




Q&A

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June 12, 2020
Standardisation
Digitisation Innovation



Ovidiu Vermesan
SINTEF
CREATE-IoT



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Advancing the digital transformation of European industry

The role of standards in accelerating innovation

The case of IoT/IIoT

INTERNET OF
THINGS

Ovidiu Vermesan, CREATE-IoT

Webinar, 12 June 2020



MONICA

SYNCHRONICITY



Co-Funded by the European Commission



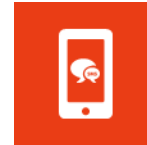
Innovation



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Innovation is defined as “the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations”.

Source: Organisation for Economic Cooperation and Development (OECD)



Standardisation and Innovation



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03

Standards allow the sharing of investments and risks associated with the development of new technologies and applications (fostering innovation through collaboration).

04

Standards facilitate the development of new markets and trade, by helping to establish and exploit network effects, increasing consumer confidence and allowing to reach critical mass.

02

Standards support the commercial exploitation of innovative ideas, providing a basis for the dissemination of information and an accepted framework within which patents can be drawn up, removing undue proprietary interests and barriers to trade.

01

Standards help to reduce redundant product/service development, allowing to free up resources that can instead be dedicated to inventive and innovative work. Standards contribute to technical evolution by applying, at the right time, critical design constraints and avoiding starting from scratch.

Standardisation and Pandemic Crisis



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Standards promote innovation and provide solutions to address global challenges!



Medical equipment/protective gear
(Medical) laboratory standards
Business continuity/emergency management
Quality control techniques
Health, safety & hygiene
Sanitation and waste management
Food standards
Logistics standards
Platforms interoperability



New business models
Business continuity
Enhanced safety protocols
Disruption of inputs to global value chains
Disruption of supply chains
New production/manufacturing models
New emerging standards



Standardisation and Pandemic Crisis



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QUALITY & STANDARDS AND THEIR ROLE IN RESPONDING TO COVID-19



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



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Panellists



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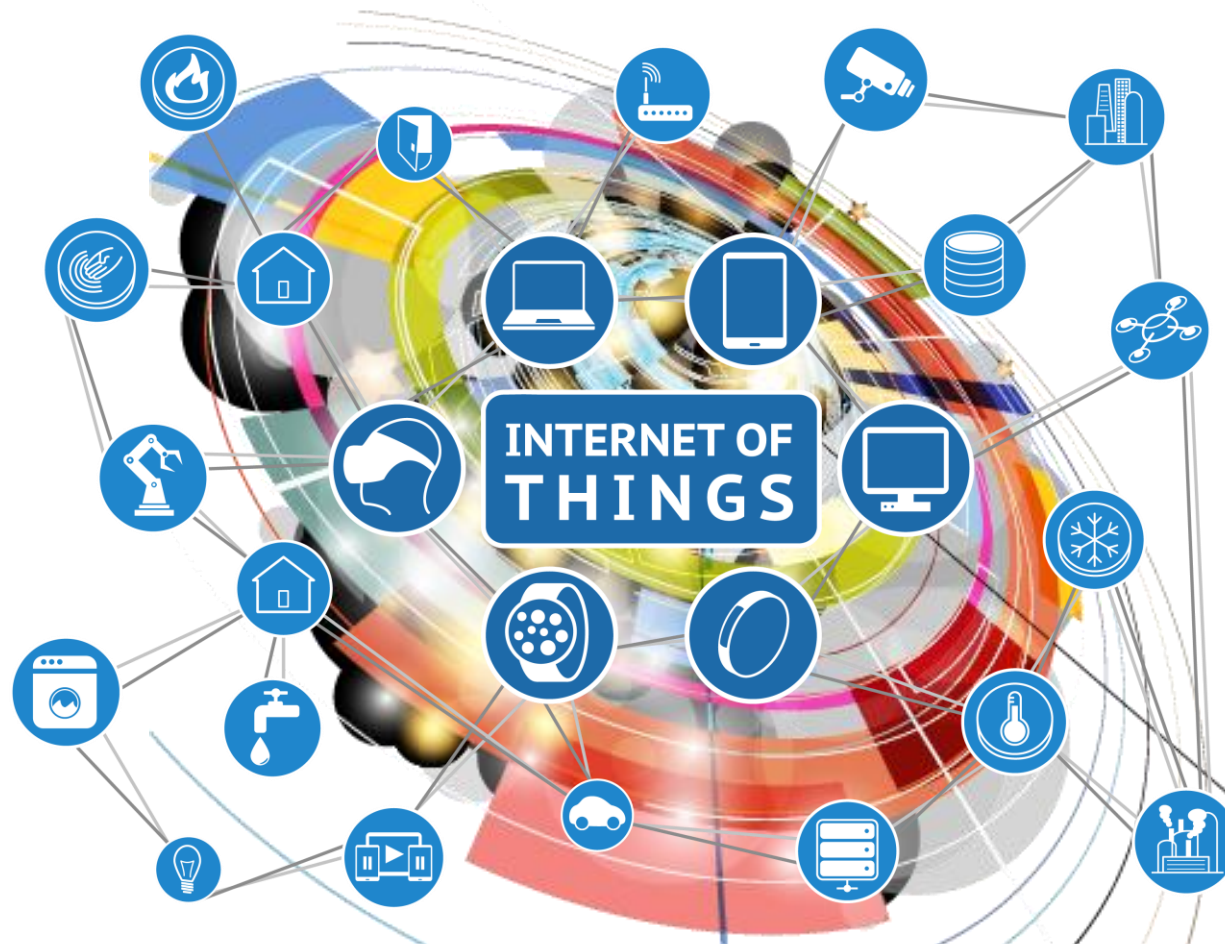


AIOTI (Georgios Karagiannis)
CEN/CENELEC (Ashok Ganesh)
ETSI (David Boswarthick)
GS1 (Francesca Poggiali)
ISO/IEC JTC1 (Östen Franberg)
ITU-T (Sébastien Ziegler)
W3C (Dave Raggett)

Thank You!



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Ovidiu.Vermesan@sintef.no

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June 12, 2020

MODERATOR



Franck Boissière
DG CONNECT
European Commission



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June 12, 2020

14.05-14.40 Fostering
collaboration: the view of AIOTI



Georgios Karagiannis
AIOTI

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AIOTI

Alliance for Internet of Things Innovation





Alliance for
Indigenous Digital
Innovation



AIOTI IoT Standardisation

AIOTI WG03 IoT Standardisation

Chair

Patrick Guillemin

ETSI



Co-Chair

Georgios Karagiannis

Huawei



The vision for WG03 is to be recognized as a major contributor to the worldwide interoperability, security, privacy and safety of IoT systems and applications, and particularly for the development of the market in Europe.

Scope: (1) Maintaining an IoT standards framework landscape, (2) Consolidation of architectural frameworks, reference, architectures, and architectural styles in the IoT space, (3) HLA / High Level Architecture, (4) IoT identifiers, (5) IoT relation and impact on 5G, (6) (Semantic) Interoperability, (7) Personal data protection/privacy to the various categories of stakeholders, in the IoT space (with WG04 IoT Policy), (8) IoT Security (with WG04 IoT Policy)

AIOTI WG03 Strategic objectives (2021-2027)

- 1 (Cross)-IoT application domain activities, including standardisation, policies, use cases and business models**
- 2 IoT is an important enabler for the success of 5G and vice versa;** How existing IoT standards accommodate the use of these converged technologies, such as 5G, IoT/IIoT, Artificial Intelligence (AI), robotics, cloud and edge computing and as well automation, in vertical and cross-vertical applications?
- 3 Data Sovereignty and the role of IoT;** How data sovereignty will impact IoT standardisation?
- 4 Industry Digitization and IoT standards;** How digital transformation will impact the IoT related standardisation?
- 5 IoT and its impact to UN Sustainable Development Goals (SDGs) and European Green Deal;** How IoT and IoT standards be used to support UN Sustainable Development Goals (SDGs) and European Green Deal?
- 6 Focus on Business drivers and business models in each vertical AIOTI WG;** How they will impact the IoT standardisation?
- 7 Large Scale Pilots are important to verify the IoT gaps that are identified by AIOTI in IoT standardisation, policy and IoT deployments, and to show how these gaps can be alleviated**
- 8 Cooperation with other IoT related initiatives and SDOs** are needed to reduce fragmentation and remove all barriers on the deployment of IoT in EU and worldwide

WG03 Highlights (ref. <https://aioti.eu/aioti-wg03-reports-on-iot-standards/>)

