

Regional Standardization Forum for Bridging the Standardization Gap

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Overview of IoT related activities in ETSI

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Content

- Introduction to ETSI IoT related activities
- ETSI TC SmartM2M
- ETSI ISG CIM
- Other ETSI activities related to the IoT (incl. ISG CDP)
- Backup: information on European “Alliance for IoT Innovation”, SmartM2M details

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Personal thanks to Patrick Guillemin, ETSI SmartM2M Officer and AIOTI WG03 Chair, for coordination and validation of various information details.

Introduction to ETSI IoT related activities

(ETSI: European Telecommunications Standards Institute)

IoT related activities in ETSI

Many impacted groups (from ETSI portal <http://portal.etsi.org>)

| BOARD | FC | GA | IPR | OCG | 3GPP | oneM2M | ATTM | BRAN | BROADCAST | CABLE |
|----------|------|-------|---------|-------|------|--------|------|------|-----------|----------|
| CYBER | DECT | EE | eHEALTH | EMTEL | ERM | ESI | HF | INT | ITS | LI |
| MSG | MTS | NTECH | PLT | RRS | RT | SAFETY | SAGE | SCP | SES | SmartBAN |
| SmartM2M | STQ | TCCE | USER | CCM | CIM | ECI | ENI | IPG | ISI | MBC |
| MEC | mWT | NFV | NGP | OEU | QKD | SMT | OSM | NSO | STF | WORKSHOP |

SmartM2M, **ATTM** (SDMC, TM6, AT2, TM4 and PLT), **CABLE**, **NTECH**, **NFV**, **MEC**, **NGP**, **oneM2M**, **3GPP**, **SES**, **AERO**, **BRAN**, **DECT/ULE**, **EMTEL**, **ERM** (TG28/LTN), **mWT**, **ITS**, **MSG**, **RRS**, **RT**, **SES**, **TCCE**, **CIM**, **CDP** etc. + **Board IoT**

Security (ESI, LI, SAGE, CYBER/QSC, QKD, ISI), **Energy Efficiency** (ATTM, EE, CABLE, OEU), **QoS/QoE** (STQ), **Interconnect & test** (INT, MTS), **Smart Card** (SCP), **Health** (eHealth, SmartBAN), **USER**, **HF**, **SAFETY** etc... + **AIOTI** + **H2020**

ETSI TC SmartM2M

ETSI TC SmartM2M today in summary

Activity focus

- Supporting the European IoT community building, incl. on IoT standards identification and adoption
- Bridging the European stakeholders' needs in the area of IoT, in particular in relation to oneM2M
- Supporting ETSI in the IoT area, collaborating with other ETSI groups (SmartBAN, ITS, CIM, etc.)
- Supporting oneM2M, in terms of promotion, technical support and pre-standardization (e.g. providing test suites for ontologies in different domains, based on oneM2M and SAREF)

Some deliverables (details in backup slides)

- Communication framework and ontology for Smart Appliances
- Extension to Energy, Environment and Buildings
- Further extension foreseen in 2018-19 (agriculture, automotive, e-health, e-wellness, wearable, industrial domain)
- Landscape and gap analysis for IoT

ETSI TC SmartM2M from its start

ETSI SmartM2M started in 2008 as ETSI M2M:

- It has developed **two releases** of IoT/M2M specifications
- It is the **initial promoter** of the oneM2M initiative
- With the publication of
 - oneM2M Release 1 (Data sharing and communication framework) and
 - oneM2M Release 2 (Semantic interoperability support),

the transfer of its core technical work in oneM2M **has been completed**

ETSI SmartM2M standard approach

It is based on the standardization of an **interworking framework** made of:

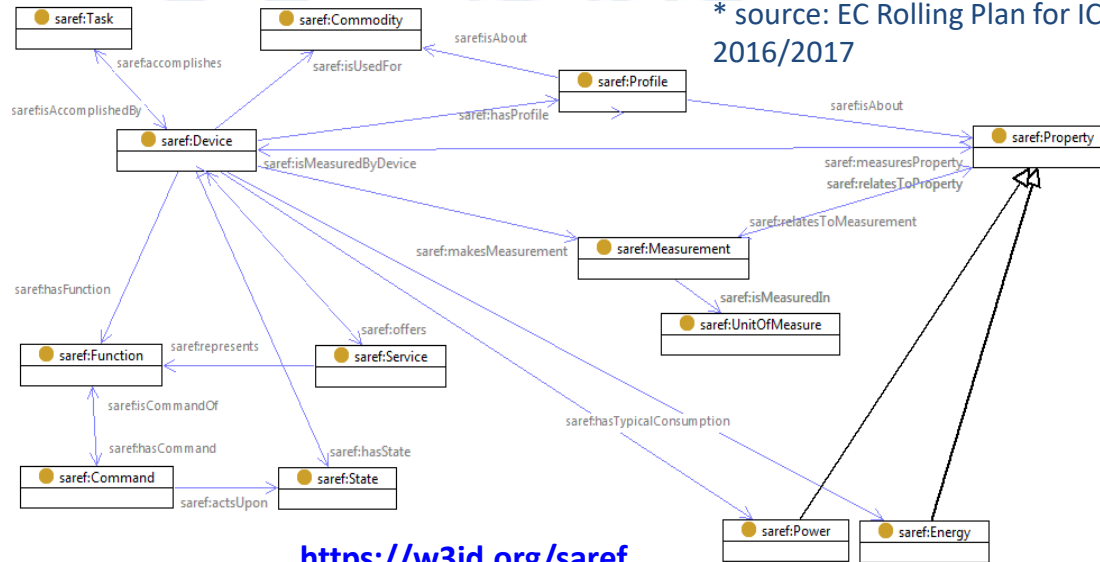
A global communication framework enabling semantic interoperability: **oneM2M** Release 1 (2015) and Release 2 (2016)

An ontology framework for multiple domains based on **SAREF**, specified in 2015 and updated in 2016, integrated with the oneM2M base ontology

SAREF (Smart Appliances Reference Ontology)

