



**Welcome
to the World
of Standards**



NEWS FROM THE REFERENCE ONTOLOGY FOR SMART APPLIANCES...

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What is behind the term « Ontology »?



- **A formal specification of a conceptualization, used to explicit capture the semantics of a certain reality.** For this study:
 - a set of **concepts used to describe the ‘household appliance’ and ‘function’**;
 - precise definitions of these concepts **in natural language** e.g., ‘an appliance is an instrument or device designed for a particular household function, such as cooking or cleaning’;
 - **instances of these concepts**, e.g., the specific household appliance of type ‘washing machine’ from manufacturer ‘A’ and with serial number ‘123xyz’;
 - **relations among these concepts** e.g., a household appliance of type ‘washing machine’ realizes the function ‘cleaning’; and
 - **axioms to constrain the intended meaning of these concepts**, e.g., special conditions under which an appliance should function, such as a specific timeslot during the night when the energy costs are reduced

Why do we need an ontology for SAP ?



- **Ontologies are used to improve the communication among stakeholders,**
 - providing a shared understanding that
 - reduces ambiguities and confusion in the terminology adopted in the smart appliances domain.

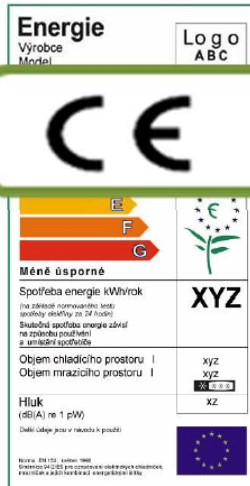
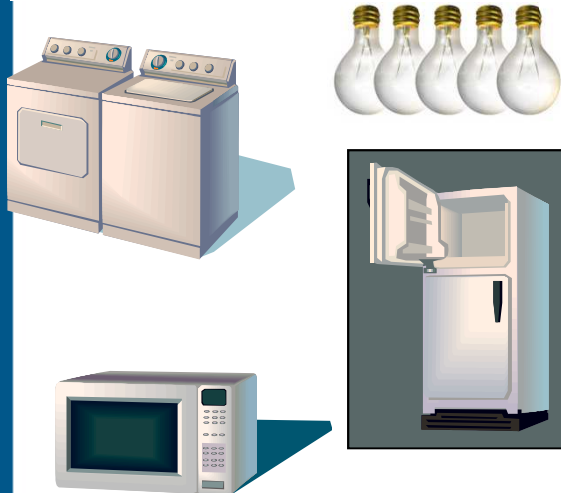
- **Ontologies are also used here to**
 - provide an **interpretation to data** and, therefore,
 - facilitate **interoperability between systems and devices** provided by different vendors,
 - providing a **reference model that allows translation and mapping among different assets** (models/standards/software) from different parties.