- IoT Landscape georgios.karagiannis@huawei.com
 - IoT Landscape maintenance is key to keep the liaisons alive and maintain dialogue on how to foster collaboration to improve interoperability & security, v2.9 published in October 2019
 - Gap Analysis and recommendations michelle.wetterwald@netellany.fr ; emmanuel.darmois@commledge.com, 1st release published May 2018, 2nd release to be published in January 2020
 - Cooperation with SDOs/Alliances to foster co-creation and interworking georgios.karagiannis@huawei.com, Patrick.Guillemine@etsi.org (e.g., Liaisons: 3GPP, ITU-T, ISO, OSGi Alliance, BBF, 3GPP; MoUs – signed: All, OSGi Alliance, BDVA, SC14.0, ISO/IEC JTC1 SC41, under discussion OPC Foundation
 - IoT relation and impact on 5G thomas.klein@de.ibm.com ; georgios.karagiannis@huawei.com 1st release published in June 2018, 2nd in March 2019, 3rd release published on 3rd of May 2020
 - HLA / High Level Architecture Huawei/ marco.carugi@gmail.com ; omar.elloumi@nokia.com R4, published in June 2018, R5 ongoing (2020)
 - IoT Reference Architecture and its mapping with existing IoT Reference Architectures
 - IoT identifiers juergen.heiles@siemens.com ; henri.barthel@gs1.org 1st release published Feb'18
 - SemIoP IoT Semantic Interoperability Martin.Bauer@neclab.eu ; Laura.Daniele@tno.nl two JWP on semantic interoperability published in October 2019
 - IoT Privacy (with WG04) vanderwees@arthurslegal.com Nuance of Trust event, Series of GDPR-Centric AIOTI webinars,
 - IoT Platform, experimentation, LSPs recommendations on concrete standard framework & references to enable "IoT Trust" and IoT "Privacy by design" + STF 547
 - IoT Security (with WG04) vanderwees@arthurslegal.com, jacques.kruse-brandao@sgs.com ; harm.arendshorst@ilabs.ai
 - IoT Security Architecture for Trusted IoT Devices; Baseline Requirements for Security & Privacy up to segment requirements; experimentation, LSPs recommendations on concrete standard framework & references to enable "IoT Trust" based on IoT "Security by design" + STF 547
- > Series of IoT Webinars on Application-Centric (IoT Verticals meet IoT Horizontals). The central themes of the webinars are: Personal Wearables (H2x): Health, Living, Consumer, Public Space, and other verticals, Moving Sensors (M2x): Farm2Fork, Mobility, Consumer, Cities, and other verticals + Long Term Fixed IoT Applications (F2x): Industry 4.0, Cities, Consumer, Water Management, Energy, Construction, Living, and other verticals.
- Joint MSP/DEI WG on Standardisation participation / November 2018 report



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Ashok Ganesh
CEN/CENELEC



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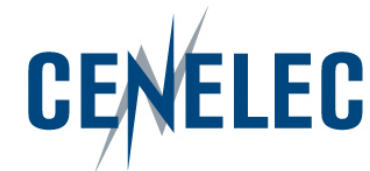


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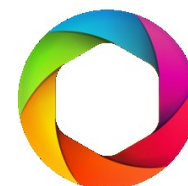




European Standardization Organizations

Ashok Ganesh
CEN-CENELEC

12 June 2020



CREATE-IoT

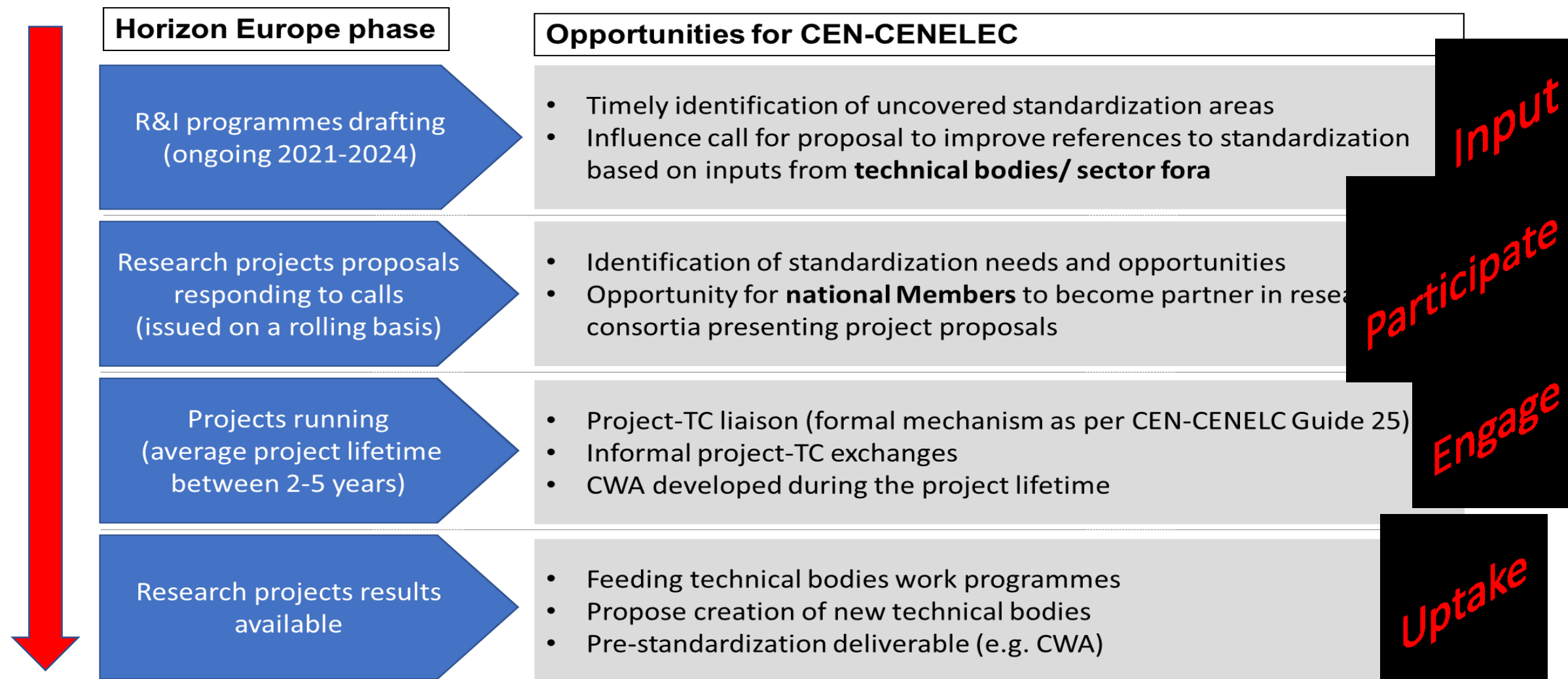
The CEN & CENELEC Innovation plan

Three main focuses:

- To engage with researchers and innovators through recognizing contributions from research
- To offer deliverables and processes that meet researchers and innovators needs by a fast – track approach
- To obtain the support and recognition of (national and European) institutions



Horizon Europe + Standardization



Create market impact for project results



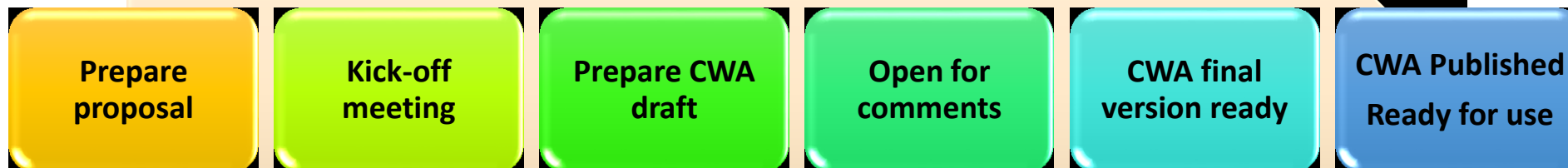
Project results



CWA



Full consensus
standard



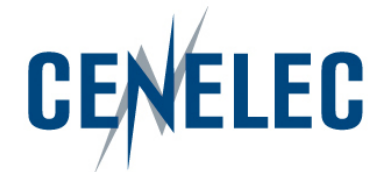
Standardization Responds to Needs - Living Example

In response to the coronavirus outbreak, the French Standardization Organization, **AFNOR**, released a Technical Specification(**TS**) document for mass production and artisanal making of “face masks”.

- This document was made available to
 - **companies** that are candidates for **mass production**
 - **any actor** who has the appropriate materials and equipment for **handcrafting**
- This TS has been downloaded for **a million times**
- EC asked CEN-CENELEC to create a CEN Workshop Agreement (CWA) for face mask face production
- CEN-CENELEC working to deliver CWA in **3 weeks**.



- Individual
in future.
- 
- A network diagram featuring a complex web of interconnected nodes (colored circles) and lines, forming a dome-like structure. Above the network, numerous colorful circular icons represent various technologies and services, including a laptop, smartphone, car, camera, robot, lightbulb, airplane, washing machine, faucet, speech bubble, mobile phone, people, truck, server, monitor, heart, envelope, database, and a padlock. The background is a light gray gradient.



