In context sensor data through semantic dataspaces

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Problem

The evolving smart grid is a cyber-physical-social system that will run on data. That data is spatial/temporal, siloed, and often streaming from sensors.

Direction for smart pipes?
Insight

- Apply new standards from W3C/OGC Spatial Data on the Web (including sensor data) for Data Interoperability over multiple independent applications.
- Leverage the data-on-the-web ontologies for data mining over linked data.
- Use user context modelling to discover data of relevance.

W3C and OGC to Collaborate to Integrate Spatial Data on the Web

6 January 2015 — The W3C and the Open Geospatial Consortium (OGC) announced today a new collaboration to improve interoperability and integration of spatial data on the Web. Spatial data — describing geographic locations on the earth and natural and constructed features — enriches location-based consumer services, online maps, journalism, scientific research, government administration, the Internet of Things, and many other applications. In the United States alone, geospatial data and services are estimated to generate $1.6 trillion annually.

"Location, as well as providing context to much of today's online information, is vital to the emerging field of connected devices," said Ed Parsons, Geospatial Technologist.
Method

- Case study: Characterise Consumer Demand
- Apply an agile development methodology, working with ACTEWAGL
- Start with ACTEWAGL-supplied substation-level demand data at 15 minute intervals
Link external data

- weather (available as linked open data already)
- public events
- demographics
- G-NAF
- ACT Energy Audit
- Development applications
- ....
Analytics

- Leverage the ontology as a knowledge base to mine for usage patterns over qualitative and quantitative data.
- Incorporate spatial and temporal descriptions for learning features.
User context modelling

- Develop user profiling and local spatio-temporal context
- Use user context to discover relevant data
- Provide for binding to dynamic sensor feeds
Impact

- Trial of new data management technology for utility industry
- Identification of localised, contextual demand factors from open data