First ontology standard in the Internet of Things (IoT) ecosystem*

* source: EC Rolling Plan for ICT Standardisation 2016/2017



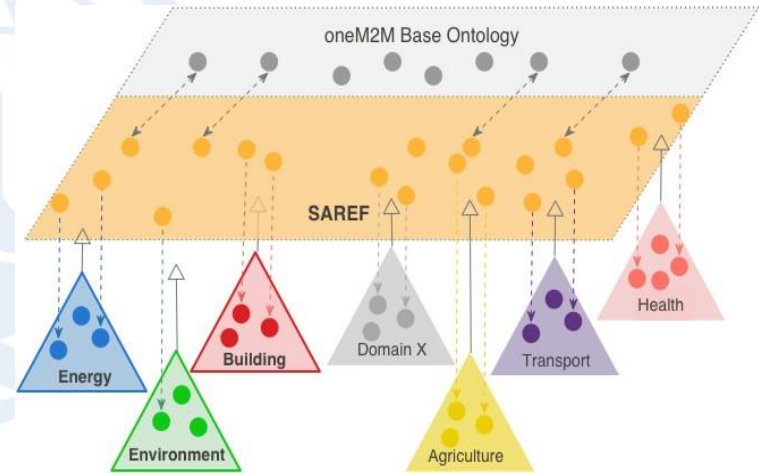
Developed in close interaction with the industry

<https://w3id.org/saref>

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SAREF roadmap

The multitude of other domains currently on the roadmap are **turning SAREF into “Smart Anything REFerence ontology”**, enabling better integration of semantic data from various vertical domains in the IoT



Support of SmartM2M to oneM2M

A study is ongoing to prepare the normative work for **Smart Lifts** based on **oneM2M communication framework and SAREF**

Smart Agriculture interworking and interoperability events are planned based on oneM2M communication framework and base ontology.

SmartM2M is also responsible of **oneM2M testing support** with the development of **conformance testing** specifications for the test suite for oneM2M

SmartM2M has also started a preparation study for the **virtualization of the oneM2M communication framework**

Full workplan available at <https://portal.etsi.org/tb.aspx?tbid=726&SubTB=726>



ETSI ISG CIM

ETSI Industry Specification Group on Context Information Management (ETSI ISG CIM)

ETSI ISG CIM has mandate to establish an info-exchange layer on top of IoT platforms like oneM2M especially targeting Smart City applications

Founding members of ETSI CIM (February 2017) were:

- Telefonica, NEC, Orange, imec, Easy Global Market → [25 members now](#)

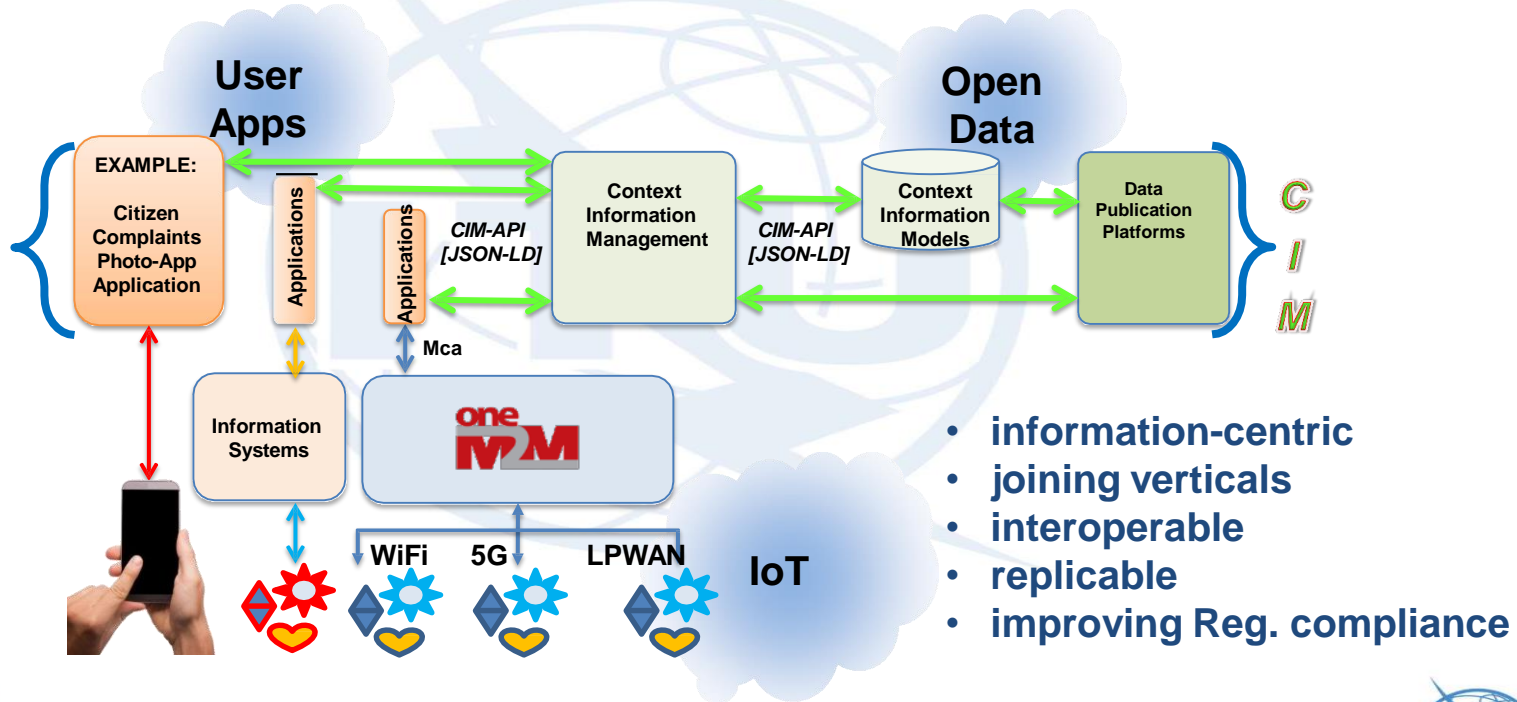
Applications include

- combining eGov, Pollution Monitoring, citizen alerts for Smart Cities
- synchronize Transport Management applications

Outputs expected in 1st year

- Identify (interoperable) Data Models
- Specify an API (start at OMA NGSI)
- Encourage an open-source project of API