European Standardization Organizations

Thank you

Ashok Ganesh

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collaboration: the view of ETSI



David Boswarthick
ETSI



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The Standards People



Role of Standards in Accelerating Innovation

Presented by: **David Boswarthick**

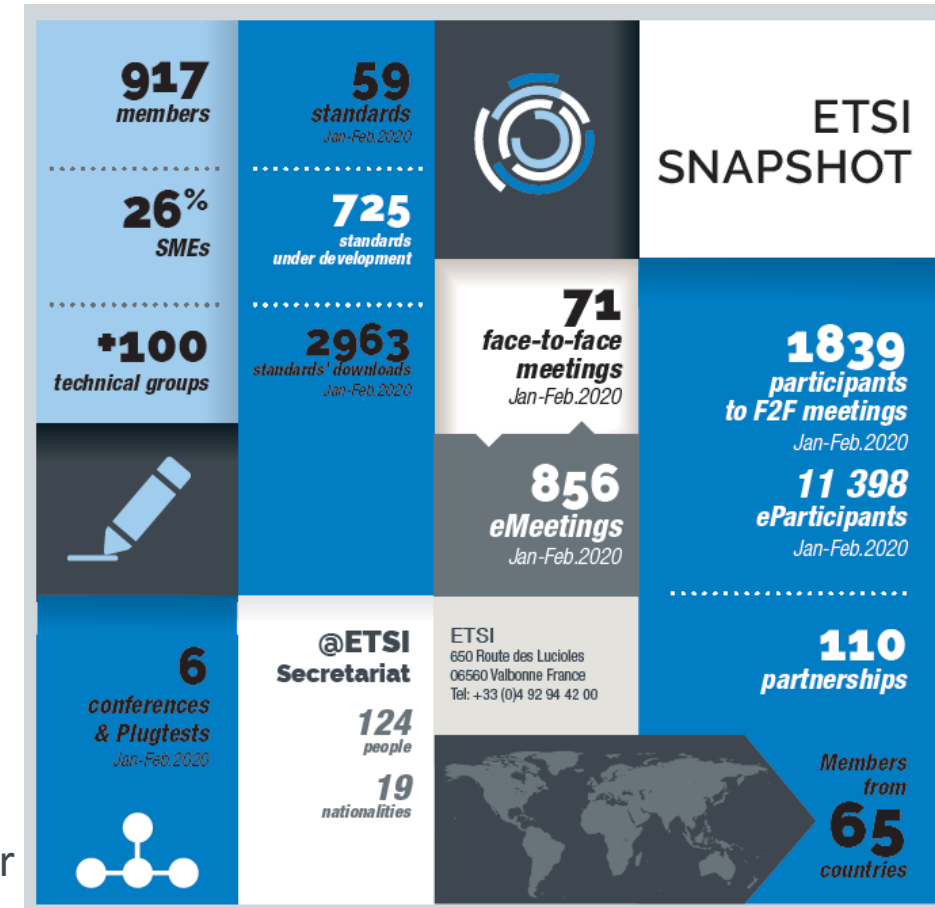
For: **CREATE-IoT Webinar**

12th June 2020

About ETSI - Bringing people together... Info Only



- ✓ Independent, non-profit standards organization
- ✓ Officially recognized by the European Union to support EU regulation
- ✓ **30** year track record of technical excellence in the ICT sector
- ✓ Founding Partner Member of both **3GPP** and **oneM2M**
- ✓ Over **910** members from **65** countries over **5** continents
- ✓ Diverse community: private companies, research and academia, governments, public bodies, societal stakeholders
- ✓ Over **48 000** standards published to date, **2 600** annually
- ✓ **17.5 million** downloads annually – All standards are free of charge
- ✓ Over **90** technical groups holding more than **4 000 (e)** meetings per year
- ✓ More than **50** conferences and interop events per year



About ETSI - At the heart of digital...

Info Only



☞ To design tomorrow's digital world

- ✓ 5G
- ✓ IoT / M2M
- ✓ Cybersecurity
- ✓ Network Virtualization
- ✓ Multi-access Edge Computing
- ✓ Automated Network Management
- ✓ Artificial Intelligence
- ✓ Blockchain
- ✓ Quantum (Compute & Key)
- ✓ AR/VR/XR
- ✓ ..and many others

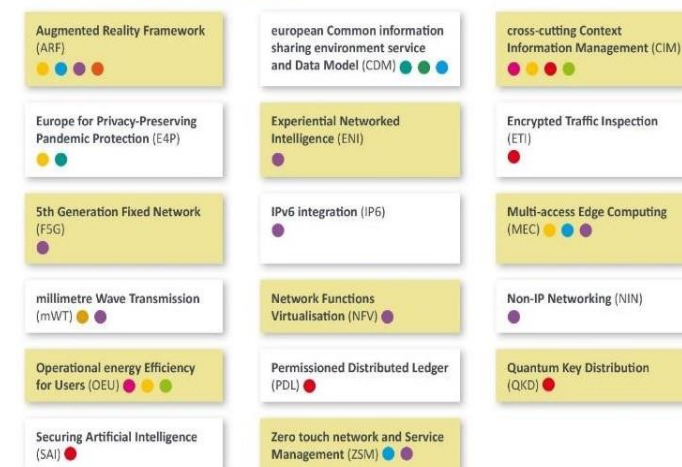
Committees, Projects & other groups



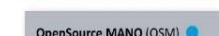
ETSI Partnership Projects



Industry Specification Groups



Open Source Group



Standards and Research, Accelerated Cooperation



Relationship between Standards and Innovation

Engaging in Standards groups at the appropriate stages of research and innovation cycles is crucial to the development of new and evolved technologies.

It is important to identify research topics for standardization at an early stage of all research projects in order to ensure that the requisite standards are available to the industry when they are needed to take the relevant new technologies to market.

Why Standardization?

Every ICT device, application or service implements standardized technologies, at many levels. Standards support interoperability across technologies. They help create global markets and enable networked development, where innovation occurs on top of existing technology platforms.

ICT standards embody a 'state of the art' of technology development. They are an essential resource for researchers in ICT. ICT markets are shaped by standards and if ICT research should lead to new products, new services, or whole new markets, then clearly research must result in standardization activities

How to Accelerate Innovation through Standards

Standardization and research are highly interlinked.

Different standards can play different roles at several stages of the research and innovation process.

There is currently limited awareness of the benefits of standards and standardization among researchers

Guidance and Education is required

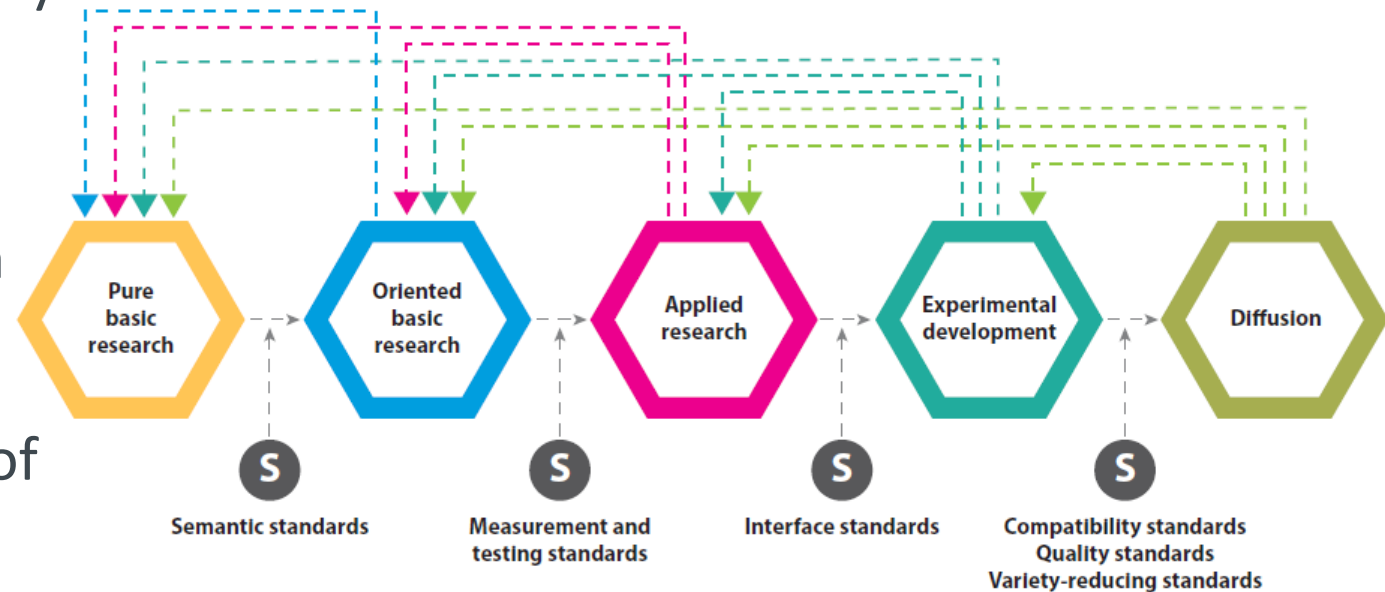


Figure 5.9: Various roles of different types of standards in the innovation process (Blind and Gauch 2009)

Pre-normative incubator groups for Research in ETSI

ISGs are the perfect ETSI tool for developing ‘early’ standardization work resulting from the output of research projects.