The vision for Smart Appliances, by the European Commission



EupP

Energy using and producing Products



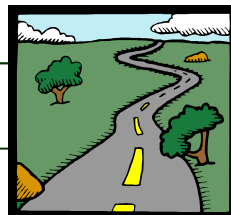
options



PLC



study



Coordination,
Towards standards



CTI, SmartM2M



The home things

Part of the Internet of Things

The “Semantics of Smart Appliances” project from the EC

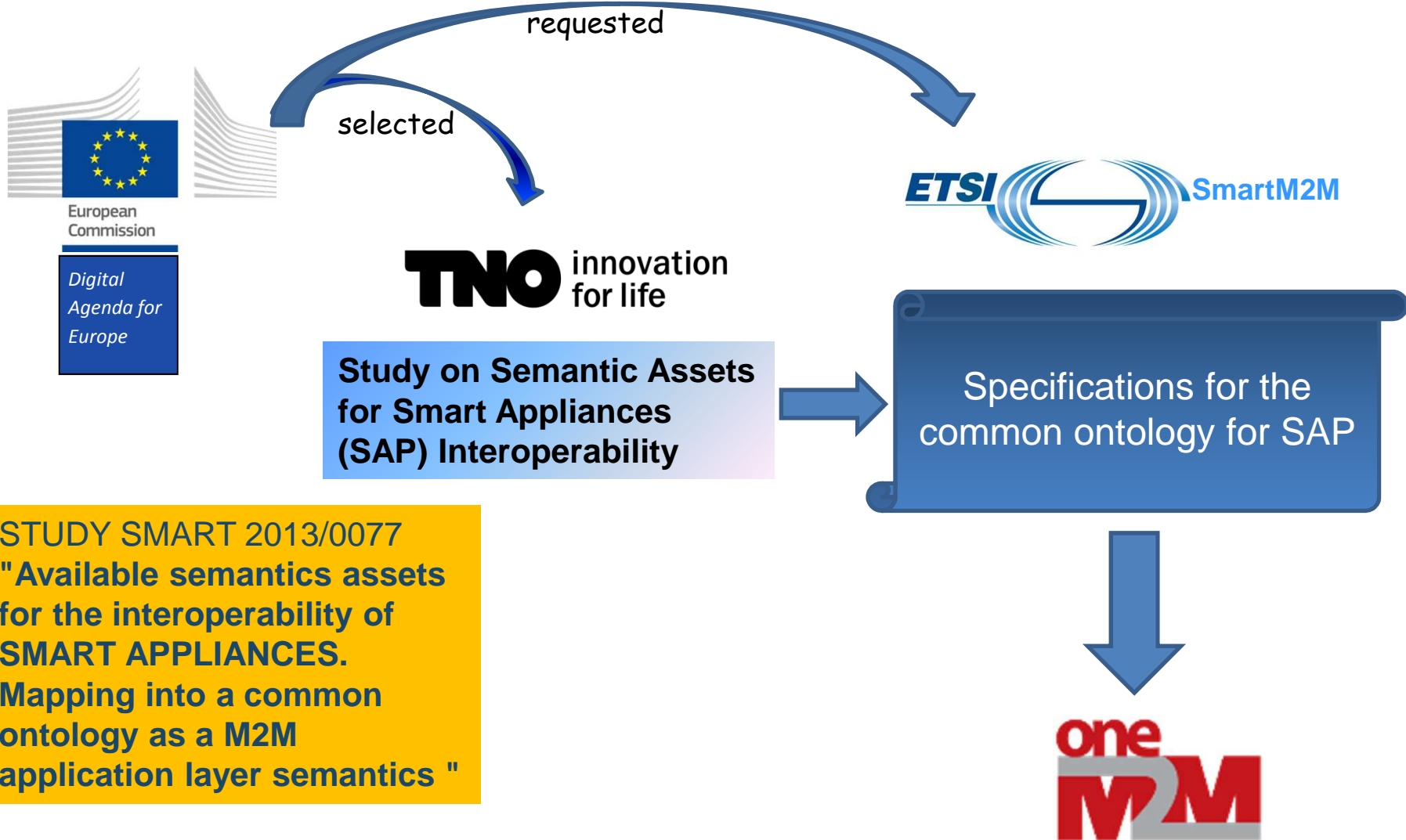


STUDY SMART 2013/0077 on "Available semantics assets for the interoperability of SMART APPLIANCES. Mapping into a common ontology as a M2M application layer semantics "

Goal: 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.

Incentive from the EC towards a common ontology for SAP



STUDY SMART 2013/0077
"Available semantics assets for the interoperability of SMART APPLIANCES. Mapping into a common ontology as a M2M application layer semantics "