Context Information Management Layer - exchanging information between domains



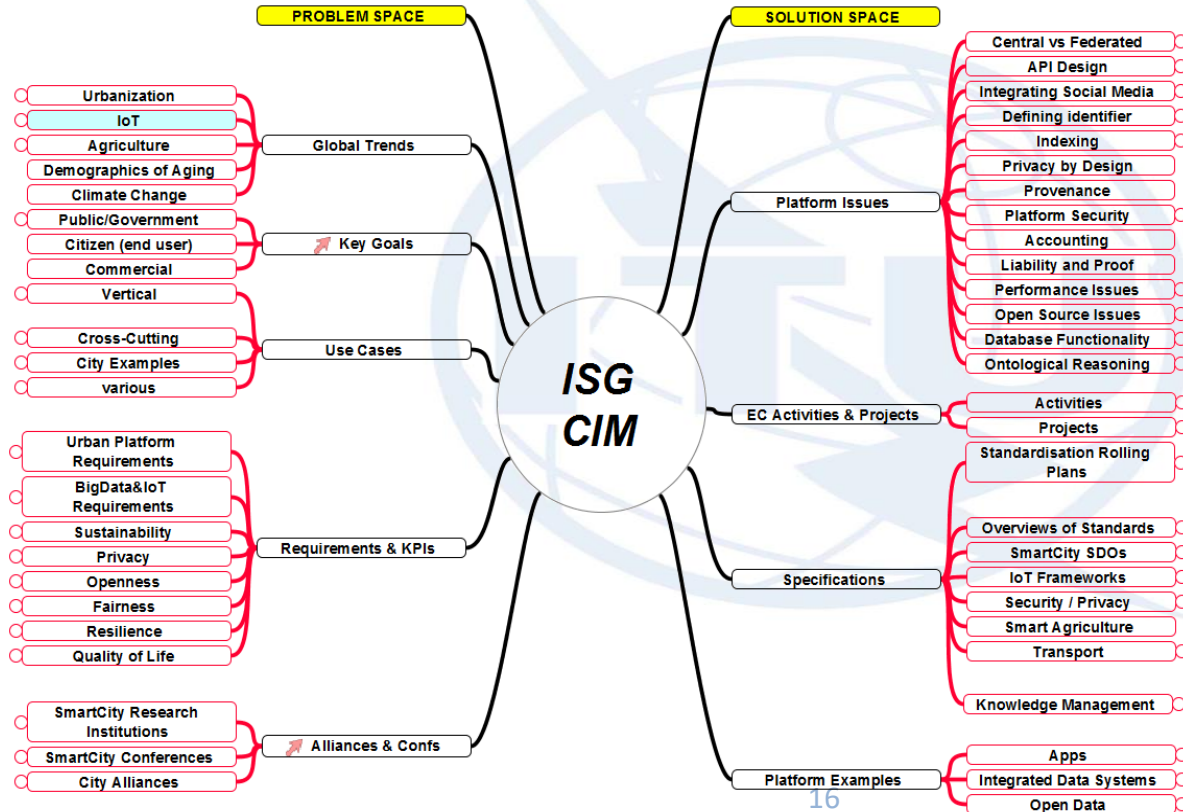
- information-centric
- joining verticals
- interoperable
- replicable
- improving Reg. compliance

ETSI ISG CIM collaborations with other organisations

- oneM2M
- SmartM2M
- W3C
- ITU-T FG DPM
- H2020 Research Projects
- ...

CIM-003-GAP (GR CIM 003)

Architecture and Gap Analysis



GAP ANALYSIS

What are the stakeholder goals and requirements ?

What kind of information needs to be exchanged ?

What kinds of queries/filters must be possible ?

How to help existing systems interwork ?

ETSI ISG CIM work items

See: <https://portal.etsi.org/tb.aspx?tbid=854&SubTB=854>

[DMI/CIM-001-AB \(MI\)](#) Annotated Bibliography

[DGR/CIM-002-UC \(GR CIM 002\)](#) Use Cases

[DGR/CIM-003-GAP \(GR CIM 003\)](#) Architecture and Gap Analysis

[DGS/CIM-004-APIprelim \(GS CIM 004\)](#) API

[DGS/CIM-005-DPP \(GS CIM 005\)](#) Data Publication Platforms

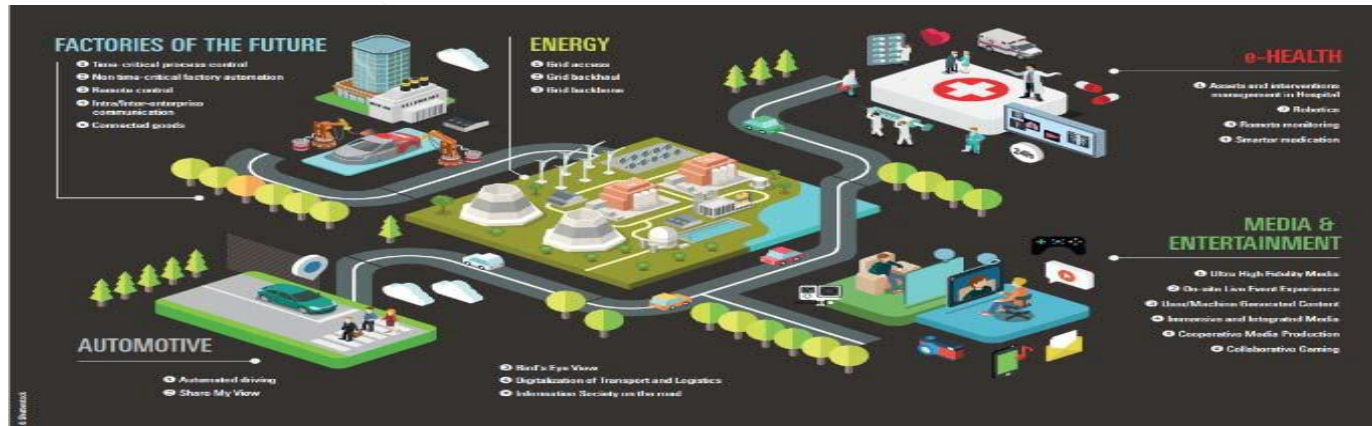
[DGS/CIM-006-MOD0 \(GS CIM 006\)](#) Information Model(s)

[DGR/CIM-007-SEC \(GR CIM 007\)](#) Security and Privacy

NOTE: Work Items are being handled in parallel, with frequent cross-checks for consistency, in order to rapidly converge.