This tool has been used for many successful standards efforts on such technologies as **mWT, NFV, Edge, Artificial Intelligence, AR/VR/XR, Quantum Safe, Quantum Key** and many more.

An ISG may be established on the initiative of any group of, at least four (4), Full or Associate members (or applicant members) making a request to the ETSI Director-General. The streamlined ISG process can enable a group to be set up quickly (4 weeks) and deliverables may be published in only a matter of months making it the ideal mechanism for early stage standardization.

ETSI ISGs are open to both ETSI members and non-members.



Some Lessons Learned from recent Pandemic

- The COVID-19 pandemic had demonstrated the importance of ICT at many levels
 - Simply connecting people and services during confinement (Voice/Telework/Netflix)
 - Providing data and services to Health organizations, Governments and Citizens
- ETSI reacted quickly to the demand to help and to direct requests from ETSI members
 - Build a COVID-19 tracing APP group (ISG E4P), took less than 4 weeks
 - Inject energies into EP eHealth with the publication of a dedicate Whitepaper
 - Dedicated discussion in ETSI Board (and Secretariat) on what more can be done
- Learning and acting now in order to be better prepared for future pandemics
 - Help with the current wave of COVID-19 AND mitigate future waves
 - “Share” and apply lessons learned to future “similar” health challenges

Cooperation, Coordination, Communication

ETSI Recommends:

Improved Cooperation 'early on' between EC research projects and Standards – more reactive and shorter lead times

Education and visibility made by Standards bodies on their current work activities and opportunities for synergies with research and policy

Education by Standards bodies on how to bring new work into standards as well as the value of standards for research

Better Coordination between EC, research bodies, funded projects, LSPs, SDOs and other Standards Partners – Open approach

Research Helpdesk

- **Dedicated Webpages**
- **Dedicated email**
- **Guides / Videos**
- **Support to EU Projects**
- **Setting up ISGs in ETSI**
- **Advice on EU Research**
- **Advice on Standards**

ETSI Research Helpdesk

Research@etsi.org

David Boswarthick: ETSI Director of New Technologies

David.Boswarthick@etsi.org

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collaboration: the view of GS1



Francesca Poggiali
GS1 Global Office



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AIOTI WEBINAR ON ADVANCING THE DIGITAL TRANSFORMATION OF EUROPEAN INDUSTRY

Francesca Poggiali
GS1 Public Policy Director Europe
12 June 2020



Standards support IoT

IoT is driving increased connectivity of “things” – which leads to massive data collection. Data quality is more important than ever and GS1 global and open standards provide the foundation for accurate, sharable, searchable and linkable data, starting with standardised attributes.

GS1 global and open standards for the supply chains connect the physical and digital worlds, laying the foundation for IoT.

Unique identification of objects, assets, locations, etc. (things) and automatic data capture, powered by GS1 barcodes and EPC/RFID, enable interoperability and are key requirements for IoT.



Standards support IoT

IDENTIFY

GS1 provides solutions for identifying “things” and for connecting the identifiers to the Internet. For example, the Global Trade Item Number is used massively in retail to identify products and in transport and logistics, the Serial Shipping Container Code is increasingly adopted as the universal identifier for parcels. The growth of IoT will require persistent identifiers for everything and serialisation of items, objects and assets is an essential part.

The GS1 identification system is designed in a generic and open way that makes it suitable for virtually any IoT application that connects things.

CAPTURE

GS1’s data carrier portfolio comprises several barcode and two RFID standards. Many other automatic data capture technologies have been developed and deployed, more are emerging, e.g. active or semi-active RFID technologies in various frequency bands; sensors; real-time locating systems; steganography also known as digital watermarking; Near Field Communications (NFC) that is largely available on smart phones.

A proactive assessment of data capture technologies will give the opportunity for GS1 to integrate relevant solutions in the standards.

SHARE

The Share layer of the GS1 system comprises three categories:

- Master data providing descriptive attributes of items;
- Transaction data consisting of business transactions exchanged between two parties;
- Visibility event data tracking objects in the supply chain.

A growing set of IoT applications is leading to an increasing demand for accessing and sharing data ubiquitously. GS1 is also considering complementary data sharing techniques.

IDENTIFIERS IN IoT - AIOTI WG3 ANALYSIS

In addition to the identification of the Things itself, identification is used for several other purposes. Various identification schemes already exist, are standardized and deployed.

AIOTI WG3 has performed a thorough analysis of the identification needs and related standardization for IoT:

- Evaluated identification needs for IoT and related requirements
- Classified different identification needs
- Categorized identifier requirements
- Provided examples of existing Identifier Standards

Available at:

https://aioti.eu/wp-content/uploads/2018/03/AIOTI-Identifiers_in_IoT-1_0.pdf.pdf

IoT, GS1 and Retail

Today's consumers expect to interact with retailers, brands and products digitally.

Interactions with smart connected devices are a part of the experience. GS1 open standards enable interactions with consumers and all along the supply chain through GS1 identification barcodes, EPC/RFID tags, watermarks and sensors of all kind.

Exchanging rich product data using sensors that are built on standardized GS1 data structures, combined with data analytics, can boost innovation and develop enriched consumers experiences.

Life in the future of Consumer IoT



IoT pilots

IoT Large-Scale Pilot



The Internet of Food and Farm 2020 (IoF2020) project aims to consolidate Europe's leading position in the Internet of Things (IoT) technology applied to the agri-food sector. We develop an ecosystem consisting of farmers, food companies, policy-makers, technology providers, research institutes and end-users. The project aims to solve the European food and farming sectors' social challenges, maintain their competitiveness and increase their sustainability.

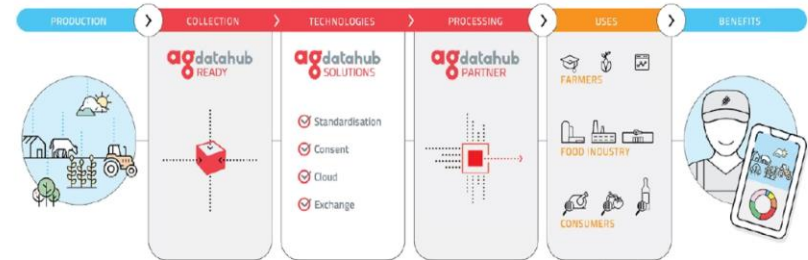
FOR MORE INFO:
IOF2020.EU

agdatahub

agdatahub.eu

Rolling-out collaborative digital technology for agriculture

Created to meet the needs of farmers and value chains, Agdatahub employs shared and **sovereign technological infrastructure** combined with a **collective and structured standardisation process** to guarantee the development of agricultural digital technology.



THANKS FOR YOUR ATTENTION

Francesca.Poggiali@gs1.org

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ISO/IEC JTC1



Osten Franberg
ISO/IEC JTC1



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Advancing the digital transformation of European industry

The role of standards in accelerating innovation – The case of IoT/IIoT

Webinar 12 June 2020

Identifying areas for collaboration of IoT from ISO/IEC JTC1

ISO/IEC JTC1 is an international organization that develops standards environment where experts come together to develop worldwide Information and Communication Technology (ICT) standards for business and consumer applications.

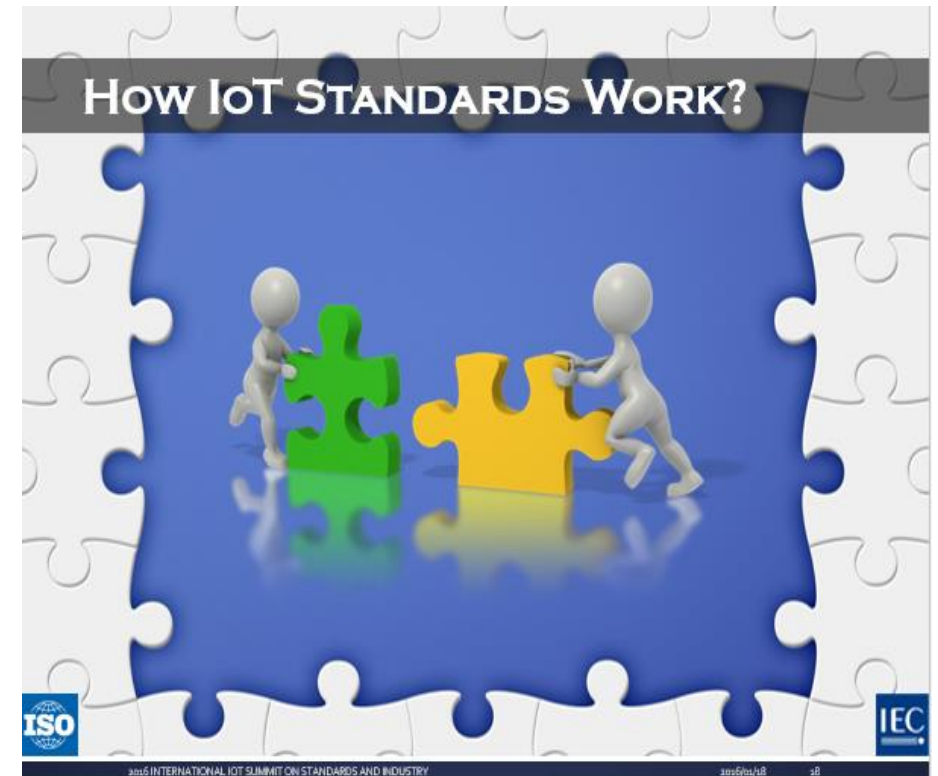
Östen Frånberg Sweden

Experience

- Royal Swedish Academy of Engineering Sciences. 2006-2014
- IoT Agenda IoT, Luleå University of Technology. 2012-2014
- Föreståndare, IT-department Uppsala University Sweden. 2014