A 3-step approach for the Study

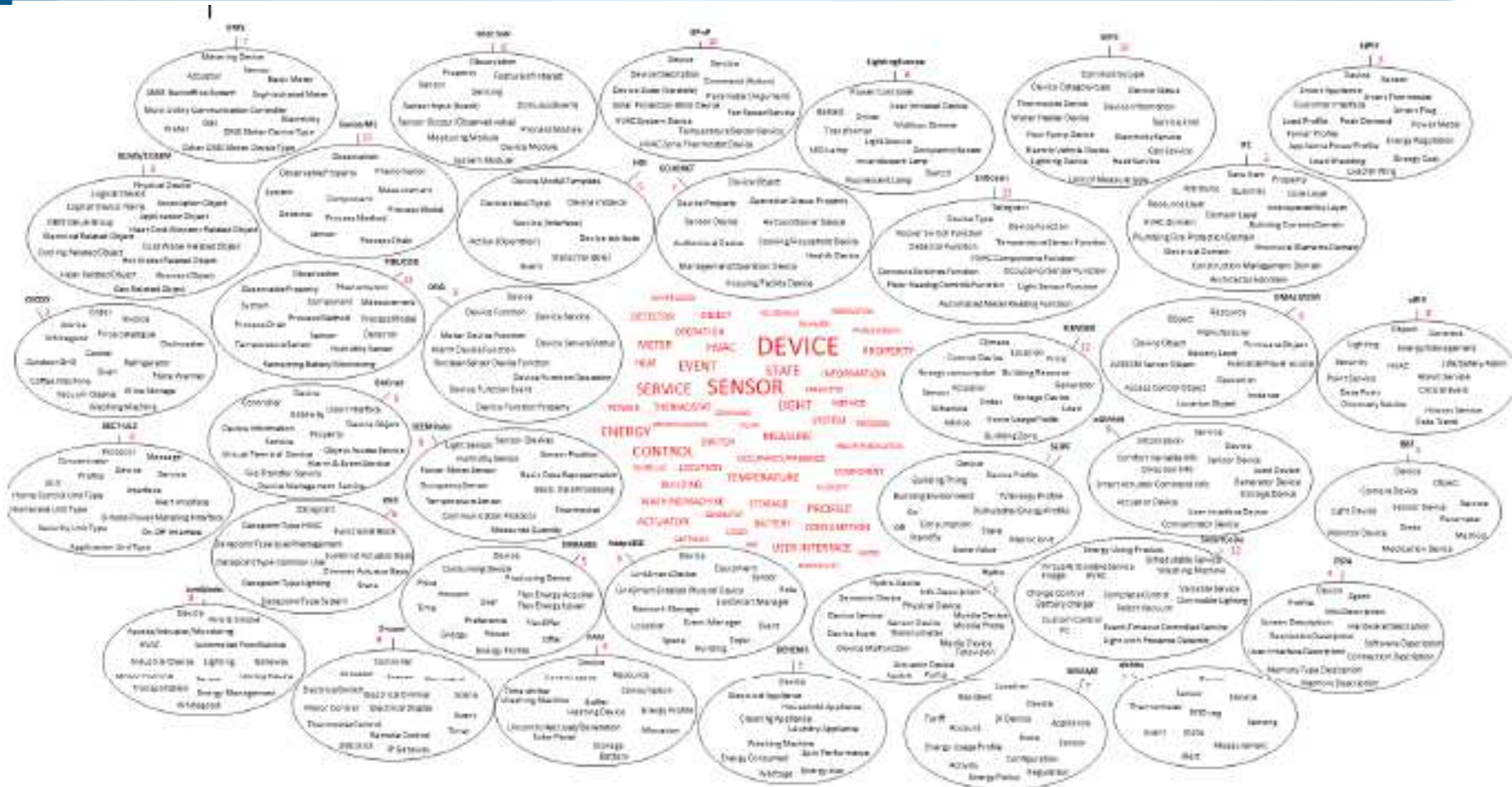
1. Take stock of existing semantic assets and use case assets
2. Perform a translation exercise of each model or use case to a common ontology language and subsequently a mapping between these models
3. Propose a common ontology and document it into ETSI SmartM2M/oneM2M architecture

Several existing heterogeneous assets considered as starting examples in TNO study



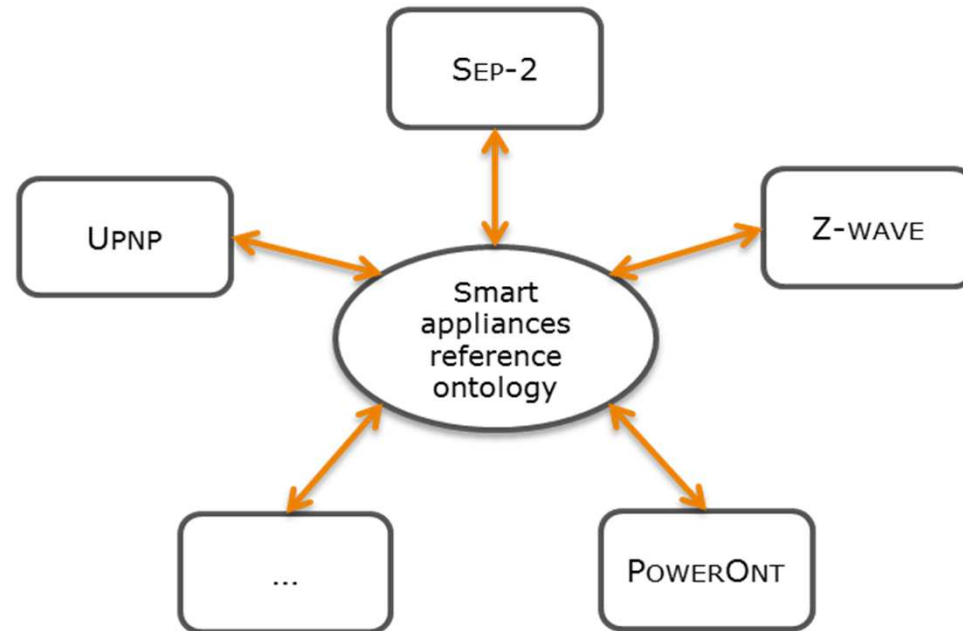
- ECHONET
- FIEMSER
- UPnP
- SmartCoDE
- OMA LW M2M
- SEP2
- EnOcean
- OMS
- Hydra
- KNX
- W3C SSN
- OSGi DAL
- eDIANA
- FAN
- DECT ULE
- Z-Wave
- SEEMPubs
- SEIPF
- FIPA
- Mirabel

