

# AIOTI WG Standardisation: Standardisation challenges for IoT and Edge computing

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11 March 2021



Edge Computing Standardization and Interest Groups Workshop at Edge Computing World, 11 March 2021

# Outline

- **AIOTI Overview**
- AIOTI WG Standardisation Overview
- SDOs, Alliances and OSS active in edge computing
- IoT and Edge Computing Standardisation Challenges

# AIOTI Mission and Vision

## Mission

To drive business, policy, research and innovation development in the IoT & Edge Computing and other converging technologies across (different verticals alongside) the Digital Value Chain to support digitization in Europe, and competitiveness of Europe

## Vision

Together we aim to lead, promote, bridge and collaborate in IoT & Edge Computing and other converging technologies research and innovation, standardisation and ecosystem building providing IoT deployment for European businesses creating benefits for European society. We co-operate with other global regions to ensure removal of barriers to development of the IoT & Edge Computing market, while preserving the European values, including privacy and consumer protection

- IoT/IIoT applications in verticals
- Vision on IoT/IIoT/edge computing for the future
- IoT/IIoT – engine for converging technologies

## LEADERSHIP

## CONTRIBUTION

- Providing input on EU policies and strategies
- Providing input to standardisation bodies

- Contribution in relevant EU funding programmes and partnerships
- European and International dimension

## COLLABORATION

## SHARING

- DLT's applied to industrial sectors
- Computing continuum (data-connectivity-computing)



# Potential new innovative concepts to future IoT and edge computing research and innovation

- IoT/IIoT together with Edge Computing are critical elements of the digital transformation with their capabilities to drive the deployment of Industrial Safety and Critical applications and services based on connected devices and sensors
- New IoT and edge capabilities drive the decentralisation of architectures and topologies and accelerate the decarbonisation of applications in industrial sectors.
- Edge computing has triggered a paradigm shift in cloud computing and there is a clear need to orchestrate resources to create a "computing continuum".
- We are seeing calls for a new operating system at the edge for decentralised IoT/IIoT computing architectures and real-time processing
- Open industrial IoT edge computing platforms must strive for leadership to address the challenges of the evolving digital age

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# AIOTI WG Standardisation

## Mission

WG Standardisation is to be recognized as a major contributor to the worldwide interoperability, security, privacy and safety of IoT and Edge Computing systems and applications, and particularly for the development of the market in Europe

## Scope

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



# AIOTI WG Standardisation Highlights

- **IoT Landscape** Georgios Karagiannis (Huawei)
  - **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 (FBConsulting / Netellany), Emmanuel Darmois (Commledge) 1st release published May 2018, [2nd release published in January 2020](#)
  - **Cooperation with SDOs/Alliances** to foster co-creation and interworking Georgios Karagiannis (Huawei), Patrick Guillemain ETSI (e.g., Liaisons: 3GPP, ITU-T, ISO, OSGi Alliance, BBF, 3GPP; MoUs – signed: All, OSGi Alliance, BDVA, SCI4.0, ISO/IEC JTC1 SC41, under discussion OPC Foundation
  - **IoT relation and impact on 5G** Thomas Klein (IBM) ; Georgios Karagiannis (Huawei), 1st release published in June 2018, 2nd in March 2019, 3<sup>rd</sup> release published on 3<sup>rd</sup> of May 2020
- **HLA / High Level Architecture** Marco Carugi (Huawei), Omar Elloumi (Nokia) R4, published in June 2018, R5, published in December 2020
  - **IoT Reference Architecture** and its mapping with existing IoT Reference Architectures
  - **IoT identifiers** Juergen Heiles (Siemens), Henri Barthel (GS1) 1st release published Feb'18
- **SemIoP IoT Semantic Interoperability** Martin Bauer (NEC lab), Laura Daniele (TNO) two JWP on semantic interoperability published in October 2019
- **IoT Privacy** (with WG04) Arthur van der Wees (Arthurs Legal) 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) Arthur van der Wees (Arthurs Legal), Jacques Kruse-Brandao (SGS), Harm Arendshorst (ilabs)
  - 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