Other ETSI activities related to the IoT

ETSI ISG CDP (City Digital Profile)



ISG CDP announcement on 2 Nov 2017:

<http://www.etsi.org/news-events/news/1237-2017-11-news-etsi-creates-city-digital-profile-group-on-smart-cities>

“ ... to accelerate the delivery of integrated citizen services and provide a technology road map for city leaders, by promoting the use of standards in a replicable solution stack. The aim of this ISG is to enable cities to procure smart solutions with confidence that they will be extendable, configurable and interoperable with similar services from other cities.”

ETSI contributes to

CEN-CENELEC-ETSI Coordination Groups:

- Smart Cities, Smart Meters and Smart Energy Grid

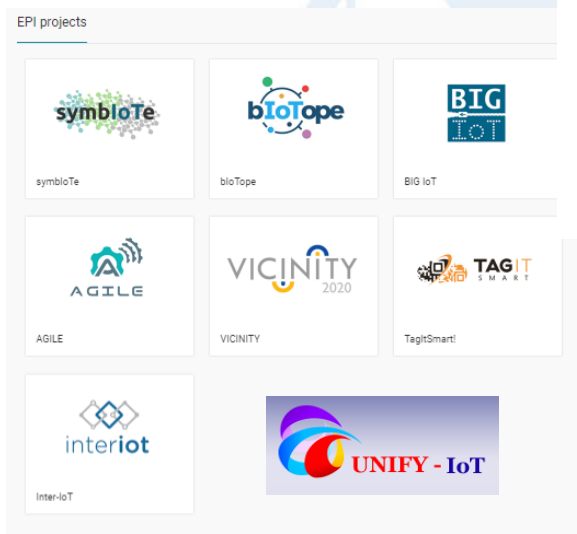
AIOTI (www.aioti.eu)

- WG03 (IoT Standardisation)
- WG08 (Smart Cities)
- with many SDOs (ITU-T, W3C, IEEE, CEN, ISO, CENELEC, IEC, JTC1, ETSI, oneM2M, 3GPP.), OSS, Industry Sectors and IoT Alliances, IERC (research) ... and the European Commission

FIWARE (founding members of the ETSI ISG CIM)

ETSI and H2020 IoT projects

ETSI is a partner in 3 H2020 CSAs (Coordination and Support Action):
Smart City project **ESPRESSO** (*Smart Cities*), **UNIFY-IoT** (IoT Platforms),
CREATE-IoT (IoT Large Scale Pilots)



ESPRESSO

systemic Standardisation approach to
Empower Smart cities and communities!

SYNCHRONICITY



ETSI Security work

TC CYBER

- co-ordinates Cyber Security work, acts as a centre of expertise and develops detailed standards itself when required

Some TCs closely related to Cyber Security topics

- Lawful Interception and Data Retention, e-Signatures, SCP...

All committees addressing security in systems “by default”

- Mobile Communications, **IoT**, NFV...

Thank you very much for your attention

Backup information (1) - the European Alliance for IoT Innovation (AIOTI)

The development of the Alliance for IoT Innovation (AIOTI)



The **Alliance for Internet of Things Innovation (AIOTI)** was initiated by the European Commission in 2015, with the aim to strengthen the dialogue and interaction among IoT players in Europe, and to contribute to the creation of a dynamic European IoT ecosystem to speed up the take up of IoT.

Launch in 2015
by Commissioner
Günther Oettinger



In context of the
preparation of Large Scale
IoT Projects under EC's
Horizon 2020 initiative



From 2016 one-stop-shop for IoT in
Europe

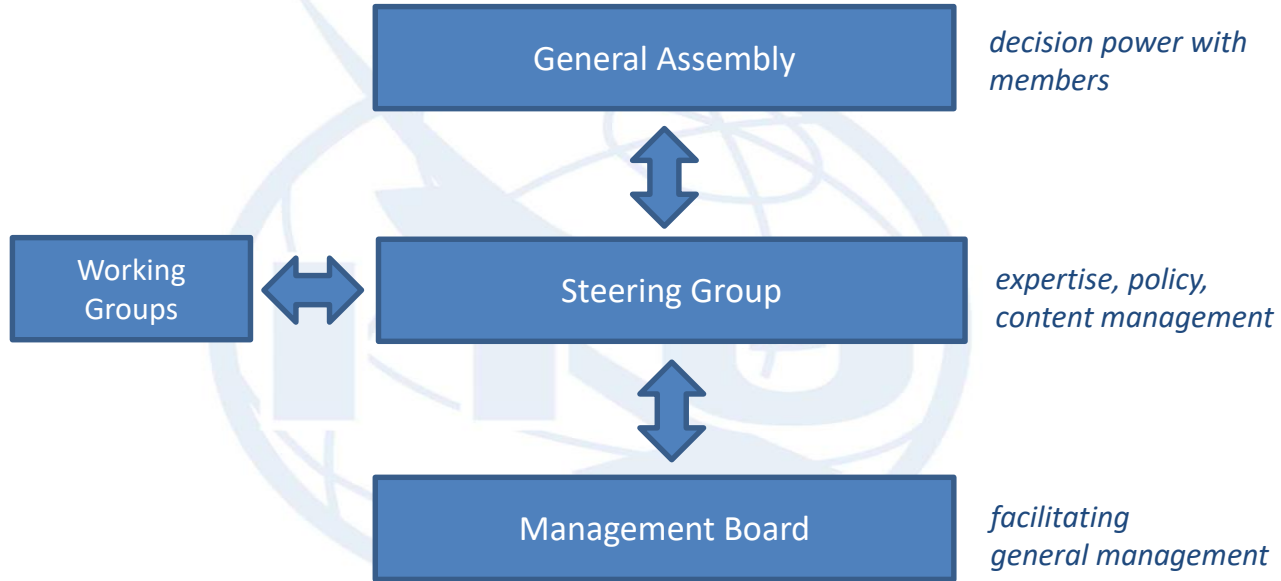
AIOTI key strategic challenges

- Addressing rapid technological developments
- User acceptance of IoT innovation, building trust
- Drive towards deployment
- Managing the risk of fragmentation, converge in a field of international competition
- Education and information to stakeholders in their context
- Numerous cooperations, incl. signed MoU with
 - Brazilian IoT Chamber, Brazil
 - IoT Acceleration Consortium (ITAC), Japan
 - and initial steps towards signing MoU with Alliance of Industrial Internet (All), China