TNO interim 2nd Report – visualization of seeking commonalities among semantics assets



...mapping among different assets

The SAREF ontology enables semantic interoperability in the smart appliances domain.



Different assets share some recurring, core concepts, but often use different terminologies and different data models to represent these concepts.

Using the SAREF ontology, different assets can keep using their own terminology and data models, but still can relate to each other through their common semantics.

Core concepts for the SAREF (Smart Appliances Reference) Ontology



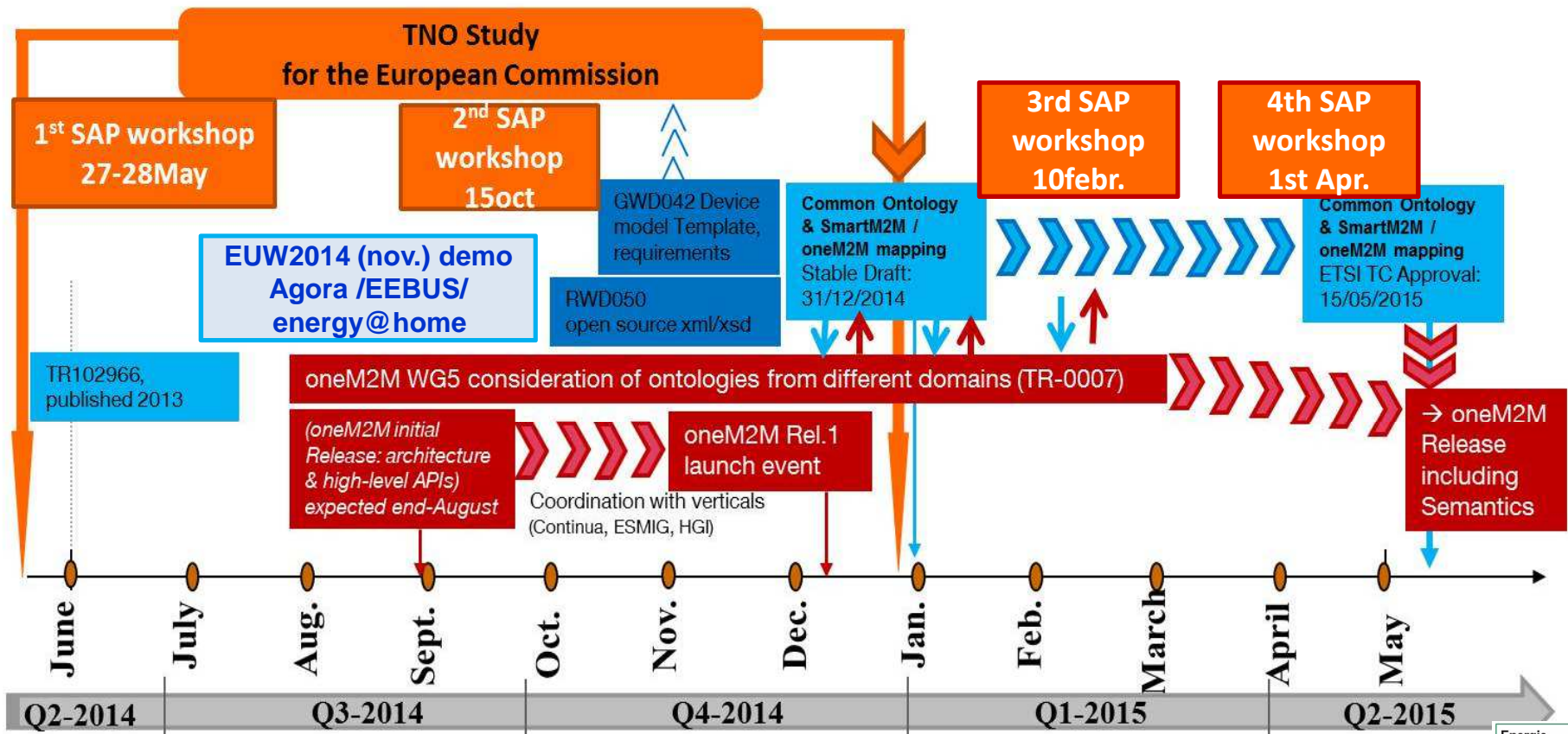
- *Device,*
- *Device category,*
- *Function,*
- *Function category,*
- *Service,*
- *Command,*
- *Parameter,*
- *Mode/Status,*
- *Energy profile,*
- *Energy,*
- *Power,*
- *Time/Duration,*
- *Building,*
- *Sensor, Actuator,*
- *Meter,*
- *Load, Storage, Generator,*
- *Unit of Measure.*

