oneM2M

Smart Appliances (SAP) common ontology
Status on current European Commission study

Group Name: WG5
Source: Patricia MARTIGNE (ORANGE, WG5 vice-chair) **/ this presentation is a personal adaptation based on the Report delivered by TNO**
Meeting Date: 2014-07-28
Agenda Item: Information

Context

- European Commission (EC) concern about how to reduce gas emission.
- One axis is to enhance Energy Efficiency in households
  - via Smart Appliances (energy Consuming and Producing Products)
  - that need to communicate on the basis of a common ontology

In 2012, the EC hosted a workshop "**Roadmap for the Standardization of Smart Appliances**" Present: E2BA, CECED, Eu.bac, ELC, SGTF, ETSI M2M, CENELEC TC59x WG7, HGI, buildingSmart Int., OASIS oBIX, OSGi, AGORA,...

>>> Main recommendations from this workshop =
High-level semantic model is needed, including common vocabulary for appliances' product information, commands, signals, feedback.
Agree on **a common architecture** and open repositories with reusable pieces to create a bridge over the communication layer chaos.

The EC "Semantics of Smart Appliances" project

STUDY SMART 2013/0077 on

"Available semantics assets for the interoperability of SMART APPLIANCES. Mapping into a common ontology as a M2M application layer semantics "

- **Goal:** Provide the material needed to define the relevant tools and data models for the collection of devices that helps the EU to reach its 2020 goals regarding the reduction of greenhouse gas emission and buildings' energy consumption. Leverage ETSI SmartM2M as an organization that can elaborate Standards for the European markets.

- **Tasks**:
  1. Take stock of existing semantic assets and use case assets
  2. Perform a translation exercise of each model or use case to a common ontology language and subsequently a mapping between these models
  3. Propose a common ontology and document it into ETSI SmartM2M/oneM2M architecture

- **Timing:** finish in February 2015

Scope of the project

- **Domains:** Homes, private dwellings, common public buildings and offices

- **Appliances:** Home and building sensors, white goods, HVAC, Lighting, Micro-renewable home solutions, Multimedia and PC equipment

- **Use cases:** Interoperability with construction design tools, facility management systems, energy management systems, building control systems, ESCO systems, Smart Grid

- **Stakeholders:** manufacturers of white goods, HVAC, plumbing, security and electrical systems, lightings, sensors, actuators, micro-renewable home solutions, multimedia, and computers. And related industry, such as utilities, operators, architects, service providers...

Associated deliverables

– First interim study report:

Published (May 2014)

Covering stock-taking activity of Task 1 and related semantic map

– Second interim study report:

ongoing

Translation of assets to OWL and mapping. Not exhaustive.

– Third interim study report:

Unified ontology, and how it fits in ETSI M2M/oneM2M architecture

– **Final study report** (combining and updating previous study reports)

– **OWL-files of semantic assets / Smart Appliances Unified Ontology in CIRCABC**

1st interim Report of the Study

- "Study on Semantic Assets for Smart Appliances Interoperability"

- Presented at the SAP (Smart Appliances) Workshop, 27-28 May 2014, Brussels co-organized by the EC and ETSI

- Shortlist* of 20 assets (out of 43 initially identified) which provide a good basis for further common ontology development. *criteria for the short list was based on how well the asset is covering the scope of the project and if the asset provides concrete semantic specifications (complete information in terms of data models and product specifications), preferably in the form of XML or OWL files that can be used to build the common ontology.

20 short-listed assets (1/2)

Acronym	Reference
DECT ULE HAN FUN	HF-Overview, HF-Protocol, HF-Service, HFInterface, HF-Profile, V1.00, 2014-23-1
ECHONET	ECHONET Specifications Appendix "Detailed Requirements for ECHONET Device Objects" Release C, 31 May 2013
eDIANA	D2.2-A "Ontology for Device Awareness", 30 November 2009
EnOcean EP	EnOcean Equipment Profiles (EEP), Version 2.6, 17 December 2013
FAN FPAI	HEGRID AD1305 Interface description: Interface report, Version 1.0, 7th January, 2014
FIEMSER	D5 FIEMSER Data Model, February 2011
FIPA	FIPA Device Ontology Specification, SC00091E, 3December 2002
HYDRA	Deliverable D6.6 Updated MDA Design Document, version 1.0, 20 August 2009
KNX	KNX System Specifications Interworking Datapoint Types, Version 1.07.00, 26 April 2012
MIRABEL	D7.5 "MIRABEL-ONE: Initial draft of the MIRABEL Standard, version1.0", 22 Dec 2011

20 short-listed assets (2/2)

OMA LWM2M	OMA Lightweight Machine-to-Machine Technical Specification Candidate version 1.0, Dec2013
OMS	Open Metering System Specification Vol.2 –Primary Communication Issue 4.0.2, and OMSData Point List –RELEASE A, Annex B to Volume2: Primary Communication Issue 4.0.2, 27Jan2014
OSGi DAL	RFC-196 OSGi Alliance Device Abstraction Layer, Draft, February 2014
SEEMPubs	Deliverable D5.1 "Data Format Definition, version 1.0", 30 September 2012
SEIPF	D. Bonino, F. Corno, F. Razzak "Enabling Machine Understandable Exchange of Energy Consumption Information in Smart Environments", Energy and Buildings 43 (2011) 1392–1402
SEP2	Zigbee Alliance / HomePlug Alliance Smart Energy Profile 2 Application Protocol Standard, ZigBee Public Document 13-0200-00, April 2013
SmartCoDE	Deliverable D1.1.2 "Model of local energy resource cluster", 31 December 2012
UPnP	UPnP Device Architecture 1.1, SolarProtectionBlind:1, HVAC:1, Lighting Controls:1
W3C SSN	Semantic Sensor Network Ontology
Z-Wave	Z-Wave Technical Basics Chapter 4 «Application Layer», 1 June 2011

Conclusions from 1ˢᵗ Report

- The considered assets form a heterogeneous set when considering their semantic coverage. However, 3 main trends appeared:

  o Devices, sensors and their specification in terms of services, functions and states;

  o Energy consumption information and profiles to optimize energy efficiency;
  o Buildings related semantic models.

