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4CH BUILDING DIGITAL TWIN International Congress

# Current roadmap for the ETSI SAREF ontology

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ORGANIZED BY:

BDTA DigiChecks EUnet4DBP

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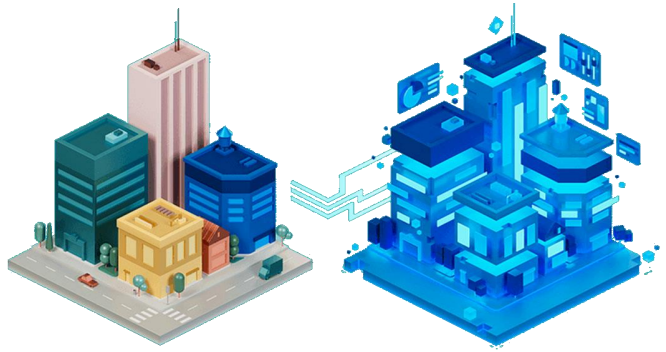
# Semantic interoperability in Digital Twins requires



That the infrastructures have networks of sensors and actuators enabling the **synchronization** of the physical and virtual worlds

That digital twins include data spaces capable of integrating information from these sensor and actuator networks, enabling **semantic interoperability** between

These data sources and the digital twin itself
The digital twin and other systems



# Fragmentation in the IoT landscape



## Building smart IoT applications requires:

- Interchanging and using information from others (whether people or machines)
- To understand unambiguously such information

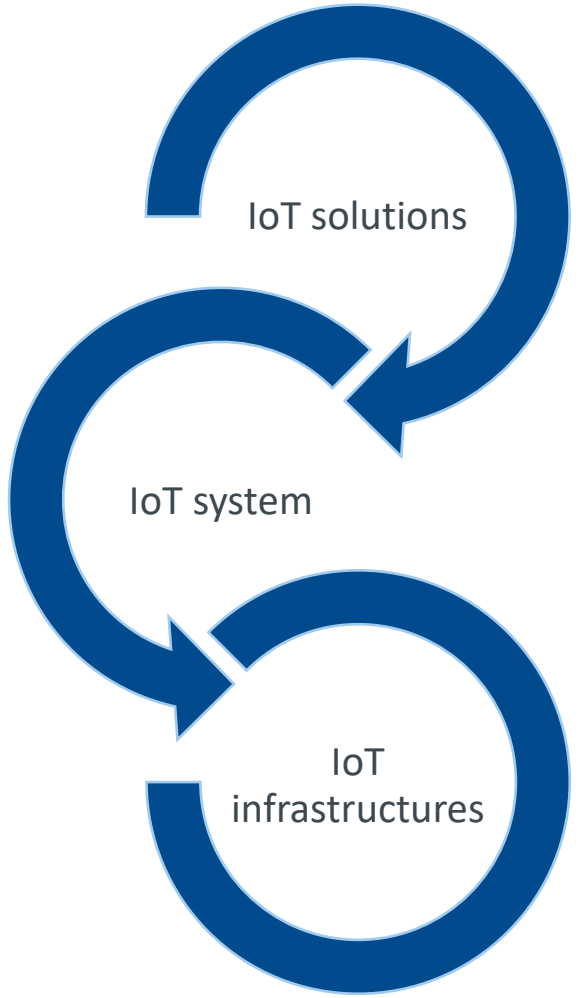
**Need standard data models that enable interchanging not only information, but also the meaning of such information to avoid misinterpretations between senders and receivers**

# SAREF goals

3 To enable interoperability between IoT solutions from different providers and among various sectors

1 To serve as a coherent and cohesive reference semantic model for IoT systems

2 To bring a common understanding across cross-domain heterogeneous IoT infrastructures



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# SAREF roadmap

#BDTIC

**2013**

ETSI/EC
SMART 2013/0077
study

**2015**

Publication of SAREF v1
as ETSI TS 103 264

**2017**

Publication of SAREF v2
ETSI STF 513
- SAREF4ENER
- SAREF4ENVI
- SAREF4BLDG

**2019**

ETSI STF 534
- SAREF4CITY
- SAREF4INMA
- SAREF4AGRI

ETSI STF 556
- SAREF forge
- SAREF portal requirements
- SAREF4SYST

**2020**

ETSI STF 578
- SAREF development framework and workflow
- SAREF ontology portal

Publication of SAREF v3
ETSI/EC STF 566
- SAREF4AUTO
- SAREF4EHAW
- SAREF4WEAR
- SAREF4WATR