Source: AIOTI

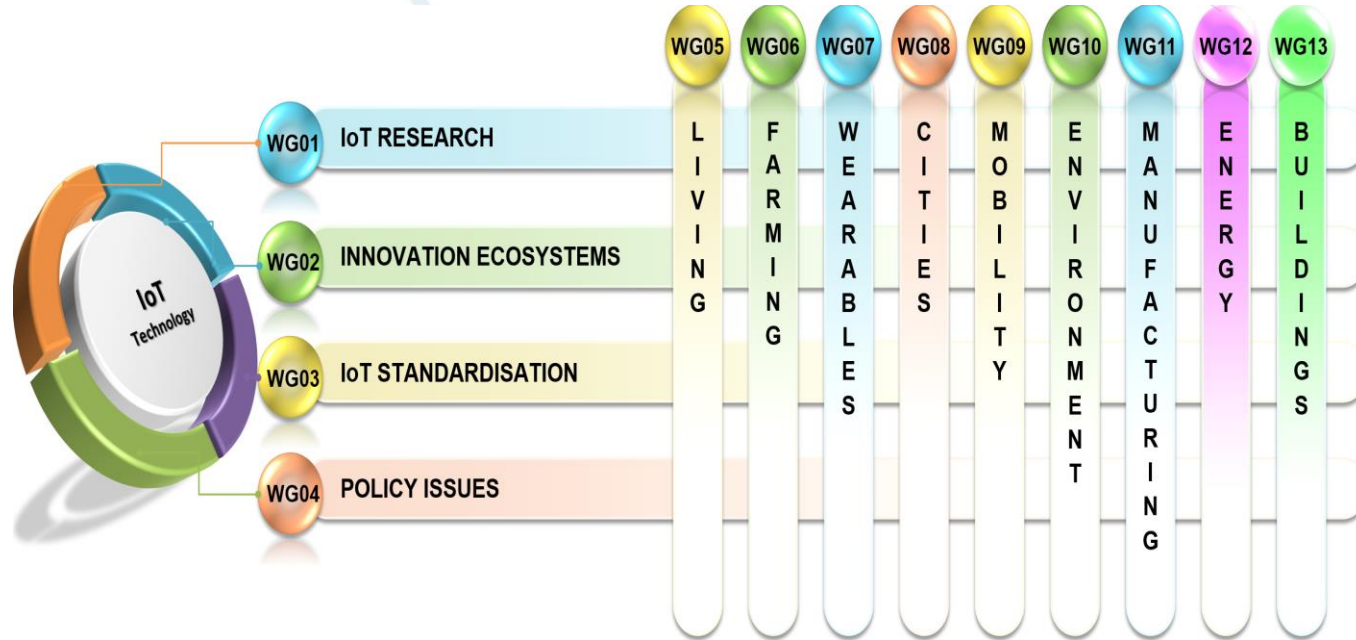
September 2016: AIOTI established as a legal Association

governance structure



Note: every member is active in at least one Working Group

AIOTI Working Group structure

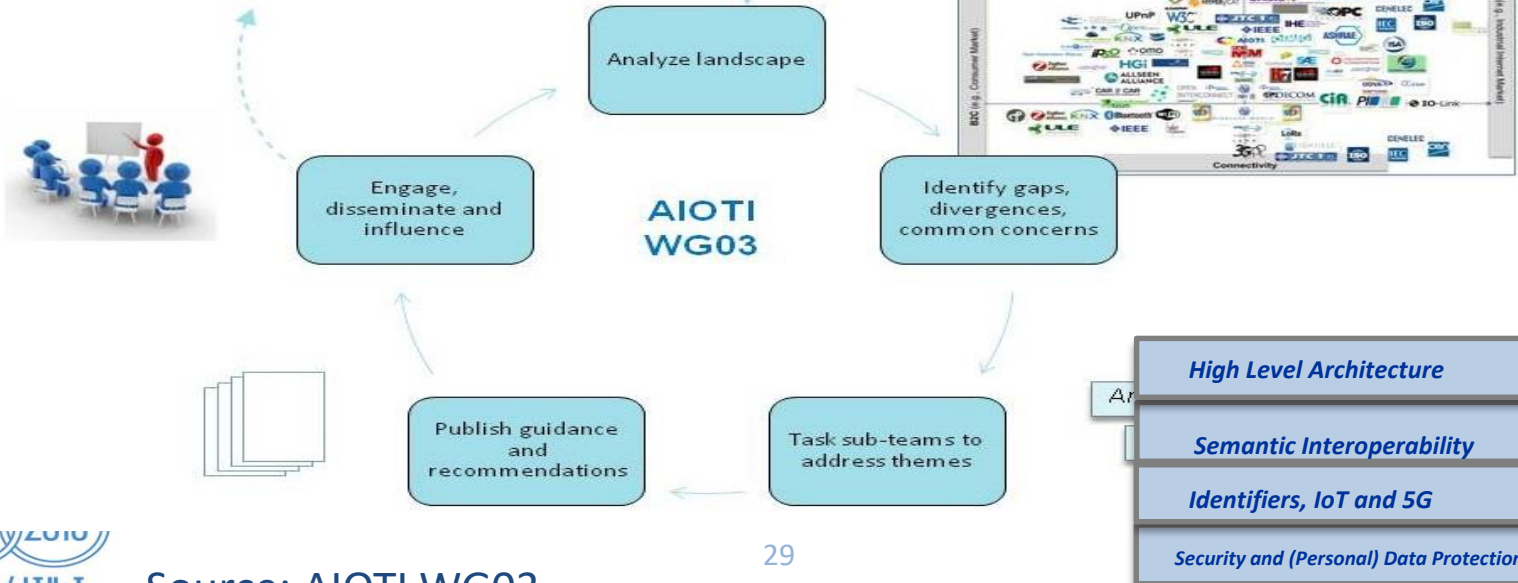


AIOTI WG03 (IoT standardization): engagement model



WG03 support to AIOTI in:

- Digital Single Market
- Digitising European Industry
- H2020 Large Scale Pilots