- Assets covering different trends can be connected starting from the most recurrent terms Device, Sensor, Service, State and Event.

Next steps of the Study

- Analyse in detail the semantic assets that are on the short list as defined in 1st interim Report.
  - by performing a translation exercise of each asset to an ontology in OWL and
  - a mapping exercise between different assets described by different OWL ontologies

- 2nd Interim study report: "**translation exercise of each model (or use case) to a common ontology language and mapping or matching exercise between all the models.**
  - The mapping will not be exhaustive but will include the main structures and classes, relations and instances that have to be at the core of the intended smart appliances unified ontology.

- *OWL-files* will be created during this phase.

Possible roadmap (personal illustration) wrt M2M standardization activities

Standardization activities around a common data model & ontology for Smart Home

Presentation for information - **current EC study on SAP common ontology**
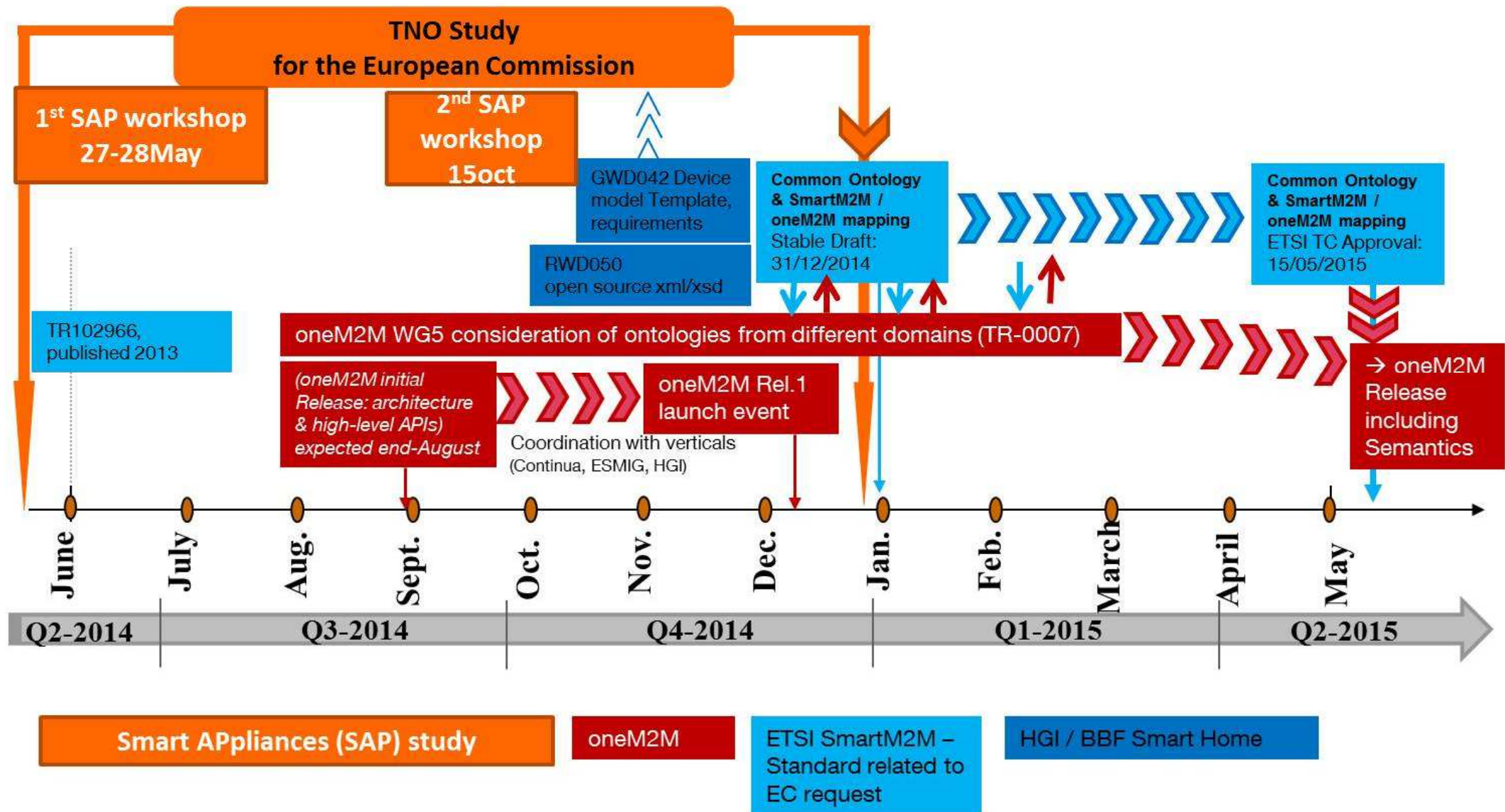
Thank you!

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