**2021**

ETSI STF 602
- SAREF4LIFT
- oneM2M alignment

**2023**

ETSI STF 653
- SAREF harmonization
- Consolidation of SAREF extensions
- SAREF development framework and workflow v2
- SAREF ontology portal v2

ETSI/EC STF 641
- SAREF harmonization
- SAREF v4
- Consolidation of SAREF extensions
- SAREF and digital twins
- SAREF EN

SmartM2M
- SAREF4GRID

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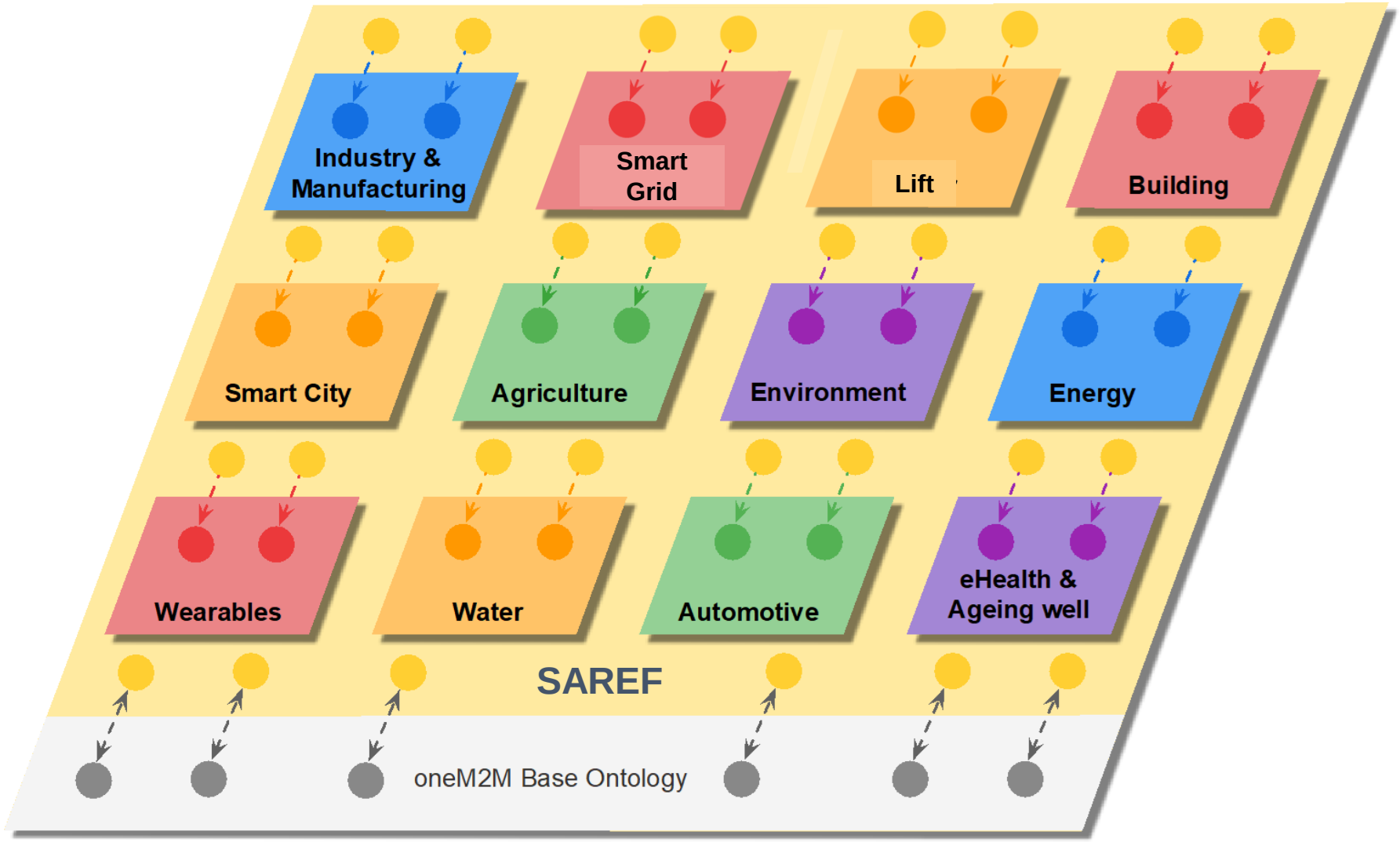
# SAREF extensions