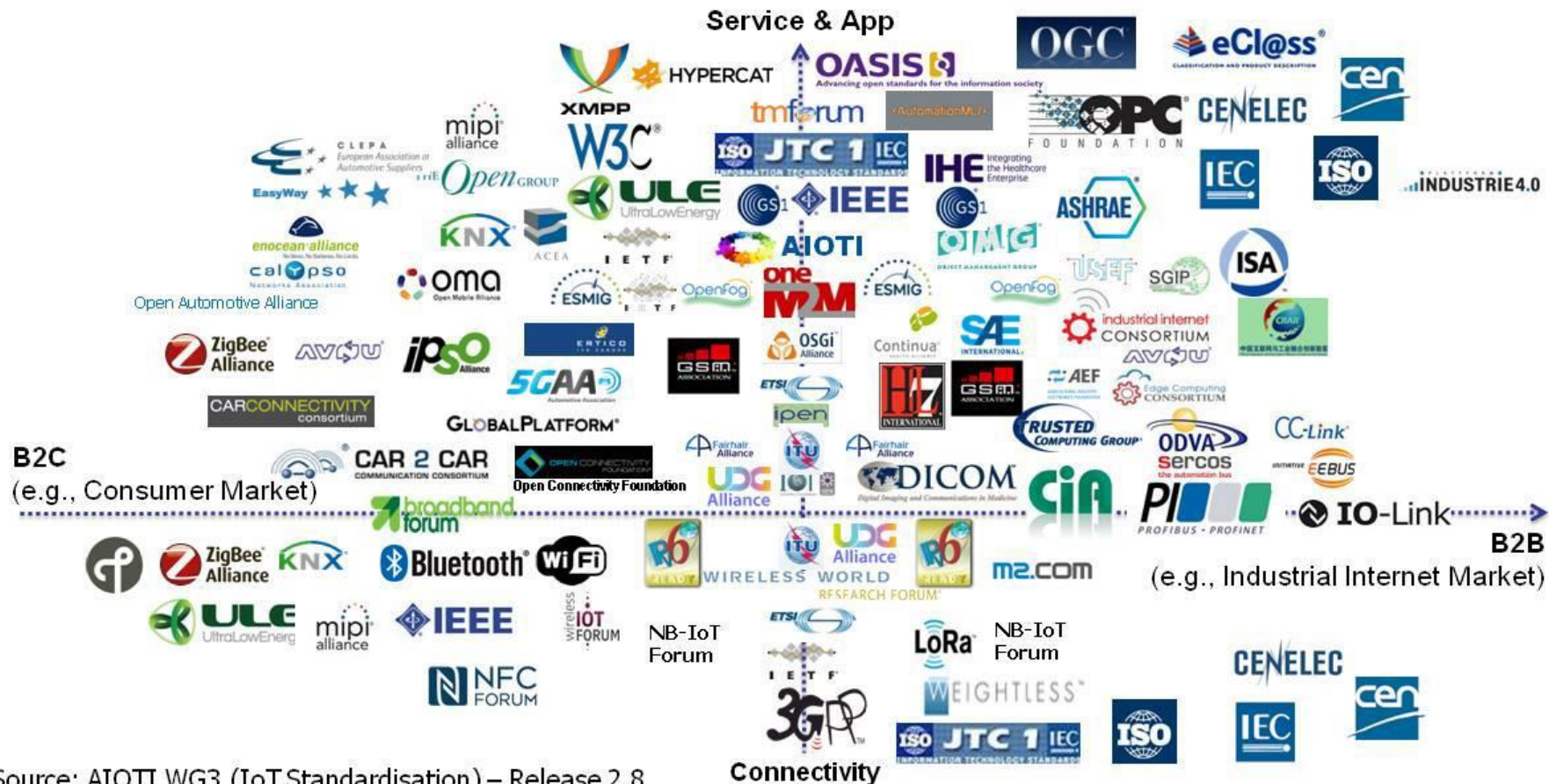
AIOTI WG03 (IoT standardization)

- Identifies and, where appropriate, makes recommendations to address existing IoT standards, analyses gaps in standardization, and develops strategies and use cases aiming for
 1. Identifying horizontal concerns/general principles for IoT
 2. Bootstrapping trust
 3. Investigating relevant regulations and their potential impact
 4. Community building
 5. Conducting initial studies on the role of people in IoT
- IoT Landscape
 - IoT Landscape maintenance is key to keep the liaisons alive and maintain dialogue on how to foster collaboration to improve interoperability & security
 - IoT relation and impact on 5G
 - IoT-EPI IoT Platforms analysis improvement / H2020 UNIFY-IoT
 - Gap Analysis and recommendations / EC funded STF 505, CREATE-IoT
 - Cooperation with SDOs/Alliances to foster co-creation and interworking
- High Level Architecture (HLA) - work plan update in progress
 - IoT Reference Architecture and the mapping of existing IoT Reference Architectures to it
 - IoT identification
- IoT Semantic Interoperability
 - Important topic of the moment that created a great international collaboration
- IoT Privacy (with WG04)
 - IoT Platform, experimentation, LSPs need concrete standard framework & references to enable "IoT Trust" and IoT "Privacy by design"
- IoT Security (with WG04)
 - IoT Security Architecture for Trusted IoT Devices; Baseline Requirements for Security & Privacy up to segment requirements; experimentation, LSPs need concrete standard framework & references to enable "IoT Trust" based on IoT "Security by design"