Current position

- Chairman TK IoT, national IoT committee, Sweden 2017
- Co-Editor of the current IoT Reference architecture
ISO/IEC JTC1 30141:2018 IoT RA, 2014-2018
- Head editor of next generation IoT RA 2019
- Project leader IoT and Building 2020



ISO/IEC JCT1, SC41 WG3 Architecture, Framework, and Vocabulary Status of the project after 25% (1 year)

NextGen Work Plan Review as of 27 May 2020

- Following ISO/IEC/IEEE 420x0 Recommendation for creation and updating Reference architectures
- Continuing 30141 plan execution (2019-2023)
- Continue 4+1 “Work Threads” of activity
- 30141 part1, IoT principles. Part 2, implementations
- Mindshare with: IEEE, AIOTI, NIST, IIC, AG8, SC27, more

Work Threds	Resources	Purpose
Execution plan	<u>Eric</u>	Review and propose methods to integrate external material
IoT RA	<u>Editors</u>	Update the Reference Architecture
Harmonize	<u>Wei</u>	Update and harmonize the Vocabulary
Mind share	<u>Östen</u>	Create common mindshare and form alliances
CSA	<u>Ivor</u>	Verify Reference Architecture via CSA

30141 Profile 2023

IoT RA

•Quality

• Footprint

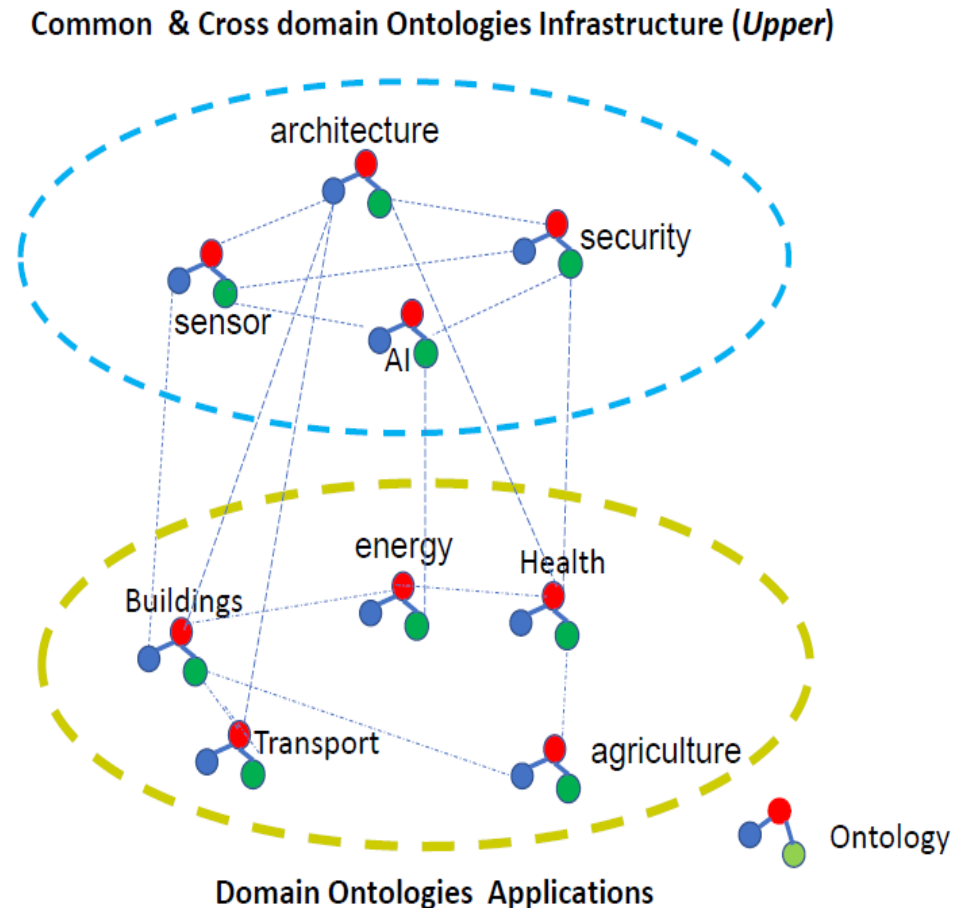
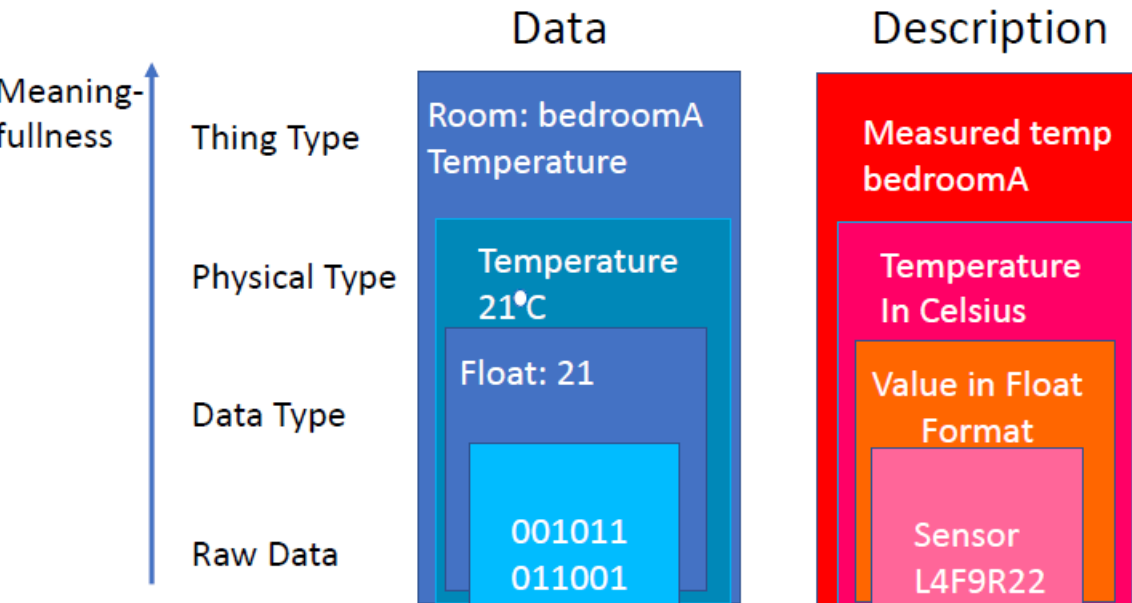
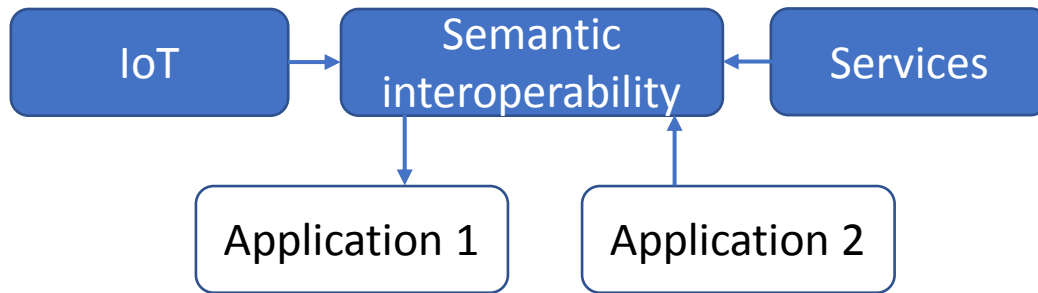
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•New Tec