ETSI SmartM2M current items related to the reference ontology for Smart Appliances



- **TS 103 265 "Smart App: Ontology & Mapping"**
TB approval planned by 2015-05-15
- **TS 103 267 "Smart App: communication framework"**
TB approval planned by 2015-05-15
- **TS 103 268 SAP_testing**
 - **Part1: Testing methodology** TB approval planned by 2015-01-31
 - **Parts 2 to 4** - planned by 2016-04-30

Approximative standardization roadmap (personal interpretation) around a common data model & ontology for SAP

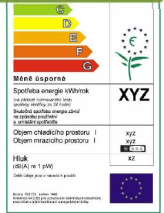
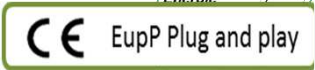


Smart APpliances (SAP) study

oneM2M

ETSI SmartM2M – Standard related to EC request

HGI / BBF Smart Home
AGORA – EEBUS – ENERGY@HOME



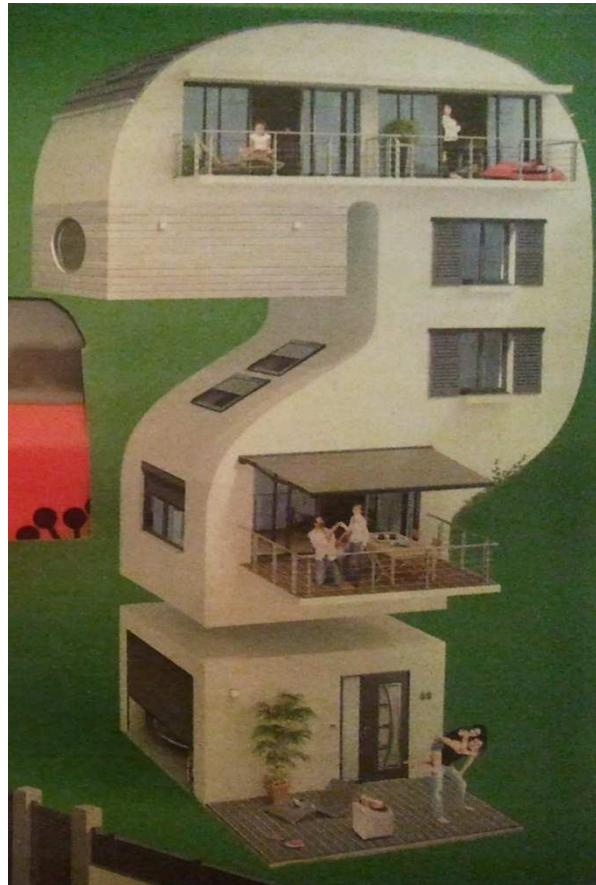
Next steps around SAP, as part of IoT



- 🌐 ETSI SmartM2M : specifications requested by the EC
- 🌐 HGI open source project: developing a Device data model Template
- 🌐 AGORA, EEBUS and Energy@Home are also part of the SAP ecosystem
- 🌐 Several academic projects have already a great background in ontologies enablement
- 🌐 oneM2M WG5 is a place where semantics-related discussions are taking place with all types of actors globally involved in IoT, for preparation of oneM2M Rel2

>> 2015 should be the Year of further cooperation all together on IoT Semantics & Ontologies <<

Thank you!



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