Second Interim Report
Translation exercise of each model to a common ontology
language and mapping exercise between all the models

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Laura Daniele
Study team

Laura Daniele
laura.daniele@tno.nl

Jasper Roes
jasper.roes@tno.nl

Frank den Hartog
frank.denhartog@tno.nl

Jack Verhoosel
jack.verhoosel@tno.nl
WP2 - where did we start?

Results of WP1

› We have analysed 43 assets

› We have defined an initial semantic coverage of these 43 assets
  › For each asset, we have created a visual representation of key terms

› We have provided a visual representation of all assets and their overlap
  › Most recurring key terms among different assets
  › Only linguistic, not (yet) accurate semantic analysis

› We identified a short list of 20 assets to be used in WP2 and WP3
## Short list

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<th>ECHONET</th>
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<td>Hydra</td>
<td>FIPA</td>
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<td>KNX</td>
<td>Mirabel</td>
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WP2

WP2 started from the results of WP1 with the goal of analyzing in detail the 20 semantic assets in the short list by:

- performing a translation exercise of each asset into an OWL ontology
  - **Task 2.1:** Translation

- creating an initial mapping between the assets described by the different ontologies
  - **Task 2.2:** Mapping
WP2 results

- The *D-S2 Second Interim study report* covers the translation of semantic assets in the short list to OWL and a mapping between the various models
  - the report is available [here](#)
  - the mapping is available [here](#)

- The *D-O1 OWL-files semantic assets* deliverable consists of all OWL files created during WP2
  - The ontologies are available [here](#)
WP2 approach

- Translation to OWL
  - 4 assets were already expressed in OWL
  - 16 assets have been translated from scratch
- Creation of human-readable descriptions
- Publication of the ontologies
  - guarantee persistent access
  - facilitate their (re)usability in the smart appliances community
- Initial mapping of the 20 ontologies using core concepts
- Extension of the long list of 43 assets considered in the *DS-1 Interim Study Report*
Task 2.1 – Translation to OWL

- 4 assets were already expressed in OWL
  - we contacted the authors of these ontologies in order to acquire the original OWL file

- 16 assets have been translated from scratch
  - UML-like data models → (more or less) straightforward translation
  - technical specifications in terms of natural language descriptions and tables → sometimes cumbersome
  - XML schemas → support for translation, but we did not use them to automatically generate OWL
Ontologies (1)

- When creating the ontologies, we have followed some best practices:
  - include basic metadata to enable understanding and reuse
    - such as creator, date of issue, title, description and source of the ontology
  - make the ontology self-descriptive by using labels, definitions and comments for each class or property
  - provide a human-readable description that explains the main classes and properties
  - publish the ontology at a stable URL to guarantee persistent access, and facilitate reusability
  - make the ontology accessible for a long period by providing some guarantee of maintenance
Ontologies (2)

https://sites.google.com/site/smartappliancesproject/ontologies
Ontology tools

- Web Protégé (online tool)

- Protégé
  http://protege.stanford.edu/

- TopBraid Composer
  http://www.topquadrant.com/downloads/

- The .ttl ontologies can also be opened as textual files using a text editor (e.g., Notepad) or a web browser
Task 2.2 - Mapping
Task 2.2 - Mapping

- We proposed an initial mapping of the ontologies by means of a number of concepts that we have identified as most relevant as basis for the reference ontology
Core concepts (1)

- 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
Core concepts (2)

These core concepts:

- have not been organized in any hierarchical relationship, nor relationships among them have been defined yet
- we still did not work out their explicit definitions
- should be considered as a means to present the mappings in DS2 and as an input for early discussion with the expert group and stakeholders
- provide the basis for creating the reference ontology in WP3
  - WP3 will start from these concepts, eventually adding new or different concepts, if necessary
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Parallel activities

- Developing the reference ontology is part of WP3, but we have started its development in parallel with WP2
- build the reference ontology incrementally while creating individual ontologies for the specific assets
- include relevant concepts as soon as they turned out to be relevant for (several of) the specific assets
- involve the expert group and stakeholders for validation in an early phase of the development of the reference ontology, instead of presenting our results only at the end of WP3
What’s next?

WP3 will develop a reference ontology as a proposal to become a standard at ETSI and provide the documentation of this ontology into the ETSI M2M architecture.
Thank you for your attention

Questions?