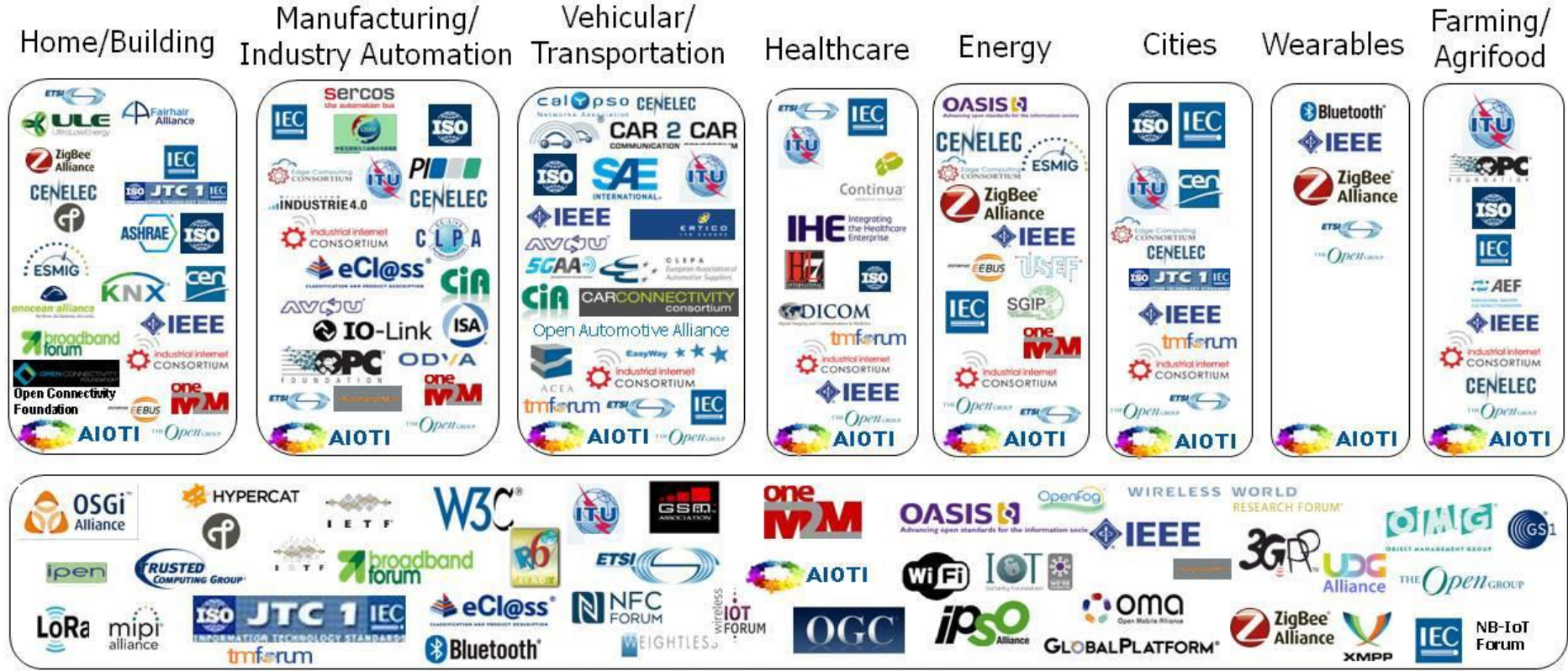
AIOTI WG03 reports

- <https://ec.europa.eu/digital-single-market/en/news/aioti-recommendations-future-collaborative-work-context-internet-things-focus-area-horizon-2020> since 26/10/2015 before the H2020 IoT LSPs selection
- <http://www.aioti.eu> -> [resources](#) <https://docbox.etsi.org/SmartM2M/Open/AIOTI/> with latest WG03 Reports
 - AIOTI WG03 IoT Landscape [V2.8](#) (IoT Reference Architecture mappings)
 - [IoT-EPI UNIFY-IoT D3.1 IoT Platforms analysis](#) improvement from AIOTI WG03
 - STF505 [IoT Landscape](#) (ETSI TR 103 375) and [Gap Analysis and recommendations](#) (ETSI TR 103 376) + [7-8 February 2017](#) reports and recommendations
- AIOTI WG03 High Level Architecture [V3.0](#)
 - IoT identification (WG03 survey and work in progress)
- IoT Semantic Interoperability
 - First report AIOTI WG03 [SemloP report 2.0](#) - 2015
 - [SemloP White Paper](#) Dec2016 (endorsed by AIOTI, oneM2M, W3C and IEEE P2413)
- WG03 contributions on IoT in [AIOTI inputs to EC DSM/DEI WG2 workshops](#) in addition to AIOTI WG06 Smart Farming
- ETSI IoT Security Week, AIOTI WG03 [IoT Privacy report](#) (with WG04) - June 2016 and [13 January 2017](#)
- 12 Sep 2017 [AIOTI-ARMOUR Workshop](#) hosted at ETSI

IoT SDOs and Alliances Landscape (Technology and Marketing Dimensions)



IoT SDOs and Alliances Landscape (Vertical and Horizontal Domains)



Horizontal/Telecommunication

Source: AIOTI WG3 (IoT Standardisation) – Release 2.8

Mapping of IoT SDOs/Alliances to Knowledge Areas

Security & Privacy



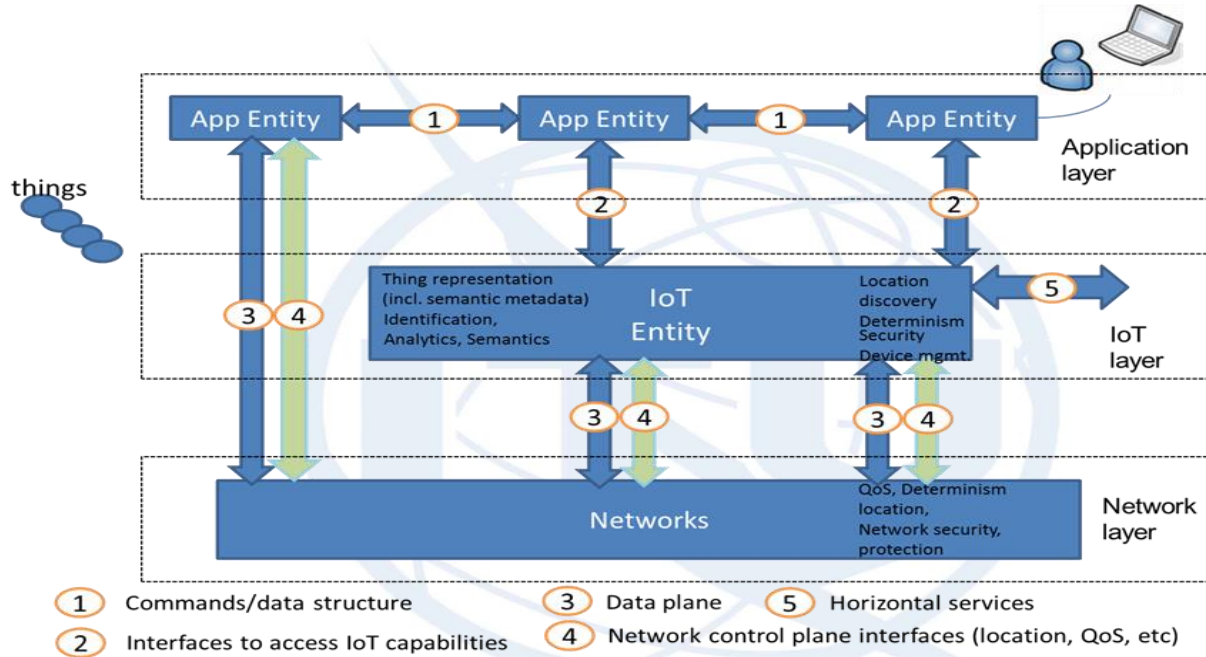
Applications (*)