AIOTI WG3 IoT Standardisation: <https://aioti.eu/aioti-wg03-reports-on-iot-standards/>



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# SDOs, Alliances and OSS active in Edge Computing

## SDOs & Alliances



## Open Source Software



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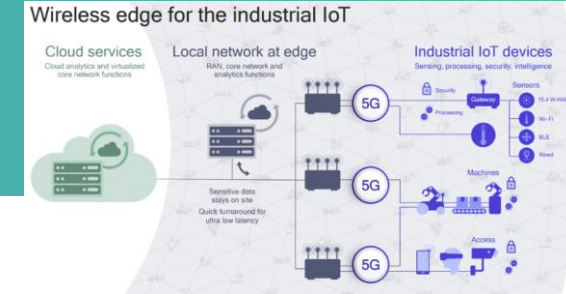
# AIOTI WG Standardisation- IoT related Open Issues – Impact (from “Gap Analysis and recommendations” report

Nb	Short name	Nature of the standardisation gap	Domain
1	Applications to Span Multiple Ecosystems	APIs that decouple applications from the details of specific IoT ecosystems as a means to enable open markets of services.	Service and applications
2	Safety	Safety standards (e.g. ISO 26262 or ISO 21448) to be taken into account	Deployment
3	(Cyber-)Security	Risk Management Framework and Methodology.	Security / Privacy
4	Data management	Data rights management: ownership, storage, sharing, selling, liability, etc.	Security / Privacy
5	Harmonized identification	Harmonized reference for unique and secured naming mechanisms.	Applications Management
6	Semantic interoperability	Standards to interpret and process the sensor data in an identical manner across heterogeneous platforms. Need of a global and neutral data model.	Service and applications
7	Platform interoperability	Multiplicity and fragmentation of IoT HLAs, platforms and discovery mechanisms.	Integration / Interoperability IoT Architecture
8	Connectivity interoperability	Competing communications and networking technologies.	Connectivity
9	Ethics and trustworthiness	Ethics. Transparency and choice for citizens.	Service and applications Security / Privacy Societal
10	Open Markets of Digital Services	Standards needed to enable open markets of services.	Business
11	Device certification	Certification mechanisms defining “classes of devices” and ensuring quality of the devices.	Device-sensor technology
12	Solution deployment and maintenance tools	Tools to enable ease of installation, configuration, maintenance, operation of devices, technologies, and platforms. Standardized methods to distribute software components to devices across a network	Deployment
13	Scalable device deployment	Unified model/tools for deployment and management of large-scale distributed networks of devices.	Deployment/ Device-sensor technology
14	Green technologies	Green technologies.	IoT Architecture / Societal
15	Usability	Easy accessibility and usage to a large non-technical public.	Applications Management

# AIOTI WG Standardisation- IoT related Open Issues – Impact (from “Gap Analysis and recommendations” report

- Technical topics are well understood
- Interoperability is making its way
- IoT and Edge Computing convergence as an open Issue (several gaps are as well gaps for IoT and edge computing)
- Data security & privacy well understood, but more work needed for IoT and edge computing convergence
- Deployment and societal topics need further focus in standardisation

# Some additional edge computing standardisation challenges



Challenge	Standardisation need
IoT/IIoT and edge computing are at the core of digitalisation, with key industrial sectors seeing great potential in these technologies	What are the roles of IoT & Edge Computing standardisation in Industry digitization, considering a converged use of ICT and OT technologies?
New IoT and edge computing capabilities drive the decentralisation of architectures and topologies, and accelerate the decarbonisation of applications in industrial sectors	What is the decentralized reference architecture? What is the basic functionality of edge computing nodes?
A new operating system at the edge for decentralised IoT/IIoT computing architectures and real-time processing	
Edge computing has triggered a paradigm shift in cloud computing	Which implications has the computing continuum on the IoT, data, computing and connectivity standardisation?
Orchestrating resources to form a "computing continuum"	





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