist.gov/smartgrid/>