•Relevant

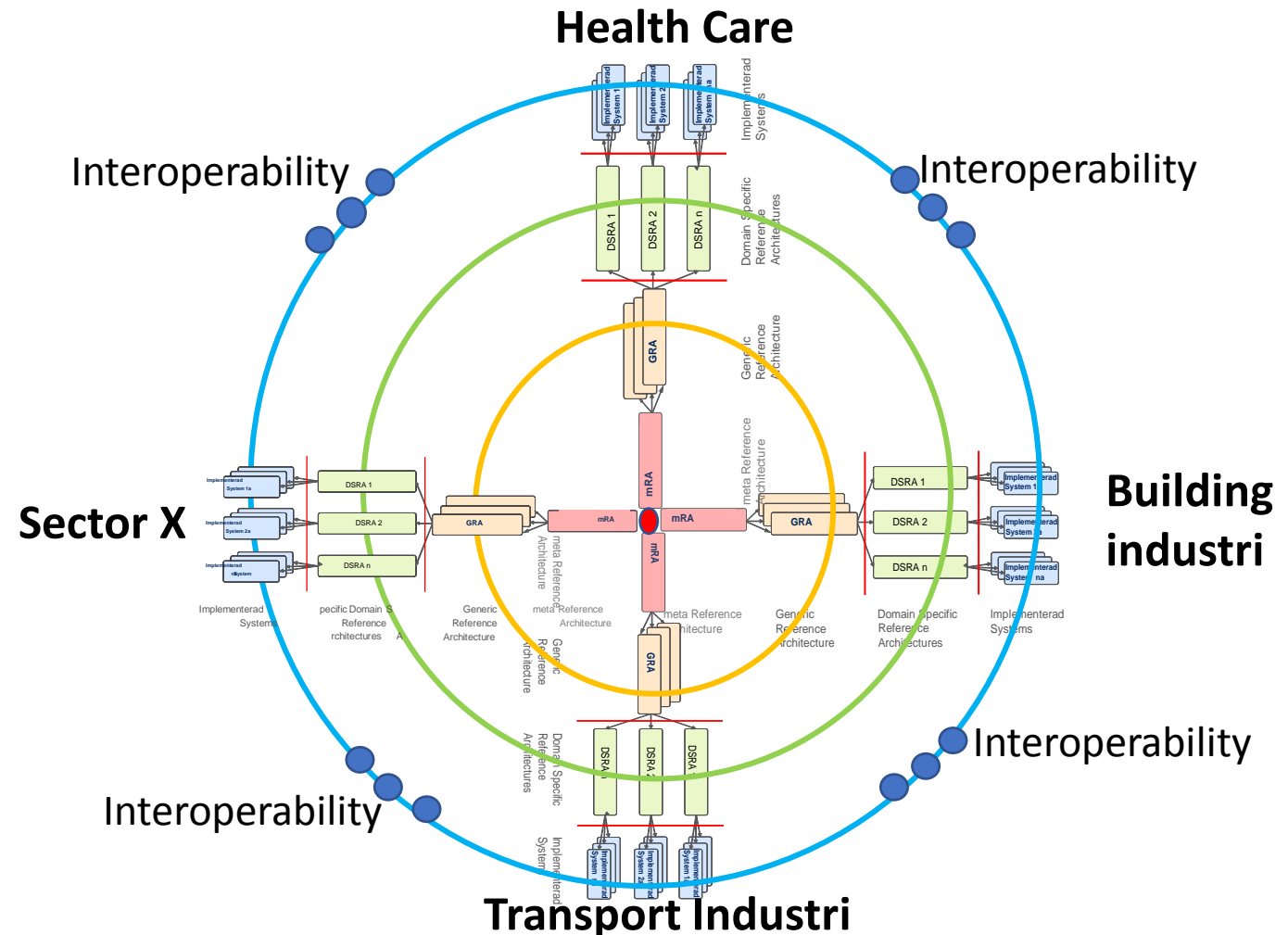
Semantic Interoperability

- semantic interoperability, information description is used for negotiation, so meaning of data is understood =common
- semantic interoperability for IoT is achieved by invoking services, and by using specific knowledge and concepts of IoT



Benefit building Interoperability using meta architecture

The principle is to inherit vocabulary, terms, rules etc. from **meta reference architecture** to create a **generic reference architecture** for IoT. Then create an industry-specific (**domain-specific**) architecture for the construction industry. Based on **DRSA**, installation companies develop control system IoT for buildings. At the same time, the health care business does the same, which means that you get common vocabulary, terms, etc.



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Sébastien Ziegler
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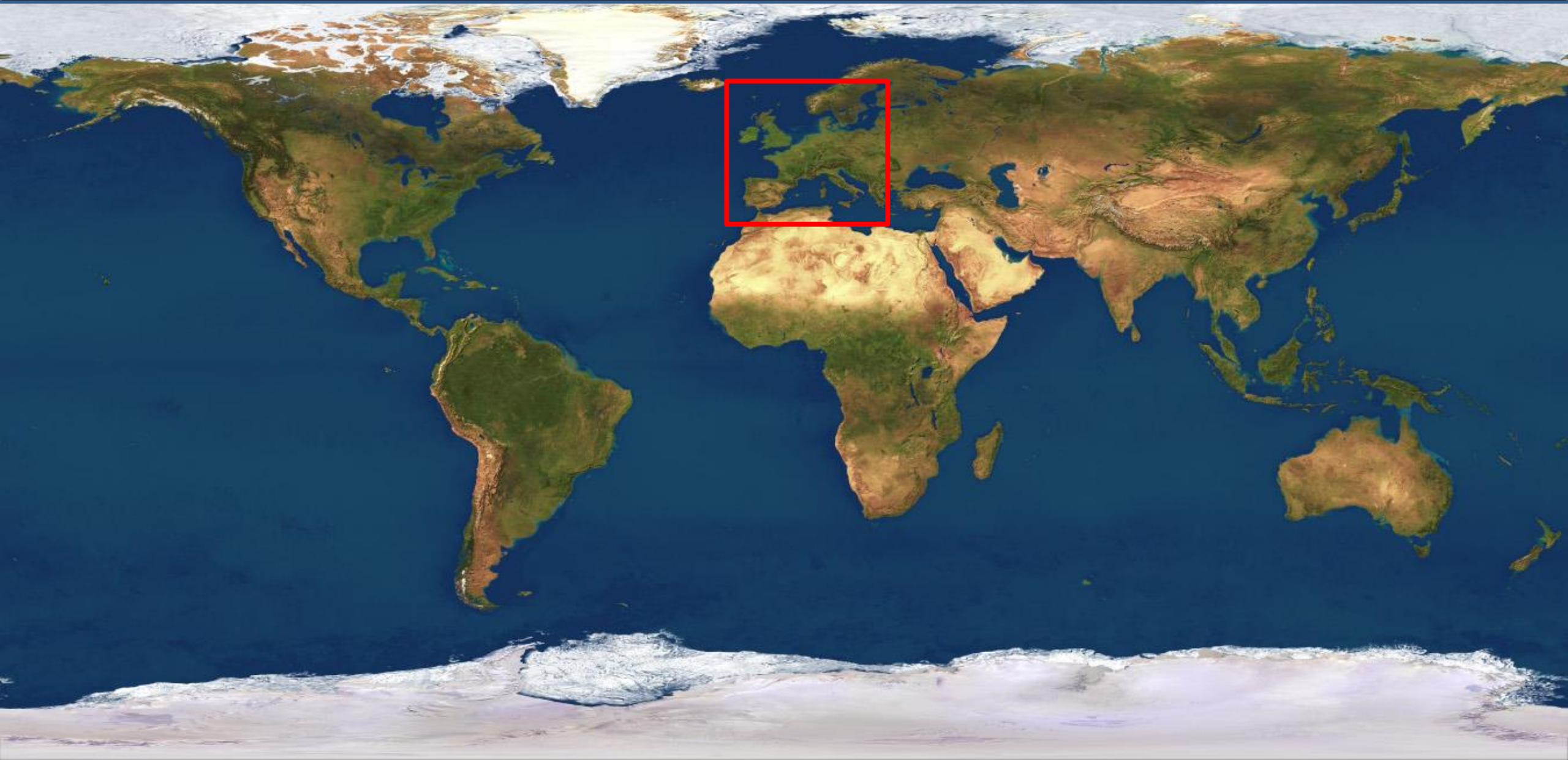
European Large-Scale Pilots ITU and IoT Standardization