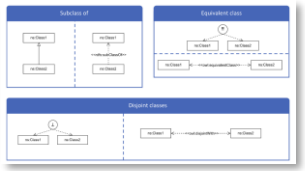


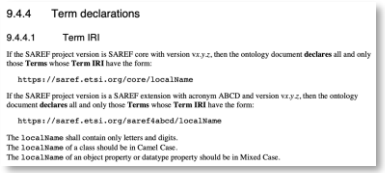
# SAREF governance

## SPECIFICATIONS

### Principles

- Standards
- Requirements
- Guidelines





9.4.4 Term declarations

9.4.4.1 Term IRI

If the SAREF project version is SAREF core with version vx.y.z, then the ontology document **declares** all and only those **Terms** whose **Term IRI** have the form:

`https://saref.etsi.org/core/localName`

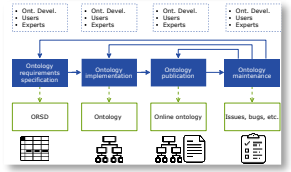
If the SAREF project version is a SAREF extension with acronym ABCD and version vx.y.z, then the ontology document **declares** all and only those **Terms** whose **Term IRI** have the form:

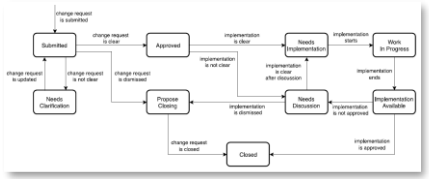
`https://saref.etsi.org/saref4abcd/localName`

The `localName` shall contain only letters and digits.
The `localName` of a class should be in Camel Case.
The `localName` of an object property or datatype property should be in Mixed Case.

### Processes

- Actors
- Ontology development methodology
- Workflows




### Technology

- Development framework
- Technical requirements

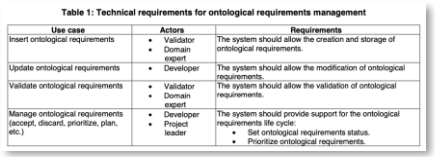


Table 1: Technical requirements for ontological requirements management

| Use case | Actors | Requirements |
|---|---|---|
| Insert ontological requirements | • Validator<br>• Domain expert | The system should allow the creation and storage of ontological requirements. |
| Update ontological requirements | • Developer | The system should allow the modification of ontological requirements. |
| Validate ontological requirements | • Validator<br>• Domain expert | The system should allow the validation of ontological requirements. |
| Manage ontological requirements (accept, discard, prioritize, plan, etc.) | • Developer<br>• Project leader | The system should provide support for the ontological requirements life cycle:<br>• Set ontological requirements status.<br>• Prioritize ontological requirements. |

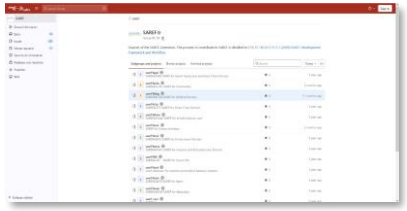
ETSI TS 103 411

ETSI TS 103 608

ETSI TS 103 673

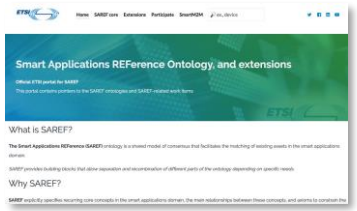
## SOFTWARE

### SAREF forge



https://labs.etsi.org/rep/saref/

### SAREF ontology portal




https://saref.etsi.org/

### SAREF pipeline

https://labs.etsi.org/rep/saref/saref-pipeline/

oops!

THEMIS

# Towards a SAREF EN (A European Norm)



The EC/EFTA has commissioned ETSI to draft a European Norm on SAREF (STF 641)

**High Level Objective**: Giving provisions, how to implement, prove and show SAREF compliance with EN SAREF process and SAREF Technical Specifications

- Bring together widely considered **good practice in semantic interoperability** for IoT smart applications in a **set of high-level outcome-focused provisions**
- Provide **guidance** on making IoT smart applications and products interoperable in compliance to the SAREF framework
- Give organizations the flexibility to innovate and implement SAREF-compliant semantic interoperability solutions appropriate for their products and applications
- Provide a **basis to support normative and regulation recommendations**

# What is the ultimate goal?



## Use the digital twin as a single global database

COGITO

See the COGITO project presentation for an example

https://cogito-project.eu/

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