IoT Architecture



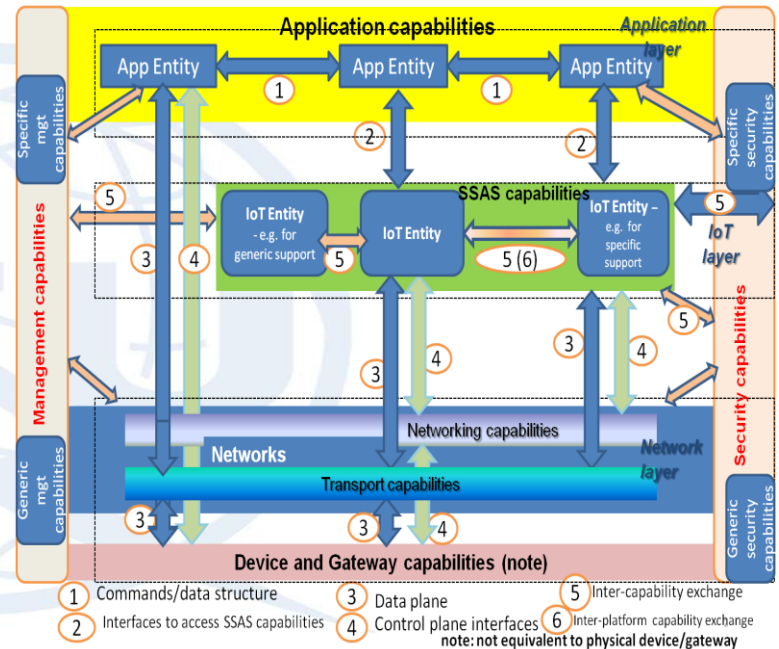
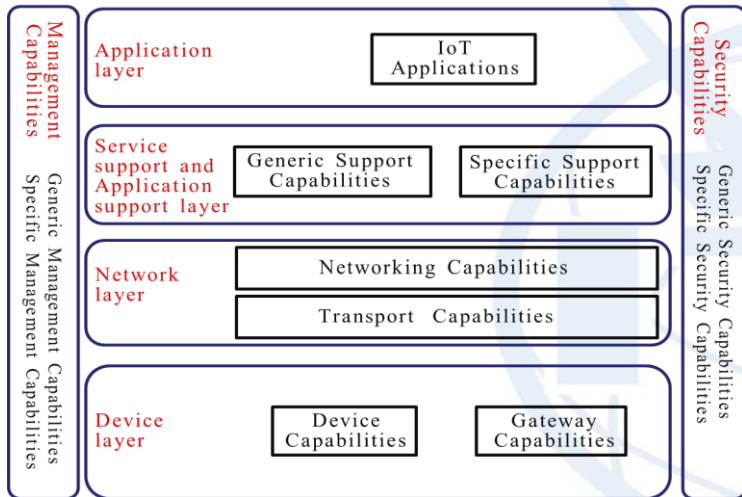
AIOTI High Level Architecture (HLA)



AIOTI HLA functional model

Source: AIOTI WG03 (IoT Standardisation) – HLA Rel. 3.0

AIOTI HLA mapping example: AIOTI HLA functional model - ITU-T IoT Reference Model mapping



ITU-T IoT Reference Model [Y.2060]

Source: AIOTI WG03 (IoT Standardisation) – HLA Rel. 3.0

8 February 2017 EC/AIOTI WG03 Panel on Converging IoT standards

<https://ec.europa.eu/digital-single-market/en/news/internet-things-platforms-and-standardisation-workshop>

- **3GPP**, Luis Jorge Romero, ETSI Director General
- **oneM2M**, Omar Elloumi, Nokia, oneM2M TP Chairman
- **ETSI TC SmartM2M**, Enrico Scarrone Telecom Italia, SmartM2M Chairman
- **ITU-T SG20**, Marco Carugi, NEC Corporation, ITU-T SG20 Rapporteur and Mentor
- **IEEE P2413**, Paul Murdock, Landis+Gyr
- **ISO/IEC JTC1 WG10 (IoT) now JTC 1/SC 41 since May 2017**, Henri Barthel, GS1
- **CEN/CENELEC**, Bernhard Thies, CENELEC President
- **IIC**, Jean-Pierre Desbenoit, Schneider-Electric
- **OPC and Platform I4.0**, Thomas Hahn, Siemens
- **IETF**, Georgios Karagiannis, Huawei Technologies
- **W3C** (Dave Raggett)

NOTE – Another relevant panel on IoT standards convergence at IoT Week 2017, 6-9 June 2017

Backup information (2) - SmartM2M details

Communication framework and SAREF standard (1/2)

Start in 2013 with the study about Energy products (Smart Appliances) using and producing Energy in the home: ETSI has collaborated with EC DG Connect and EC DG Energy to provide a standardized solution (common semantics for the Smart Appliances domain, reference ontology as interoperability language) and produced the following main specification sets:

1) ETSI TS 103 264: SAREF and oneM2M Mapping

It standardizes the core of SAREF and its mapping on the base ontology defined by oneM2M

- First version of this specification published in Nov 2015
- Revised version including a full mapping on the base ontology of oneM2M published in Jan 2017

Energy, Environment and Building sectors are part of the normative work

Direct inputs from EEBus and Energy@home have been included

DTS/SmartM2M-103271 (TS 103 410) on SAREF extensions

- TS 103 410-1 SAREF for Energy (January 2017)
- TS 103 410-2 SAREF for Environment (January 2017)
- TS 103 410-3 SAREF for Buildings (January 2017)

Communication framework and SAREF standard (2/2)

2) ETSI TS 103 267: Communication Framework

Published by ETSI in November 2015

It complements the common ontology with the means to communicate and share information, mandating the use of oneM2M as interworking and communication framework for SAREF, to assure the ability for smart appliances to communicate in a common way, either directly or via interworking with specific local protocol

3) SAREF Testing suite

Published in January 2017

- TS 103 268-1: Smart Appliances; testing methodology
- TS 103 268-2: Protocol Implementation Conformance Statement (PICS)
- TS 103 268-3: Test Suite Structure and Test Purposes (TSS&TP)
- TS 103 268-4: Abstract Test Suite (ATS)