CROSS FERTILISATION THROUGH ALIGNMENT, SYNCHRONISATION AND EXCHANGES FOR IoT

Dr Sébastien Ziegler, Mandat International

Online webinar: The role of standards in accelerating innovation
June 12 2020

IoT is Global



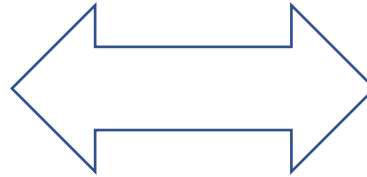
Global IoT Market (2026) 1'102 Bn US\$

CAGR 24,7%¹

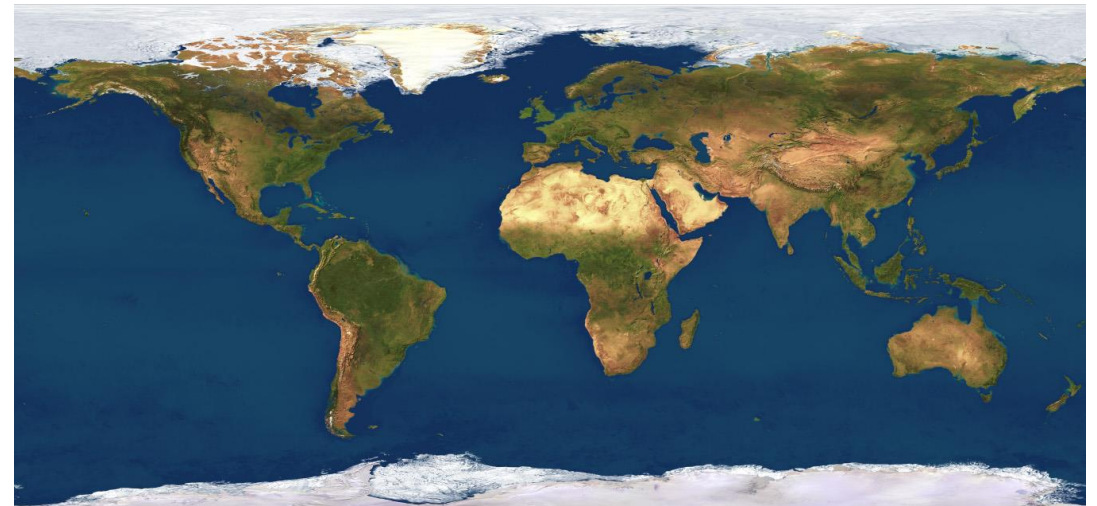
2018: Asia >2/3 Cellular connected IoT devices



0,5 Billion
\$18 Trillion



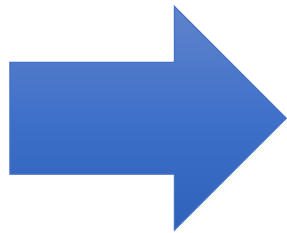
7,8 Billion
\$87 Trillion



What Does IoT Need to grow?

- 1. Research and Development**
 - 2. Interoperability**
 - 3. Economies of Scale**
- = GLOBAL STANDARDS**

RESEARCH



**Global
Standards**

ITU-T Study Group 20

IoT and Smart Cities and Communities

Lead expert group to develop standards & guidelines on:

- **Internet of things (IoT) and its applications**
- **Smart cities and communities**, including its e-services and smart services
- **Internet of things identification**

More than 120 experts (including Academia, members, and SMEs)

Last period (2017-2019):

- **63 Recommendations** Decided/Determined/Approved
- **13 Supplements and informative texts** agreed
- **Over 40 events organized** related to IoT and Smart Cities and Communities

- 2 Working Parties (7 Questions)
- 4 Regional Groups:
 - SG20RG-LATAM
 - SG20RG-AFR
 - SG20RG-ARB
 - SG20RG-EECAT

**2019 Catalyst Awards
finalist**

Recommendations ITU-T Y.4200 “Requirements for the interoperability of smart city platforms” and Y.4201 “High-level requirements and reference framework of smart city platforms”

Next meeting: 6-16 July 2020, Geneva, Switzerland



ITU-T SG20: Ongoing standardization work

Internet of things (IoT)

- **Drones** for IoT
- IoT requirements for **edge computing**
- **Artificial Intelligence** and IoT
- **Accessibility for IoT**
- **Blockchain** and IoT
- IoT for **developing countries**
- **Intelligent Transport Systems (ITS)** based on IoT
- **Privacy and trust** of IoT systems
- **Interoperability**
- **Edge computing**
- **IoT-devices authentication**
- **Digital twins for IoT**

Smart cities and communities

- **Open Data** in Smart Cities
- **Use cases, requirements and architectures** for Smart cities and communities
- **Smart Services in rural communities**
- **Disaster notification** of the population in smart cities and communities
- *Smart City Infrastructure*

Data management & processing

- Data structure and data transfer protocol for **automotive emergency response system**
- Function description and metadata of Spatio-temporal Information Service for SSC
- *Integrity*

Joint Coordination Activity: IoT and SC&C



- To coordinate IoT activities and share information
- To cooperate with other Foras and SDOs.

**IoT and SC&C standards online
roadmap**

Collaboration with other SDOs and IOs



- 17 new Recommendations approved
- 1 ongoing work item
- 6 Technical Reports agreed



- Organization of World Smart City Forums
- Working team on Smart City Terminology

Joint IEC-ISO-ITU Smart Cities Task Force

- To build synergies on ongoing work in ITU-T, IEC and ISO related to smart cities and communities;
- To maximize efforts in order to identify new areas of cooperation related to smart cities and communities;
- To develop a holistic view on smart cities and communities taking into consideration the scope, areas of work and expertise of ITU-T, IEC and ISO to support smart cities and communities development.



WORLD TRADE
ORGANIZATION

ITU, ISO, IEC are WTO endorsed
= Free Trade Advantage



H2020 Access to SG20

SYNCHRONICITY



INTERNATIONAL TELECOMMUNICATION UNION

**TELECOMMUNICATION
STANDARDIZATION SECTOR**

STUDY PERIOD 2017-2020

SG20-TD1244

STUDY GROUP 20

Original: English

Question(s): 6/20

Geneva, 9-18 April 2019

TD

Source: Rapporteur Q6/20

Title: Updated baseline text for Draft Recommendation ITU-T Y.2061, "Features of application programming interface (API) for IoT data in smart cities and communities"

Purpose: Discussion

Contact: Dr Sébastien Ziegler
Mandat International
Abdulahdi AbouAlmal
Etisalat Group, UAE

Keywords: API, IoT Open Data and Smart Cities

Abstract: This document contains the draft baseline text for the draft new Supplement ITU-T Y.2061, "Features of application programming interface (API) for IoT data in smart cities and communities"



INTERNATIONAL TELECOMMUNICATION UNION

**TELECOMMUNICATION
STANDARDIZATION SECTOR**

STUDY PERIOD 2017-2020

SG20-TD1525-R1

STUDY GROUP 20

Original: English

Question(s): 6/20

Geneva, 25 November-6 December 2019

TD

Source: Rapporteur Q6/20

Title: Proposed baseline text for the draft new Supplement ITU-T Y.2061, "Features of application programming interface (API) for IoT data in smart cities and communities"

Purpose: Discussion



AI4IoT

SYNCHRONICITY



Supplement on Artificial Intelligence and Sustainable Development Goals (SDGs)

- ❖ Technologies from which AI will facilitate smart city transformations;
- ❖ AI role in managing the data generated within the IoT realm and urban spaces;
- ❖ Benefits of adopting AI and how can reach SDGs.



United 4 Smart Sustainable Cities (U4SSC)



U4SSC is a **United Nations Initiative** to achieve Sustainable Development Goal 11: "Make cities and human settlements inclusive, safe, resilient and sustainable."

Supported by:



Convention on
Biological Diversity



UNITED NATIONS
ECLAC



Coordinated by:



UNECE



United Nations
Educational, Scientific and
Cultural Organization



United Nations
Environment Programme



United Nations
Environment Programme



United Nations
Framework
Convention on Climate Change



UNITED NATIONS
UNIVERSITY

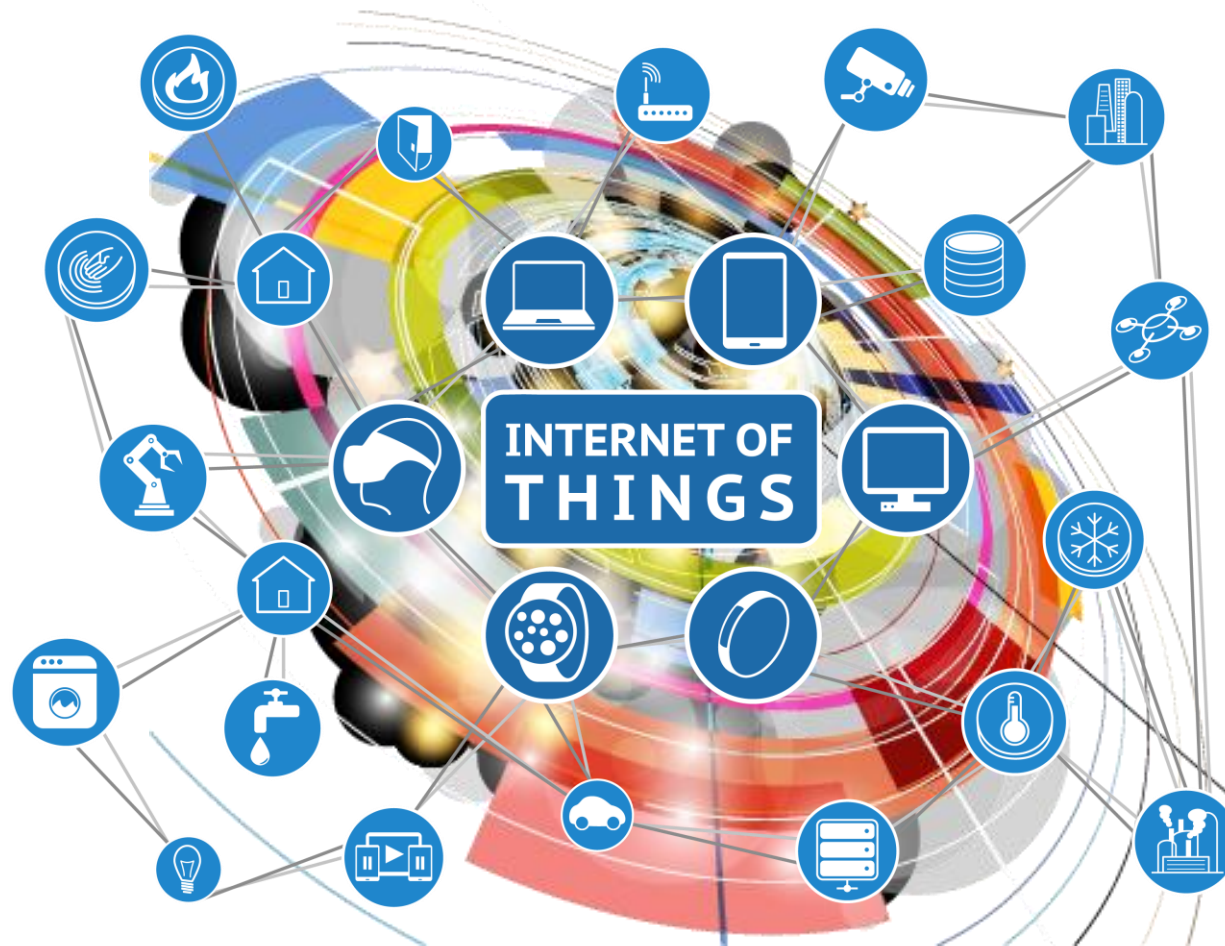
UNU-EGOV
Operating Unit on Policy-Driven
Electronic Governance



Thank You!



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June 12, 2020

14.05-14.40 Fostering
collaboration: the view of W3C



Dave Ragget
W3C



Co-organised and
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European
Large-Scale Pilots
Programme



CREATE-IoT



Alliance for Internet of Things Innovation





Advancing the Digital Transformation of European Industry Webinar 2020

The role of standards in accelerating innovation – The case of IoT/IIoT

Session 2 – Identifying Areas for collaboration

Fragmentation is hindering the potential for digital transformation of Industry

- Digital transformation has huge potential to streamline production, reduce costs, and enable much greater flexibility
- But it is being held back by several factors, e.g.
- The IoT is fragmented with limited signs of convergence
- Much of business knowhow is inside people's heads
- Traditional databases make it hard to adapt quickly
- Data science is burdened by high data preparation costs
- Businesses are understandably cautious about sharing data
- Legitimate concerns over management of personal data

The need for collaboration

- To dig ourselves out of the hole caused by fragmentation, we need to encourage collaboration and building shared understanding across SDOs and industry alliances
- A shared understanding of the high-level goals, the major challenges and the ways to address them
- How each SDO can complement other SDOs
- W3C is actively liaising with ISO, ITU-T, ETSI, AIOTI and others

Paving over the cracks with the Web of Things

- W3C's Web of Things (WoT) provides an abstraction layer for digital twins
- This decouples applications from the protocols and standards used by different vendors and different SDOs
- This makes it much easier and cheaper to develop services that combine sensors and actuators from heterogeneous environments
- WoT [Thing Descriptions](#)* (in JSON-LD) cover
 - The programming interface for digital twins in terms of object properties, actions and events
 - Semantic information, e.g. what is being measured and units of measure
 - Security and communications metadata for use by the WoT platform

* W3C Recommendation 8 April 2020

Data Spaces & Challenges for Integration

- Business needs evolve all the time as markets don't stand still
- Traditional IT solutions require upfront integration via agreement on the meaning, representation and use of data
- SQL/RDBMS are very hard to adapt to rapidly changing needs
- Data Spaces as solution for sharing heterogeneous data and timely incremental integration based upon rich metadata
- It is impractical to require everyone to use the same data models
- We thus need ways to map data between different approaches

Data Sovereignty & Trust Delegation

A vision for the future of personal information services

- The IoT is worrying in respect to mass collection of sensitive personal data that is open to risk of abuse, e.g. the furore around face recognition in public spaces
- Seducing people with wonderful services puts them at a disadvantage in relation to the all powerful service providers – the click through effect
- Access to rich personal information is essential to providing higher value services
- However, we want sovereignty over our information!
- Access to personal information needs to be properly justified
- Huge opportunities for trusted personal agents that manage access by service providers via suitable terms and conditions covering how services can use personal information
- Most people don't understand and won't read the small print in terms of service policies
- Hence the need to delegate trust to agents that manage your information, reflecting your values as determined from your behaviour and that of others like you
- This is an example of benevolent AI as described by Stuart Russell, UCB

Simplifying Semantic Technologies

- The Web of Things solves the fragmentation at the network edge
- Developers can then focus on supplying and consuming services via data spaces and open markets free of borders between EU nation states
- We need a uniform framework for declarative and procedural knowledge
- Chunks simplifies semantic technologies for the average developer
 - Amalgam of RDF and Property Graphs that also includes rules
 - Cognitive databases combining graphs, statistics, rules and graph algorithms
- Cognitive AI that draws upon decades of work in the cognitive sciences
 - Mimicking the human mind at a functional level on ordinary hardware
 - Please join the [W3C Cognitive AI Community Group](#)

AI for Industry 4.0

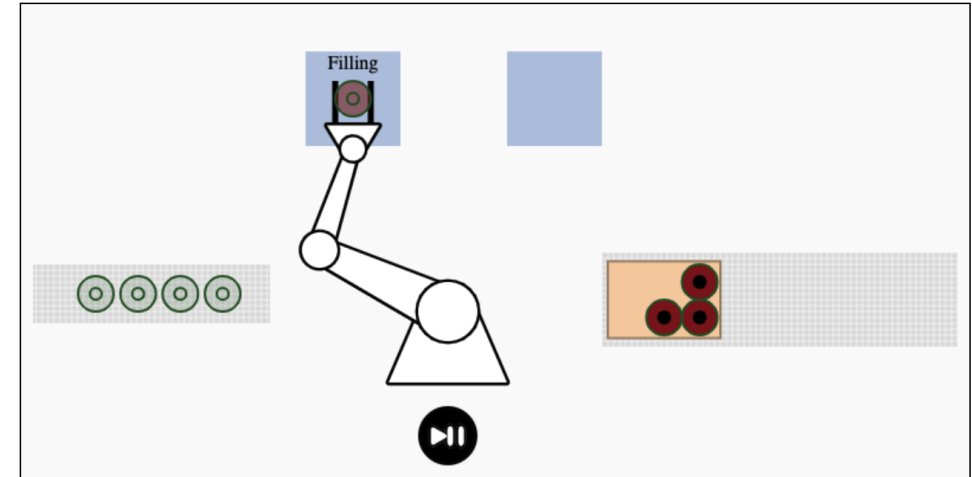
Cognitive control of factories

- **Cognitive AI demo that runs in a web page**
- Live simulation of bottling plant with robot, conveyor belts, filling and capping stations
- Real-time control by a cognitive agent
- <https://www.w3.org/Data/demos/chunks/robot/>

```
# add bottle when belt1 has space and wait afresh
space {thing belt1} =>
action {@do addBottle; thing belt1},
space {@do wait; thing belt1; space 30}
```

```
# add box when belt2 has space and wait afresh
space {thing belt2} =>
action {@do addBox; thing belt2},
action {@do stop; thing belt2},
space {@do wait; thing belt2; space 95}
```

```
# stop belt when it is full and move arm
full {thing belt1} =>
action {@do stop; thing belt1},
action {@do move; x -120; y -75; angle -180; gap 40; step 1}
```



Log:

```
executed rule _:_15 stop
set goal to: after _:_54 {step 1}
executed rule _:_27 move
set goal to: after _:_55 {step 2}
executed rule _:_30 grasp
set goal to: after _:_56 {step 3}
starting belt1
wait on filled
executed rule _:_34 start
```

The Future of the IoT

- The IoT evolves into the Sentient Web = digital twins + cognition
- Cognition as combination of graphs, statistics, rules and graph algorithms
- Cognitive Databases take over from earlier database technologies
- IoT protocols are only of interest to engineers at the network edge
- Ontologies are developed through human-machine collaboration
- We mostly communicate with cognitive agents using natural language
- We rely on AI that is strong, empathic and trustworthy!
- Let's embrace change and reap the rewards for European citizens!


Contact me for details: Dave Raggett <dsr@w3.org>



Q&A

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