Energy@home Data Model and AGSuite implementation

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Scope: smart home & demand side management

Goal: create a market for new Value Added Services based upon device-to-device communication in the Smart Home

Approach: International Standards, trials, regulations, scope synergies
Energy@home Data Model 1.1

- Publicly available since 10/2015
- Derives from IEC TC57 use cases
- Represented in UML
  - Automatic mapping to XSD & to REST resources
- Extends IEC Common Information Model Model & IEEE 2030.5 (SEP2)
  - Function-centric approach
  - Vocabulary of function types, function schemas
- Provides following Function Sets:
  - Device Information
  - Monitoring&Control
  - Metering
  - ApplianceStatistics
  - ApplianceEvents&Alerts
  - PowerProfile
  - Time and Response
- Includes a tutorial with a SEP2 mapping example & all the steps to generate Java classes from the XSD representation files (both XSD and WADL)
Until version 2.0 of SDT, the Energy@home data model could not be fully mapped, since it was not possible to represent complex (structured) data types.

- Energy@home submitted in May 2015 an initial proposal for SDT extension to complex data types.

- The proposal was then taken into account by HGI (Andreas Kraft) along with proposals from other contributors.

- Version 3.0 of SDT (published at the end of 2015) adds full support for complex data types.
The full Energy@home data model was then automatically mapped to SDT 3.0, using a model-to-model transformation language (QVT).

```
modeltype XMLSchema uses "http://www.w3.org/2001/XMLSchema";
modeltype WADL uses "http://wadl.dev.java.net/2009/02";
modeltype SDT uses "http://homegatewayinitiative.org/xml/dal/3.0";
modeltype ecore uses "http://www.eclipse.org/emf/2002/Ecore";

transformation toSDT(
    in energyAtHomeXSD:XMLSchema,
    in energyAtHomeWADL:WADL,
    out energyAtHomeSDT:SDT
);
```

The result of the mapping is publicly available on Github

With an automated transformation, it will be easy to keep the two data model representations aligned.
Energy@home Data Model and SAREF

- TNO performed a study (January 2014 - March 2015) for the European Commission to bring together semantics and data from smart appliances in buildings and households.

- TNO defined the Smart Appliances reference ontology (SAREF) that can be used to match the data from different organizations. SAREF fits into the ETSI M2M architecture.

- The Energy@home data model, together with the one defined by the EEBUS Initiative, has been incorporated by TNO into a SAREF extension. Semantic interoperability with EEBus (and possibly others) is thus greatly simplified.
Conclusions: an ‘open’ Data Model

• The energy@home data model can be easily integrated into the SDT framework, moreover it interoperates with various technological solutions:
  
  – ZigBee Home Automation 1.2
  – IEEE 2030.5 (SEP2)
  – EEBus
  – Any SAREF-compatible data model

• Commercial implementation of the Energy@home framework has already begun (see next slides…)